POPULAR WIRELESS, January 2nd, 1932. REGISTERED AT THE G.P.O. AS A NEWSPAPER.

THE FIRST 7-METRE ADAPTOR

Popular Wireless

Every Thursday PRICE 3d.

No. 500. Vol. XX. INCORPORATING "WIRELESS" January 2nd, 1932.

In this issue—

The "P.W." ECKERSLEY THREE

Other Special Features This Week include:

THAT FINISHING TOUCH
An article of special value to short-wave enthusiasts.

THE MAN WITH FOURTEEN VOICES!

TUNING OUT FATHER TIME!
A peep behind the scenes of the New Year Broadcasts.

THE SCOTTISH REGIONAL

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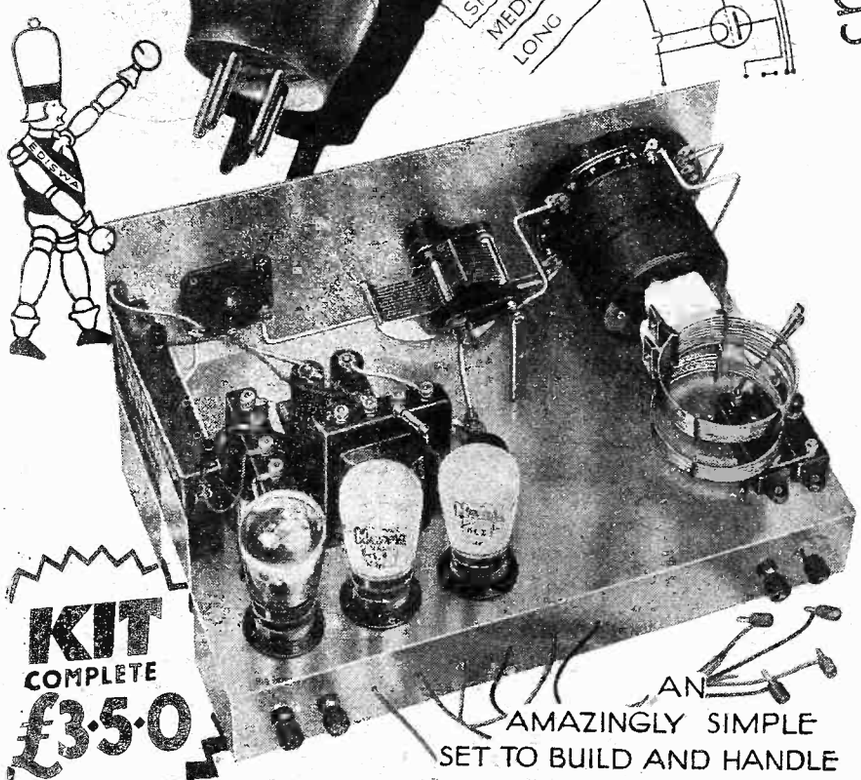

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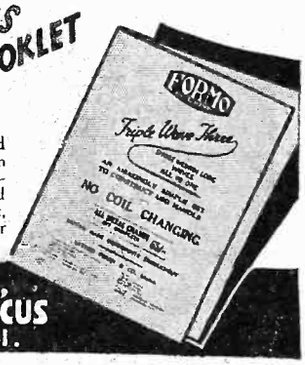

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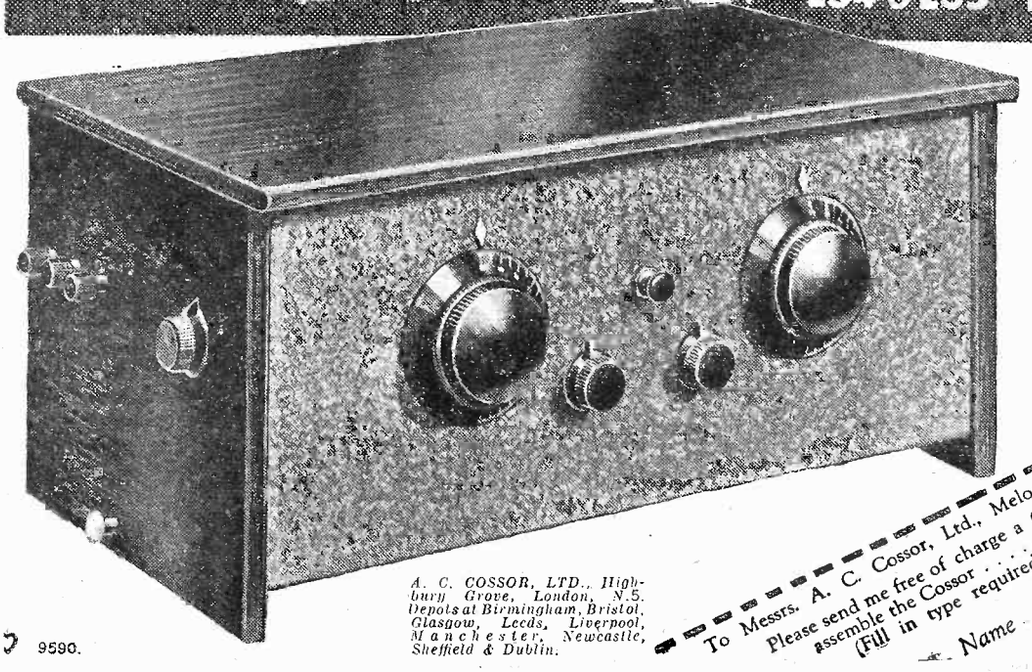

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Popular Wireless

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GREETINGS
ARIEL'S SECRET
SAFETY FIRST
VARIABLE TONE

RADIO NOTES & NEWS

BACK TO THE BAND
"MAGIC" RESULTS
THE CREAM OF THE BAG
"BIKRADIO"

New Year Greetings.

WELL, here's all the best for 1932; may it be the one we've all been waiting for since about 1914. Instead of making a lot of resolutions, take my tip and, instead, when you get a hot-stuff brain-wave, think of two American phrases, "Effective immediately" and "Do it now."

Stimulated with the ginger-wine and underdone nut steaks of their Christmas festivities, the "P.W." technical staff are all ready to give you of their very best. They are straining—the hounds!—at the leash! They're off!

"Ariel's" Big Secret.

I AM going to have you cock-eyed with curiosity about this, with any luck, because it really is worth a bit of a canter, me lads. I admit that it's the "Wireless Constructor's" "benefit" this time, but as there is no valid reason why a "P.W." devotee should not read the "Constructor," I am giving you the friendly tip—by easy stages!—about what's going to happen about—a man's initials and a number.

Look here! I'll give you the number. If a man makes a wheelbarrow for £1 and sells it for £4, what percentage of profit does he gain? The answer is the number. (*Another thrilling revelation next week.*)

Safety First.

HERE I go, careering along in my frivolous way, instead of reporting the percentage of "pirates" in Persia, like a good "Ariel." But when I read that the B.B.C. has rejected a design for the ceiling of one of its new studios because it incorporated the signs of the Zodiac, on the grounds that these might offend religious susceptibility—why, my heart positively rollicks within me.

I fully agree with the principle involved, but I think it is pushed to a ridiculous extreme in this instance. Any religious significance which those symbols ever had is now as dead as a door-knob. Are we to upbraid Nature because the new moon is shaped like the crescent, the symbol of Mohammed?

"WHAT'S ALL THIS ABOUT 7 METRES?"

Our Chief Radio Consultant inspecting the first 7-metre adaptor.

Capt. Eckersley—whose first set for "P.W." is described this week—was greatly interested in this, the original 7-metre adaptor, particulars of which also appear in this issue.

The B.B.C. (Tame) Oracle.

THIS is a good week, and no mistake. I'm fairly romping along, and I hope you are as light-hearted as I am. Here's another one with jam in the ends as well as the middle. The "Radio Times'" (tame) oracle, writing about the recent broadcast of "Julius Cæsar," said: "Shakespeare is impossible in the modern theatre, with its realistic settings and its slow, unyielding mechanism." On the contrary, Shakespeare is impossible—as a dramatist—*without* the modern stage and its wonderful equipment.

As he is a poet, one can drowse over him in everlasting content, but how many, many folk have I heard to say that the staged play threw a new light upon the pages which they had previously seen only as the hiding-place of poetic gems!

That Broadcast of "Julius Cæsar."

SINCE I have embarked on controversy arising from the B.B.C.'s "Julius Cæsar," I permit myself to say that the presentation of that play was very unsatisfactory. The speakers gabbled—probably they were told to do so by some programme bloke who wanted the Second News to begin promptly—they gabbled like the Roman geese famous in history.

The Management of Crowds.

AND that was not the only trouble. The crowd was allowed to drown the speeches of the principals, Brutus and Cassius died most unconvincingly, and Brutus' boy was too obviously a lady! But perhaps I have been spoiled! I waited from 2 p.m. till 8 p.m. to see Tree play Mark Antony in 1905, and it was worth the leg-ache and the half-crown. Shakespeare wasn't "impossible" to Tree and His Majesty's in those days!

(*Continued on next page.*)

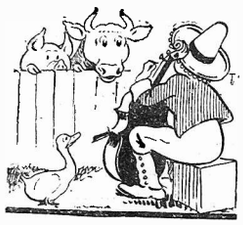
"ARIEL'S" RUNNING COMMENTARY ON RADIO *(Continued)*

The Variable Tone.

MR. GEOFFREY DAMS, who gave a recital of songs on December 13th (Mid. Reg.) is, one might say, a tenor merely by force of circumstances. It happened like this. During the war he applied for the position of baritone in a concert party but was told that there was no vacancy. However, refusing to be licked he coolly announced that he was a tenor! And he has sung as a tenor ever since, the saucy lad!

Back to the Band.

A REMARKABLE double *volte face* was accomplished by Antoni Sala, who broadcast on December 16th. This great Spanish 'cellist gave up music as a profession in 1919, and went on the land—this after making his name famous everywhere that counts. He was a farmer for several years and then returned to music, "back to the band," so to speak, and now appears before us, having lost none of his former brilliance. Not always thus does the world welcome back fame's strayed children.



A Magic Result in Ceylon.

I PROMISED to do a bit of sleuthery for P. R. C. (Colombo, Ceylon), who, with a "Magic" Three, heard what he thought was the London Regional on October 17th–18th. He gave certain data about the items which he heard, which correspond very closely to the National programme, on 261 metres.

However, I think that he may safely say that he received from Great Britain, which is a triumph both for him and for "P.W.'s" "Magic" Three.

The Truth About "Ariel."

I GET a fair sprinkling of inquiries about my *nom de plume*; some people seem to think it is meant to be an artistic rendering of "aerial"; others blame Shakespeare ("The Tempest"), while others are lost in undisguised wonder about the word's origin. It is borrowed from Shakespeare, his Ariel being a jovial, light-hearted spirit—probably a cousin of Puck, I should think.

But, those blurbs on Broadcasting House which are supposed to represent Ariel refer to a low branch of our family, of whom we never speak. This paragraph answers E. A. W. (Burton-on-Trent) and other kindly inquisitives.

The Cream of the Bag.

COME, let us run hastily through my mail on this glad New Year morning. Years may come and years may go—but my room is as cold as ever, in January. Wrapping newspapers round my feet and legs, I plough through the pile. Ha, here is my perennial friend in the Gold Coast Colony, who wants me to induce someone to ship him a sample radio-gram. *Saith he!* Nice letter from A. T. (Port Elizabeth) in praise of "Magic Four." P. H. (Batley) has tuned in to twins. Luck! Call 'em K.W. and K.C. And, finally, there is an optimistic man of Wales who wants me to be a Hon. Bard for a guinea. Sir, I was born in '86!

Radio Advertising in U.S.A.

A KINDLY reader of Waterloo, Ontario, sends me an article written by Dr. Lee de Forest and published in the "Mail and Empire" of Toronto, which I should like to reproduce wholly. "Radio has been perverted to the lowest commercial use and its possibilities debased until the family that regularly listens to most of the flapdoodle it exudes runs danger of infection from its diseased vulgarities." "Direct advertising is out of place in radio."

SHORT WAVES.

The reason that certain famous people never speak from Savoy Hill, we are told, is that they require a visible audience.

One of the present imperfections of wireless is that the broadcaster has no assurance that anybody is listening to him.

* * *

Gramophone records of favourite wireless items are selling well. An appropriate present for an agricultural friend is a record of a week's Fat-Stock Prices set to a syncopated rhythm.—"Punch."

* * *

"There ain't no escape from wireless nowadays. When I was on 'oliday in Scotland, f'r instance, I called at wot the poet calls 'a dim sheiling in a misty glen,' and when the guid wife opened the door to me she couldn't 'ear wot I said for the noise of the B.B.C. Orchestrer playin' in the kitchen."—"Empire News."

* * *

"Away for a YELL earned vacation, the National Grand Opera will be replaced to-night by a grand opera concert organization on WEAF."—"New York Herald-Tribune."

We trust that none of these singers have strained their voices during the season, as this item seems to insinuate.

* * *

DIVIDE IT FAIRLY.

Hearing that scientists can't agree as to how to split the atom, Aunt Agatha thinks they should share it equally between them.—"Sunday Pictorial."

Dr. Lee de Forest Gets Going.

". . . a blaring recital of outright falsehoods, wild exaggerations and lying claims that are an outrage on the credulous public." "Advertising belongs in publications where it can be read or disregarded, and where it is not forcibly rammed down the national throat—or ears." "The Federal Radio Commission gravely licenses the radio centres of blatancy and . . . commends what they call American radio's 'self-supporting system' as entirely admirable and satisfactory." Right on the nob!

Personal Note.

THIS is in the nature of an S.O.S. My small Arielette (male), snub nose, fair complexion (hidden by inkspots and mud) (football practice!), after having developed serious symptoms of amateur radio was suddenly pulled up by the sight, in a schoolfellow's house, of a fretwork skeleton illuminated with small electric lamps. Hence, we have veered violently to fretwork, so that, instead of wires and batteries, this house is all sawdust and fretwork pipe-racks!

Does anybody know whether this craze lasts long? Or is there any cure?

"Bikradio."

MY sneaking hope that Ariel Junior would be the pioneer of bike-radio has been shattered by P. S. (Tooting), who points out, quite accurately, that in *the very first number* of "P.W." June 3rd, 1922, there was a photograph of bikradio. Well, I am not going to try to compete with a memory like that of P. S. I prefer to sit back and gloat over the discovery of a reader who remembers what was in our No. 1. I myself hadn't the foggiest. Perhaps Datas will tell us what Gladstone said in—— (No politics!—Ed. "P.W.").

Three o'Clock a.m. Courage.

THAT'S what our splendid lifeboatmen have—"three o'clock in the morning" courage. It needs real manhood to turn out of a sound sleep and a warm bed and pull off in a pitch-black, freezing night to the aid of a ship in distress. The Royal National Lifeboat Institution, which maintains 106 motor lifeboats and 77 pulling and sailing lifeboats, has to carry on its work by voluntary subscriptions, and it has saved an average of eleven lives a week for over a century. You can send the money to the Secretary of the Institution, Lifeboat House, 42, Grosvenor Gardens, London, S.W.1.

"Come On, Boys!"

I DO hope that none of my lynx-eyed critics will accuse me of belittling the efforts of fellow "fans," causing the dollar to flop, and spoiling Mr. Firestone's efforts to make india rubber out of alfalfa, if I refer gaily to the fact that in the U.S.A. the short-wave lads "got on to" the police wavelengths, with the result that when a row was reported by radio and the cops hastened to the scene they found the normal crowd augmented by heaps of "fans" who had picked up the report and decided to attend.

In view of this development in other cities, New York, which is to equip 250 police cars with seven-valvers, has decided to use special code words in its police messages.

ARIEL

TUNING OUT FATHER TIME

Broadcasting in the New Year at Savoy Hill

Some fascinating details about the great moment when the Old Year blends into the New, with radio reaching back into the past year and forward into the future.

By HAROLD A. ALBERT.

"TO town and country, seaside places and ports, to those who sleep in the folds of the quiet hills, in cities still ablaze with light or manufacturing towns lit by the glow of the blast furnace, or in farmsteads on the levels of the plain in England and Wales, Scotland or Northern Ireland or the Irish Free State, or the Isles of the Sea, Greetings! To the King and all his House and all his subjects, a Happy New Year!"

Do You Recognise It?

No, I have not suddenly gone into training for the Laureateship or the Bardic Trials, but I'd like to know whether you recognise that? If you have anything like a memory and if you're anything like a listener, you must do, for that touching little piece comes from one of the Grand Good Nights which have been broadcast by the B.B.C. on every New Year's Eve since 1925.

I've just had a most interesting little chat with Mr. J. C. Stobart, a Savoy Hill veteran whose name will be familiar to POPULAR WIRELESS readers. He it is who first conceived the idea and who makes the annual broadcast—and lest you are not yet sitting up in your chair, let me add that this gentleman produces the Epilogue!

It was from an early form of Epilogue, in fact, that the New Year's Eve Grand Good Night sprang, and during our talk Mr. Stobart told me all about it.

The First Occasion.

"An announcer used to read a verse or two of poetry after the programme on Sunday nights, and from him I conceived my notion. We tried it out one night in the middle of the week and it proved a success. Then we turned it into a grand Christmas greeting and the New Year idea naturally followed.

"In the first Grand New Year Good Night—and Good Morning, I remember, I greeted the stars and Mother Universe and old Sol himself, and then all the great cities of Britain. But never yet have I made this broadcast without leaving somebody out!

"One year I forgot Dundee, since when marmalade has been bitter in my mouth. And another year, when wishing happiness to people by their professions and trades, I left out the firemen. Even now, I feel that I shall no sooner leave the microphone than I shall remember something or someone whom I have forgotten.

"Mind you, I'd much rather think out a new idea, but listeners won't let me, and so I just have to go on perfecting the old, although every year makes my task easier and easier. Still, I can never be sure of perfection.

"One year, when I greeted the cities, the broadcasting stations attached to them answered and were heard by listeners. Not until afterwards did I discover that Sheffield for some reason which remains unexplained to this day had not responded.

Here's a Good One!

"While I, in the London studio, imagined that my words were receiving an answer, listeners heard nothing but silence.

"On another occasion, a famous critic in referring to my morning greetings to the different nations in their own languages, deplored what he termed my faulty pronunciation of Italian. I can't think what that critic can have been dreaming about, for the greeting in question was delivered in Esperanto!"

I asked Mr. Stobart then how he felt on sending good wishes to several million people.

"I dare not think," he answered. "Broadcasting is like being at a great height. It's dangerous to look over or even to realise the drop. One of the announcers here, after reading the Epilogue, confesses to feeling 'all in.' If I gave a moment's thought to the vastness of my audience, I should probably feel the same."

And that ended our conversation. I moved on to another corner in the Savoy Hill hive where I discussed with a programme official New Year's Eve broadcasts in general.

There was a time, in the very early days, when the Old Year went out unsaluted and unsung by the B.B.C.

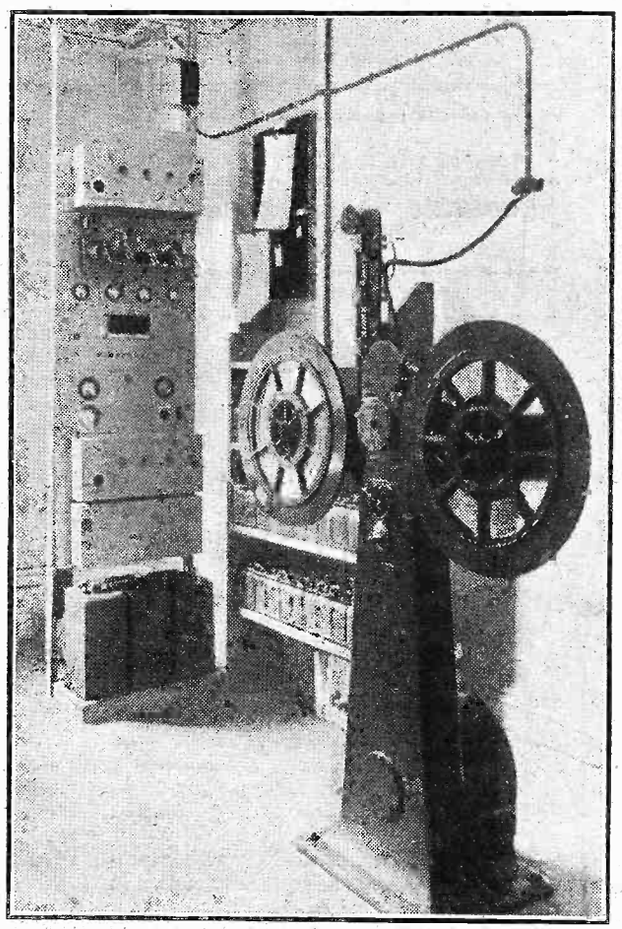
Early Efforts.

Then, in 1923, the former Archbishop of Canterbury delivered a little homily just before the midnight hour; in 1924 was relayed a watch-night service; in 1925 Mr. Stobart began *his business*, and ever since then wayfarers in the vicinity of the radio headquarters during December have seen gentlemen with notebooks and puckered brows hunting NEW IDEAS. Which statement is not strictly true, but it will pass.

Very good some of the ideas have been, too. Do you remember the retrospective programme when you heard as if by magic fragments

(*Continued on next page*).

BOTTLED PROGRAMMES OF THE PAST!



This is the Blattnerphone—a wonderful arrangement of magnetised steel ribbon which records and preserves any programme so that it can be re-hashed in full detail at any time. With it we shall be able to hear some of the General Election speeches all over again—if we want to!—exactly as they were delivered.

TUNING OUT FATHER TIME

(Continued from previous page.)

of the programmes of the past year? And do you remember the New Year party that was broadcast as a surprise item in the dying hours of 1928?

Davy Burnaby acted as host, and I have his word for it that it was the most hectic radio party ever thrown. An hilarious studio audience gulped whisky and sandwiches and such remarks as, "What'll you have, Davy?" and "Jolly good stuff this!" were broadcast to the world.

To this day Davy swears that over two dozen spinsters wrote in to complain of the "drunken orgy."

"The Birth of the Year."

Then there was that programme, "The Birth of the Year," which included relays of New Year Celebrations from the Continent and which was probably one of the most intricate international broadcasts ever carried out. As Germany rang out the Old Year, English listeners heard the Cologne Cathedral bells chiming midnight when it was eleven o'clock by Greenwich.

The spinning of the world was utilised for entertainment purposes and we were taken into restaurants and dance halls and little squares in quaint market towns by the aid of the microphone. The New Year, in short, was heard dying a dozen deaths before it was counted out in England.

I thought it wonderful at the time, but maybe I was wrong, for a studio official frowned as though deeply injured when I expressed these sentiments.

"To the B.B.C., that programme was disappointing in many ways," said he, "for at that time the landlines were not so well organised as they are to-day, and reception of some foreign stations at Tatsfield by wireless link was partly spoiled by 'fading' and atmospherics. So that when we expected beautiful chimes, we just received 'buzz-buzz'!"

But that is ancient history. There can, at any rate, be little argument about the impressive qualities of the New Year's Eve broadcast last year when, speaking in the *empty* Cathedral Church at Canterbury, the Archbishop welcomed 1931.

THE GRAND "GOOD-NIGHT"

He is Mr. J. C. Stobart, the B.B.C.'s Director of Education, who has evolved a magnificent "Good-night" that includes everybody everywhere. But one year he forgot the firemen, who were very "put out"!

An Impressive Broadcast.

Anyone who heard his "Here am I, an old man, standing alone, while another year passes and the shadows cluster thickly," must have been deeply touched.

The programme preceding it was good, too. Do you remember how the dance music faded out and stern voices summed up the passing year whilst sound effects brought memories to life?

We heard long perished news bulletins, the King opening the Indian Conference, the first public appearance of the B.B.C. Symphony Orchestra, the first television broadcast, the now vanished Hyde Park carillon, the multi ludinous activities of 1930 all brought back to life by means of sound effects, gramophone records, and the spoken word.

And this year, so quickly does Progress march, you will hear in an "Historical Retrospect" that is being planned not impressions of past broadcasts, but to all intents and purposes the actual broadcasts themselves. Some of the outstanding programmes of the year have been preserved by means of the Blattnerphone which records them on steel ribbons and reproduces them as required, and a selection is being made of the best.

TWO USEFUL HINTS

SOLVING YOUR SOLDERING PROBLEMS

Soldering Small Parts.

SMALL articles for soldering are not always easy to hold over the flame, especially if there are several parts to be brought together in accurate relationship.

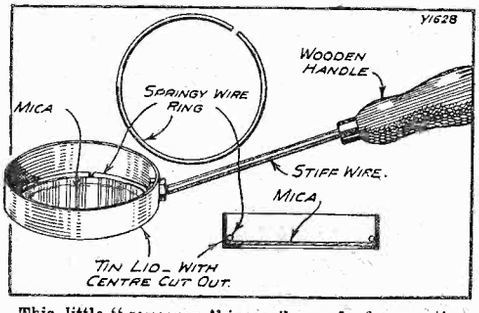
A soldering-iron is of little assistance, because the mere act of touching the parts with the iron is liable to move them out of position. If you have a blowpipe and a charcoal block, you will find no difficulties, but here is another method which is handy when you have no blowpipe.

Make up a little pan as shown in the sketch herewith. The centre part is cut out of a tin lid, leaving a small ledge all round inside, and a thin disc of mica is fitted inside, resting on the ledge.

Secure the mica disc with a ring of springy brass, sprung inside the lid and pressed down against the mica. Fix a stiff wire handle to the edge of the pan (not with solder, as it would melt), and equip it with a wooden grip.

Now you can heat your work in the pan, with no risk of it adhering to the bottom. Provided that the mica is thin, enough heat will pass through it for soldering, while no soot from the flame which you are using can be deposited on the work.

MADE OF MICA



This little "saucepan" is easily made from a tin lid and mica, as explained above. And it certainly simplifies the problem of soldering very small parts together.

A Lead-in Problem Solved.

WHEN you have a multi-wire aerial, it is often a bit of a problem to determine the most advantageous method of bringing the aerial down-leads into one common path.

For instance, it is never an easy matter to solder together two or more multi-strand aerial wires, and, of course, little electrical efficiency would remain after a time if the down-lead wires were merely twisted together.

The best method of dealing with a problem of this nature is graphically shown in the illustration.

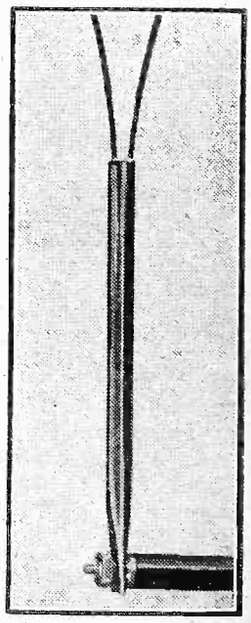
Obtain a 4-in. length of brass tubing of about ¼-in. bore. Flatten one end of it by means of a hammer, and drill this with a hole large enough to enable the tube to be screwed to an ordinary lead-in tube.

Now bring all the aerial down-lead wires together within the brass tube, and let them reach down to the bottom of the latter. With the wires in position within the tube pour molten lead into the tube until the latter is full to the top.

The down-lead wires will now be firmly connected in the one common path, to wit, the brass tube, which, as illustrated, may be screwed to an ordinary lead-in tube, passing through the window-frame, or else screwed to and additionally secured to the lead-in tube by means of solder.

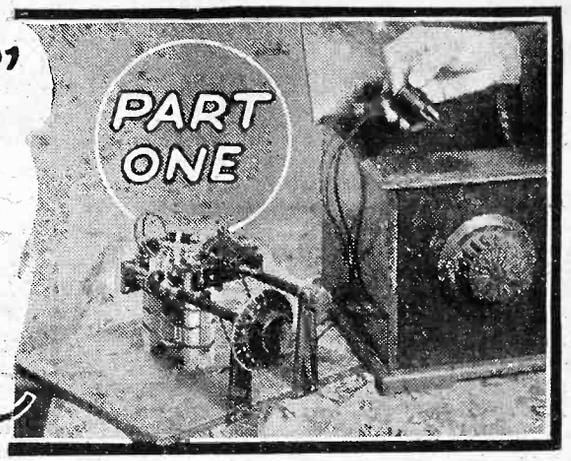
Two or more down leads treated in this manner are electrically efficient, and, when the brass tube is *soldered* to the lead-in tube, the efficiency of the down-lead system remains unaltered with the passage of time.

LEAD-IN EFFICIENCY



Getting good contact at the lead-in is often difficult when a two-wire aerial is used, but here is a stunt that gets over the difficulty.

The "KELSEY" 7-METRE ADAPTOR



The B.B.C. is to experiment with a 7-metre wave for broadcasting. But they have suggested that one of the problems to be solved before the new wave can be widely used is that of making adaptors for ordinary sets. "P.W." has solved this problem, and is able to present an inexpensive, easy-to-make adaptor suitable for any ordinary set. It is designed and described by G. T. Kelsey, the well-known originator of short-wave adaptors.

IN introducing what has been described as the world's first seven-metre adaptor, I feel that I cannot do better than to refer briefly, first of all, to the present European wave-length muddle and the effect that it is having, even upon our own local broadcasting.

Cutting-Out Interference.

Surely, few of us will have failed to have noticed at some time or other the annoying and almost persistent heterodyne whistle on the London and Northern regional transmissions, and, as most of us know, this state of affairs is due entirely to the fact that the number of wave-length "channels" available for broadcasting in Europe is inadequate.

To obtain "whistle-free" reception from every station in Europe, it would be necessary for each station to have a band of frequencies, 10 kcs. wide, to itself.

But the trouble is that there are already more stations in Europe than there are available 10-kilocycle "channels" in the allotted band between approximately 200 and 550 metres. In consequence, a certain amount of overlapping is inevitable and the consequent trouble, with the results of which we are all more or less familiar, will be even more accentuated as the powers of stations are increased.

This state of affairs, as long as it interferes only with the reception of distant stations, although most undesirable, is not perhaps such a *very* serious matter, because, as we all know, there are many other parasitical noises to contend with when receiving distant stations quite apart from heterodynes.

A Way Out.

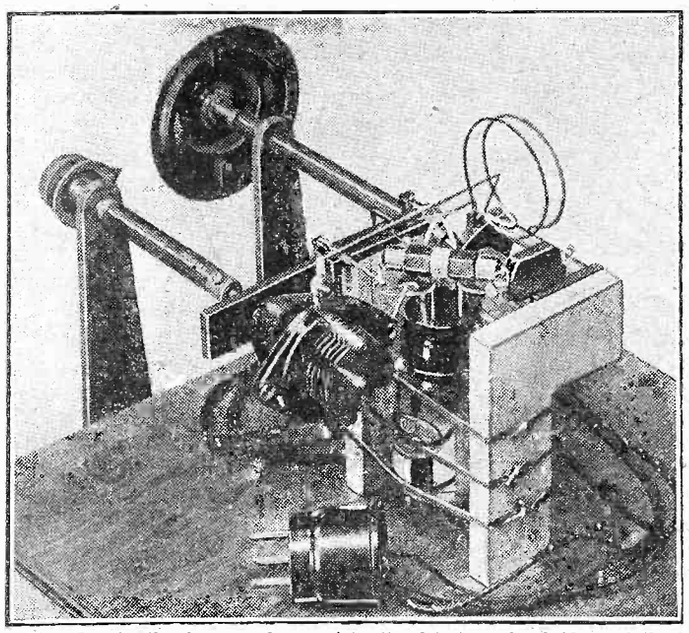
But when it looms up as a menace to the satisfactory reception of our local programmes upon which we largely depend for our entertainment, then it is certainly time that something was done.

This is really the whole secret behind the B.B.C.'s recent announcement that experiments were to be undertaken on the remarkably low wave-length of seven metres to explore the possibility of using this wave for a localised broadcasting service.

It is as yet much too early to predict

(*Continued on next page.*)

SUITABLE FOR ANY SET

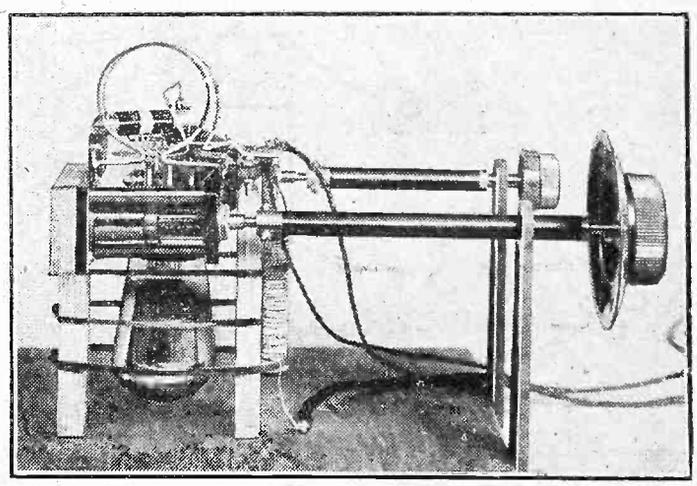


The plug in the foreground goes into the detector valve holder and the present detector valve is replaced by the one in the adaptor. Your set is then a perfect 7-metre receiver!

HOW THE "SHILLING-A-METRE" IS SPENT.

Piece of ⅜-in. plywood 10 in. × 10 in. for baseboard.
1 Screw-in type neutralising condenser, maximum capacity ·00002-mfd., minimum capacity, ·0000015-mfd. (Jackson).
1 Panel type micro condenser for reaction, maximum capacity 38-m.mfds. (Igranic).
1 ·0001-mfd. grid condenser (Dubilier type 665, T.C.C. type M., Formo "button" type or Ormond small type).
1 Two megohm grid-leak with terminals or soldering connections (Igranic, Graham-Farish, Loewe).
1 standard 4-in length (overall) extension handles (Bulgin).
1 6-in. ditto.
Length of No. 16 gauge tinned copper wire for the coils and for wiring up.
Pieces of ebonite and wood for mounting purposes (see diagrams for dimensions).
Soldering tags (special type used for valve-pin connections, see diagram), flex, screws, 2½ in. length of ⅜ in. diameter ebonite rod and 68 in. of No. 30 D.S.C. wire for special H.F. choke, valve adaptor plug, elastic bands, etc.

ONLY TWO CONTROLS TO HANDLE



One simple tuning control and a reaction adjustment are all that you have to manipulate.

THE "KELSEY" 7-METRE ADAPTOR

(Continued from previous page.)

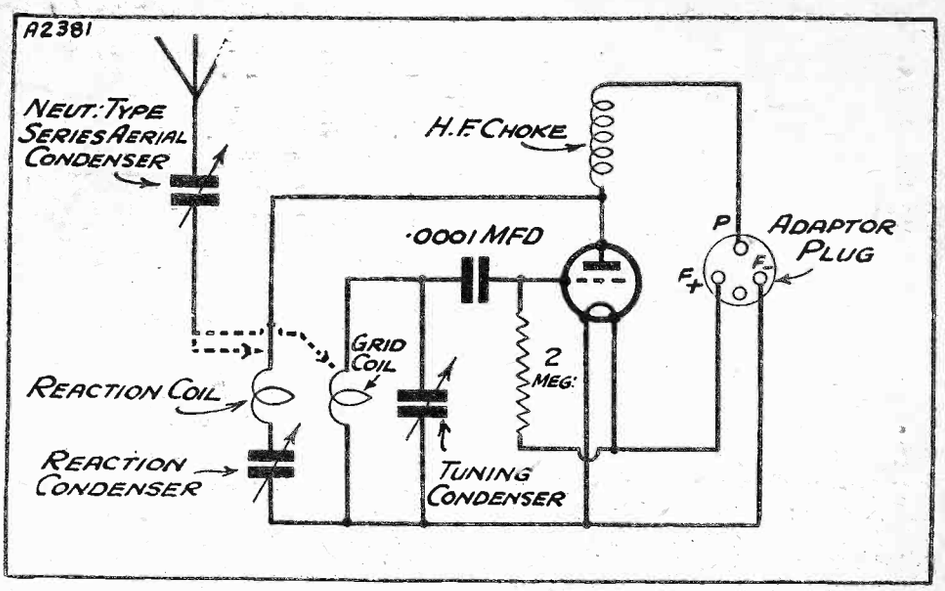
what the ultimate result of these experiments will be; and in any case, the B.B.C. make it quite clear that the use of seven-metre transmitters for localised broadcasting can never obviate the necessity of utilising the normal broadcasting band to some extent.

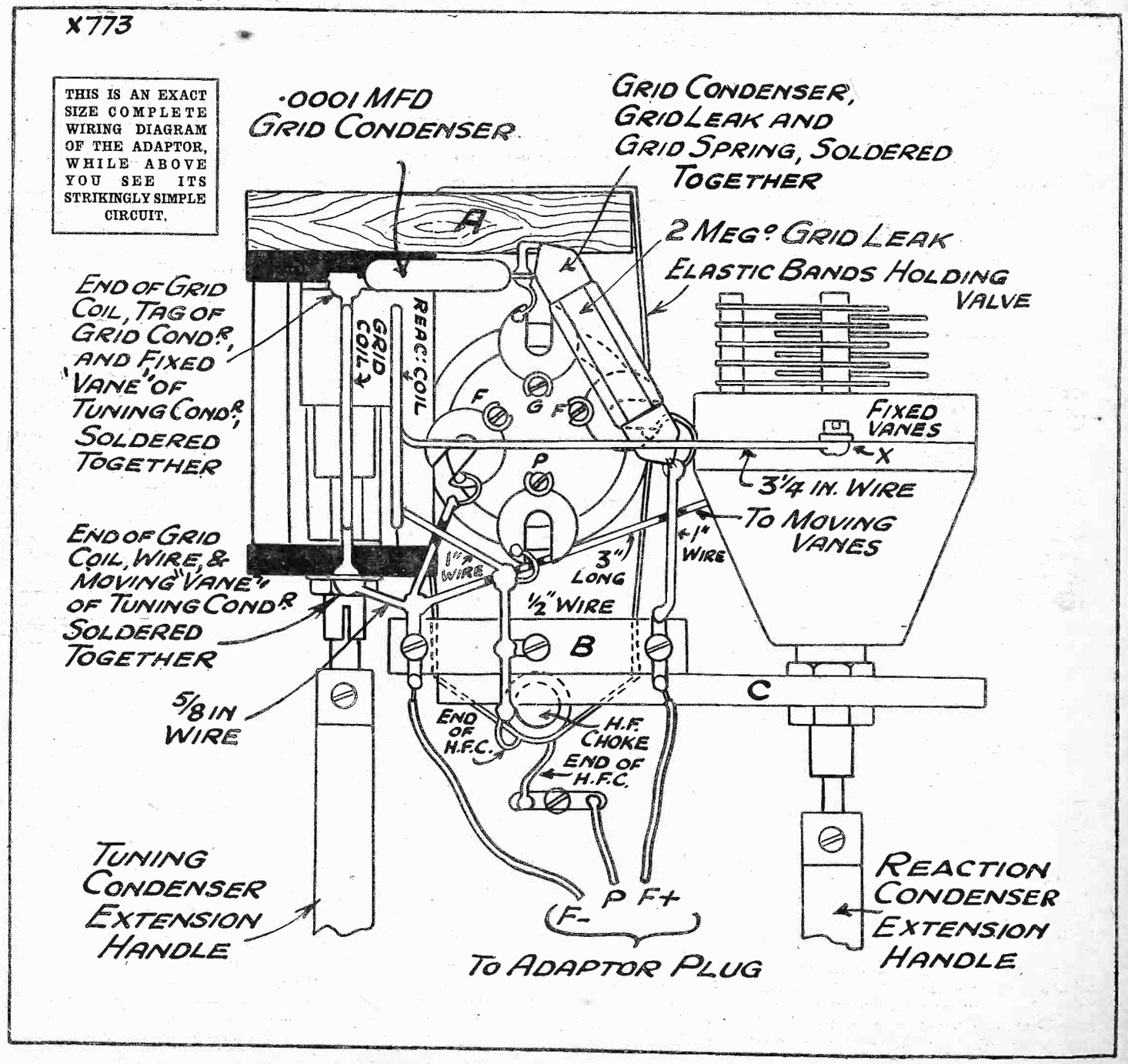
Sure to Succeed.

But if the experiments *do* prove successful—and there is every reason to believe that they will—then the day may not be far distant when we shall see the erection of low-powered seven-metre localised transmitters all over the country.

There are, as a matter of fact, certain definite advantages in the use of a seven-metre wave for localised broadcasting which cannot be obtained on any other available wave-length band. And one of the most important of these is that interference, broadcasting or otherwise, could not possibly

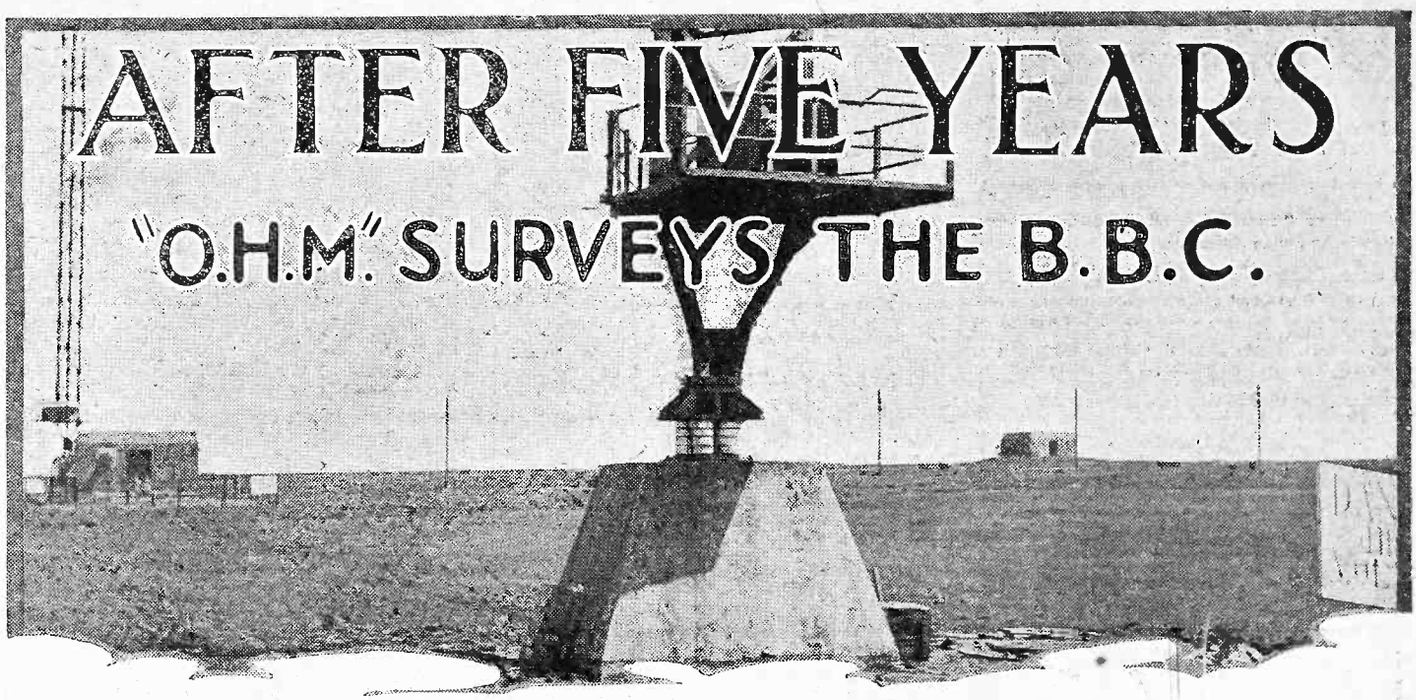
(Continued on page 1024.)





AFTER FIVE YEARS

"O.H.M." SURVEYS THE B.B.C.



WHEN I switched on my set the other night without consulting the programmes as published I was delighted to tune in to the beginning of a vaudeville programme which included, to my special appreciation, the inimitable Mabel Constanduros. I reflected that if I had resumed my interrupted listening at that stage instead of about six months earlier I might have said plausibly that there was very little difference between the vaudeville of five years ago and of to-day.

Continuing his intensely interesting and informative series, "O.H.M." discusses the vaudeville and other light programmes. He advances a strong plea for a "smooth continuity" and less "rigidity" and has quite a lot to say regarding the various dance bands which are regularly "on the air."

LORD GAINFORD

The Vice-Chairman of the B.B.C.

But it so happens that I have been listening fairly closely during the past six months, and therefore I must now try to delineate the responses which accrue therefrom. It is all rather bewildering, I know, but I confess that I must begin by protesting against obvious efficiency and specialisation when these seem to me to be detracting from the effect which should be presumed at the listening end.

"Why This Crabbing?"

In 1925 and 1926 I listened to many B.B.C. vaudeville (or variety, as they were called then) programmes, and, although for the most part I confess that I was very angry at elementary deficiencies of production, I must insist that in those few programmes of this class which I approved they were much better than anything that I have heard in the formidable average which confronts me since my resumption six months ago.

Why this crabbing? Is this again an attempt to cripple the B.B.C. in its valiant endeavour to do the impossible? No, I admit the rationality and probability of such a question, but I continue to plead that the fact of my absence for five years puts me in a particularly favourable position to help broadcasting in the widest sense.

The basic defect, of course, is departmentalisation. It is obvious to me now that the kind of mind that runs Savoy Hill believes that it is necessary to assert education and religion in order to make it effective. I wonder.

Donald Calthrop's Influence.

In relation to the particular subject of light entertainment, as I would prefer to call it, I feel real gaps in the absence of Donald Calthrop (now an expensive film star), R. E. Jeffrey (now a successful film executive), and one or two others whose names I forget, but whose influence was for the most part in the right direction—that is, in developing the thesis of the continuity of programme work, the whole being regarded as entertainment.

But there it is, these individuals have gone, others have replaced them. I believe that those actually in charge are at least as efficient, perhaps even more so. For instance, Val Gielgud (the protégé of that great editor of the "Radio Times," Walter Fuller), and Jack Watt, the brilliant young producer upon whom the stage is turning envious eyes.

A Big "But"!

All and more, agreed. But—and it is a big "but"—there is the fact of freezing rigidity, of unnatural competition, of a constant artificial balance.

What a waste of goodwill! What a menace to future growth!

And now to turn to some advantages of the new regime. There is, of course, the inevitable Jack Payne's Band, whose leader, I understand, has been boosted in the correspondence columns of the official journal of the B.B.C. as a "potential alternative Prime Minister."

The possession of such popularity is no small asset, even in the days when democratic procedure is hardly at a premium. I think it a mistake, however, for the B.B.C. to allow Jack Payne freedom in personal publicity obviously denied to all others.

VAL GIELGUD

The B.B.C. Productions Director.

Having delivered myself of this criticism, I am all the more anxious to make it clear that Mr. Jack Payne provides a good cement for vaudeville programmes. I would say definitely better than that of his predecessor, one Sydney Firman, who headed "The London Radio Dance Band." Yes, Jack Payne is an efficient dance band conductor, and his "boys" are up to the mark.

The Loss of Sir Walford Davies.

And now, following my main principle of seeking entertainment under whatever disguise, I would mention Sir Walford Davies, whose portrait I came across in an illustration of a music lesson for schools. I find no evidence that Sir Walford is now, as he did in the old days, "giving unrivalled pleasure to millions of listeners." The segregation of Sir Walford Davies is a definite loss in real entertainment value.

As to the variety of dance music available from outside sources, of course, the position has enormously improved since the old

(*Continued on next page.*)

CORRESPONDENCE

THE "ECKERSLEY" TUNER—AN INTERNATIONAL SHORT-WAVE CLUB.

THE "ECKERSLEY" TUNER.

The Editor, POPULAR WIRELESS.

Dear Sir,—Having just finished reading the second of Captain Eckersley's articles on this new tuner, I must confess that there are several points which are not quite clear to me, and I am taking the liberty of writing you thereon.

First of all, Captain Eckersley states that it is a new tuner, and that it embodies a new system of tuning. From my reading of the circuit diagram it would appear that it is a resistance-coupled H.F. filter. If my reading is correct, perhaps you will kindly inform me how the band-width is kept constant, because from my experience of this type of filter the band-width is far from constant over the tuning scale, with a result that correct pre-selection is impossible to obtain.

Secondly, Captain Eckersley tells us that owing to the two coils being placed at right angles, coupling between them is only slight, but that some coupling does exist. He follows this up by stating that direct pick-up will also take place, but that this is unimportant, as for very strong signals great selectivity is not needed.

I am afraid I cannot follow this theory, because it is an established fact that even though the local station's signals may be cut out by the tuned circuit, they will exert a paralysing influence upon signals that occupy a near band of frequencies.

Perhaps Captain Eckersley will enlighten us as to how this is overcome. Then, again, owing to the absence of complete screening of his tuner, will not cross modulation and other like evils creep in and nullify any advantage gained by the use of a filter circuit, especially when the use of a screened-grid valve is contemplated?

These are the points which are not clear to me, and I trust that Captain Eckersley will be kind enough to give me his valued help, because I am sure that there must be other readers like me who are striving after a solution of the difficulty of separating nearby powerful stations.

I am, sir,
Yours faithfully,
ALBERT G. SANDERS.

26, Redbrink Crescent,
Barry Island, Glam.

CAPT. ECKERSLEY'S REPLY.

A. G. SANDERS, Esq.

Dear Sir,—The Editor has passed me your letter of November 30th.

You are perfectly right in believing that this device is a resistance-coupled filter. You are perfectly right in supposing that with the cheap and simple arrangement that I have designed for a certain market the band-width does not keep constant. There is not a single high-frequency tuner of a simple kind, that I know of, that does keep the band-width constant. The band-width is largely determined by the R/L value of the coils. If you apply reaction, therefore, you can make the band-width more constant over the whole tuning range because you can adjust this value of R/L; this always provided you do not have to force the reaction to the limit.

So, let us say that although the formula for the attenuation through the filter at various frequencies around the resonant frequency is complex, and although the R/L term helps to determine the band-width, in practice the variation of reaction does tend to keep the band-width sufficiently constant throughout the tuning range.

With regard to your second point, there is, as I said, certainly some direct pick-up when the local station is very powerful, but supposing you are tuned to a frequency slightly different from the local station, then it is your contention that, the direct pick-up existing, the detector valve is paralysed. I cannot agree with this because if the tuner were adjusted, say, 18 kilocycles from the local station, and if there was a moderately strong carrier 18 kilocycles away from the local station and the tuner was tuned to this carrier wave, then if the local station was still predominantly strong you would hear it as a modulated signal. If the tuner cut the intensity down by about five times from the intensity it would be received as if the circuits were in tune, then what is called de-modulation sets in and the local station is only heard as an 18-kilocycle modulation. Of course, it is not, in fact, heard at all because of its very high frequency. If it is not heard it means that its intensity is about $\frac{1}{5}$ the intensity of the station it is desired to receive, and therefore in fact no paralysing takes place. I only mentioned this direct pick-up because I did not want people to think that in this cheap model the thing was perfect, but I am perfectly sure this direct pick-up has no deleterious effects. I have thoroughly tested the tuner myself and, for instance, fifty miles from London it is quite possible to separate London from Mühlacker and vice versa, and without any deterioration of quality on the London station. Closer to London it is not possible to get Mühlacker, but it is perfectly possible to get London free from Mühlacker, which practical point, I think, illustrates that my theory is right in practice.

Cross Modulation and Screening.

Then again, owing to the absence of complete screening you suggest that there would be cross modulation. Cross modulation itself is not a serious thing as regards the detector circuit, nor is it a function of screening. If the jamming station is very strong and the tuner unselective, then, of course, bad effects take place because there is no way of eliminating the jamming station. If the tuner is selective enough the jamming station appears as what we call "monkey chatter." That is, the modulations heterodyne with the carrier to which the tuner is tuned. This monkey chatter is not deleterious in itself because it can be eliminated by a filter.

All the time I feel that I want to make the point that if the tuner is selective enough as it stands to ensure de-modulation of the interfering station, then the tuner has achieved its purpose.

Finally, let me say that of course it is much better to have complete screening, but in a cheap model not fundamentally necessary. It is better because you would probably get a greater selectivity if the coils were screened. The selectivity at present is quite remarkable, and I hope you will verify my statement by a trial of the tuner itself.

Yours faithfully,
P. P. E.

Bush House,
Aldwych, W.C.2.

INTERNATIONAL SHORT-WAVE CLUB.

The Editor, POPULAR WIRELESS.

Dear Sir,—I wish to thank you for printing a notice in the issue of October 24th about the International Short-Wave Club.

YOUR CHANCE!

I must say the response has been really remarkable. I have received hundreds of applications from all over the country, from Scotland to the Channel Islands, from members of H.M. Forces, also from the Irish Free State and Germany. Many with a good word to say about POPULAR WIRELESS. And I must say many have joined, or think of becoming members.

I should like to say a word or two about the I.S.W.C.

First of all, I should like to make it quite clear that the I.S.W.C. is the original short-wave club, also it has thousands of members in sixty-two countries (including the British Isles), its news is up to date (being supplied by its members all over the world), also it has the support of the National Broadcasting Co. of America, Columbia Broadcasting System, and many radio stations throughout the world.

I may say I still have a number of copies on hand if your readers care to send for a copy, enclosing stamp.

Thanking you for your willingness to help the short-wave fan and the ordinary listener.

Yours faithfully,
A. E. BEAR.

10, St. Mary's Place,
Rotherhithe, S.E.16.

AFTER FIVE YEARS.

(*Continued from previous page.*)

days. But it was a special joy to me to hear the Savoy Orpheans come on the air again a few weeks ago. How wonderful was the benefit to British broadcasting of the old Savoy Orpheans and the Savoy Havana bands is difficult to estimate; perhaps Mr. De Mornys knows, and I wonder where he is?

It seems to me that the old Savoy Band represented the pinnacle of gaiety and brightness in an emerging new tradition of entertainment. I was not here to witness the tragedy of their withdrawal from the microphone, and I am glad I wasn't. However good, the new band of the Savoy cannot claim the resolute sufficiency of its more colourful if less experienced and polished predecessors.

The Dance Bands.

Be that as it may, the range of outside dance bands is much improved. At the top of the list I have no hesitation in placing Henry Hall and his Gleneagles Dance Band, which plays such a lot from Manchester as well as from Edinburgh. Here seems to me is an admirably restrained, balanced, and efficient organisation controlled and guided by one whose commercial leanings are subsidiary to his sense of duty.

Then, of course, there is Roy Fox, at the Monseigneur, Jack Harris' Band from Grosvenor House, and Moschetto and his orchestra from the May Fair Hotel, just to mention a few other able combinations.

Entertainment the Test.

Perhaps my readers may begin to wonder whether there is not too much carping criticism in this article. They may also ask what are my constructive suggestions? If I answer the latter, I shall take the liberty to presume to ignore the former.

My doctrine is simply this: broadcasting stands or falls by virtue of entertainment, intrinsic and extrinsic. Listeners with reasonably healthy minds have no use for avowed educational uplift; on the other hand, they will welcome an appropriate assemblage and dilution of basic programme ingredients, of which both education and uplift are essential if inconspicuous constituents.

Presentation Is Everything.

So the problem is, from every point of view, pleasant, acceptable presentation. There should be a smooth continuity enabling the "Philistine" listener to enjoy Sir Oliver Lodge just as much as he enjoys any vaudeville turn.

Education likewise should be regarded not as a department of, but as an essential component of, the general scheme of broadcasting.

For goodness' sake let's get away from rigidity, from the terrible tyranny of long-term engagements, let's seek a new enfranchisement.

And, to co-ordinate and apply this just doctrine with full authority to interfere except in regard to religion, I would suggest we need a strong man or two. For my part I nominate Dick Sheppard, and I would like to see him advised mainly by Dr. Adrian Boult and Val Gielgud.

The Man With Fourteen Voices

A talk with a most interesting personality, who has been working behind the scenes at Savoy Hill for many years. The Dramatic Department find him a host in himself for though he is really a Lancashire Lad he is equally happy as a Scotsman, an Irishman, an old Cockney, or whatever part they want him for!

I HAVE just had a real honest-to-goodness ninety-minute conversation with a man who is probably one of the most extraordinary personalities heard over the wireless, and certainly the most extraordinary in the field of radio drama.

He has fourteen different voices at his command, has appeared in over two hundred wireless plays, and yet has never starred in a broadcast production, although he may have taken eight or nine different parts in one. He is one of the workers of the B.B.C.—and how! His name is Philip Wade.

You may or may not have heard of him. He is one of those modest characters who perform a good deal of hard work but at the same time keep in the background. It takes a journalist to "bring him out."

How He Began.

"I began broadcasting round about 1925," I at last managed to make him say; "I had been an actor since 1919, and when the B.B.C. moved-in to Savoy Hill, they duly received an aspiring letter from me through the post.

"They tested me, gave me parts in those very early plays 'In the Mine' and 'Congo Night,' and I've been broadcasting ever since. Talking to the microphone is the most cold-blooded thing in the world. After all, what is there to worry about?

"Nothing ever goes wrong, and nothing is ever likely to do so. Now, if I were a variety artiste by profession, I might be able to retail dozens of stories.

"They all seem to have stocks of them. But the lot of the radio actor is hard. He rehearses his part, broadcasts it, and that is all there is to it. All my amusing experiences happened years ago. Then, I must admit, there were not a few.

All that for Nothing!

"We were once putting over a play in the studios at Savoy Hill which was being relayed by land-line solely to Newcastle. Having plugged away at the dialogue for some thirty minutes, we were all getting very hot and excited as the grand climax loomed nearer and nearer, when the Announcer walked into the studio.

"'All right, fellows, you needn't get flustered,' he remarked, and put down a switch at the side of the microphone. 'Now, begin all over again, if you please.' We had been talking for over half an hour to a mike that hadn't been turned on! Why our silence had not been discovered earlier, I can't imagine.

"Another amusing thing is that sometimes I have played with so many characters that I have been in the gravest danger of getting them all mixed up. This evening, for instance, I'm appearing—if that is the right word—in a revue that runs for an hour.

Real Versatility.

"During that period. I shall be a Cockney, a Scotsman, a Lancashire lad—easy this, because I come from Lancashire—an old man, a middle-aged business man, and others into the bargain.

"I once played the King *and* Polonius during a broadcast of 'Hamlet' to schools.

PHILIP WADE

Mr. Wade has been with the B.B.C. since its early days, and has appeared in many broadcast plays. He often takes the parts of several characters at once!

This would be impossible on the legitimate stage, of course, and I almost made it impossible on the wireless by very nearly making the King speak to Polonius in the voice of Polonius, and *vice versa*.

"But all these things happened in the past. Everything nowadays is cut and dried—the wheels are oiled. There's only one thing to make you laugh, and that is the Blattnerphone, the device now used at Savoy Hill to record any broadcast of special interest on sound strips which can either be immediately reproduced or else preserved for future use.

"The great thing about it, though, is that it enables the broadcaster to hear his own voice. At first, I confess I didn't recognise mine—any of them. It *was* a shock.

The Blattnerphone Backwards.

"It's funny, also, to hear the 'record' played backwards, and especially at, say, treble its normal speed. The programme that went down so well with listeners sounds under these conditions like nothing but Chinese gibberish intermingled with the 'gobble-gobble' of excited turkeys."

So much for the lighter side of Philip Wade and his work. Not content with acting on the legitimate stage, and perpetually rehearsing and broadcasting in radio drama, he also manages himself to write radio plays and sketches, yes, and even full-length dramas. Hence his remarks on this aspect of broadcasting are equally not without interest.

"I think it is likely that the future trend of radio drama will be in the direction of greater simplicity and the reduction of the number of voices to a more manageable size," he told me. "I don't think there is the same scope for pageantry as there is in the film, for instance, though many large-scale plays have been very successful.

Those Highbrow Plays.

"As for the 'Expressionism versus Naturalism' controversy, all I can say is that there can be no progress without experiment. If every listener cannot understand a highbrow play, it is hardly fair of him to put all the blame on the B.B.C.—is it?"

STATIONS WORTH HEARING

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.

DECEMBER will appear in most wireless logs as about the best month of the year for the reception of foreign stations, though it was run close by November. In both of these atmospherics hardly ever raised so much as a crackle, and after the rattling up that they had had during the earlier part of the year the long-distance man's eardrums were able to settle down into place again.

I had rather expected that when really good conditions came along, with dozens of stations ready to supply full loudspeaker volume, heterodyne troubles on the medium wave-band might be pretty serious.

A Pleasant Surprise.

As I have pointed out before, a tiny station may plant a poisonous whistle on to the transmission of a big fellow hundreds of miles away if the two are working on wave-lengths over close together and receiving conditions are good.

I am glad to say, though, that heterodyne troubles are not serious at present, and that one's worst fears were not realised when stations strengthened up. Almost the only important sufferers from heterodynes—and these only occasionally—have been Rome and Naples.

I wonder if you have noticed the astonishing daylight strength of Heilsberg. This is a station which some people have difficulty in receiving well after dark, since he is sandwiched between Turin and Bratislava.

But Heilsberg has been coming through with terrific strength in broad daylight at times when nothing was to be heard of his wave-length neighbours.

If you have not heard him, try for him at such a time, and I think that you will be rather surprised. On the other hand, the giant Prague has been distinctly off colour of late; perhaps he is making some alterations in his aerial or his transmitting gear.

In the Daytime.

Besides Heilsberg, there are several other medium-wave stations now well receivable in the daytime. The pick of these are Langenberg, Beromunster, Brussels No. 1, Toulouse, Strasbourg, Breslau, Hilversum, and Trieste.

After dark the number of powerful stations is almost overwhelming. Using a four-valve set with a couple of screen-grid stages, I find that one can pick up any number at excellent volume with the reaction control at zero, and it is no uncommon thing to have to make use of the volume control.

Fading is to some extent in evidence, though only on occasional evenings is it so serious as to spoil one's pleasure in listening to items from the bigger foreign stations.

Some Good "Catches"!

Here are a few stations that you should add to your log just now if you have not previously had them. Katowice is very strong on many nights, and Barcelona is beginning to look up. Naples is usually strong and can be well received if he is not heterodyned. Munich is rather a chancy station, but the odds are on one's being able to pick him up at reasonable strength at present.

Genoa is often to be found coming in well, and Brno is a station which you should certainly capture.

Try for Bratislava at any time when you find Heilsberg silent, and don't forget Horby on Sunday evenings, if your selectivity is not sufficient to receive him at times when the London National is at work.

SHORT-WAVE NOTES

News and views regarding an exciting and fascinating wave-band.

By W. L. S.

A HAPPY and Successful Year to all my readers! We've seen the last of 1931, and we can look back on it, from our own special point of view, with rather mixed feelings. It hasn't really been such a bad year from the short-wave listener's point of view.

If 1932, as a whole, is not a good year, I think the first few months *ought* to be. I hope, in fact, that by about a week after you read this conditions will be really good.

And now for the details of "*P.W.'s*" *Second Receiving Competition*. I have chosen the period of twenty-four hours between midnight on Saturday, January 23rd, and midnight on Sunday, January 24th. *Remember the dates.* In next week's notes I will give you the full details of what to listen for, how to listen, and the method of scoring. Try to show the world that "P.W." readers know, not only how to make receivers, but how to use them.

Interesting Correspondence.

And now for correspondence. I have two cards from J. B. M. (Glasgow), one reporting reception of Saigon at R7 on the speaker, and the other with details of W 8 X K on his 48-metre wave once more. Just after midnight on December 12th, he was received at R6. This should be a good sign, as he has been absent altogether of late.

G 5 J Z, of Heathfield, Sussex, kindly sends a photograph of his transmitter, and an interesting description. He would welcome reports on his telephony transmissions on 42 metres at 9.30 and 11 on Sunday mornings.

A. S. W. (Burnley) enters the H.A.C. Club with a good log, and reports an unusual station in the person of Y V Q, Venezuela, who was received in the afternoon on 16·39 metres. He asks for a list of short-wave commercial stations. The best I know of is contained in the Amateur Call-Book, on which my friend "Ariel" has been enthusing of late. It is obtainable from R.S.G.B. Headquarters, 53, Victoria Street, London, S.W.1.

A "Canned" Convert!

Now, here is a real event. F. N. B., of Hale, Cheshire, the well-known "diehard" who formerly scorned metal screening, recants "about 85 per cent" of his remarks on that subject. The reason for this is that he has built a "cast-iron" short-waver, and finds it the best he has ever had.

Probably this is because he has designed it with intelligence, and mounted the coils so that their field is not full of sheet metal. He has some threshold howl trouble, though. He also advocates another "Boiled Owl Session"—the American equivalent for "reception competition." This I have already mentioned.

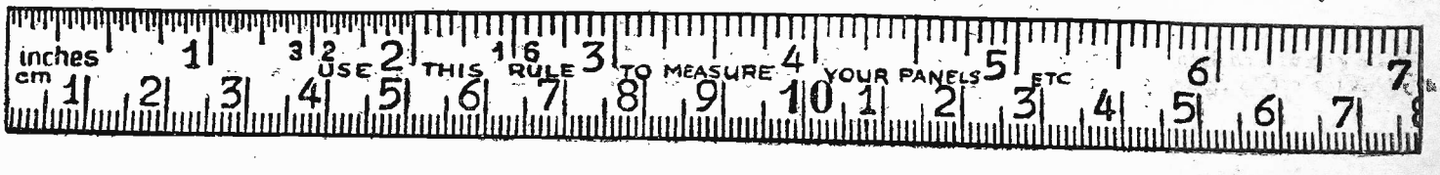
On the Higher Bands.

According to H. B. (Stockport), the station mentioned with the call-sign F V C N has turned out to be Rabat, Morocco, on 32 metres approximately. H. B. sums up the present conditions admirably by describing W 2 X A F as "possible" and W 2 X A D as "past history."

N. P. (New Milton) acts as a spokesman for quite a number of readers in asking for coil sizes for the longer waves—up to 180 metres—with "My S.G. Four." I suggest that "hank-wound" coils could be made up and mounted on the usual two-pin plugs.

Keeping the same diameter as the other coils, you will require about 15 turns for the 80-metre band, and 30 or 35 for the 150-metre band. In the latter band your 80-metre coil will serve for reaction, while on 80 metres the 9-turn coil should do for this purpose.

There is nothing much to be heard between 100 and 150 metres, but if you wish to listen there, an intermediate size of about 20 turns should do the necessary.



When everything depends on one single valve

Marconi H.2 is exclusively chosen by Mr. G. T. Kelsey for his 7-metre adaptor—efficient as ever on a frequency of nearly 43 million cycles!

PRICE 8/6

CHARACTERISTICS

Impedance 35,000 ohms. Amplification Factor 25.
Mutual Conductance 1.0 M.A. per volt.
Filament Volts 2.0. Filament Amps. 0.1.

MARCONI dependability is essential!

THE MIRROR OF THE B.B.C. By O.H.M.

THE B.B.C. IN 1932

DR. BOULT'S PROGRESS—JACK HYLTON'S BROADCAST—NORTHERN ACTIVITIES.

THE B.B.C. emerges from 1931 a little bruised perhaps but with steadily increasing strength, and the support of the vast majority of listeners who depend increasingly on the programmes initiated from Savoy Hill and other B.B.C. centres for their entertainment.

The Scottish Regional will be inaugurated this year, and substantial progress should be made with the West Regional. I think it a pity that the West Regional was not put in hand at the same time as the Scottish station, but there it is. I suppose finance was the obstacle.

The really big thing about 1932 should be the inauguration of the Empire Broadcasting Service, and I suggest that His Majesty's voice should be the first signal to be distributed by the Empire circuit.

I know it is asking a good deal to hope that the new 5 S W should be ready this year; but I think it is really worth while, and I commend it to the personal attention of Sir John Reith. I know Mr. Ashbridge, the Chief Engineer of the B.B.C., will do all he can about it.

Dr. Boult's Progress.

An eminent American impresario told me the other day that he had made a special offer to Dr. Adrian Boult to desert the B.B.C. in order to take over one of the leading American Symphony Orchestras for a period of five years, the figure mentioned being sixty thousand dollars a year, tax free.

My informant said that Dr. Boult had asked for a fortnight in which to consider the offer in the light of his commitments to the B.B.C. I earnestly hope that Sir John Reith will be able to avert this threatened catastrophe. Dr. Boult is one of the main individual assets of the B.B.C.

Jack Hylton's Broadcast.

Jack Hylton's recent visit to Savoy Hill, when the B.B.C. permitted the use of one of their studios for a performance by his famous band for relaying to America, is bound to have its repercussions.

The National Broadcasting Corporation of America, who were responsible for the show as an advertisement for a well-known brand of cigarettes, paid pretty handsomely for the use of the studio and also for the work done by the officials of the B.B.C. in connection with the broadcast, which took place between 3 and 4 a.m., while British listeners were asleep.

The announcer, the engineers, and the balance and control officials, all got something (as, of course, they should for their services), but that had no effect on the opinion they afterwards expressed that, compared with any other band which broadcasts in this country, Jack Hylton's is in a class by itself.

Not only was Hylton's performance really marvellous for its musicianship and conducting, but the actual arrangement and orchestration of the material was declared to be first-class.

From what I hear I should not be surprised if Hylton is invited to give some broadcasts for British listeners. Personalities should not be allowed to enter into the question at all if we are giving something better to America than we are offering to British listeners.

Northern Activities.

A concert party entertainment every fortnight is an attractive feature of the North Regional programmes, whose listeners have always responded in their appreciation to this light form of good, wholesome broadcast fare.

Mr. Liveing, the North Regional director, and his staff at Manchester, have made a special study of concert parties with a view to getting the best results for broadcasting, and while, no doubt, a good deal of the right atmosphere accompanies relays from outside sources, their experiments over a long period have shown that a party definitely trained for microphone work and which gives its performances in the studio is more suitable to their requirements.

Listeners will remember that during the summer a party called the Summer Mummers laid the foundation of the possibilities of studio concert party entertainment, from which developed quite recently another combination known as the Yorkshire Mummers, which gave its first broadcast a few weeks ago.

I hear that another party known as the Lancashire Mummers has now been got together, and this is to broadcast for the first time at 9.35 on Wednesday, January 20th. These two parties will present separate shows once a month in future.

The Lancashire Mummers will give theirs in the Manchester Studio, while the Yorkshire Mummers will appear before the microphone in the Leeds Studio. London and West Regional listeners will read this item with more envy than interest and hope that this Northern development will prove so successful that something will be done on similar lines in their own areas.

A Circus Suggestion.

Another type of broadcast in which the North seems to excel over the South is in the annual relays from either the Tower Circus at Blackpool or the Belle Vue Circus at Manchester.

These relays have always been exceedingly popular, yet, so far as I know, no attempt has ever been made to give listeners anything from the great annual circus which draws thousands from all over the country at Olympia at this time of the year.

Last winter practically the whole of the first half of the circus at Belle Vue was broadcast, together with some entertaining interviews with different members of the troupe; and on Saturday, January 16th, an hour and a half of the Northern programme will be occupied with a similar excerpt also from Belle Vue.

Even the children are not forgotten, because good use will be made of the

(*Continued on page* 1022.)

"GOT YOU THIS TIME!"

They were rehearsing at Savoy Hill, and just as Philip Ridgeway caught Anna Day the camera caught them both!

FOR THE LISTENER

By "PHILEMON."

The B.B.C. has been in hot water lately, but, as our Contributor points out, progress always means that corns are hurt!

IT is difficult to please everybody. It is almost impossible to move in this world without treading upon somebody's corns.

Those who have the tenderest corns usually squeal the loudest: and it is a sort of instinct with most of us, when we hear people squealing, to step off the corns as quickly as possible. If we can, we would rather go on our way without hurting anybody, without being causes of offence.

There have been rumours recently that the B.B.C. has been getting into hot water. I do not quite know what that means. I suppose it means that the mailbag has been heavy with complaint.

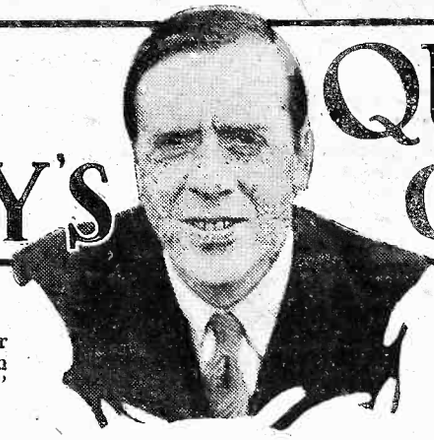
Not long ago, a play about Russia was abandoned because it was said in certain quarters that it would give offence; and more recently there have been items in the programmes which have offended the sensibilities of some listeners.

Catering for Both Sides.

I have a good deal of sympathy with the B.B.C. It has been said that broadcasting is a kind of journalism; but there is at least one big difference between ordinary journalism and broadcasting. One paper may cater for Conservatives, and another for Radicals, and all goes smoothly, for only

(*Continued on page* 1022.)

CAPT. ECKERSLEY'S QUERY CORNER



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 direct to Capt. Eckersley; a selection of those received by the Query Department in the ordinary way will be answered by him.

A Nasty One!

M. K. (Roehampton).—"In a receiver which I constructed recently, incorporating resistance and transformer coupled stages an output transformer was used for coupling the loudspeaker to the last valve.

"Severe L.F. instability and howling was experienced, but when a choke and condenser output filter was substituted for the output transformer, quite satisfactory results were obtained. What was the reason for this peculiar effect."

That's a nasty one! Was it that the values of the transformer-inductance ratio, etc., were wrong? They must have been different from the choke, considered as a one to one transformer, which after all is only what it is.

If, for example, the effective anode impedance using the transformer was too high, the magnification of valve and transformer was high, and in the absence of proper de-coupling might set up instability.

The choke might have a less effective anode impedance with consequent less magnification, with consequent less tendency to instability.

Why not try the transformer again, but de-couple very carefully?

Harmonics in a Super-Het.

L. T. (Nottingham).—"I am very interested in super-heterodyne receivers, and I have heard my friends speaking of oscillator harmonics. Do these harmonics affect the working of a super-het? If so, how can they be eliminated?"

If the oscillator of a super-het has harmonics, these may beat with unwanted transmissions and so produce jamming. Thus, suppose you want to pick up a station transmitting at a frequency of 600,000—your intermediate frequency is, say, 100,000—then your beat oscillator must be adjusted to 700,000 (or 500,000). [Thus 600,000—500,000 = 100,000 = 700,000 — 600,000.] But if your beat oscillator gives a frequency of 1,400,000 (or 1,000,000), then that frequency may beat with a station at 1,300,000 or 1,500,000 or 900,000 or 1,100,000, and all produce 100,000.

So don't have harmonics in a super; get rid of them by keeping a good, steady negative voltage on the grid of the oscillating valve. And do not use a grid leak to do it: use a battery—in fact, a free grid bias will do.

The Landlord and the Balcony.

E. S. R. (Aberdeen).—"I have been using for some time the metal railings of a balcony outside my window as an aerial. My landlord tells me that I must not use this, in case of lightning.

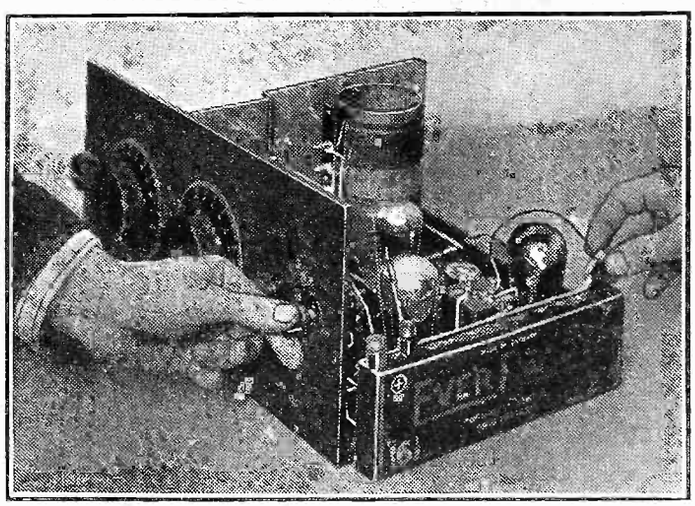
"I cannot, however, see that there is any more likelihood of it being struck by lightning because a piece of wire is attached than if it were not there. Can you advise me regarding this point?"

No, I cannot see that an aerial wire isn't electrically much the same as an insulated metal balcony. (I assume the railings are effectively insulated even when it rains! I admire your temerity, any way, and if it works it's all right, isn't it?)

If the landlord is afraid of lightning striking the balcony railings he should be equally afraid of its striking an aerial. If you earth your balcony railings aerial in a thunderstorm you earth your landlord's railings, and he ought to be grateful to you for doing what he should have done if he is afraid of lightning striking his railings!

Dear me, it's terribly complicated! Tell him from me that (a) if he is afraid of lightning he must earth his railings permanently; (b) make you erect an aerial and earth that in a thunderstorm (c) ensure safety by earthing (a) and (b), and letting you use his railings and earthing them during a storm.

SWITCH THE SET OFF FIRST!



We have said it before, and we say again, that you MUST switch the current off before you change the grid-bias plug that provides the G.B. for a power valve. On no account should the bias for such a valve be altered in any way whilst the H.T. and the L.T. are on if you value the emission of the power or super-power valve.

Low Notes and Shunt-Fed L.F.T.

B. R. (Brentford).—"Some time ago I was attracted by the scheme of deflecting the anode current of a fairly low impedance intermediate L.F. valve through an L.F. choke and feeding the A.C. component via a condenser to the primary of the L.F. transformer. The idea was, of course, that the transformer characteristics would not be affected by the steady current and better reproduction would result.

"Since this alteration I have found that there is a noticeable increase of bass reproduction, and in fact on some notes my moving-coil speaker makes a 'juddering' sound. I am somewhat puzzled by this effect, and should be pleased if you could suggest the cause and, of course, the cure."

I can only suggest that removing the current increased the inductance of the transformer and that this increased bass reproduction, and that this produced a too great voltage swing in the following stage, and thus you suffered from blasting.

The secondary of your transformer might be shunted now by a resistance decreasing the inductance, but this will result in some top cut off. You might increase the possible grid swing of the last valve, and be sure that the anode impedance of the last valve is sufficient even for the lowest notes.

Indoor Directional Effects.

M. H. (Kensington).—"Whilst using my portable receiver in a flat which is part of a steel-framed building, I noticed that in various rooms the frame aerial requires to be swung in a different direction to receive a given station. That is, in one room it is pointing towards north and in another it has to be turned to east to receive the same station. What is the cause?"

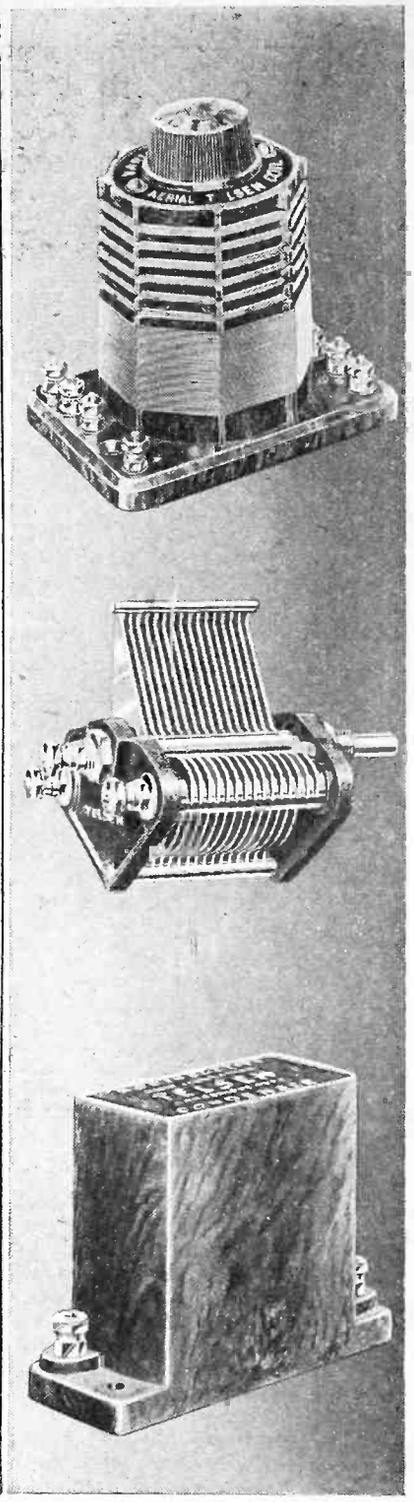
The reason signals are variable both in strength and apparent direction is because the steel-frame building distorts the fields just as flowing water has its lines of force distorted by the piles of a bridge and by any rigid objects in the water.

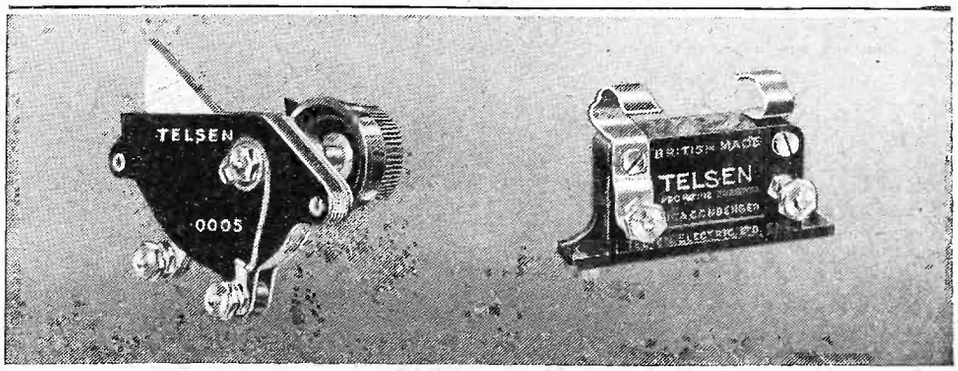
"CHANGING over to Telsen is like taking the wool out of your ears"—that is the verdict of an enthusiastic Telsen constructor which inspired the illustration on the opposite page. Telsen Components in your set give you a realism which is astonishing—they enable you to sit back and **hear**, without straining forward to listen—they bring every item on the programme 'nearer, clearer, more lively than before.'

TELSEN DUAL RANGE AERIAL COIL	Price	7/6
H.F. TRANSFORMER AND AERIAL COIL	Price	5/6
LOGARITHMIC VARIABLE CONDENSER in capacities .0005, .00035, .00025	Price	4/6
BAKELITE DIELECTRIC DIFFERENTIAL, REACTION AND TUNING CONDENSERS in all capacities Priced from		2/-
PRE-SET CONDENSERS	Price	1/6
TELSEN MANSBRIDGE TYPE CONDENSERS From		1/6
FIXED CONDENSERS Prov. Pat. No. 20287/30	Price	6d.
PUSH-PULL SWITCHES (Prov. Pat. No. 14125/31).		
Two-point	Price	1/-
Three-point	Price	1/3
Four-point (2 pole)	Price	1/6

TELSEN

100% BRITISH RADIO COMPONENTS





THE SCOTTISH REGIONAL

RECENT PROGRESS AT FALKIRK

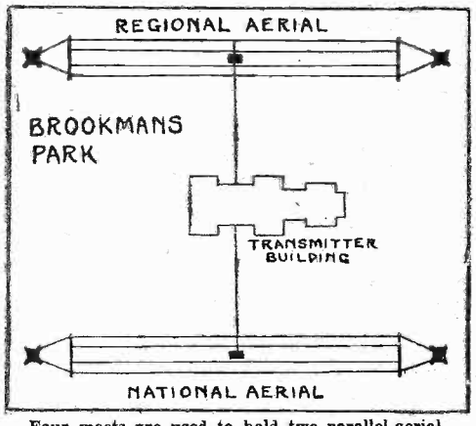
By OUR NORTHERN CORRESPONDENT.

VISITING the new Scottish Regional station near Falkirk recently, I found that excellent progress is being made. The building is practically complete and one of the two 500-ft. aerial masts has been finished. The other is rapidly nearing completion.

Nearing Completion.

Machinery is being installed, but the B.B.C. will not commit itself to anything more definite than "early next summer" in reply to questions regarding the first transmissions from this, the third of the British high-power twin-programme stations.

LONDON'S AERIAL SYSTEM



Four masts are used to hold two parallel aerial systems at equal distances from the station building.

The building of the Scottish Regional station has not, so far, been characterised by the terrible weather conditions which made the erection of the North Regional station at Moorside Edge such a nightmare. The Westerglen site near Falkirk is neither so high nor so exposed as Moorside Edge, and the surrounding country has a much "softer" appearance than the bleak and rugged hills that lie about the North Regional station.

Westerglen is roughly midway between Glasgow and Edinburgh and the station stands on a hill-top about four miles from the town of Falkirk, commanding a fine view of the valley of the Forth.

The building is similar to the transmitter buildings at Brookmans Park and Moorside Edge, but, as previously announced in POPULAR WIRELESS, the sides of the transmitting hall have been entirely bricked-in, to enable the engineers to read meters on the transmitters without difficulty caused by glare from the windows. A big skylight provides light for this room.

I understand that experiments are in progress to determine the best design for the aerials. The aerial arrangements at Westerglen will be specially interesting, as the B.B.C. is trying the experiment of suspending both aerials (Regional and National) from two masts, thus economising on the cost of one mast—no small sum of money—as compared with Moorside Edge, which, again, saved one mast as compared with the London Regional station.

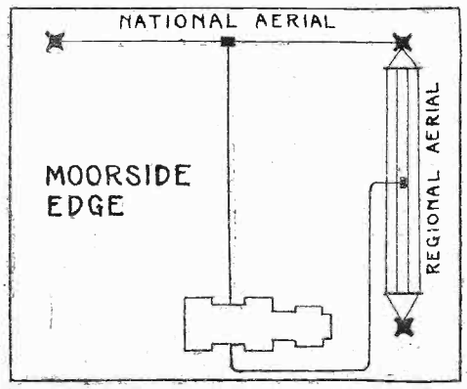
An Interesting Experiment.

It is interesting to compare the layout of the masts and aerials at these three stations:

I have not shown the aerials in the Scottish Regional sketch, as the exact arrangement is still uncertain, but the idea, roughly, is that one aerial will hang between the two masts, while the other will be in two halves, each running from the top of one mast towards the ground, on a slope.

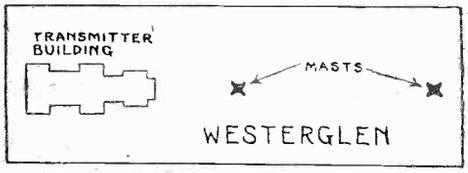
The sketches are not to scale.

USING THREE MASTS



By the arrangement shown here, Moorside Edge needs only three masts.

SIMPLIFIED SUSPENSION



At the Scottish station only two masts are to be erected.

HINTS FOR SET-BUILDERS

AN INSPECTION LAMP—EMERGENCY HEADBANDS

WHEN experimenting inside the cabinet of a wireless receiver, some form of lighting is a great help in illuminating dark corners and thus making the work far easier to carry out. For this purpose a small lamp is sometimes wired permanently across the filament busbars, but some means must then be provided of cutting it out of circuit in order to prevent a continual drain on the accumulator.

Also it is useful to be able to move the lamp about into convenient positions, especially in large receivers. A handy lamp which requires no switch to control it may be made up very simply as follows:

Two lengths of single rubber-covered flex are fixed to a flash-lamp bulb-holder, and to the end of each wire is attached a small crocodile clip, which may be obtained for twopence at any wireless retailer's. These "crocs" may then be clipped temporarily across the positive and negative filament wires, inside the receiver, at any point convenient for the work to be done, and it may be useful to fix the lamp to the side or lid of the cabinet, by means of a drawing-pin, so as to leave the hands free to work with.

The H.T. to the receiver should always be switched off before connecting the lamp to prevent the possibility of an expensive short-circuit, and when not in use the lamp is simply unclipped from the filament wires and removed from the set. It may also, of course, be used for work outside the receiver.

Handy Headbands.

Single telephone earpieces are to be picked up cheaply enough these days, and, for the experimenter and electrician in particular, they are still decidedly important articles to possess.

The trouble with many amateurs, however, is that, having acquired two single earpieces, they often find themselves unable to provide the necessary headband to fit them.

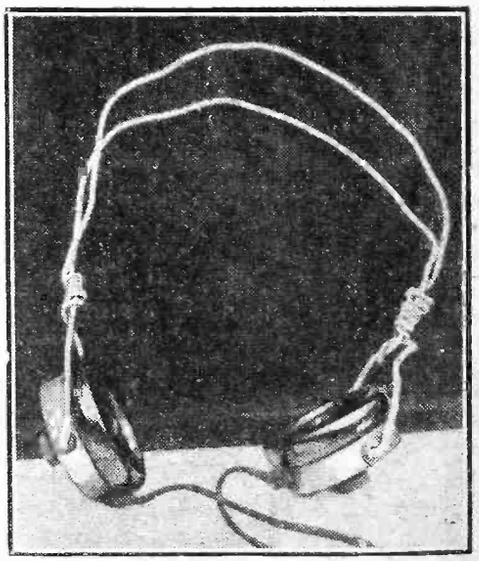
If ever you find yourself in these circumstances, don't worry. A glance at our illustration will show you a rapid and convenient method of pairing up single telephone earpieces.

Drill a small hole at each side of the earpiece cases, sufficiently wide to take, say, No. 16 guage wire. The wire is attached to the earpieces by these means.

It is then looped as shown in the illustration, thus providing a complete and serviceable headband whose size may be regulated by giving the wires one or more extra turns, curves, or twists.

Telephone headbands made in this manner are surprisingly comfortable things to wear, despite their somewhat ungainly appearance. They are very light, and they can be worn for long periods without causing annoyance to the wearer.

MADE OF WIRE!



Although so cheap and easily made, they are very comfortable in use.

The "P.W." ECKERSLEY THREE

Here it is! The very set you wanted. Personally designed and described for "P.W." readers by our Chief Radio Consultant,

Capt. P. P. ECKERSLEY, M.I.E.E.,
Originator of "Twin-Wave" Regional Broadcasting.

This set incorporates the new Eckersley Tuner, and gives results hitherto considered impossible of attainment with inexpensive and easily-obtained equipment.

KEEN STATION SEPARATION!
OVERLAPPING ENDED!
WHISTLE-FREEDOM AT LAST!

I THINK I am going to enjoy writing this article on the "Eckersley" Three, because the description of a simple receiver is so completely "out of my line." And it is always interesting to break out into something different, don't you think?

Just as looking through the wrong end of a telescope is often much more diverting than looking through in the ordinary way, so, it seems to me, I am going to get quite a kick out of this contemplation of a three-valve receiver.

Circuit Explanations.

For not so long ago, as Chief Engineer of the B.B.C., I had every set in the whole country on my mind. And after that experience, to write about just one single set is going to be decidedly diverting!

So let me proceed! It appears to be the custom of the writers who describe sets in POPULAR WIRELESS to devote a few words to a brief explanation of the circuit employed before plunging into practical particulars of "Do this" or "Don't do that." And I think it is a good custom.

Quite Different.

So I hope you will turn to the "theoretical" or "schematic" diagram on the next page and look over the circuit with me. (There is no need for you to attempt to understand it if you don't wish to, of course, but my experience of the queries you have raised in the past tells me that many of you take the keenest interest in the whys and wherefores.)

Although the circuit is quite different from any of the three-valve circuits that have appeared before, those differences are localised ones. It is not a "different-all-over" circuit, but one of the "very-different-in-parts" class.

And that brings me to the first point that I wish to make. This point is an important one—important to you who are interested in the possibilities of this receiver, and important to me as the designer of it.

It is this. I want to make clear what I had in mind when I designed this set, and what limitations I worked under, irrespective of whether those limitations were imposed by myself or by the necessities of the situation.

Majority of Ordinary Parts.

Let me say right out that I do not consider this to be *the best set it is possible to design*. Such a set would cost too much money to be really "Popular Wireless"! And it would be merely disappointing to my readers to tell them of a set which—to them—was unattainable.

No. What I have set out to do here is to describe a set that in one important respect is very much like most of the sets described in POPULAR WIRELESS, viz, a set that contains a majority of the sort of parts commonly in use to-day.

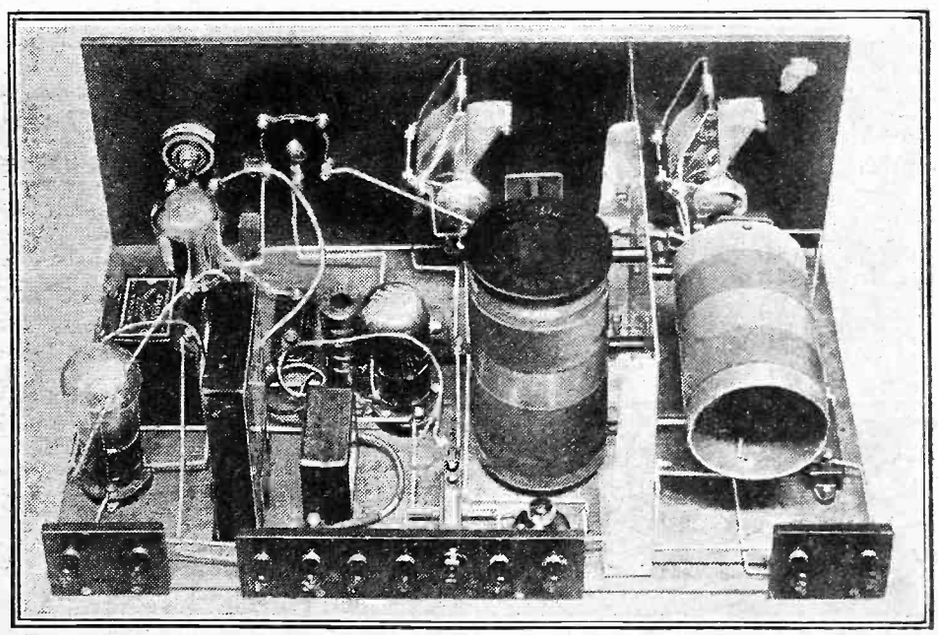
In another respect it is quite different from the ordinary set of to-day. I have tried to put myself in your place, to imagine spending your money on a set that would get the programmes you want, and yet—most important—to get these programmes with more completeness, more clarity and more beauty than is now generally experienced.

The New Tuner.

And it seemed to me that this was possible, because most sets to-day never have a fair chance to show what they can do. Most of them labour under the difficulty of trying to reproduce one wanted programme that is being

(*Contd. on next page.*)

AN ENTIRELY NEW COUPLING SCHEME



The large coils on either side of the screen, coupled by a resistance passing through it, are features never before seen in a "P.W." set. The result is completely-isolated programmes that are a joy to listen to.

THE "P.W." ECKERSLEY THREE

(Continued from previous page.)

battered and bespattered by another *unwanted* programme. Can that state of affairs be altered?

The answer is "It can. My new tuner does it!"

That tuner is the basis of this set. Apart from the tuner there is not much that differs from other sets, so when you have built the "Eckersley" Three you will be able to check my conclusions by comparing your new results with those you have been accustomed to.

Clean-Cut Reception.

And I am sure that you will agree with me that here we have something truly good. The set is sensitive and it is really selective, without being in the least difficult to handle. The clean-cut reception of which it is capable is extremely pleasing, and, without exception, everyone who has heard the set in action has been delighted with it.

As I have said, most of the set is based on commonly-accepted principles of reception. All that the aerial picks up is first passed to the "Eckersley" Tuner, and there the desired programme is selected, after which the normal three-valve set processes are carried out.

Well-Tried L.F. Arrangement.

You will appreciate this at once if you first view the circuit diagram *apart* from that portion of it representing the "Eckersley" Tuner. This tuner is indicated by a dotted outline, interposed between the aerial (to the left of the diagram) and the first valve, so you can easily "isolate" it.

Ignoring this most interesting part of the circuit for a moment, you will see that the rest of it follows along more or less conventional lines. The first valve (V_1) is the detector, and it operates on the popular grid-leak-and-condenser method.

For the benefit of those who have a gramophone, provision is made in its grid circuit for the use of a pick-up. This enables the electrical reproduction of records to take the place of a wireless programme, or to fill in the gaps when the B.B.C. engineers are off duty.

Incidentally, this change-over to gramophone can be carried out *flick*—so! For the little "radio-gram jack" depicted in the diagram is of the cut-in and cut-out variety, operated instantly by the insertion or withdrawal of its plug.

Doubtless you know the idea as well as I do. Leads from the pick-up terminate in the plug, and connect the pick-up in its right place as soon as the plug is pushed into its socket, at the same time automatically disconnecting "radio."

Radio-Gram. Change-over.

The pulling of the plug out of its socket disconnects the pick-up and restores the broadcasting. Very convenient!

Apart from this business of the pick-up, there are one or two minor points that may interest you. But, by the way——

Before I leave the question of radio-gram reproduction it occurs to me that some readers may wonder if it is worth putting in a pick-up fitting when they haven't a gramophone! An important point!

Personally I should say "Yes." Because someone may give you a gramophone for Christmas, or birthday, or something—and the cost of the plug with its socket is very small.

However, it can be omitted altogether if desired. (Simply join grid direct to grid leak and grid condenser, or if that doesn't explain itself to you, the "P.W." Technical Queries people will help you out.)

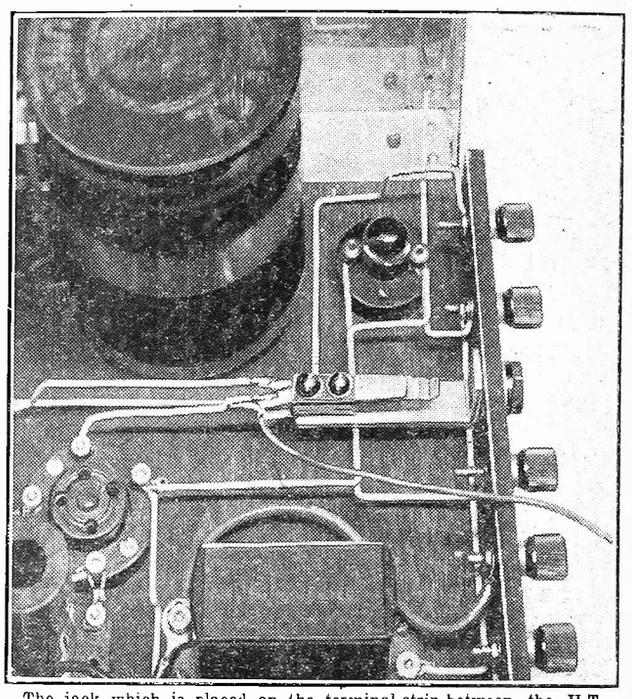
Continuing our survey of that part of the circuit not contained in the "Eckersley" Tuner, we shall note that it follows the standard detector-and-two-low-frequency arrangement very closely. Resistance-capacity coupling is followed by a stage of transformer coupling, with provision for volume control on the first L.F. grid.

The 100,000-ohm resistance inserted between the volume control and grid is what is known as an "H.F. stopper," for preventing stray H.F. from affecting the quality. (I explained the action not long ago in "Popular Wireless" in reply to an inquiry from a reader.)

A battery by-pass for L.F. currents (what is called "de-coupling") is provided, and the reaction control is of the type called "differential," which has now become so popular.

All this is more or less "old stuff." The really interesting part of the circuit is that within the dotted lines—the "Eckersley" Tuner, in fact.

FOR RADIOGRAM RESULTS



The jack which is placed on the terminal strip between the H.T. negative and L.T. negative terminals enables a gramophone pick-up to be plugged in, thus instantly converting the set into a radio-gram outfit.

One-at-a-Time Reception.

In its strategic position between the aerial and the first valve, this tuner sorts and sifts everything picked up by the former before it is passed to the latter!

Its effect is truly astonishing. If you have been suffering from too much Mühlacker; if you have been hearing ghostly drums banging in the background of your programmes; if you have had to listen to mysterious voices talking to unseen audiences, you really must get acquainted with this tuner.

It is a one-at-a-timer. Set it for London and you receive London itself, *not* London-cum-Germany, cum-Austria, cum-all-ye-faithful of the Continent of Europe!

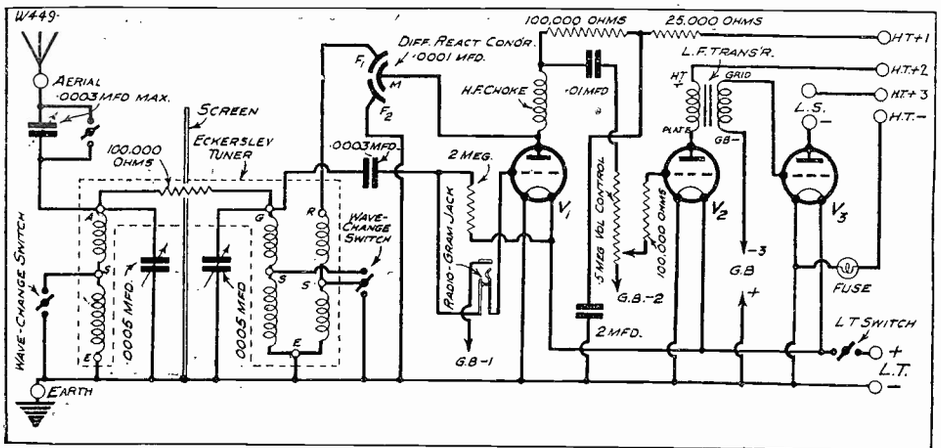
Easy Station Separation.

It really gets over that interference problem. No longer need the North Regional listeners pray that Prague may perish. No longer need the Glasgow listener "Hier Hamburg" against his will. For easy station separation *is* possible to an extent which, I am certain, will come as a revelation to many who build this set.

In previous articles in "P.W." I have told you something of the inception of this new tuning system, and of the principles on which it works. Now you have it incorporated in a set, and you are to judge it for yourselves. It's going to be exciting!

(Continued on page 1014.)

A LOGICAL SYSTEM OF STATION SELECTION



In this receiver, sharply-tuned resistance-coupled circuits select the programme required *before* it is amplified by the valves—which is the logical method of station separation. Other features are differential reaction, volume control, adequate dc-coupling and provision for playing your gramophone electrically.

THE "P.W." ECKERSLEY THREE

(*Continued from page* 1012.)

And what pleases me is that this state of affairs has been rendered possible by comparatively simple means.

The "Eckersley" Tuner is a perfectly straightforward piece of apparatus, and various radio traders have co-operated in the construction of an ample supply at a reasonable price. But I should like to remind my readers that this tuner is the result of much thought and preparation, and that haphazard attempts by them to make similar tuners at home, without proper facilities, may result in disappointment.

No Complexity of Construction.

Simple as it may appear, there is much more in its construction than the mere joining of two screened coils by a resistance; and, therefore, variations of size, or of spacing, or of electrical values may be quite fatal to its success.

What I have already said about the circuit, and what you can see from the theoretical diagram of connections, will have convinced you that so far as the making of the set itself goes there is nothing to fear in the way of complexity of construction. All the really important work of spacing and aligning the two coils is already done for you in the tuner, and there is nothing to be done in the rest of the set except to follow the instructions which will appear next week.

I don't think I need here add more about the general scope of the set, except, perhaps, to say that you will observe that it tunes over the long waves in addition to covering the "medium band" in which the Regional stations are placed. And, of course, there is no coil-changing, but a simple switch-over to the required wave-band.

Battery or Mains.

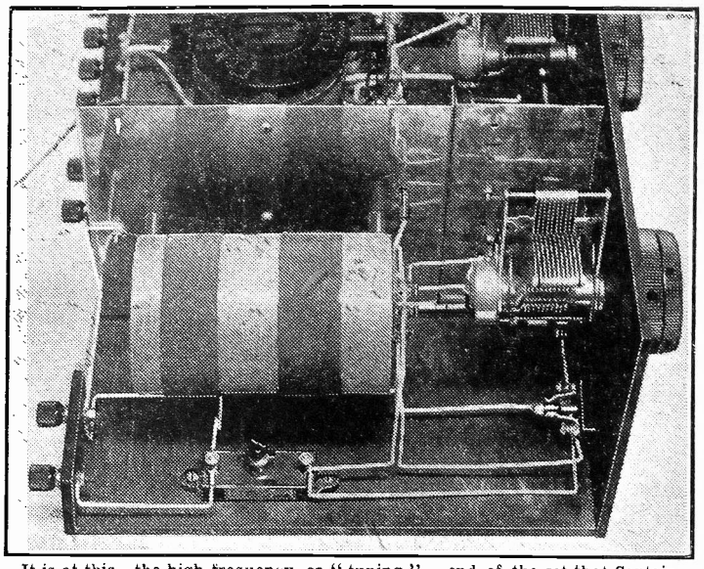
To meet the requirements of the majority this is a battery-run receiver; at least, this model uses the "battery" type of valve, and not the special "mains" valves which can only be of use to the man with an electric light supply in the house.

The set calls for no special conditions, for all the low-frequency end of it conforms to the usual practice of such designs; and it is variations here that might need special caution.

So far as the high-tension for it goes, either a mains unit or an H.T. battery can be used perfectly well. But we must leave such details for the time being and content ourselves with having outlined the main points.

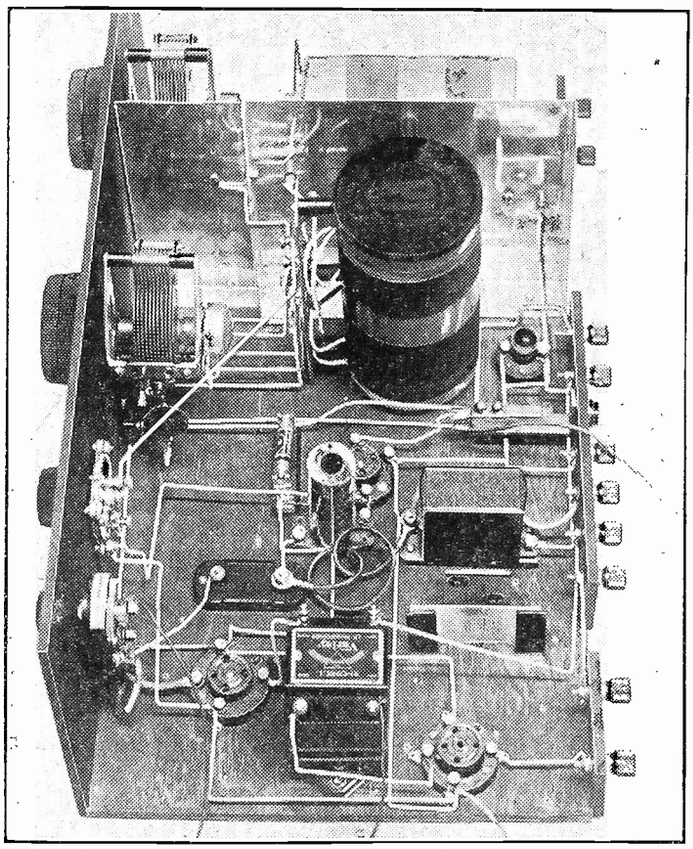
Next week I shall continue my article with details of actual construction and so forth.

PERFECT "AERIAL BALANCE"



It is at this—the high-frequency, or "tuning"— end of the set that Captain Eckersley has made really radical departures from standard practice in receiver design. Everyone who has heard the "Eckersley" Three in action admits that he has made an extraordinary "clean-up" from a quality point of view, eliminating those annoying background noises and the mush and whistle that so often mar complete enjoyment.

A STRAIGHTFORWARD L.F. SECTION



The L.F. end of the "P.W." Eckersley Three is a standard arrangement of a resistance-capacity stage followed by L.F. transformer coupling. It develops great power and amazingly good quality, for the programmes handed to it from the Eckersley Tuner and the detector are far superior in realism to the programmes it is possible to select by the ordinary methods in vogue up to now.

NOTES FROM THE MIDLANDS

By Our Birmingham Correspondent.

THE B.B.C. will have to tackle the question of accurate timing of Regional programmes. Recent incidents have irritated listeners in the provinces.

Frequently the Midland, London, and North Regional stations are broadcasting different programmes prior to the second general news bulletin at 10.15. If one of these programmes exceeds its time the question is: should the other two stations be kept waiting for the news?

One night recently the London and North Regional stations were transmitting speeches from a Jewish function. Instead of concluding at 10.15 the relay continued until 10.30. In the meantime Midland Regional listeners were treated to 15 minutes of the "doomp-doomp" interval signal. Judging by this and other happenings, when London overshoots its time, the provincial transmitters must wait, but when the provincials do so London will not wait—there have been several occasions when London has started giving out the news bulletin before the provincial transmitters were ready.

C.B.P.

These initials mean to Midland Regional listeners "Charles Brewer Production," and they signify something bright and entertaining, neatly produced and ingeniously contrived.

Mr. Brewer, who is in charge of the dramatic side of activities at the Birmingham studios, puts on the hundredth "C.B.P." on December 30th. I gather that, having reached a hundred such shows, Mr. Brewer intends to make this an "extra special."

From Midland Towns.

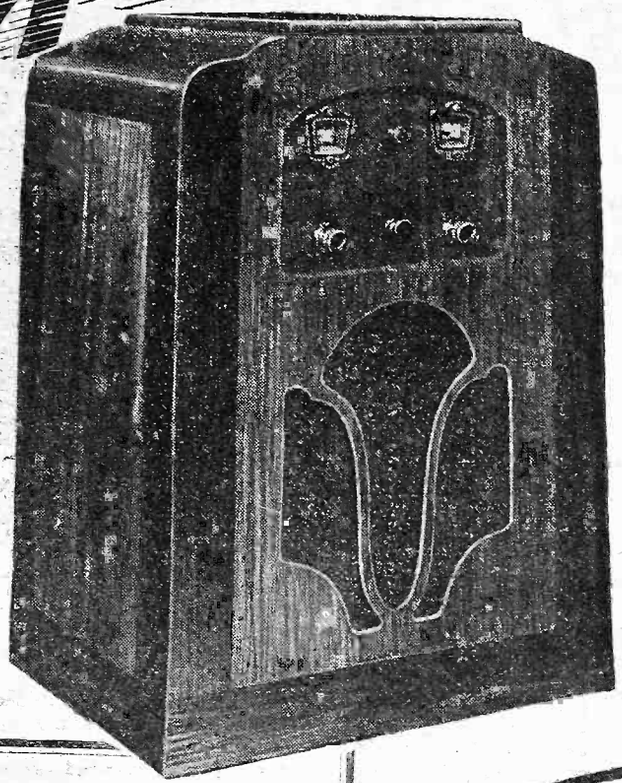
A good amount of fresh talent has been brought to the Midland Regional programme by the series of "Midland towns" programmes, in which one town is selected to provide a broadcasting programme for the Midland station.

I understand that this series is to be continued through the winter, all the principal towns being "featured."

During a recent relay of opera from the Prince of Wales Theatre, Birmingham, there occurred a queer breakdown. The singing and orchestra suddenly ceased. After a long pause it turned out that the B.B.C. was not to blame—the lights in the theatre had failed.

Incidentally, I learn that as suitable material comes along relays will be carried out from all the chief theatres and music-halls in Birmingham. They are not all wired up for broadcasting, but this work is to be undertaken soon.

The METEOR III



70 Extra Stations

Do you realise that there are over 70 Short-Wave Stations in all parts of the World transmitting programmes which cannot be heard on the ordinary type of receiver? Think what you are missing by not hearing them. Imagine the thrill of tuning in America, Africa, Australia and other far distant countries on your own set.

The Meteor combines all the attractions of quality performance, simplicity of operation, sensitivity, selectivity and handsome appearance, with the fascination of World-Wide reception on ALL-WAVELENGTHS.

With a pick-up connected to the sockets provided, your Meteor becomes an electrical reproducer of gramophone records at a flick of the Radio-Gram switch.

METEOR III KIT

Complete Set of quality components, including panel (cut and drilled), baseboard, Jiffilinx, flex, screws, plugs, etc.

75/-

or 9/- down and 7 monthly payments of 10/6

STANDARD CABINET KIT

Complete Kit with Standard Cabinet to house set only.

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or 11/- down and 8 monthly payments of 11/-

CONSOLETTE CABINET KIT

Complete Kit with Consolette Cabinet as illustrated to house set, speaker and batteries.

£5.0.0

or 11/- down and 9 monthly payments of 11/-

Choice of Recommended Accessories

Mullard Valves
1—P.M.2 DX .. 8 6
1—P.M.1 L.F. .. 8 6
1—P.M.2 .. .. 10 6

Batteries
Pertrix 120v. Super capacity 1 5 6
or
Pertrix 120 v. Standard .. 15 6
or
Ever Ready 120 v. Popular Power .. 1 4 0
Pertrix 9 v. G.B. 1 6
or
Ever Ready 9 v. G.B. 1 0

Accumulators
Fuller 2 v. 20 amp. type S.W.X.H.5 .. 8 3
or
Pertrix 2 v. 20 amp. type P.X.C.2 .. 9 0

Loudspeaker Chassis
R. & A. type 40 Reproducer .. 16 6
or
Celestion Chassis type M.12 .. 1 15 0
or
Blue Spot Special chassis & 66 P. Unit .. 1 15 0

Gramophone Pick-Up
B.T.H. Minor .. 1 7 6
or
B.T.H. Senior 2 5 0

Volume Control
ReadiRad 5 meg. 5 9

Gramophone Motor
Collaro Type B.30 with Unit Plate and Automatic Stop 1 13 0

ALL BRITISH

Free—

Go to your radio dealer. Ask him for your free copy of the Meteor Folder, which describes fully the most interesting receiver ever designed and includes full-size plan and wiring diagram with complete building instructions. The easiest set to build. No drilling or cutting, no soldering—a screwdriver and pliers are the only tools you need. Quality components throughout.

If any difficulty in obtaining your Free Meteor Folder, post coupon now to Ready Radio Ltd., Eastnor House, Blackheath, S.E.3.

Special Features of the Meteor:

18 to 1 Slow-Motion Drive on both tuning and reaction; extended anti-capacity reaction control; adjustable selectivity; Kendall loose-coupled air-spaced coils; Radio-Gram Switching, etc., etc. Mullard Valves are recommended. Designed by G. P. Kendall, B.Sc.

Daily demonstrations of this wonder receiver at the Ready Radio Showrooms: 159, Borough High Street, London Bridge, S.E.1
(2 minutes from London Bridge Station)

G. P. Kendall, B.Sc., the designer of the METEOR III, has written a book entitled: "Ten Hows for Modern Radio Constructors." It settles every radio problem for you. Send four 1½d. stamps for your copy now.

READY RADIO

Name.....

Address.....

P.W. 2/1/32. **BLOCK LETTERS—IN INK—PLEASE.**

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found-?

VALUABLE VALVE GADGET.

THE Electrical Trading Association, Ltd. has sent me one of their new valve comparison tables, which gives equivalent types of all makes of valves, with the Eta range as the base, and also includes a station-finding, dial-reading scheme. It is a very useful device, and I hope, for the sake of constructors, it is to be liberally circulated.

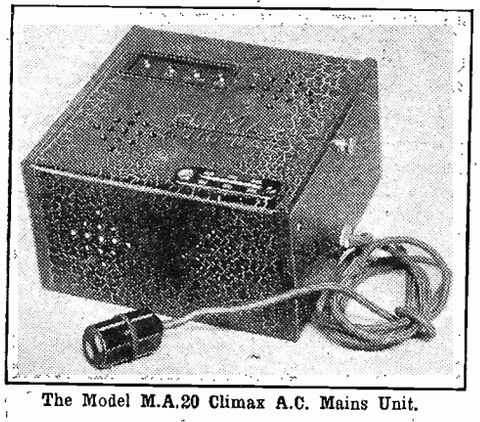
WOUND COIL QUOITS.

Melbourne Radio Supply of Walthamstow are now making "P.W." Coil Quoits, and are also supplying these ready wound on the following terms. Long Wave, for use in conjunction with P.J.1 and P.J.3 coils, 2s. 9d. Long Wave, for use with P.J.2, 2s. 3d. Hank Contradynes, 60 turns, 1s. 9d.

There are two points which particularly appeal to me in these Melbourne coils, and these are first, the well-finished off lead ends, and second, the plain marking for these, which is carried out in white lettering on the transparent material used for covering the windings.

The Quoits themselves are well made from high-grade ebonite. Constructors should also note that the Melbourne windings are exactly as specified by us in our articles.

A NEW A.C. UNIT



The Model M.A.20 Climax A.C. Mains Unit.

A "CLIMAX" H.T. UNIT.

There are two vital considerations which should guide all potential purchasers of mains units. The first, and very undoubtedly the first, is safety. The rule is that you should never buy a mains unit unless its design and construction rigidly conform with the recommendations of the Institution of Electrical Engineers.

These recommendations are scientific "safety first" rules drawn up on a basis of sound common-sense.

The second consideration is that of output. Always make sure that the unit you are contemplating buying can deliver the necessary current and a bit—say, 30 per cent—to spare against any future contingency.

Remember that, although you may be perfectly satisfied with your present valves, the day may not be far distant when you will feel the urge to acquire one which is a bigger current-eater.

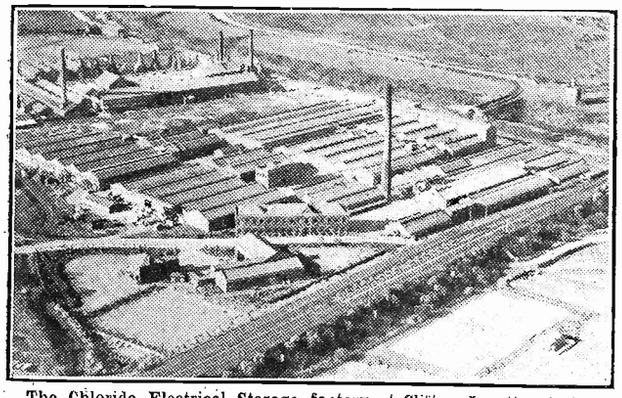
The new Climax Autobat A.C. Mains Unit gives you 20 m.a. at 150 volts, which is a superior output to most popular type units. Also, it complies with those I.E.E. recommendations.

It employs metal rectification, and is suitable for any mains from 200 to 250 volts (40–100 cycles). It has three "tappings," 60/75, 80/100 and 120/150 volts.

The price is 52s. 6d.

We have tested this new Climax unit, and find it to be quite good. There is obviously efficient smoothing, and the outputs are in accordance with the specification.

A "BIRD'S-EYE" PEEP AT EXIDE



The Chloride Electrical Storage factory at Clifton Junction is the largest battery-making plant in the British Empire. It is working full time on the manufacture of Exide, Exide-Ironclad and Chloride batteries.

A FIRST-CLASS SPEAKER.

Fifty shillings is the price of the Minor Permanent Magnet Model in the new B.T.H. R.K. range of loudspeakers.

And the fact that an R.K. speaker is now available at such a low price is in itself a striking example of the remarkable value for money the British radio industry can now offer.

You see, it would be inconceivable that any of the R.K.'s (which have always been veritable aristocrats of their class) could be anything but good.

And in actual fact this "junior" model is very good indeed. It is almost unfortunate that it necessarily exists as the "junior" member of a family, for not a few firms might be proud to style it their "senior"!

It will handle very capably anything in the way of an output from an ordinary household set and give a first-class response, providing a proper baffle-board or good cabinet is used.

And it is sensitive, too, so that from every angle it is a most attractive proposition.

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.

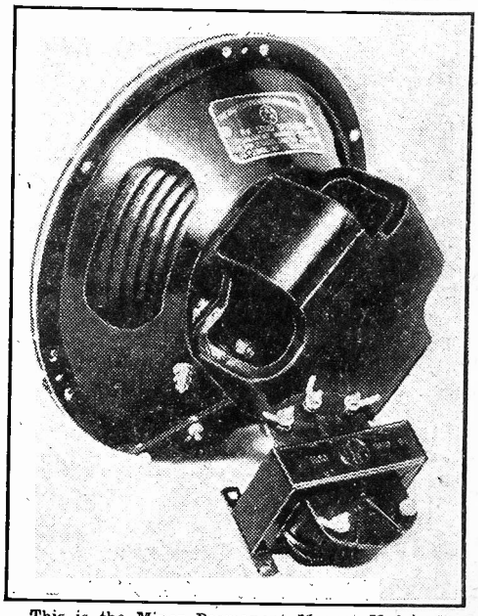
We should like to point out that we prefer to receive production samples picked from stock, and that we cannot in any circumstances undertake to return them, as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

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.

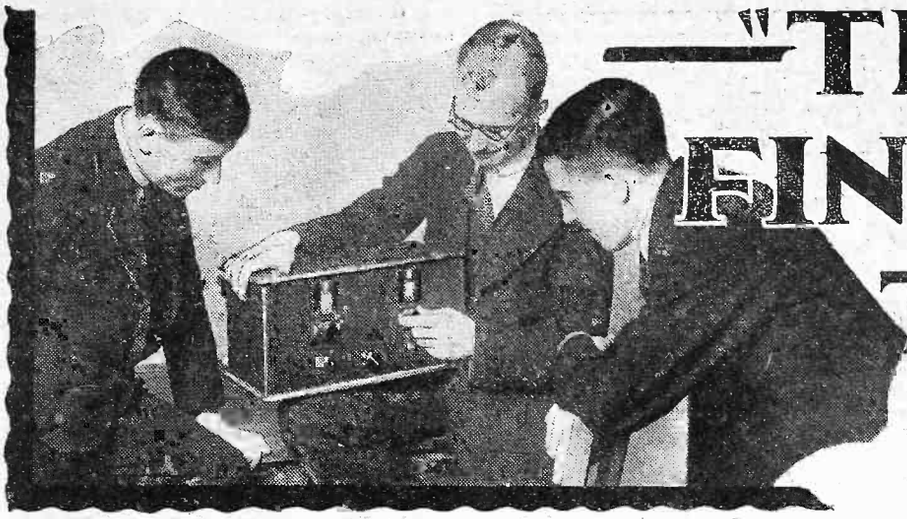
ERIE FIXED CARBON RESISTORS.

A Cricklewood factory has been secured for the British manufacture of the above well-known transatlantic components, a report concerning which will probably appear in our next issue.

ONE OF THE JUNIOR R.K.'S



This is the Minor Permanent Magnet Model of the B.T.H. R.K. loudspeaker, together with a suitable transformer.



"THAT FINISHING TOUCH"

Some practical notes on the little points that are so easy to overlook, compiled by W. L. S., one of "P.W.'s" most popular contributors.

I HAVE always imagined that there must be three classes of home-constructors.

First there is the man that does not read "P.W.," who builds a set and (a) doesn't make it work, or (b) does. In either case that is all you hear of it until the spirit moves him to make another one. He is not an enthusiast.

The second is the man that makes some sort of receiver, ascertains by conversations with friends "in the know" that it is working fairly well, and leaves it at that.

Thirdly, we have the man after my own heart who makes a set and is *never* satisfied. He gets good results from it—far better, perhaps, than does the man next door—and yet he is always thinking of how it might be improved just a little bit more.

The Enthusiast.

Although he is never satisfied—and here is the curious thing—he gets more enjoyment out of his radio than either of the other two, just because he is an *enthusiast*.

Another strong point in his favour is that he is willing to learn. Everything he finds out is one more trick in his favour; every little improvement that he can cram into one set is automatically used in the next.

Now please do not mistake it for conceit on my part if I say that I regard this man as a brother. I have *never* been satisfied yet, and probably never shall be. When I have a set that is going so well that I feel in danger of sitting back and saying, "Yes, that's as good as I can possibly make it," that is the sure signal for me to take it to pieces and start on something else.

It is, as a matter of fact, a stock joke with my colleagues that each set I make is "miles better than the previous one." Gentle humorists tell me that this only shows that the last set but four, for instance, must have been pretty bad. That, however, is the penalty for enthusiasm, and it is for the enthusiast that I am writing these few words.

Watch the Detector.

Although my remarks apply first of all to short-wave sets, they may be taken to heart equally by any "non-short-waver" who happens to be reading them.

I will commence by reminding you of the text of my usual lecture—make sure that your detector is efficient *first*. Whatever set you may be using, do not commit the awful sin of piling on the amplification to make more noise. Play with the detector all on its own until you are sure that it really is working well.

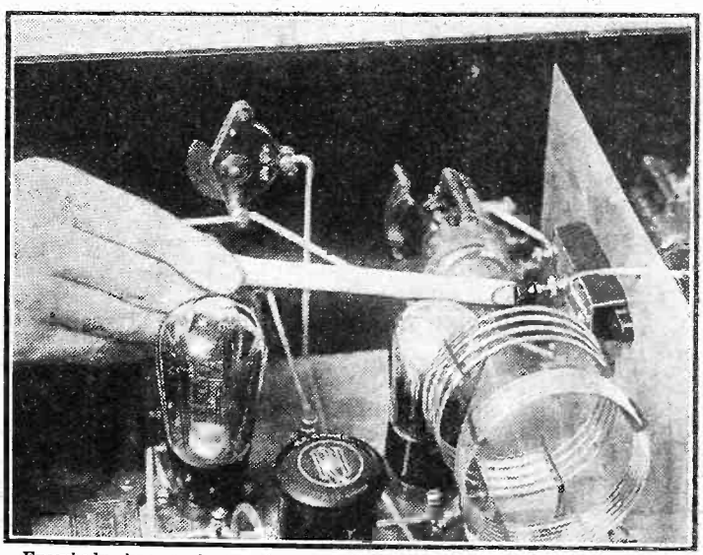
Where Efficiency Counts.

Why is it that some of us receive, on two valves, signals that astonish the owners of multi-valvers? The answer is—the detector! If some of the said multi-valver folk would plug their 'phones in on their detector only, they would probably find that they could hear nothing at all. This is not exaggeration, for I have met it in cold fact more than once.

So look after the small points that mean so much, such as the reaction control, the grid condenser and leak, the coils (see that the leads from them to their condensers are short), and, in general, play with the detector for a few days until you feel you cannot get any more from it. *Then* connect up your rows of low-frequency amplifiers again and listen to the signals.

This applies likewise to sets with H.F. stages. When allowed to do so, they tend to follow up the analogy of the American car versus the British car. In one case brute force—sheer horse-power—is used to do the job, and in the other efficiency does it.

"... AND IT MADE ALL THE DIFFERENCE!"



Everybody knows how a few expert touches can revolutionise reception—and on this page W. L. S. puts you wise to some sure aids to efficiency.

For those who have the current to spare I strongly advise the use of indirectly-heated valves as detectors on short waves. I am old enough not to be, but I must admit I was surprised myself to note the difference this made to my present receiver. Even if it means 4 volts 1 ampere from an accumulator, I think it is worth while. If you have A.C. you might try running the detector filament from raw A.C., but without redesigning the set you will probably not be able to get rid of the hum completely.

Curing Self-Oscillation.

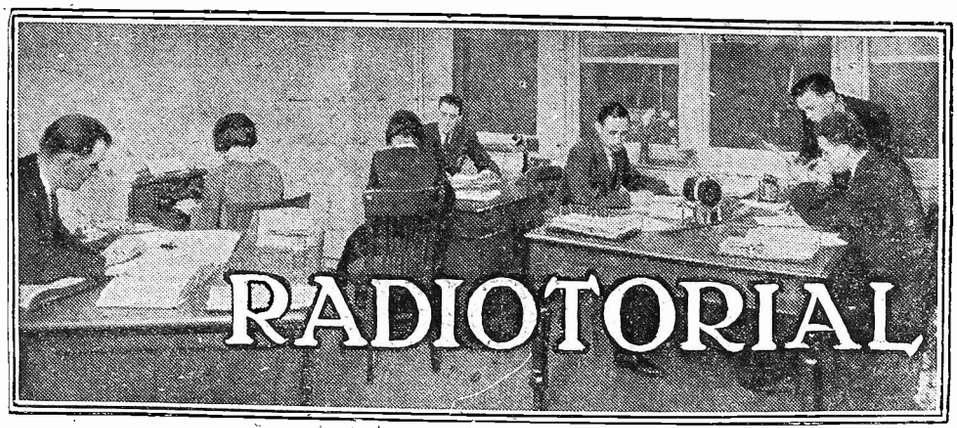
Another point that occurs to me here is this. If you find that on certain wavelengths your set will not stop oscillating, even with the reaction condenser at zero, don't cure it by reducing the H.T. This will reduce the efficiency likewise. I am a believer in *lots* of H.T. on a short-waver.

You may do the trick by tightening up the aerial coupling still more, or by using a small condenser in series with the reaction condenser. If you have another variable available, you might try substituting it for the present reaction condenser, which probably has rather too high a minimum.

Threshold Howl.

Here is another one. Don't cure threshold howl, if you can help it, by using a rather low resistance across the transformer secondary; ·25-megohm will certainly cure the worst threshold howl, but it will likewise kill the amplification.

Don't use anything less than 1-megohm, and if the howl has not completely gone, look round elsewhere. One good idea is to take out the H.F. choke in the detector circuit and to use a resistance in its place. A 10,000- or 20,000-ohm Spaghetti is useful, but the voltage drop should be compensated for by pushing up the H.T. voltage a little.



All Editorial communications should be addressed to the Editor, POPULAR WIRELESS, Tallis House, Tallis Street, London, E.C.4.

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

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

QUESTIONS AND ANSWERS

INSERTING 'PHONES ON A THREE-VALVER

"INVALID" (South Croydon).—"I wonder if you can give me some advice about providing 'phones for an invalid to use? The set is a 3-valver, run from the mains, and it is in my study, which is upstairs.

"Normally it runs one loudspeaker downstairs (with volume control) as well as a built-in loudspeaker upstairs when desired. The circuit is H.F., Det. and L.F. (transformer), using A.C. valves.

"I have a pair of 'phones which I use on a short-waver sometimes, and I want to insert these in the big set, to provide medium-strength reception in one of the bedrooms.

"My wife's sister who is staying with us has met with an accident and will be kept in bed for weeks, and the bedroom is too far away to hear the upstairs loudspeaker clearly. As a temporary measure I have run flex leads in, and used the downstairs loudspeaker up in the bedroom. But it is much too loud for an invalid.

"I am told I could use the 'phones upstairs (which are of more than sufficient strength when put in the set in place of the L.F. transformer primary), and the *loudspeaker downstairs* at the same time by a stunt mentioned in 'P.W.' some time back, the 'phones being placed in a 'two-valve' circuit, and the loudspeaker as usual running from all three valves.

"If this could be done easily please give connections, and if possible suggest a method in which I can use an L.F. transformer or 'filter' for the bedroom circuit, which would save H.T. from being carried there. (The set uses a choke-capacity output filter, and I have two 1-mfd. condensers on hand, also a volume control and old 5/1 L.F. transformer, which I can use if necessary.)"

An easy way to get a "filtered" output without making many alterations in the set would be to make the present L.F. transformer's primary act as a choke for an added 'phone circuit.

You have the necessary parts for this, comprising 'phones, large condenser and volume control. The latter is to be used as a variable resistance, and the necessary alterations to the set are as follows.

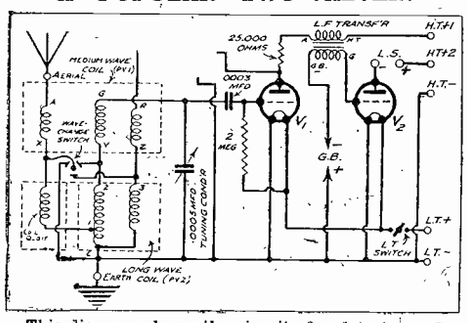
The "P" or "A" terminal on the set's L.F. transformer to be joined to one side of one 1-mfd. fixed condenser in addition to its present connections. Other side of this condenser to a long lead to the volume control in the bedroom.

Slider of volume control to one 'phone lead, other 'phone lead back to "earth" on set.

It should work well, and although the volume downstairs will be affected to some extent, it should be easy to compensate for this on the volume control.

The 'phone circuit would, of course, carry no H.T., as this would be "filtered" by the condenser intervening.

MISSING LINKS, No. 25
A POPULAR TWO-VALVER.



This diagram shows the circuit of a detector and L.F. amplifier, which is the most popular and successful arrangement for two valves. But one of the "components" has purposely been omitted—can you fill it in correctly?
Look out for the answering diagram next week.

THE QUALITY OF 5 X X.

"COMMERCIAL" (Manchester).—"Is it a fact that Daventry 5 X X is not capable of giving such good quality as the Northern Regional station?

"I have heard this question hotly debated a number of times in my travels—I am a 'commercial,' doing the North and Midland circuits—and even the wireless people themselves seem to be uncertain about it. Among the people who do not pretend to know anything of the technical side of wireless there is just as much difference of opinion, some swearing by Daventry's quality and some contending that compared with other stations it is a 'dud.'

"What is the truth, and is the talk of a new station there an indication that *quality* is in need of improvement, or merely the strength needs increasing?"

Daventry 5 X X is an old station, and the B.B.C. themselves admit its quality of transmission is not so good as the newer Regional stations at Brookmans Park and Moorside Edge.

Daventry 5 X X was built in 1925, and although a masterpiece in its day, there have been great advances in technique since then, which the B.B.C. will incorporate in the new Daventry long-waver that is now being planned.

A good measure of the advances made is the fact that whereas really modern transmitters are capable of a straight-line response to frequencies covering a range of from 30 to 10,000 cycles, the 5 X X transmitter was claimed to have even response to frequencies between 80 and 5,000 cycles. A very marked difference!

USING A FRAME AERIAL.

K. S. (Isle of Wight).—"In order to overcome the nuisance of 'jamming' from powerful stations working to ships, and from ships themselves, I was advised to use a frame-aerial set. This has given satisfaction, but I notice a peculiarity in practice which seems worth mentioning.

"I understand that the idea of the frame is that it gives the best pick-up from say, London Regional when the windings of the frame point to London. And the same with other stations.

"I find, however, that in practical use my frame's position of best reception is so that I cut out the loud (local) interference, and then bring up the foreign and distant stations with reaction, irrespective of their direction, and without moving the frame! Is this correct?"

When the interference comes from some localised source, such as a nearby transmitting station, it may be—in fact, it generally is—better to concentrate on cutting that out than on trying to strengthen distant stations. Or, if that is not very clear, can we put it this way?

The frame aerial always has a "maximum" and a "minimum" in operation. If the windings are turned to point North and South, for instance, the maximum strength of reception is possible from stations lying North or South; and at the same time the "minimum" effect takes place at right-angles to the direction in which the windings point. So that when pointing N. and S. the minimum strength is received from stations due East and West.

There are thus two ways of using the directional effect of a frame aerial. (a) It can be pointed *towards* the desired station to strengthen it. Or (*b*) it can be pointed at right-angles to the interfering station to *reduce this to a minimum.*

You are, apparently, finding that the second method (*b*) gives better results than the first, and as a matter of fact this is commonly found in such circumstances.

If, however, you moved to another locality, where there was no overpowering local source of interference to contend against, you might find it better to operate on the other principle, and move the frame windings to point at the desired station, instead of leaving them set in one position to effect a cut-out of unwanted transmissions.

P.J.3 COILS AND SELECTIVITY.

R. W. (Glasgow).—"I am using a three-valver, screened grid, detector and low frequency with P.J. coils for aerial and for the high-frequency stage between the L.T. and detector. The selectivity is wonderful and, in fact, the set seems too selective, and I am wondering if I am using it right.

"I usually put the aerial on the red or 6 turn tapping and the 30 for long-wave coil quoits. Also the same with the high-frequency stage coupled to the detector. Is this right?"

You should get adequate selectivity with the arrangement named, when it is used *in the aerial coil only.* There is probably no need to use it on the

(*Continued on page* 1020.)

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 1018.)

H.F. stage as well, and you may be losing a lot of volume by doing so.

To test this, leave the first coil with its connections as at present, but between the S.G. and detector valve take the flex lead from the red or No. 6 tapping and instead try it on the white tapping on the P.J.3. It should improve the volume on weak stations quite appreciably, and yet give you ample selectivity for your needs. Incidentally, of course, the slightly lower selectivity will mean easier handling.

OUTPUT FILTER FOR THE "COMET."

"NOVICE" (Erdington, Birmingham).—"My set is the foundation model of that wonderful circuit, the 'Comet' Three. Recently I attempted to add an output filter circuit and connected an output choke (20 henries) and 2-mfd. fixed condenser, as per instructions in 'P.W.' vol. xviii, Feb. 28th, 1931.

"Result was no loudspeaker reproduction, but I could faintly hear broadcast through headphones. Hoping to find my wires connected wrong I checked and re-checked same, only to find them correct.

"I tested components, they were O.K. I connected choke in series with condenser in the loudspeaker lead with the same result, no reproduction. I connected choke separately in loudspeaker + lead and result was half volume. Then the condenser was connected up in series with loudspeaker + lead with no result.

"I hastily discarded these brand-new components, but I grieve when I see them lying idle when 'P.W.' tells me they should be in my set, seeing that I use a mains unit.

"Hoping that you can advise me in some way or hint at what could have possibly been wrong."

In your alterations, what did you do with the lead that joined the H.T. terminal on the second low-frequency transformer to the L.S.+ and H.T. +2 terminals?

We suspect that lead is the whole cause of the trouble. Although we have explained it briefly several times in "P.W." perhaps the rather incomplete details which were given in the article on "L.F. Control for Your Comet" misled you into leaving that lead still connected to the L.S.+ terminal.

If so, all you have to do is to wire up as follows, and all will be well:

Mount your "output" choke with its two terminals facing towards the terminal strip, and secure it by means of a couple of screws. Put the big condenser back in the place shown in the photographs and fix that also.

Remove the present lead between the plate of the third valve and the L.S.— terminal—the one at the end of the terminal strip.

Disconnect L.S. + terminal from H.T. +2 terminal, and change lead from H.T.+ of 2nd. transformer from L.S.+ to H.T.+2.

Run a new lead from H.T.+ 2 to one terminal of the output choke. Wire the other choke terminal to the "P" (or "A") terminal on the V3 valve holder, and then to the nearest terminal of the 2-mfd. condenser.

Wire the other terminal of the condenser to the L.S. negative terminal. Finally wire the L.S. positive terminal (the one that is next to H.T.+ 2) to any point on the negative side of the L.T. circuit.

(Probably the most convenient place for this will be the terminal on the V3 valve holder, which is already connected to H.T.—, L.T.—, and to the other valve holders, etc. But if you like you can ignore the valve-holder connection and run the lead to the L.T.— or the H.T.— terminal direct. It comes to the same thing, as they are all joined together.)

That completes the alterations, and you should find you get quite as much volume as before with all the advantages of a filtered output in addition.

"P.W." PANEL. No. 52 Using Metal-Covered Baseboards.

The high magnification of modern valves has led to a great increase in screening, and it is now not unusual to find the whole baseboard must be covered in copper foil.

* * *

Such screening is always connected to earth, and therefore to H.T. negative and the filament (or cathode) circuit.

* * *

Consequently all wires not at earth potential must be properly insulated from the foil, and all component connections, soldering tags, bare leads, plugs, etc., must be kept away from it.

* * *

The mounting of the components such as valve holders is generally best done on insulation, dry cardboard affording quite a good protection for this purpose.

TECHNICAL TWISTERS

No. 94.

CONTROLLING THE VOLUME.

CAN YOU FILL IN THE MISSING LETTERS?

The up-to-date receiver amplifies so much that some form of volume control is usually provided to prevent . . . . . .

* * *

There are many ways in which such control can be effected, and it is easily carried out either . . . . . or . . . . . the detector. (The former is the more logical method.)

* * *

The commonest and usually the best method of volume control is to use a . . . . . arrangement in which variable connection is made along a high . . . . . to tap off the required proportion of the . . . . . .

Last week's missing words (in order) were: Short. Heaviside. Source. Heaviside, Long, Low.

MIRROR OF THE B.B.C.

(Continued from page 1006.)

in 'phones installed for the evening performance by a special relay for the youngsters between 5.15 and 6 p.m. on the same day.

Songs, pianoforte duets and solos, and choral works provided by members of Henshaws Institution for the Blind at Old Trafford, will be heard during the North Regional programme on Tuesday, January 12th.

More 9·30 Novelties.

The study of music has always been encouraged by the Institution, which, since 1837, has done good work in giving a home and an education and help of all kinds to the blind of all ages, and a fine response has often brought its reward of success at various competitions.

Only last September one member of the choir, Constance Newton, won the first examination at Durham University for the degree of Bachelor of Music, having previously gained several prizes for organ playing, including the first award at the musical festival at Wallasey.

Violoncello solos by Stuart Knussen and songs by Norman Walker (bass) are to intersperse items by the Northern Studio Orchestra in the first of two concerts which occupy the afternoon programme for Northern listeners on Sunday, January 10th.

Mr. Knussen, who has been playing the 'cello since he was thirteen years of age, has spent most of his life in Manchester, to where his parents moved from his native city of Cardiff.

A pupil of the Royal Manchester College of Music, Mr. Knussen has been a member of the Hallé Orchestra for ten years, in which he was this year promoted to the leadership of the violoncellos.

Northerners have known him as a soloist for several seasons at the pier concerts at Blackpool. Another artiste who was trained at the Royal Manchester College of Music, of which since 1925 she has also been an Honorary Fellow, is Miss Lucy Pierce, who takes part in the second concert during the same afternoon.

Midland Regional listeners will be delighted to learn that another series of "9.30 Novelties," those light entertainments which proved so attractive in the spring of 1931, is to be put on during the next few months. Five shows have been planned to be given at three-weekly intervals, and the first is down for Wednesday, January 13th.

Founded 230 Years Ago.

There will be many of the former high-spots of the last production, and Charles Brewer will again be responsible for presenting the programmes.

Such varied artistes as Mabel France, Ann Bradley, Dorothy Summers, Ernest Sefton, Alfred Butler and Jack Venables are in the cast, which will be supported by the Revue Chorus and Orchestra.

Nearly 230 years of history is behind the 1st Band of the South Staffordshire Regiment, one of the few that has an unbroken connection with that county since its inception, which is giving a concert in the Birmingham Studio on Monday, January 11th.

FOR THE LISTENER

(Continued from page 1006.)

Conservatives read the Conservative paper, and only Radicals read the Radical paper. Neither side is offended by the other's stuff.

But broadcasting has to cater for both sides. It is a universal paper, and sometimes it happens that a Conservative listener finds his ears bombarded by Radical ideas. Then he makes a row. The B.B.C. must have to stand a good deal of this sort of racket.

The Balance of Truth.

A Conservative editor would be a fool to put Radical articles into his paper, for his circulation would immediately fall. Apart from this, however, it is no temptation to do so, because he believes that Conservative ideas are right.

The organisers of the B.B.C. know, as we all know in our private minds, that the monopoly of truth is not with either side; that both sides are right in their own way. The problem of the B.B.C. therefore is to hold the balance fairly between them. I do not imagine for a moment that the question of licences has the slightest effect on the broadcasting policy.

There is no need for me to confess to you that my personal sympathies are with the go-ahead side. I am interested in new ideas and new movements; in progress, if you like to call it so; and I am always pleased to hear what the rising generation is thinking and proposing and doing.

I have from time to time added my voice to those who would encourage the B.B.C. to

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FOR THE LISTENER

(*Continued from page* 1022.)

give this side of modern life a "good show," and I have been pleased to note that more room has latterly been given in the programmes to it. Others apparently have been displeased; and, for the moment at any rate, my pat on the back seems to have less influence than their kicks.

I should be sorry if there were to be a set-back. I agree that such talks as have recently been given by Mr. Harold Nicolson and Dr. John Baker, for example, must have been pretty strong meat for some tender digestions.

I have found no difficulty in swallowing them, and they have given me much food for thought and much pleasure. I have had as much pleasure in them as some music-lovers must have had in hearing the works of Schönberg or Walton.

That Inevitable Progress.

It is not difficult for the B.B.C. to cater for the musical "modernist," for, if there is a row about it, the disturbance is confined to a comparatively small circle. But the real difficulty arises when the "new ideas" seem to threaten the foundations of home-life and religion. One has then to go warily.

I do not blame the B.B.C. for going warily. But I hope they will not turn back altogether. One does not expect them to lead. They are public servants, not masters. But I feel that their public service would be incomplete if they did not continue to give the leaders of modern thought and modern movements a place at the microphone.

The world moves. We may hang back, or pull back, but in the end we shall have to move with it. It is wise therefore for us to hear those in the forefront who can tell us something of the way in which it seems to be moving.

THE "KELSEY" 7-METRE ADAPTOR.

(*Continued from page* 1000.)

take place unless two stations were within from ten to fifteen miles of one another—a most unlikely happening.

By the time this article appears in print, it is more than probable that the first of the B.B.C.'s 7-metre experimental transmitters will be nearing completion and so here is a chance for every "P.W." reader to do some real pioneer work for broadcasting.

A considerable time must necessarily elapse before anything like a regular service can be attempted on this new wave-length. But that does not constitute any reason for you not getting in some "ground work" now!

The B.B.C. will obviously have to carry out a considerable amount of experimental work in order to determine the advisability of establishing a regular service on a wave-length that has never before been used for broadcasting: but we, on our part, must not lag behind on the receiving side.

The simple-looking adaptor illustrated in this article, which will enable *you* to participate in these pioneer tests with your existing sets, can be built for a cost not exceeding at the very most, ten shillings, and next week I intend to tell you some more about this new development, and the way in which you, too, can build yourself a 7-metre adaptor.

TECHNICAL NOTES

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

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

Changing Fashions.

THE fashion nowadays is to keep the panel of the set severely simple. It is not so long ago that all manner of controls were crowded together on the panel and, in fact, the more controls you could get on it the smarter the set looked.

Opinion has now, however, swung entirely in the opposite direction and a panel cluttered up with knobs and dials would be considered entirely out of date. Simplicity is the keynote in the modern set and manufacturers make every effort, now, to pack away as many of the controls as possible either inside the receiver or at the sides or the back, leaving only the essential tuning controls and perhaps on-and-off switch on the panel.

Improving the Set.

If your set is not really up to date in this respect you can do a good deal to improve it, at any rate, as regards its external appearance, by shifting as many as possible of the controls from the panel to some less conspicuous place. For instance, the reaction control may quite well be put at the side of the cabinet so that, although it is out of the way and not readily noticeable, it can at the same time easily be "got at."

As regards filament rheostats, these should have no place on the panel at all, and may quite well be put on the side of the cabinet or even inside. Since they should scarcely ever want adjustment it is quite a common practice to put them inside the set; but, of course, they must be in an accessible position.

I should, perhaps, add that if you have a high-frequency amplifying valve it is useful to be able to adjust the filament rheostat of the same, and so in that case you may have the filament rheostat control on the side of the cabinet: in any case it has no need to be on the panel. With a high-frequency stage you may have separate tuning for the aerial and H.F. condenser, in which case it is a good plan to have both these controls on the panel.

The on-and-off switch is commonly put on the panel, but this, also, may well be arranged at the side of the cabinet. On the other hand, it is a component which occupies very little space, and in view of its fundamental importance I, personally, always like to see it on the front.

The High-Frequency Controls.

Then there is the question of the pick-up switch, when the set is adapted for using a pick-up with a gramophone. This switch certainly need not be on the panel, but is preferably mounted at the side.

Now turning to the high-frequency controls, these may in some cases be ganged; but as this is a matter which depends very much upon the details of the circuit arrangements it is impossible to say off-hand

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whether the ganging will be a simple matter (as it will be in *some* cases), or whether it will involve a lot of re-arrangement of the inside of the receiver.

A rough-and-ready alternative to the ganging is to use dials having thumb-control so that a pair of condensers may be approximately tuned together and then accurately adjusted separately later on.

A little point which makes a great deal of difference to appearance of the set is the addition of a panel light. This consists, of course, of a small bulb of the flash-lamp variety and in addition to making it much easier to read the graduations on the dial while you are tuning, it also gives, as I say, a very professional appearance to the receiver.

The current for lighting the lamp (which is very small), may be taken from the low-tension accumulator or, in the case where the filaments are heated from a step-down transformer, the current may be drawn from the output of this transformer.

A small resistance may, by the way, be necessary in series with the lamp or alternatively you may find it better to use two lamps in series, in which case the current which would otherwise be wasted in the series resistance is converted into additional illumination.

Make It Self-Contained.

It is always a very good plan, not only from the point of view of appearance, but also for convenience, to have the batteries, leads and various odds and ends all contained in some sort of cabinet. When you consider how beautifully self-contained are the better types of modern mains-driven radio-gramophones it makes you wonder how you could have put up with all the collection of bits and pieces, wires, external valves, and all the rest of it which constituted a very good "up-to-date" set not more than five or six years ago!

If your set is a home-constructed one, with separate batteries, you will find it well worth while to consider going in for a nice cabinet for housing the set and all the accessories. A cabinet of this kind can now be obtained very cheaply and to my mind puts the whole outfit into an entirely different category, greatly improving its appearance and doubling or trebling its value in the eyes of your friends as well, no doubt, as in your own.

Copying a Set.

Have you ever tried copying a set, say, a set belonging to a friend which you know to give particularly good results, just the sort of results you want, and then found that, although you have made what appears to be a "Chinese copy," using the same components and so on, your set gives quite different results from the original one? I expect a good many of you have had this experience, and you may have wondered why two identical sets should give a different performance.

It goes without saying that if the results are different (in the same conditions), the sets *must* be different, however much they may *appear* to be the same. If you use the same components as in the original set it is not very likely that the slight

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variations in these components will account for the difference and it is much more probable that apparently small variations in the wiring-up will have a greater effect upon the results.

Importance of Tuning-up.

However carefully and accurately you may have reproduced the original receiver, the result depends, I think, more than anything else, upon the tuning-up. For instance, the voltages applied in different parts of the circuit—and this is especially true where there is any screened-grid H.F. amplification—will generally have a very important influence upon the result.

Another point to bear in mind is that it may be necessary to bring the aerial circuit practically to oscillation, while the anode circuits and the very smallest differences in the components, layout and wiring of the set may make quite an appreciable difference to the precise tuning-up which is requisite for this particular condition.

Those Little Peculiarities.

A set in some ways resembles a motor-car or an engine which, as everyone knows, has a peculiar quality sometimes called "personality," for want of a better term; you get to know the particular engine and its idiosyncrasies and notwithstanding that engines may be mass produced, there is no doubt whatever that they *do* vary quite considerably in their characteristics and in the way they have to be handled.

Just so with the set and, as I say, having modelled your receiver upon that of a friend you must then set to work to get to know its little peculiarities. Once you have mastered these there is little doubt that you will be able to produce results from it every bit as good as those from the other. But don't imagine that it will just happen automatically.

Baffle-boards.

Owing to the fact that a baffle-board for use with a moving-coil speaker, or any other powerful speaker, is sometimes inconveniently large, many people prefer to use a box for mounting the speaker, this box being in effect a smaller baffle-board with broad turned-over edges.

It is true that this arrangement is much more compact and convenient, but, on the other hand, it is not without disadvantages, the chief of which is the unpleasant resonances which are sometimes set up either by vibrations of parts of the box itself, or by the air contained within the box—or both.

I have known cases where a box of this sort worked excellently, but I have also known cases where there was a most pronounced interference with the quality of the speaker, a sort of "muffled" effect and a definitely increased interference at particular frequencies.

Influence of Cabinet.

Something can be done towards overcoming this defect by cutting a number of rather large holes at different parts of the box. This is really only equivalent to reducing the size of the corresponding baffle-board, which is somewhat similar to cutting down the scratch from a gramophone record by reducing the overall volume.

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These holes in the box do sometimes very much improve the clearness of the reproduction, especially on speech, although at the same time I think there is a tendency for the lower frequencies to be lost.

On the whole it is a good plan, if you *must* use a box, to use one as large as possible, and particularly to avoid the use of a box of which the width is less than about one-and-a-half times the diameter of the cone.

Grid Potential.

In the majority of sets it is quite sufficient to connect a grid-leak between the grid and the positive end of the filament. Many experimenters using this arrangement would be surprised to find, however, how much improvement could be obtained by making the voltage slightly less positive, which, of course, is quite easily done by means of a potentiometer connected across the filament battery, the grid-leak being connected to the slider.

Often you will find that the reaction is inclined to "plop" when the leak is connected to the positive end of the filament; this characteristic will almost certainly disappear when the potentiometer arrangement is used if the slider is shifted to some point nearer to the negative end.

Effect on Quality.

In addition to the influence upon the reaction you will often find that slight variation in the positions of the potentiometer slider have a pronounced effect upon the quality of reproduction, as well as upon the sensitivity of the receiver as a whole.

Some people who use a potentiometer make a sort of general habit of having the slider in the mid-position, and if this is satisfactory all well and good, but it is quite easy with this arrangement to find the best position. If you do not at present use a potentiometer it is really worth while to fit one, and it is more than likely that you will find that you get much better results when the moving contact is at a position away from the positive end.

Tone Control.

I have just recently had occasion to examine the tone controls on a number of well-known radio-grams, and it struck me how very effective some of these controls are. It is not more than two or three years ago that a "tone control" was more of an ornament on the set than anything else, but there is no doubt that the various circuit dodges for controlling the quality have been very greatly improved of late.

Altogether apart from the question of bringing up the bass or the treble notes, there is the scratch filter which, although in one sense is not quite what we understand ordinarily by a tone control, nevertheless is related to it and has a very definite effect on the quality of the reproduction if not upon the tone.

It is interesting to remember that it is only since we have had electrical reproduction that we have been able to avail ourselves of filter circuits for controlling tone and cutting out surface noise. With the ordinary direct or "acoustic" reproduction you can do something—in fact, you can do a good

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deal—towards minimising scratch, but acoustical and mechanical methods are not to be compared with the electrical methods which we have at our disposal when using electrical reproduction.

In fact, to my mind, one of the most important advantages of electrical reproduction, and probably quite as important as the amplification which we are able to obtain, is the fact that we have such facilities for *manipulating* the tonal quality practically as we please.

Scratch Filters.

As regards needle scratch, this must inevitably be produced so long as we have mechanical frictional engagement between the needle and the rapidly moving surface of the record. It is due to minute particles of grit and other foreign matter on the record, and also to irregularities and microscopical breakdown of the record surface itself.

It is not easy to say what is the precise frequency of the surface noise, but it is commonly supposed that it is fairly high-pitched on the average and has a frequency between about 2,000 and 5,000 cycles. I use the word "average" because it is obvious that the surface noise is not of any single frequency and is just a heterogeneous collection of irregular sounds and widely varying frequencies.

A shunt circuit intended to absorb the surface noise must naturally be designed and adjusted in relation to the frequency or frequencies comprised in the "noise." If the noise consisted of a single frequency—if that were the case we should no longer call it a "noise," but a "musical sound"—the problem would be much easier. Having regard to the difficulty of the problem, I think that designers and manufacturers are to be congratulated upon the great progress which they have made in the direction of minimising surface noise.

Screens and Coils.

Some few years back the method known as "spade" tuning was quite popular. Newcomers to radio may not perhaps be familiar with this method: it consisted in bringing a metal plate (the "spade") into proximity to a coil for the purpose of tuning.

Usually the plate was made to shift in its own plane, which was parallel to the plane of the coil, so that it covered more or less of the area of the coil. The tuning effect was due, of course, to the interaction between the H.F. currents in the coil and the H.F. currents set up in the plate.

I mention this not because it is in itself of any particular importance to-day, but because it illustrates very definitely the effect of metal plate placed close to a high-frequency coil, and this is a point which you should bear in mind very carefully with regard to metal screens. Metal shields are of the greatest value in the modern receiver, but at the same time do not forget that the shields absorb energy—indeed, it is owing to their power of absorbing energy that they are able to function as shields.

A Point of Design.

If a shield is placed at a reasonable distance from a coil—a "reasonable distance" being the sort of distance usually allowed by a good designer—the absorption effect so far as the coil is concerned will be negligible, but if you are making up a set yourself and you place the screens too close to the coils, you will find that the influence of the screen on the coil will increase very rapidly as they come closer together; the inductance of the coil will be reduced and the wave-length to which it corresponds will, of course, be similarly reduced.

With Ganged Condensers.

This question of the proximity of metal screens and coils is very important in all cases of H.F. coils, and is particularly important where you are using ganged condensers. If, for instance, you have two ganged condensers and two coils, the condensers having equal capacities and the coils having equal inductances, you may find that whereas the arrangement tunes properly at one part of the wave-length range, it goes out of balance at the other end of the range.

Quite possibly you will find that this is due to the too close proximity of one of the condensers to one of the coils, or to some other accidental condition where the presence of a metal plate is upsetting the inductance of one of the coils. This is always a point to look out for, especially if you find that it is impossible to keep your ganged circuits in balance over any reasonable range of wave-lengths.

When you consider the close and compact arrangement of the average modern receiver with all its shields and metal parts, it is obvious that a lot of thought has been necessary in order to get the shields and the components all in the right relationship to one another without causing trouble of the kind discussed above.

Watch the Layout.

So it may not be surprising if in making up your own set you accidentally run into some trouble of this kind; if this should happen the thing to do is to go over the whole layout very carefully to see whether there is any unwanted inter-action between coils and adjacent metal plates.

Try to form a mental picture of the "lines of force" surrounding the various components and how these lines of force will embrace or play upon adjacent components, and you will have no difficulty in spotting the points where trouble is liable to occur.

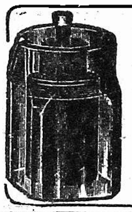
The old diagram which we used to have in our elementary textbooks on magnetism, showing the distribution of lines of force between magnets, are really very useful, and if you keep these in mind and apply them (mentally, of course) to the layout of your various components, you will save yourself a lot of trouble.

NEXT WEEK!

FULL CONSTRUCTIONAL DETAILS FOR BUILDING

THE "P.W." ECKERSLEY THREE

DESIGNED and DESCRIBED BY CAPTAIN P. P. ECKERSLEY



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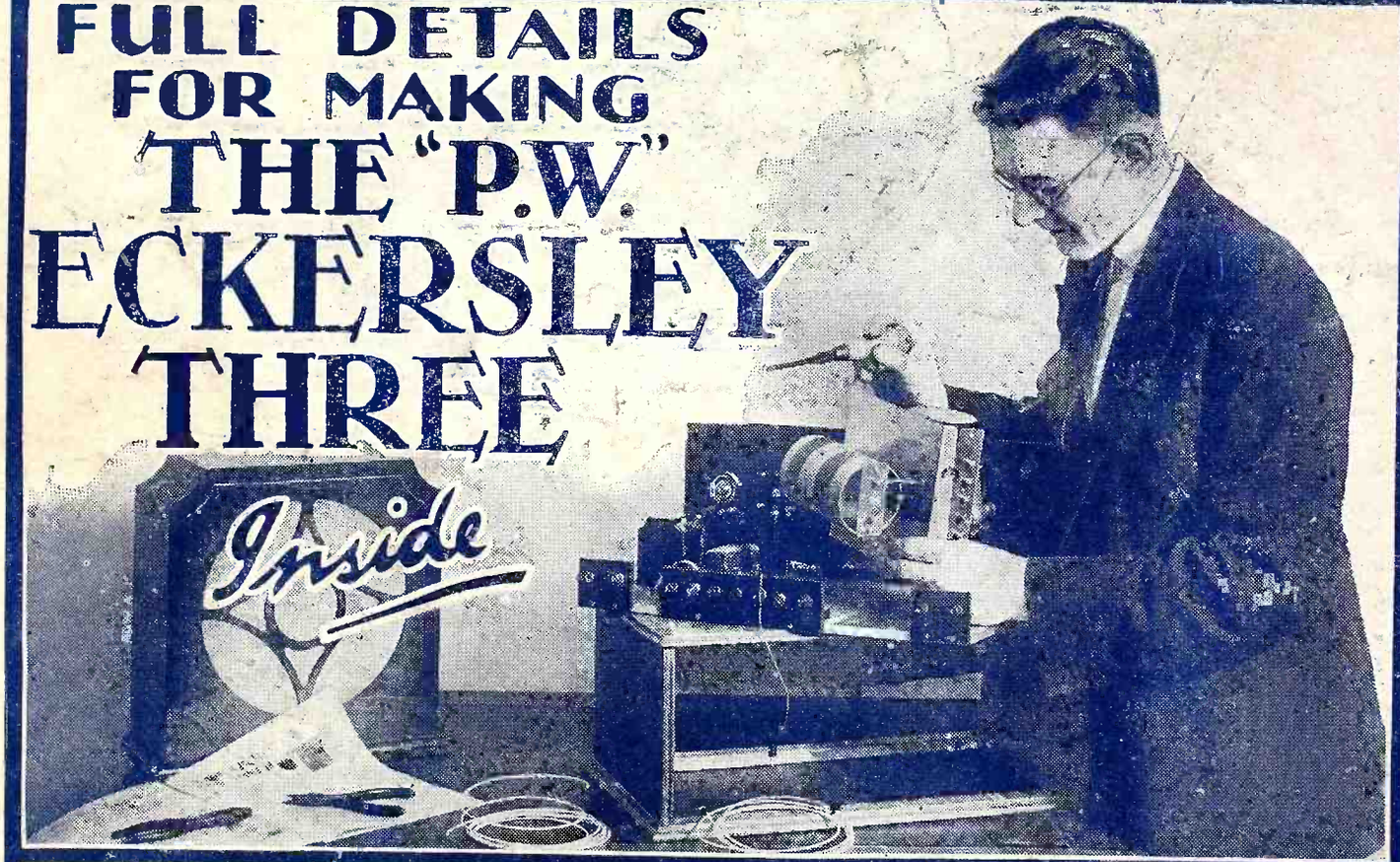
Popular Wireless

Every Thursday PRICE 3d.

No. 501. Vol. XX. INCORPORATING "WIRELESS" January 9th, 1932.

FULL DETAILS FOR MAKING THE "P.W." ECKERSLEY THREE



ALSO THIS WEEK:

THE KELSEY 7-METRE ADAPTOR (Part 2)

RADIO IN THE COURTS

WE GANGSTERS BOLD—By Haver (of Haver and Lee)

B.B.C. MILESTONES OF 1931

SCREENED GRID DETECTORS—By W. L. S.

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FIFTY YEARS AGO
DOMINION NEWS
HIGH SPOTS
ANOTHER PROPHECY

THE TALKS
"ANGEL WIFE"
POOR PORTABLES
THOSE TRAMS!

RADIO NOTES & NEWS

A Popular Return.

WELL, I expect that the murder is out and that most of you know that Mr. John Scott-Taggart, after several years disappearance from the eye of the public, during which he has become a barrister and built up his reputation as a radio engineer several storeys higher—is to return to radio journalism.

His work will be done for "The Wireless Constructor," and as to the sets which he will design and describe, I can tell you that he has some hot ones.

(Final revelation next week.)

Advertising by Radio.

THE movement against radio advertising in the U.S.A. is growing slowly but steadily, especially amongst the newspapers, who are, of course, faced with competition in ad-getting. Meanwhile, the B.B.C. continues to hand out publicity over the "mike" as coolly as possible.

It advertises books, gramophone records, dance bands, cinemas, and last, though not least, its own publications. However, some of these advertisements, such as those of gramophone records, are welcome. It all depends on how the matter is done.

Half a Century Ago.

IT is faintly thrilling to the imaginative man to be reminded that fifty years ago Dr. O. J. Lodge, now Sir Oliver, lectured at the London Institution on "Electricity v. Smoke," and that Mr. Crompton was busy with the job of lighting the Egyptian Hall and the Saloon in the Mansion House with a combination of his arc and Swan incandescent lamps. I and my contemporaries were still in the everywhere—and there was our Scientific Adviser all grown up and instructing people in matters scientific!

Dominion News.

IN Australia the Council of Churches has decided to have a broadcasting station of its own and has already ordered it. The new station will be located in Sydney, N.S.W., one kilowatt in power, and will operate on 248 metres.

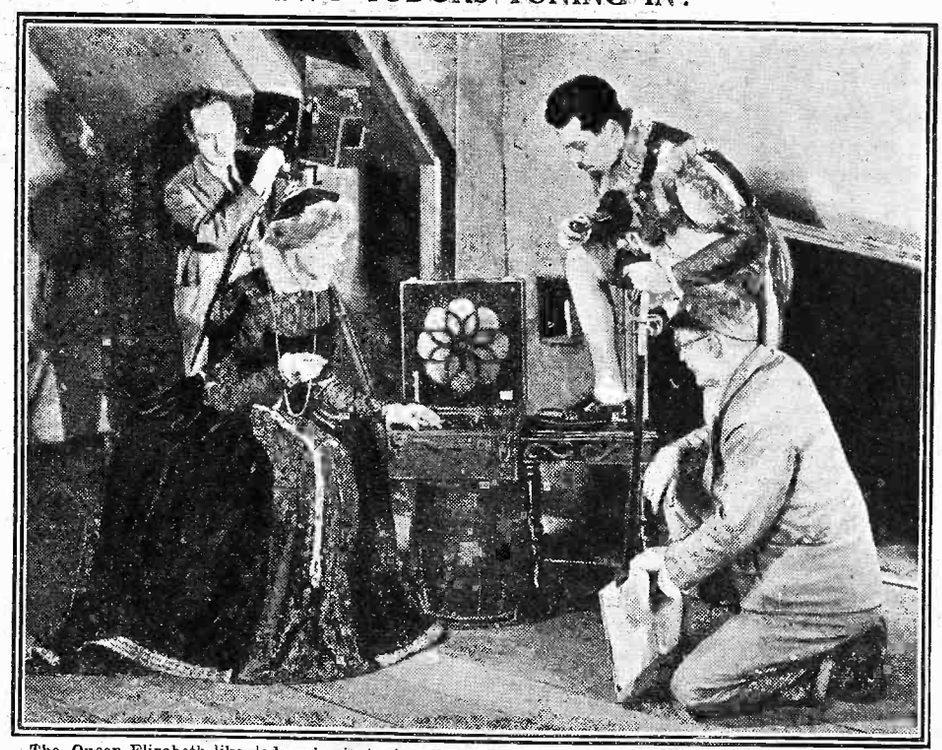
Bermuda, where the Yanks go to escape Pussyfoot and Prohib, is to have a wireless telephone service with New York.

The Attorney-General for Quebec has appealed to the Privy Council against a judgment of the Supreme Court of Canada as to the powers of the Canadian Parliament to regulate and control radio communication, Quebec claiming provincial rights to limit parliamentary jurisdiction.

The High Spots of Science.

SIR JAMES JEANS, at a luncheon to the Batti Wallah's Society (*Batti Wallah—electrician. It's Hindustani*) in December said that in his opinion the six principal events in the history of science were the work of Copernicus, of Newton and of Darwin; the creation of modern physics between 1895 and 1900; Einstein's statement of the Relativity theory in 1905, and, sixthly, the recent work concerning the relation between the mass of an electron and the dimensions of the universe as a whole. I would give a place to the work of astronomers and bacteriologists somewhere in the first six.

TWO TUDORS TUNING IN!



The Queen-Elizabeth-like lady who is tuning the portable set, and her companion with the sword, are actors in a film now being prepared in London. Kneeling in front is Mr. Granville Squires—who is occasionally heard over the air—in the rôle of a film director.

A Few Short Years.

A BRIEF announcement by the Postmaster-General tells us that the Anglo-Spanish telephone service has been extended to Majorca. That is an island off the east coast of Spain. The exciting inference is that a person in, say, Chile (S. America) can speak to another in Palma de Mallorca, the capital of the Balearic Islands, which islands furnished mercenaries to the army of Alexander the Great.

Now I know Majorca pretty well, having lived there from 1911 to 1914, and it is amazing to think that such a facility has been made available to an island which, when I was there, regarded wireless as something like witchcraft! I have seen a

(Continued on next page.)

NOTES—NEWS—AND INTERVIEWS *(Continued)*

Mallorcan maiden cross herself at the sight of a bit of aerial wire!

Another Prophecy Comes True.

IT is said that, instead of bombs, the R.A.F. is to try the effect on unruly niggers in Irak and India of powerful loudspeakers, through which the airmen will boom warnings in the native lingos. Once again I would refer to Kipling's "As Easy as A.B.C." in which he describes, *inter alia*, how the Aerial Board of Control used highly-magnified sound to bring a turbulent community into a reasonable state of mind. The sounds were pitched in some particular key which simply flayed the nerves of the victims till they begged for silence. Not a perfect parallel, like that of the radio-controlled plough, but getting on that way.

The "Talks" Policy.

EVERYTHING I hear goes to confirm the rumour that in future the B.B.C. "talks" will be maintained at the dull level of mere instruction, like the divine in his pulpit, "seven feet above criticism." Miss Hilda Matheson, formerly Talks Director, resigned because of divergence between her views and that of, one must suppose, that Board of Governesses. Judging by those talks which, like the "Escape" series, were popular amongst all classes of listeners, I think that the B.B.C. would solve much of its difficulty by letting future talks be episodic rather than statements of opinion.

The Angel Wife.

GLAD to hear from A. J. F. F. (Singapore), who sends me another copy of "Omba' Pende," the Official Organ of Malayan Radio, and asks for the way to make a heterodyne wavemeter for a S.W. set completely enclosed in metal. (He asks W.L.S.!)

He enquires whether, as Ariel, I have wings. I should think I have! Angel's wings, pair, folding, one: tight corners, for the use of. They sprout like mushrooms immediately I am bowled out.

Apropos of nil, he tells me that a wife is like an angel because she is always "up in the air" and always "harping" on something. Mm! Not bad, but rotten theology. I hope he gets one of the other kind!

Shall We Hear Any More of It?

REPORT hath it that a Toronto professor has produced an alloy of metals which has no electrical resistance, *even at normal temperature*. Lumme! If this be all hotsy-totsy the mathematics of electrical engineering are due to get a smart shaking up. Ohm's Law will have the *R* taken out of it and copper will be a rotten investment! Unless, of course, copper is in the conspiracy. Anyhow, it can't affect radio very much, or the lamp and heater makers.

The Belgian Relay.

THE radio correspondent of the "Evening Standard," though a skilful writer, has little technical knowledge of radio, and thus criticised the December relay broadcast from Brussels somewhat too unkindly. I do not know whether he is equipped with the knowledge which would justify him in his criticism of the artistes' execution on that occasion, but one could not expect him to appreciate the difficulties or the beauties of a relay which involves landline, submarine cable and radio links. The B.B.C.'s Continental relays are triumphs of engineering.

SHORT WAVES.

A technical writer says that wireless waves that reach the moon are thrown back to earth again.

Every planet to its taste!—"Punch."

* * *

WON'T BUDGE.

A theatrical producer says he has discovered a street musician who will go a long way.

We wish we could persuade the wireless fiends next door to do the same.

* * *

Answer to Correspondent.—You say that one of the twins swallowed a piece of crystal, and you are wondering if it is harmful. Well, no, but baby will probably come out in "spots." Be careful that baby does not consume any more crystal, however, as he, or she, will be very "sensitive" in later years.

* * *

Several people are complaining that the standard of musical performance has improved to such an extent since the broadcasting of hotel orchestras began that the more serious business of mastication and digestion is considerably interfered with.

The poor old B.B.C. simply can't do right.

* * *

SLIMMING UNDER DIFFICULTIES.

"Only dairy cows were able to retain their figures."

Fat stock prices, as recently announced by the B.B.C.—"Punch."

That Explains It.

I HAD the pleasure at the end of the year to strike a cheerful note about the Mazda Valve Works. Mr. W. W. Burnham, who writes a graceful letter in reply to my note about him in our Christmas number, tells me incidentally that for four years he has been in charge of the radio division of the Ediswan Electric Company, and that one of his principal aims in life is to popularise the Mazda valve. That explains it. He is evidently succeeding. Hence Mazda Works can't stop for sleep.

Interesting Appointment.

AMONGST my jottings I find one to the effect that Mr. Will Day, of the well-known firm, Dayzite, Ltd., has been appointed President of the Society of Model and Experimental Engineers in succession to Sir Felix Pole. Mr. Day is a versatile person, for besides running a successful business he has found time to become a Fellow of the Royal Photographic Society, and to go deeply into the mysteries of cinematograph work.

An Unexpected Result.

NEWS from Berlin tells us that the Federation of Gramophone Record Producers has forbidden the broadcasting of records by German stations because so much use of records has been made that their sales have fallen off. One would think, at first, that the advertising of records by radio would increase their sales; on consideration one realises that many people who might be buyers are likely to decide against a purchase if they hear the record. That gives rise to the wonder, whether people ever *do* buy records without first having heard them or the pieces which they record.

Those Poor Portables.

THE campaign of the underworld against portables wags merrily along, and I understand that one firm is contemplating a display of their models in a Safe Deposit; entrance by ticket only.

There are, apparently, only two well-defined methods of separating portables from owners—"smash and grab," and "gum-shoe work."

The first is elementary; the second has a number of variants, including walking in with a brass face and walking out with a portable. The latest type of "gum-shoe work" is that evolved by a mere beginner, who buzzed into someone's office, said he represented the "Radio Magazine" (a fictitious title)—and could he have a portable for test!

An International Event.

THE Anglo-American Radio Society informs me that a programme dedicated to their noble selves was broadcast from W J A C, Johnstown, Pa., U.S.A., at 2 a.m. on January 1st, on 228·9 metres, with a power of 100 watts. If any of you sat up and took notice of this broadcast you would oblige by sending reports on its reception to W J A C, Johnstown Automobile Co., Johnstown, Pa., or to the headquarters of the Society at 11, Hawthorne Drive, Willowbank, Uxbridge, Middlesex, England.

Those Trams.

THIS little story, which I found leavening the pages of a "trade" paper, is "lifted" with gratitude and passed on to you to relate—especially to sufferers from tram noises.

An old lady, in writing to the maker of her receiver complaining of interference, said—amongst other things—"Whenever a tram comes down this road it comes in through the loudspeaker."

Hum! Must be a hole in that speaker! What does she do with those trams?

ARIEL.

WE GANGSTERS BOLD!

BY HAVER

The microphone variety turn known as Haver and Lee comprises a pair of artistes having individual reputations as entertainers. Haver doesn't quite give the game away, but he offers you some clues!

ALTHOUGH, as Haver and Lee, my partner and I are comparatively newcomers to the world of wireless, we have both of us individually and under our own names, frequently endeavoured to entertain listeners before.

That, however, is not a matter on which we wish to dwell. In our own interest and that of our audiences it is probably better that our other identities should not be generally known.

To the building up of our new characters of bold, bad, but somewhat futile gangsters previous conceptions could only prove a hindrance for which the introduction that our ordinary stage reputations might gain for us, would be but small compensation. After all, wireless is a specialised medium, and except as a matter of interest, reputations made elsewhere count for little with audiences on the other side of the microphone.

Nevertheless, I believe that listeners do like to know something of those who are endeavouring to entertain them, and in our case it may be interesting to see how much of our stories I can tell without giving ourselves away completely.

Air-Minded!

My family have been in the entertainment business for generations, and my grandfather, Bellini, as partner of the famous Blondin, at one time enjoyed an almost world-wide reputation. He performed with Blondin everywhere.

When Blondin achieved his most memorable feat of walking across the Niagara Falls and whirlpool on a wire, my grandfather emulated his feat across the river a little further down. As far as the actual tight rope walking was concerned, this was probably equally difficult, although I believe the odds on his immediate decease in the event of an accident were just a shade less overwhelming.

The large amount of time he spent aloft with only the slightest visible means of support seems to have achieved the result of making him "air-minded" at a time long before this term was thought of. He dreamed and talked aviation.

To America by Balloon!

It is certainly a fact that he claimed to have invented an aeroplane that would undoubtedly fly if only engineers would provide him with an engine of suitable weight-for-power ratio. Unfortunately, they only achieved this comparatively recently, so my grandfather's aeroplane remained among the might-have-beens.

Another of his projects was to fly the Atlantic in a balloon. According to his plans, all that was necessary was to build a hangar at Sandy Hook and fit it with a quickly removable roof. The balloon was to be filled, provisioned, and placed inside, then all that remained was to wait for the equinoxial gales, remove the roof, and the whole business would be over in 48 hours.

I never heard of him making the attempt, and altogether he seems to have missed several opportunities of bequeathing an especially illustrious name to his grandson.

His wife, my grandmother, was active in a somewhat different sphere of entertainment. She was a legitimate actress and among her best-known rôles was that of "Ophelia" to G. B. Brook's "Hamlet." Her proud boast was that she had made the first sword belt ever worn by Sir Henry Irving.

My father followed in my grandfather's footsteps. He, too, became a wire walker, and although he didn't cross the Niagara Falls, Blondin was so pleased with his progress that he early bestowed his own name upon him and christened him "The Infant Blondin."

One of my father's feats in this country was to cross the river at Rosherville Gardens, Gravesend, Kent, on a 70-feet-high wire. This was some little time ago, but there are probably many people living who remember it.

Not Wide Enough.

If there is anything in heredity, no doubt I ought to be a wire walker myself, but somehow or other I decided to be different. For one thing I have seen quite a lot of wires and none of them have been anyway near wide enough. Given one as broad as the Strand and I might do something; otherwise my ambitions do not lie in that direction.

Comedy, dancing, and instrumental work appeal to me far more, and it was along these lines that I was working with my sister in the years immediately preceding the war.

(*Continued on next page.*)

A POPULAR PAIR OF PERFORMERS

That inimitable pair of broadcasters Haver and Lee, in characteristic make-up.

WE GANGSTERS BOLD!

(Continued from previous page.)

After demobilisation, I appeared for a time by myself, and then, in conjunction with a partner, went out to Coblenz as an entertainer with the American Army on the Rhine. Afterwards my partner returned to America and I settled down on my own in vaudeville.

Haver Writes Songs.

In addition to my ordinary stage work, song-writing has always attracted me, and it is a line in which I have been fortunate enough to be successful. Obviously, if I am to preserve my anonimity, I cannot mention names of songs, but wireless listeners, at any rate, will be familiar with a number of them.

In connection with these songs, curious little coincidences sometimes happen. Some time ago in a dressing-room, at Portsmouth, I was discussing with Miss Mona Grey a song of mine which was then newly published.

In the room with us was a portable wireless set, and at the end of our chat, we switched it on. Immediately from London, Jack Payne announced that he was about to play the very number of which we had just been talking.

At least twice since then a similar thing has happened to me, once at Southampton a year after the first incident, and again a few days ago in a Lyon's Corner House.

My partner's parents, like my own, were members of the entertainment profession, and indeed at one time were very well-known to them. He himself has appeared in comedy parts all over the country, and was one of the artistes specially chosen by a well-known peer to appear at his country seat before the King.

This, I believe, was the only entertainment of its kind ever given there. My partner was presented with a diamond tie-pin at the conclusion of his performance.

Curiously enough, we first met and knew each other when we were still quite kiddies, and then lost sight of each other until we were re-united by the demands of our present wireless turn.

At the time of our first meeting, our parents were working the same vaudeville circuit in America, and so we youngsters were thrown a very great deal together. It was then that the wonderful idea came to us of walking round the globe and visiting every country in the world.

Our scheme was to take nothing but a suit-case each, and since as the sons of artistes we could both dance, we felt that a brief performance at any theatre we came across would no doubt be sufficient to provide us with all that was necessary in the way of board and lodging.

Perhaps in view of our tender years it was just as well that our optimism never got beyond the stage of buying big cigars and endeavouring to look as mysterious as possible.

First-Hand Knowledge.

The idea for our present wireless turn came as a result of actual listening-in. We do feel that, from our own experience, the average listener desires something that will make him laugh.

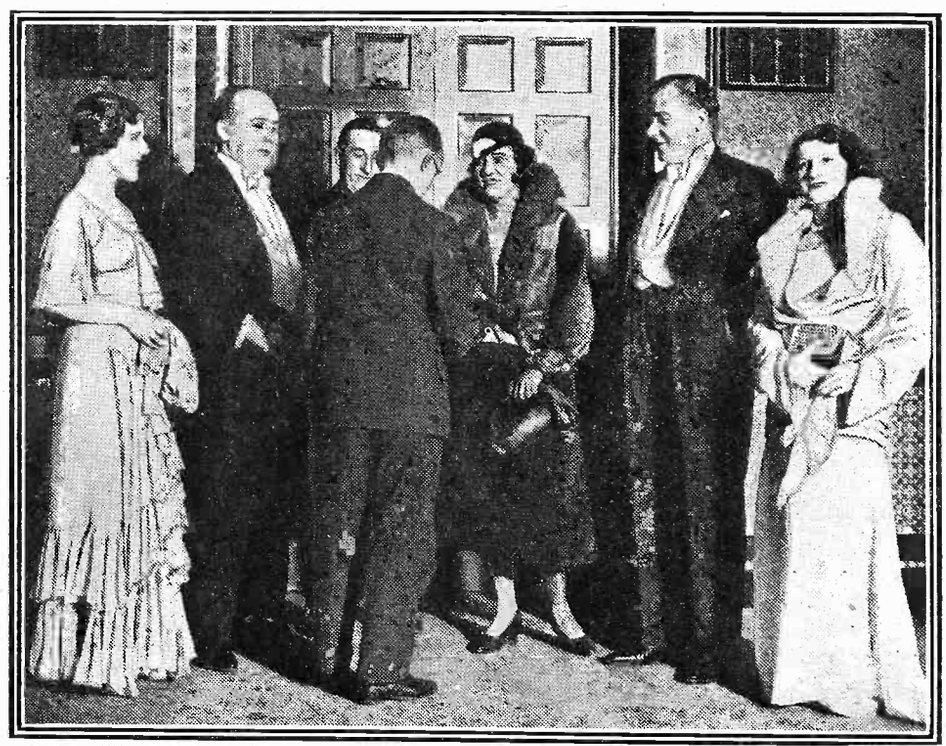
Furthermore, we believe that the laugh should be reasonably obvious, not because wireless audiences are in any way lacking in the intelligence to appreciate subtleties, but because the bulk of the people who compose them have usually had to do more than enough hard thinking during their ordinary hours of business.

One other factor we felt to be desirable was action, for this, in addition to holding interest and attention, can be used to provide humorous situations outside the scope of ordinary cross-talk and patter.

As far as gangsters are concerned, my partner obtained his knowledge of them first hand during a prolonged stay in San Francisco. This was at a time when gangsters were gangsters, not prohibition-created Al Capones, but just plain crooks and thugs of the toughest order.

I myself have never knowingly met one, and from what my partner tells me about them, take it from me, I am not particularly anxious ever to do so, and prefer to remain just a wireless gangster.

A SUCCESSFUL SONG WRITER



A competition for the most popular song during 1931 has recently been won by a working-man in the person of Mr. Albert Romaine. Above, you see Mrs. Payne (with Jack on her left) presenting him with a cheque for the royalties.

THAT FLASH

Two letters from readers concerning this interesting phenomenon.

HE TRIED A NEW ONE, TOO!

The Editor, POPULAR WIRELESS.

Dear Sir,—Your correspondent, J. L. (Ilford), has raised an interesting query, as already stated in Capt. Eckersley's query corner. J. L. has hit upon something which I have been interested in myself, and gone so far as to experiment with same. Below I give an account of my experiment which might interest J. L., and other readers of "P.W." A short time ago I was unlucky enough to burn out three valves which had been in use about six months. I decided to inspect the inside of the valves for various reasons. With a small mallet I gave the bulb of one valve a smart tap, on breaking same I was surprised to see a bright blue flash. I could not account for same, so I broke the second valve, and the third, each with the same result. On looking at the glass of the broken valves, I saw that they were covered with a white deposit, which had, I think, an unpleasant smell of gas. Having on hand an unused new 6-volt valve, I thought I would break same to see if I should get the same result, but no, there was no flash, and neither did the broken glass smell of gas. In this case the valves which had been used gave a flash, and the unused one did not. I was once told that after the valve has been used for a length of time there is a gas formed in the valve, caused by the burning of the filament. If this is correct, no doubt that means there was gas in the first three valves and none at all in the 6-volt, as the filament had not been burnt. Therefore, in my opinion as to the cause of the flash, both in J. L.'s case and mine, is that the valve being broken, the immediate escape of gas against the air caused the flash to occur. I do not know if valve makers fill any valves with gas during manufacture, because, in any case, I should think it was gas which made the flash.

With all good wishes to "P.W."

Yours truly,

"A REGULAR READER."

Crawley, Sussex.

A CHEMICAL COMBINATION.

The Editor, POPULAR WIRELESS.

Dear Sir,—Re the query raised by R. J. (Ilford) in the December 12th issue of POPULAR WIRELESS, one of the suggestions put forward by Capt. Eckersley is very near the solution.

The particular valve in question is one of the barium vapour coated type, in which a chemical compound of barium is deposited on the anode. During the process of manufacture the barium compound (usually barium oxide or a mechanical mixture of barium oxides and carbonates with a reducing agent) is heated by heating the anode with eddy current heating gear.

The barium compound then reduces itself to the pure metal in the form of a vapour which condenses on the filament and also on the cool parts of the valve structure. The filament, after suitable treatment, is then in a state conducive to electron emission.

The remaining barium metal on the anode, often in a state of fine division, usually falls off during the life of the valve and collects in the base of the glass bulb.

Barium in a fine state of division has a very great affinity for oxygen and combines with this gas violently. Usually sufficient heat is generated to make the chemical change visible.

Therefore, when a valve of the barium type is broken the sudden inrush of air blows the barium about, and, being in a fine state of division, chemical combination occurs, with sufficient heat to cause the divided particles to become visible.

Yours faithfully,

Hammersmith, W.6. C. G. L.

The KELSEY 7-METRE ADAPTOR

PART 2

More about a wonderful unit which makes practical the opening up of an entirely new broadcast band.

By G. T. KELSEY.

LAST week I outlined the reasons for the B.B.C.'s forthcoming tests on the "fly-weight" wave-length of seven metres.

In this article, before I commence to tell you how you, too, can participate in these pioneer tests with your existing set, I want first of all to say a word or two about the wave-band that is covered on this, the world's first seven-metre adaptor.

If I were to tell you that this adaptor covers from 6·3 to 8 metres, accustomed as you probably are to thinking in terms of wave-length, you might be inclined to think that it has an extremely limited range.

That just shows how misleading the term wave-length can be!

A Comparison!

There is really only one satisfactory way of "visualising" the band between, to take round figures, seven and eight metres, and that is in terms of frequency. By way of providing a comparison, let us deal with the ordinary broadcast wave-lengths in like manner first of all.

From 200 metres—which is 1,500 kilocycles—up to 2,000 metres, corresponding to 150 kilocycles, there is a difference in frequency of 1,350 kilocycles.

From 7 metres, or approximately 42,857 kilocycles, to 8 metres, which is near enough 37,500 kilocycles, there is a difference in frequency of 5,357 kilocycles!

Now for the somewhat staggering comparison!

Assuming the same frequency separation between stations, as is aimed at on the normal broadcast wave-lengths, there is room between 7 and 8 metres for over *four times* the number of stations that can be placed between 200 and 2,000 metres!

Rather a surprising fact, isn't it?

It's Kilocycles That Count.

That, as a matter of fact, is precisely the reason why I have started the constructional article by delving into figures, because I think it demonstrates in a very convincing manner the need for following the original design even to the most minute, and seemingly unimportant, details.

Just think that if *your* adaptor, when finished, is as much as a quarter of a metre out, you will be about as near to 7 metres as the London Regional Station is to Radio Paris!

But the last thing I wish to imply by that is that my new 7-metre Adaptor is extremely difficult to make! It is certainly a little more difficult than the average run of home-constructor sets, but to compensate for that, the diagrams are very much more detailed than usual. So that if you take care and follow the original in *every* detail, there is absolutely no reason why you, too, should not be one of the very first ever to hear a broadcast signal on 7 metres.

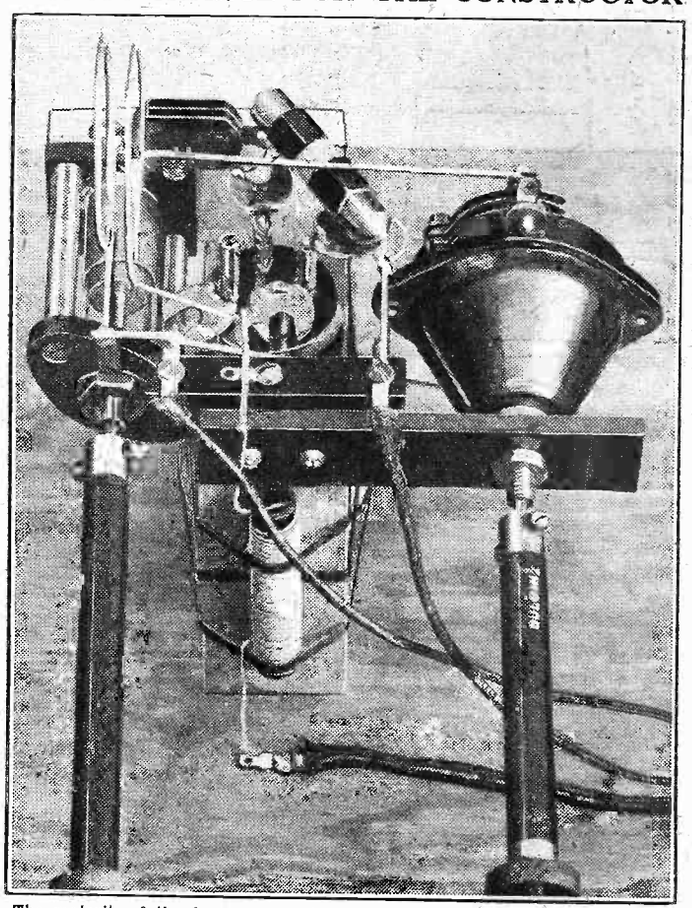
Most readers of "P.W." will no doubt be familiar with the way in which an adaptor unit is fitted to a set, but for the benefit of new readers, a few words by way of explanation would probably not be amiss.

One of the most important things to bring forward is the fact that in order to use an adaptor it is not necessary to make any alterations to your existing set. You just remove the detector valve, and, if the set has an H.F. stage, the H.F. valve as well, and that is as far as you need touch your existing set except to switch it on and off.

As for the Adaptor, the valve adaptor plug goes into the detector valve's socket of your present set, and your present detector valve, if of a suitable type (see later paragraph) is used in the unit.

There are no battery connections to make when it is desired to use the Adaptor, for all the necessary "juice" is obtained via the plug which goes into your present set, and as soon as you want to revert to the ordinary broadcast waves, well, the Adaptor can be taken right out of circuit in less than a couple of minutes!

A REAL CHANCE FOR THE CONSTRUCTOR



The majority of the few components can be made at home, so at very little expense keen constructors have the chance to co-operate with the B.B.C. in their 7-metre experiments.

Few Components.

I shall have some more to say about the use of the Adaptor a little later on. Meanwhile, let us get down to the constructional part of the business.

A complete list of the components required was given in the first article, and I strongly advise you to refer to this when buying your parts, because there are certain components for which there is no alternative. The reason for this, it should be pointed out, is not because there are no other

(*Contd. on next page.*)

THE KELSEY 7-METRE ADAPTOR

(Continued from previous page.)

suitable makes, but because there are no suitable types *in* those makes as far as I know.

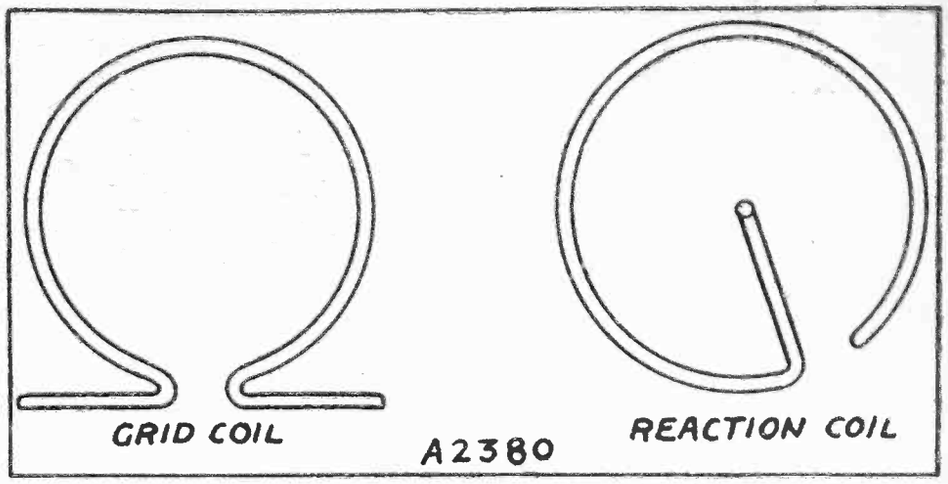
The constructional work should commence with the preparation of the baseboard and the wooden supports upon which the Adaptor is built up. First mark out on the baseboard the two diagonals, and using the point where they meet as a centre, describe a circle 2¼ in. in diameter. This circular disc should next be cut away.

Fitting the Valve.

In the Adaptor illustrated, this hole was not cut out, but it is obvious that the removal of the valve will be greatly facilitated with a hole in the actual baseboard, and it will therefore be well worth while to spend a minute or two in cutting it.

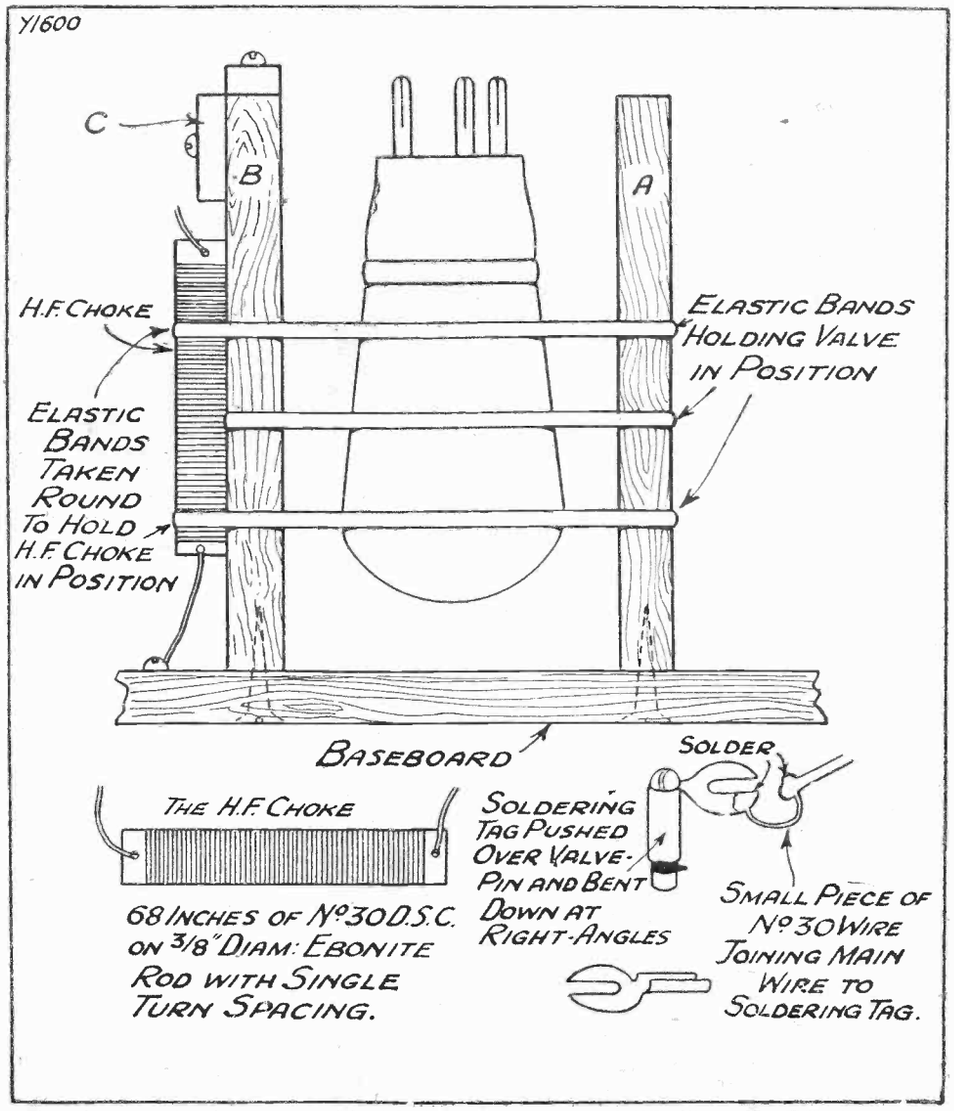
The dimensions and details of the wooden supports marked A and B in the various diagrams can be obtained from the special dimensioned diagram, in which they are shown. It doesn't matter very much what kind of wood you use for these supports so long as it is ⅜-in. thick, but make absolutely certain that the wood is thoroughly dry. If there is any doubt about it, put it in a hot oven for half-an-hour or so before you use it. The same thing applies, as a matter of fact, to the main baseboard.

THE SMALLEST COILS YOU'VE EVER MADE!



This picture illustrates the exact size of the coils.

YOU EVEN MAKE YOUR OWN VALVE HOLDER!



The valve mounting is a very special affair, but offers no practical difficulties. The H.F. choke also, as you can see, is exceptionally simple to wind.

When the back and front upright supports are ready, screw them to the main baseboard in such a way that the sides that face one another are 2¼ in. apart. In other words, they should just come to the edge of the hole in the baseboard.

You will next require two strips of ebonite, one 2 in. by ⅜ in., and the other 3½ in. by ¼ in. The smaller of these should have three small holes drilled in it, one at a quarter-inch from each end, and one in the centre. Double-sided soldering tags should be fitted, by means of small nuts and bolts, to the two holes at the ends, while the central hole should be used for securing the ebonite strip centrally to the front upright support. This, of course, should be put under the screw before it is finally driven home.

The larger strip also requires three holes in it, two small ones, the first ⅜ in. away from one end, the second ⅞ in. away from the same end, and the third and larger hole, which is for the reaction condenser spindle, should be drilled exactly 1 in. away from the other end of the strip.

This larger strip should next be secured by means of wood-screws to the top of the front side of the front upright support.

Supported By Elastic.

You can now commence to mount the components, starting off with the screw-in type neutralising condenser, which is the tuning condenser, and the reaction condenser.

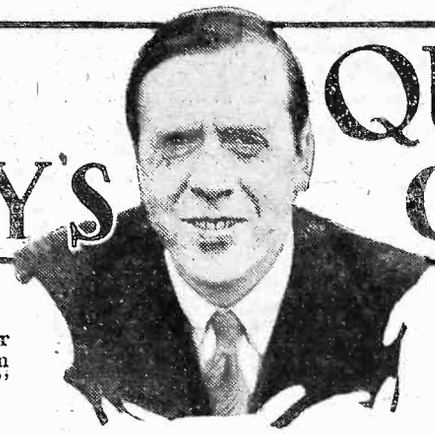
When these two have been secured in the position shown in the diagrams, place three fairly strong elastic bands round the two upright supports, and place the valve centrally, and upside down, between the elastic bands. The exact position is clearly shown in one of the diagrams. In this same diagram is also shown the type of soldering tag with which connection is made to the valve pins.

You will now find it best to refer to the detailed wiring diagram published in the last issue of "P.W." in order to locate the exact positions for the remainder of the components. This is a procedure over which particular care should be taken, especially in the positioning of the coils.

With regard to the coils, by the way, the coil diagram accompanying this article is exact size, and you will, therefore, find it best when making them, to bend each

(Continued on page 1060.)

CAPT. ECKERSLEY'S QUERY CORNER



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 direct to Capt. Eckersley; a selection of those received by the Query Department in the ordinary way will be answered by him.

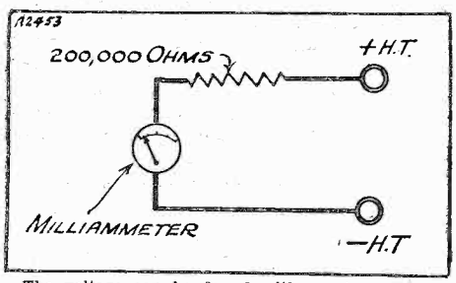
Voltages From an "Eliminator."

B. G. (Tottenham).—"I am using an H.T. eliminator and I am doubtful whether the set is getting the correct voltages. Will you please tell me of a simple method of measuring the voltage from a mains unit, since I understand that the average voltmeter is not suitable."

I answered a similar question some time ago, and pointed out that a cheap voltmeter could not measure the volts on a fairly low-powered eliminator. If you've not got a good voltmeter, you can buy one to do it!

If you don't want to buy one you could save money by making one. Get a milliammeter reading to 1 milliamp. Get a 200,000-ohms wire and resistance. Ask the makers what they guarantee in accuracy—probably 5 per cent. Then connect the resistance and milliammeter as shown in my sketch.

SIMPLE AND ACCURATE



The voltage can be found with great accuracy by noting the current flow as explained below.

Then 1 milliamp on the scale reading is 200 volts, with an error of ± 5 per cent—surely sufficient for your purposes? Of course, one *can* buy electrostatic voltmeters which take on current—and *sometimes* short-circuit. It's worth while investigating if you can buy an electrostatic up to 200 volts, I suppose, but my other suggestion is good also.

* * *

Coil and Condenser Proportions.

J. G. (Brentford).—"When it is desired to obtain sharp tuning with a tuned circuit neglecting the efficiency in other respects, is it preferable to use a small variable condenser and a fairly large tuning coil, or a large condenser and a smaller coil?"

It does not matter. The selective response of a tuned circuit depends usually upon the ratio of the resistance to the inductance of the tuning coil.

This is not always strictly true but usually so. So if you build a coil of thick low-resistance wire you have to make the coil big to get the right inductance and the "*R* over *L* ratio" (ratio of resistance to inductance) is good because you used thick wire and because you made the coil big.

If you are making generalisations, it's a *big* coil which is a *selective* coil. Then you may find that the selectivity at shorter waves with this same coil is worse than at longer waves. And you may think that's because you use a small condenser at shorter waves.

It's not that, it's because at shorter waves the frequency of electric oscillation is greater, and *therefore* the resistance of the coil greater, therefore *R* over *L* greater, therefore the selectivity worse.

Everything depends then upon *R* over *L*!

* * *

"Ohms per Volt."

J. M. (Cardiff).—"I have a voltmeter reading up to 150 volts, and the makers say that its sensitivity is '60 ohms per volt.'

"Does this mean that the total resistance of the instrument is 9,000 ohms, even when I am measuring the voltage of a 20-volt battery?"

Yes, 60 ohms per volt means that, for a voltmeter reading up to 150 volts, the total resistance is 60 × 150 ohms = 9,000 ohms. And, of course, the resistance is the same whatever voltage you are reading. 1 volt or 6 volts or 150 volts. Every voltmeter is really an ammeter in series with a resistance. The voltmeter movement moves because current passes through it. Thus, volts = current times resistance. In a voltmeter the resistance is constant, as I said, and therefore more volts means more current, meaning the needle of the movement is pushed over further. In your instrument of 9,000 ohms the maximum current at 150 volts is

$$\frac{150}{9{,}000} = 0{\cdot}01666 \ldots \text{ amperes,}$$

or just over 16·6 milliamperes.

If you remove the series resistance in a voltmeter, you have a milliammeter. A voltmeter should take as little current as possible. The good voltmeter (expensive) is 1,000 ohms per volt.

Reversing the Transformer's Secondary.

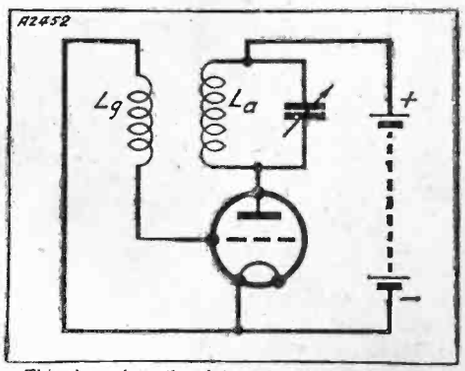
C. J. (York).—"It is sometimes recommended, in cases of L.F. instability, to reverse the connections to the secondary terminals of an L.F. transformer. I have proved this to be successful, but I do not understand why.

"Is there any simple explanation of the manner in which the cure is effected?"

The method by which a valve is "made to oscillate" depends upon two things: (1) a coupling between anode and grid circuits; (2) a correct phase relationship between the voltages in each of these circuits.

Thus, consider the circuit conventionalised as shown in my sketch. Suppose you switch on the H.T.

PHASE AND FEED-BACK



This shows how the plate and grid circuits can be coupled by coils for reaction effects. The principle is exactly the same if an L.F. transformer is used instead of—as in this case—an H.F. transformer.

A rush of current passes through the anode coil L_a. This induces a voltage between grid and filament via the coil L_g. This coil *may* be connected so that the volts induced either check the current or assist it.

Depending upon which of these two things happen, the valve will either cause circuits to oscillate or not.

The coil L_g must be connected across grid and filament in one particular way to create oscillation. If the valve will not oscillate one reverses the reaction. Nor need "the valve oscillate." Retroaction can be produced, and we may call this instability.

Nor need oscillations be generated at "high" frequency. Then in a transformer-coupled amplifier we have a possibility of retroaction and so on between grid and anode circuits coupling, and therefore the circuits may oscillate or be unstable. Reversing the connections in one coil kills the retroactive state, as I explained above.

B.B.C. MILESTONES OF 1931

An interesting summary of the outstanding events of the past year.

By OUR SPECIAL CORRESPONDENT.

THE total number of transmitting hours for the year ended September 26th, 1931, was 67,686 hours 47 minutes, and the percentage of breakdown time was ·03. This compares with 72,396 hours last year and a percentage of ·04—the decrease in hours being accounted for by the closing of certain relay transmitters.

Moorside Edge was Completed.

Constructional work at the North Regional station at Moorside Edge, near Huddersfield, was completed during the early part of the year. Following public reception tests, the Regional transmitter took over the service on May 17th, and the full service of alternative programmes was introduced from this station on July 12th, 1931.

* * *

Constructional work on the Scottish Regional station has continued. The building is now completed and the installation of plant is in hand. It is expected that public reception tests will begin in the early summer of 1932.

* * *

After lengthy tests, a suitable site for the West Regional station has been purchased at Washford Cross, near Watchet, Somersetshire. The contract for the building of the station has been placed. Constructional work will begin immediately.

* * *

On November 6th the B.B.C. announced its intention of proceeding immediately with the erection of an Empire broadcasting station at Daventry. This station will comprise two transmitters, each capable of working on a number of wavelengths, so that it will be possible to reach the various parts of the Empire at a time of day suitable for local reception. It is expected that the station will be available for service in about a year's time.

Ultra-Short-Wave Transmitter.

In co-operation with Marconi's Wireless Telegraph Company, an ultra-short-wave transmitter, using a wave in the band 6·5 to 8 metres, will be installed in Broadcasting House in order to permit investigations into the suitability or otherwise of waves of this length for broadcasting purposes. The duration of these experiments will depend on the initial results obtained; but in any case the most favourable results would not materially change the present broadcasting distribution system using medium and long waves.

* * *

During the year, work has proceeded at Regional centres for the modernising of studios and control-room arrangements. At the Scottish Regional headquarters in Edinburgh new control-room equipment is being supplied, while in the West Region a talks studio and offices were opened in Bristol. Negotiations are at present proceeding for an extension of the Midland Regional headquarters at Birmingham. In the North Region new premises have been obtained in Leeds, and the work of conversion is now in hand.

Extension of Underground Cables.

Work has proceeded throughout the year on the new high-quality cable system for interlinking stations in place of the overhead circuits used since 1923. This work has been carried out by the General Post Office, and the new cable circuits are gradually being handed over to the Corporation. Up to the present the following routes have been handed over: London to Leeds and Manchester; London to Daventry and Birmingham.

The cable linking Leeds, Newcastle and Edinburgh will shortly be handed over to the B.B.C. These new cables give improved quality and reliability in S.B. working.

International Relay Work.

Work in connection with international relays has been rather of consolidation than of extension, and relays from Bayreuth and Vienna, among others, have shown the high standard which can now be reached. Relays from abroad, other than the Continent of Europe, have taken place generally over the Post Office radio telephone services, and in particular those from Australia, the United States and from the liners "Homeric" and "Empress of Britain" will be recalled.

* * *

The result of the recent meeting of the Union International de Radiodiffusion held in Rome indicated that although international agreement was not forthcoming for a general revision of the Prague wavelength plan, yet it was possible to arrange for minor changes which have resulted in a reduction in interference among the restricted number of stations to which they were applied. The British transmitters affected were North Regional, London Regional and London National, and the change has had satisfactory results.

Research Work Carried Out.

Work on the acoustics of Broadcasting House studios has formed an important part of research work carried out by the B.B.C. Other sides of the B.B.C.'s activities on which research work has been carried out are the practical methods of operation of broadcasting transmitters, with particular reference to the development of the necessary measuring and indicating instruments to ensure satisfactory volume control of programmes; design of microphone and amplifier equipment; design of broadcast transmitters, with particular reference to aerial systems in order to achieve on the one hand the best efficiency for local service and, on the other hand, a reduction of interference at a distance.

Apparatus for recording programmes has been installed in London and is used extensively for rehearsal work.

THE VOICE OF THE VATICAN

Vast improvements are being carried out in Vatican City, Rome, and this photograph shows the new radio station there. It should be familiar to short-wave listeners in this country, as it comes over exceptionally well.

DRAMA IN THE MIDLANDS

How a special broadcasting studio has been opened within a theatre building.

THE opening of a special broadcasting studio on the top floor of the Birmingham Repertory Theatre marks the beginning of a new and auspicious era of close co-operation between this famous dramatic organisation and the B.B.C. By the time these words are in print the new drama studio will be in use.

It is not a large room, but is fully equipped as a modern radio studio. When I visited it recently the carpenters were hard at work. Red signal lamps were being installed and the room was being thoroughly sound-proofed. An adjoining room is provided as an engineers' control point.

Valuable Resources Available.

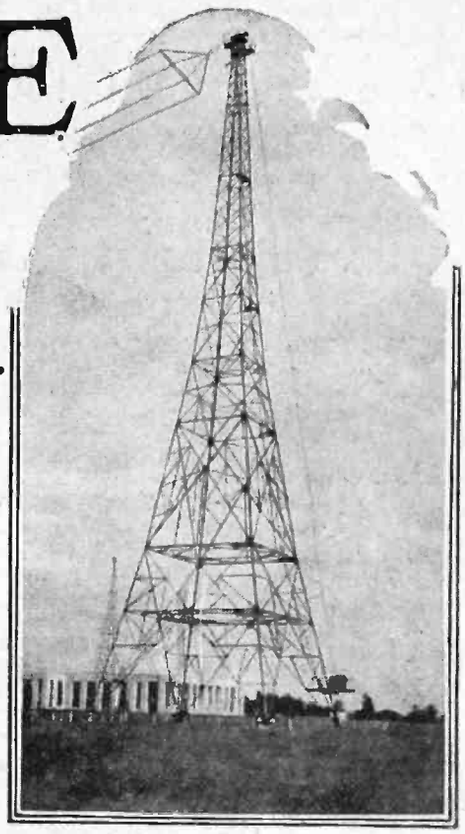
The idea behind the scheme is that relays of plays from the stage of a theatre are not entirely satisfactory, but the valuable resources of the Birmingham Repertory Theatre will be available for broadcasting through this new studio.

The players will be able to broadcast in the environment with which they are familiar, and without needing to go round to the B.B.C. studios at the Midland Regional offices, and owing to the large cast available it will be possible to put any play on at short notice.

It is expected, in fact, that while a play is being broadcast from the new studio, another play may frequently be in action on the stage in the same building.

AFTER FIVE YEARS

"O.H.M." SURVEYS THE B.B.C.



Great changes have taken place in the B.B.C.'s organisation in recent years, and in this critical account "O.H.M." expresses the view that in many ways the B.B.C. has, instead of forging ahead, retarded. It is also interesting to note that six years ago he gave the opinion that our own P. P. E. was the "second man" in British Broadcasting.

5. ADMINISTRATION AND PERSONALITIES.

IN my investigation during the past few months, I have encountered altogether unnecessary reluctance and obstruction on the part of B.B.C. spokesmen, when I was trying to get at the real truth of the present administrative position of the Corporation.

I have had, therefore, to fill in the gaps with speculation which I hope is intelligent and which I believe is true. But before beginning to set out my views, I must just underline what I regard as the folly of B.B.C. silence on nearly every subject not directly associated with programmes or engineering.

The "Hush-Hush" Method.

It seems to me a great pity that the B.B.C. has not sufficient faith either in itself or in its public to be quite open about its methods of administration and the details of its expenditure. There is, I think, a good deal more secrecy being practised now than there was in the old days, and to that extent the general goodwill of broadcasting undoubtedly suffers.

Now coming to administration, from what I can see of its results, it is undoubtedly tidier and smoother than it was five years ago. Indeed, it is almost too tidy; in some respects it is getting too much like the administration of a model factory or of a great industrial undertaking.

Fear may not be so pronounced a weapon of discipline as it was five years ago; I cannot be certain about this, but I can be certain that fear is still too big a factor in the administrative machine of the B.B.C. There is still a lamentable absence of sympathetic contact and mutual understanding between those who administer and those who build programmes.

Spoils the Programmes.

I had in the old days to criticise "the administration complex," which I found rampant in the B.B.C. It is still there, and rather more rampant. This disease is simply the conviction that administration is something apart from the ordinary work of mankind; it is a kind of sanctified task which can be entrusted only to the chosen few.

It has always puzzled me why there should be such a big administrative organisation at Savoy Hill; I mean a department in itself quite apart from Programmes and Engineering. As long as the exercise of the "Administrator foible" is simply costly, it might be excused because of gains in certain directions: but when the foible begins to interfere with programmes then it must be dealt with.

And I believe that administration *qua* administration has begun to impinge upon the routine associated with the work. Therefore, it should be faced fairly and squarely.

In the Old Days.

If the specialist executant, in other words, the Department Chief, is not to be trusted in the normal conduct of his work, then he is either unsuited for the work and should be replaced or there is unjustifiable administrative interference. My view is that the trouble is the latter.

Now what about the authority and autonomy of the B.B.C. centres outside London? In the old days one of the most encouraging and stimulating features of the B.B.C. administration was the enthusiastic and yet friendly rivalry between the score or so of stations that constituted the low-power system of distribution.

OF "RECORD" FAME

Every listener is familiar with the voice of Christopher Stone, and his gramophone recitals are easily one of the most popular items in present-day programmes.

I remember vividly the composite programmes containing really good work from Bournemouth, Aberdeen, Newcastle, Birmingham, Manchester, Plymouth and the rest. It seems to me that a great change has come over British broadcasting with the reduction of provincial centres.

For one thing, the staffs outside London are not nearly as happy and active as they used to be. They seem to be moving in the shadow of impending disaster.

As one of them put it to me, "we are between two fires, created by our sense of duty to our Region and our sense of duty to the B.B.C."

Centralised Control.

I suspect that the B.B.C. does not admit that any of its staff should have a local loyalty! Certainly Savoy Hill has concentrated in its own hands very much more programme work than was the case five years ago.

I recognise that some concentration was right and proper, but I submit that the administrative attitude of Savoy Hill does not sufficiently envisage the whole country. In the old days, it was argued, I think justly, that the B.B.C. was able to create within itself an effective alternative to direct competition.

I do not know whether this argument is advanced now, but I am sure it could be sustained only with the greatest difficulty. No, the price of tidyness, better discipline and greater docility has been a heavy one: and I can only hope that it is not too late now to get back on the right lines.

More humanity, more taking of the public into confidence, more confidence in staff: these form the corrective nostrum for present maladies. Writing about the B.B.C. six years ago, I placed, according to my idea of their actual order of importance to broadcasting, the names of the chief personalities without regard to artificial classification.

(*Continued on next page*)

RADIO IN THE COURTS

Recently there have been some extremely interesting cases concerning Radio Patents in the courts, and below our Special Correspondent gives some news regarding two recent applications for important extensions.

MR. JUSTICE LUXMOORE has recently given judgment on an application made by the British Thomson-Houston Co. Ltd., to prolong the life of Patent No. 148129, which covers the use of a "smoothing" circuit for supplying D.C. current from A.C. mains. Under this patent every wireless set or gramophone amplifier driven from the electric mains was liable to pay a royalty.

After a prolonged hearing the application was refused, with the result that still another famous radio invention goes to join the shades of the reaction and grid-leak patents.

A Profitable Patent.

The eliminator patent was originally issued to the British Thomson-Houston Co. Ltd. as and from the 22nd December, 1915. It was, therefore, due to expire on the 22nd December, 1931, at the end of the full-term period of 16 years.

The ground on which an extension was asked for was that part of the normal life of the patent overlapped the war period, during which time the patentees were prevented from reaping the full benefit of the invention owing to the fact that they were occupied in carrying out other work of national importance.

The Court, however, declined to accept this plea.

The actual circuit arrangement described in the patent was originally used for converting an alternating supply into a "smooth" D.C. current for operating X-ray apparatus but, of course, for the last four or five years it has found a far wider use in connection with the mains-driven wireless sets.

The primary of the supply transformer T, Fig. 1, is tapped across the alternating mains, the secondary being used to feed a rectifier K, which may be arranged to give either single- or double-wave rectification, as preferred. The essential feature of the patent lies in the smoothing circuit inserted between the rectifier output and the tapped potentiometer P, or other "load," from which the constant voltages are to be drawn.

How It Works.

The output current from the rectifier consists of a series of unidirectional "pulses" corresponding to each cycle (or half-cycle if a full-wave rectifier is used) of the original A.C. supply. These pulses are fed into the smoothing circuit L, C, C_1, where the series choke L passes the direct current easily, but obstructs the passage of any alternating or "ripple" components, tending to throw them back into the condenser C.

Since the impedance of the condenser is comparatively small to fluctuating voltages, the "ripples" readily pass across from the positive to the negative line, and away from the potentiometer P.

Any ripples that may succeed in passing across the inductance find a similar shunt path open through the second condenser C_1. They accordingly slip across this back to the negative lead, leaving the supply to the potentiometer free from any irregularities likely to set up disturbances in the set.

This is, of course, the broad principle of the smoothing circuit as used in a mains-driven set. In recent years various other modifications have been developed, but they have all paid tribute to the "master" patent which has just expired.

Raw A.C. Valves.

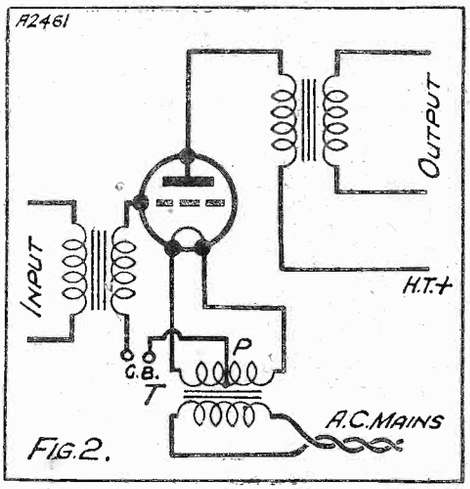
Coupled with the "eliminator" application, the British Thomson-Houston Co. Ltd. asked for an extension of another patent (No. 15448, of 1915), connected with the use of raw A.C. for heating valve filaments. In this case they were successful in obtaining a prolongation of three years from the 2nd November, 1931—the date at which protection would otherwise have ended.

When a valve is heated directly with raw A.C. it is obvious that the voltage across the filament must fluctuate in rhythm with the frequency of the A.C. supply. Unless suitable precautions are taken this will set up pulsations in the plate circuit of the valve, which will be repeated in the loudspeaker.

According to the second patent, the secondary of the supply transformer T, Fig. 2, is tapped at its centre point, P, and the return lead from the grid (or plate) is taken to what may be called the "electrical centre" of the filament. In this way the *average* difference of potential existing at any instant between the filament and the grid (or plate) is effectively reduced to zero, and the transfer of "hum" from the A.C. mains to the loudspeaker is, therefore, prevented.

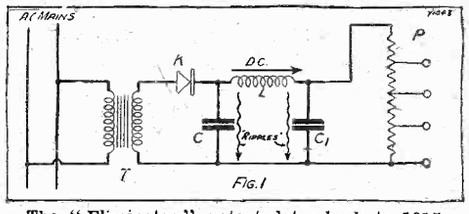
Manufacturers using this circuit arrangement are still liable to pay patent royalties on it until the 2nd November, 1934.

A.C. FOR HEATING



This circuit is the basis of a valuable patent covering the use of raw A.C. for heating the filament of a valve.

THE SMOOTHING CIRCUIT



The "Eliminator" patent dates back to 1915, and only expired at the end of last year. It was in an effort to obtain an extension of life for this patent that the B.T.-H. Co. applied, though unsuccessfully, to the courts.

AFTER FIVE YEARS

(Continued from previous page.)

This was my list in 1925: Sir John Reith, Captain Peter Eckersley, Captain Cecil Lewis, Mr. J. C. Stobart, and Major Gladstone Murray. My list to-day is as follows: Sir John Reith, Lady Snowden, Major Gladstone Murray, Mr. Ashbridge, Dr. Boult, Mr. Gielgud and Admiral Carpendale.

Sir John Reith, of course, remains the dominating personality, both by virtue of his qualities and of his position. To him, the B.B.C. owes what is best in its tradition, what is its real claim to distinction and superiority in the permanent sense.

A Difference.

I mean the now accepted conception of a public service devoted to the public good with a deep sense of responsibility and a comprehensive grasp. There is, however, one marked difference about Sir John. Six years ago he was restive, perhaps even anxious, to hand over the service which he had created. Other great enterprises beckoned to him. But the intervals between national crises in which the B.B.C. was always conspicuous have not been of such duration as to permit him to "sign on" with any of the various large commercial concerns seeking his services.

My impression to-day of Sir John Reith is that he is much more settled, that, in fact, he has induced himself to accept broadcasting as his career and "will stay the course," other things being equal.

Lady Snowden's fine idealism and public spirit, now applied principally to broadcasting, places her high in the list of chief personalities. I described Gladstone Murray in 1925 as invaluable to the B.B.C. for his diplomatic gifts alone.

Built From Broadcasting.

Since that time he has evolved one of the biggest publishing businesses in the country, producing a revenue now in excess of a quarter of a million. But I should think that his chief service to broadcasting is still in the zone of "public relations."

Having established a unique intimacy with practically everyone that counts in the newspaper world, he is able by his personality, and ever-adroit manœuvre, to retain for the B.B.C. the biggest and most favourable volume of outside opinion of any public organisation in the country.

The R.I. *Improved and Perfected* ECKERSLEY *Laboratory Tested* TUNER

RESISTANCE COUPLING
The coil for aerial tuning is connected to the secondary coil for grid circuit tuning by means of a high resistance of suitable value.

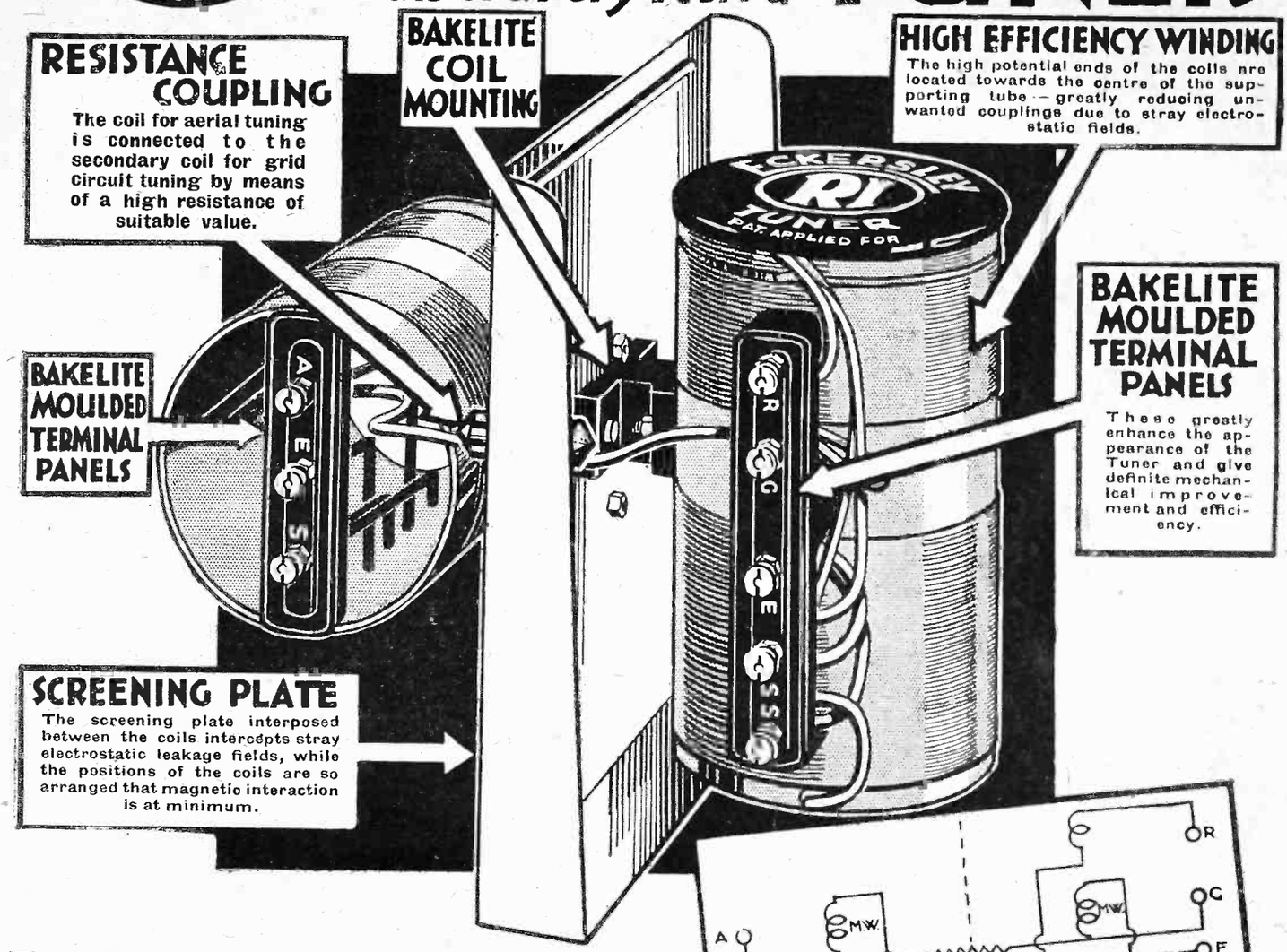
BAKELITE COIL MOUNTING

HIGH EFFICIENCY WINDING
The high potential ends of the coils are located towards the centre of the supporting tube—greatly reducing unwanted couplings due to stray electrostatic fields.

BAKELITE MOULDED TERMINAL PANELS

BAKELITE MOULDED TERMINAL PANELS
These greatly enhance the appearance of the Tuner and give definite mechanical improvement and efficiency.

SCREENING PLATE
The screening plate interposed between the coils intercepts stray electrostatic leakage fields, while the positions of the coils are so arranged that magnetic interaction is at minimum.



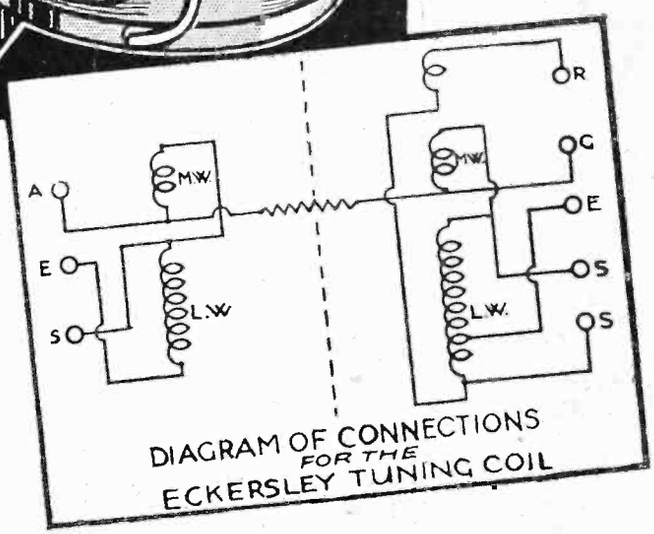


DIAGRAM OF CONNECTIONS FOR THE ECKERSLEY TUNING COIL

The Eckersley Tuner gives REAL SELECTIVITY to the million at a price within reach of all

It is revolutionary in principle, design, size and operation and comprises two coils with magnetic axes at right angles, separated by a metal screen and coupled in an entirely new way by a resistance.

It is $6\frac{3}{4}$ x 7 x $7\frac{3}{4}$ ins. in size—and is not small because "bulk" has been established as absolutely essential to greatest selectivity.

The Eckersley Tuner ***tunes first*** and cuts out mush, obviates sideband jamming and passes only clear cut signals for first and subsequent amplification as compared to ordinary coupling of two tuned circuits by a valve which magnifies interference.

R.I. produced the original model of the Eckersley Tuner to the inventor's specification and have mechanically improved the constructional details which give an unequalled degree of efficiency. Every R.I. Eckersley Tuner is subjected to the most critical laboratory tests before release.

List No. B Y 30. Provisional Patent No. 29404/22.10.31. Size: 6¾ × 7 × 7¾ ins.

15/6

THE KIT ACHIEVEMENT OF THE SEASON

FORMO — ARTHUR PREEN & Co LTD.

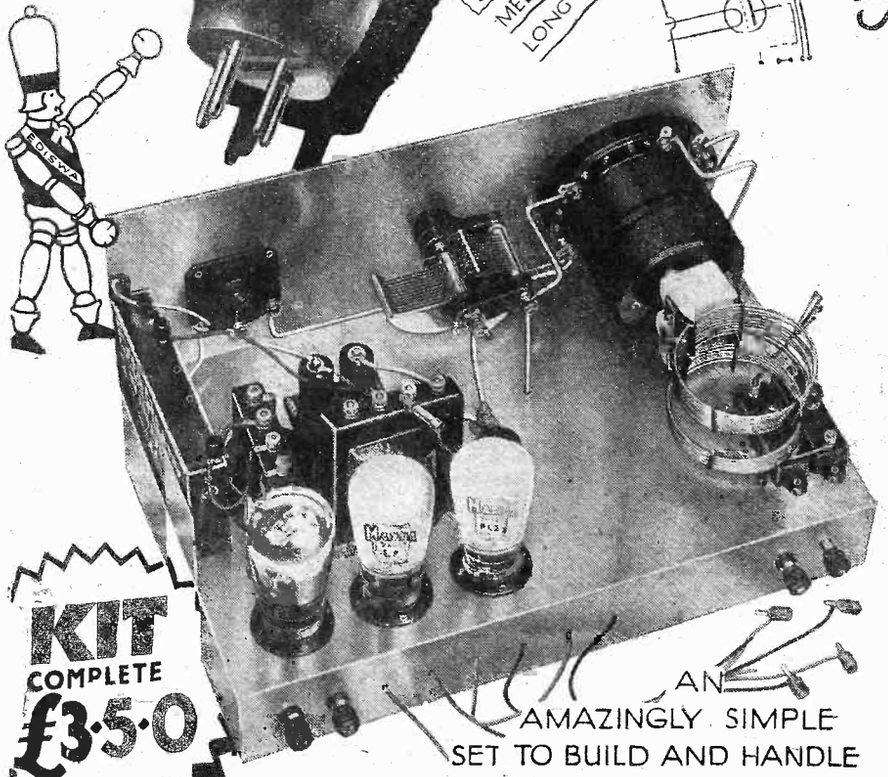
Triple Wave THREE

FULLY PROTECTED

INCORPORATING THE WONDERFUL NEW TRIPLE WAVE, SWITCH OPERATED. COIL — PRICE, COIL ONLY **17/6**

BUILT AROUND THE Tale in one FAMOUS

MAZDA THE BRITISH VALVES



This easily constructed Kit provides you with the opportunity, never offered before, of tuning in to the world's ultra-short wave stations in addition to the host of medium and long wave broadcasts—by the simple turn of a neat panel switch.

NO COIL CHANGING

Another feature of this wonderfully efficient three valver is that when the wave switch connects the ultra-short coils in circuit with the detector valve, it simultaneously reduces the capacity of the ·0005 tuning condenser to ·00015 through a small mica condenser and thereby enormously improves reception.

The efficiency of the Kit is assured by the use of the famous **MAZDA VALVES,** numbers P.220.A., L.2. and H.L.2. which are obtainable from all Radio Dealers.

KIT COMPLETE £3·5·0

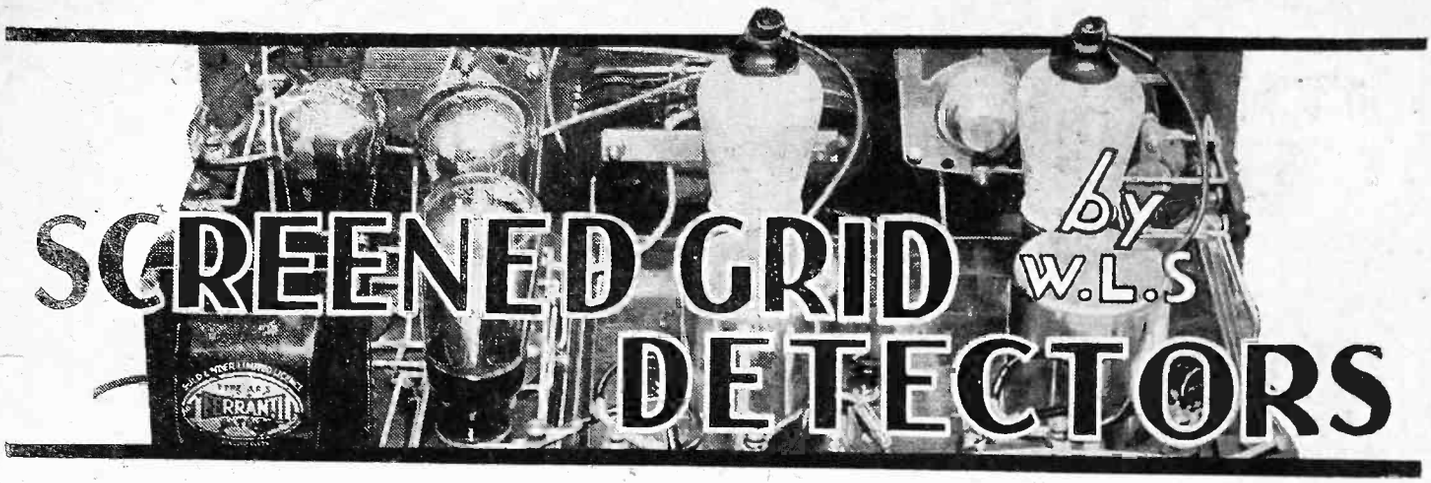
AN AMAZINGLY SIMPLE SET TO BUILD AND HANDLE

WONDERFUL RANGE & SELECTIVITY

Get this **FREE BOOKLET**

Components are supplied already mounted in position and the simple wiring instructions are described and illustrated in this Booklet, obtainable FREE from your dealer, or address below.

ARTHUR PREEN & CO., LTD. — FORMO — ARTHUR PREEN & Co LTD. — **GOLDEN SQ., PICCADILLY CIRCUS LONDON W.1.**



SCREENED GRID DETECTORS

by W.L.S

Practical points regarding a most interesting application of the ubiquitous S.G. valve.

IF one can judge the interest taken in any particular branch of radio—particularly short-wave radio—by the amount of correspondence that an occasional mention of it stirs up, this article is in great request.

There seems to have been a great amount of interest taken in some recent remarks of mine on the efficiency of the S.G. valve as a detector. Further, a fairly recent article in "P.W." by a colleague of mine awakened the minds of still more keen experimenters as to its possibilities.

I propose to deal in detail with one or two of the small snags that are often met when one first tries out this simple experiment for oneself.

Effecting the Change.

I am assuming that you are converting your existing triode detector to one of the S.G. variety. To do this, you simply transfer any leads that go at present to the "plate" terminal on your detector valve holder to a flex lead ready to go to the "pip" of the screened-grid valve.

The old "plate" terminal is now the "screen" terminal, and therefore has to be fed with a suitable screen voltage, and by-passed to earth as directly as possible through a condenser, preferably of 1- or 2-mfd. capacity.

Point Number One is this: Do not assume that the screen requires the same voltage that you would give it if the valve were working in an H.F. stage.

Far from it! In my experience the best voltage for the average S.G. valve used as a detector is about 25. Sometimes 30, or even 40 may be used with advantage, but *never* 75 or 80.

Point Number Two concerns ways and means. It is usually advisable to provide the voltage by means of a potentiometer, which may be fixed. It is, in fact, a disadvantage to have this voltage readily variable, and particularly to vary it as a means of reaction control. The reason is just this—where you encounter a "dead spot" in the tuning, and have to push up reaction somewhat to make the set oscillate, you will be putting your screen volts higher than they ought to be for full efficiency.

Fixed Screen Voltage.

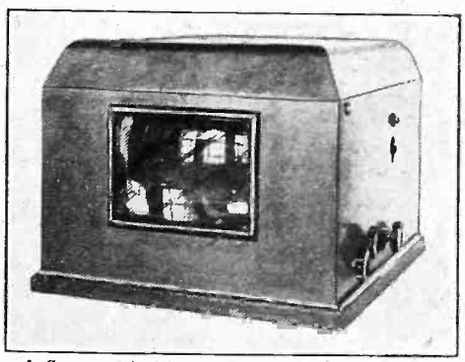
Thus, without knowing it, you will have some small bands of wave-lengths over which the set apparently oscillates well and behaves normally but is definitely inefficient.

A good "fixed potentiometer" for supplying the necessary screen voltage may be made from two Spaghetti resistances. One is taken from the screen to earth, and the other from the screen to positive H.T. The ratio between the one running to earth and the *total* resistance of the two gives you the fraction of the H.T. voltage that will be available on the screen.

To take two examples: 50,000 ohms to earth and 100,000 ohms to H.T. positive will give you one-third of your total H.T. voltage on the screen. If you run the set from 90 or 100 volts this is very suitable.

In another case, 25,000 ohms to earth and 100,000 ohms to H.T. positive will give you, on the screen, one-fifth of the total voltage. Where 125 or 150 volts is the usual H.T. used, this will give the required 25 or 30 on the screen.

A NEAT TELEVISION SET



A German television receiver which is attracting considerable interest.

Keep to your normal reaction control, whether it is throttle-control or one of the many other good capacity-controlled methods.

Point Number Three is a different matter altogether, and concerns the coupling of your newly-acquired screened-grid detector to the following valve. On account of the high impedance of the average S.G. valve, transformer coupling is liable to give a noticeable drop in efficiency. Resistance-capacity coupling is ideal, and I find an anode resistance of 100,000 ohms perfectly satisfactory.

The coupling condenser may be 002 or ·005 or any intermediate figure, and the grid leak (on the L.F. stage) about ·5 megohm. I guarantee that with this arrangement you will not be able to produce a threshold howl or a bad reaction control unless you use absurd voltages for the screen and plate.

The Grid Leak.

For Point Number Four we have to go back to the screened-grid valve again. You may find that it does not like the same value of grid-leak as your old triode detector did. In general, a lower-resistance leak appears to give nicer results. If, for instance, you have been using 5 or 10 megohms, as many short-wave men do, you may have to come down to 2 or 1·5 megohms.

You may, also, find that the set works better with the grid leak returned to the negative end of the filament. This is a matter for experiment on your own.

I do not intend these remarks to apply entirely to short-wave receivers. I find a screened-grid detector justifies the slight extra expense even on the broadcast waves, particularly where no H.F. is used. In dealing with a multi-valve H.F. set the gain is not very noticeable, and, further, precautions must be taken to avoid overloading the detector. This means a pre-detector volume control for local station work.

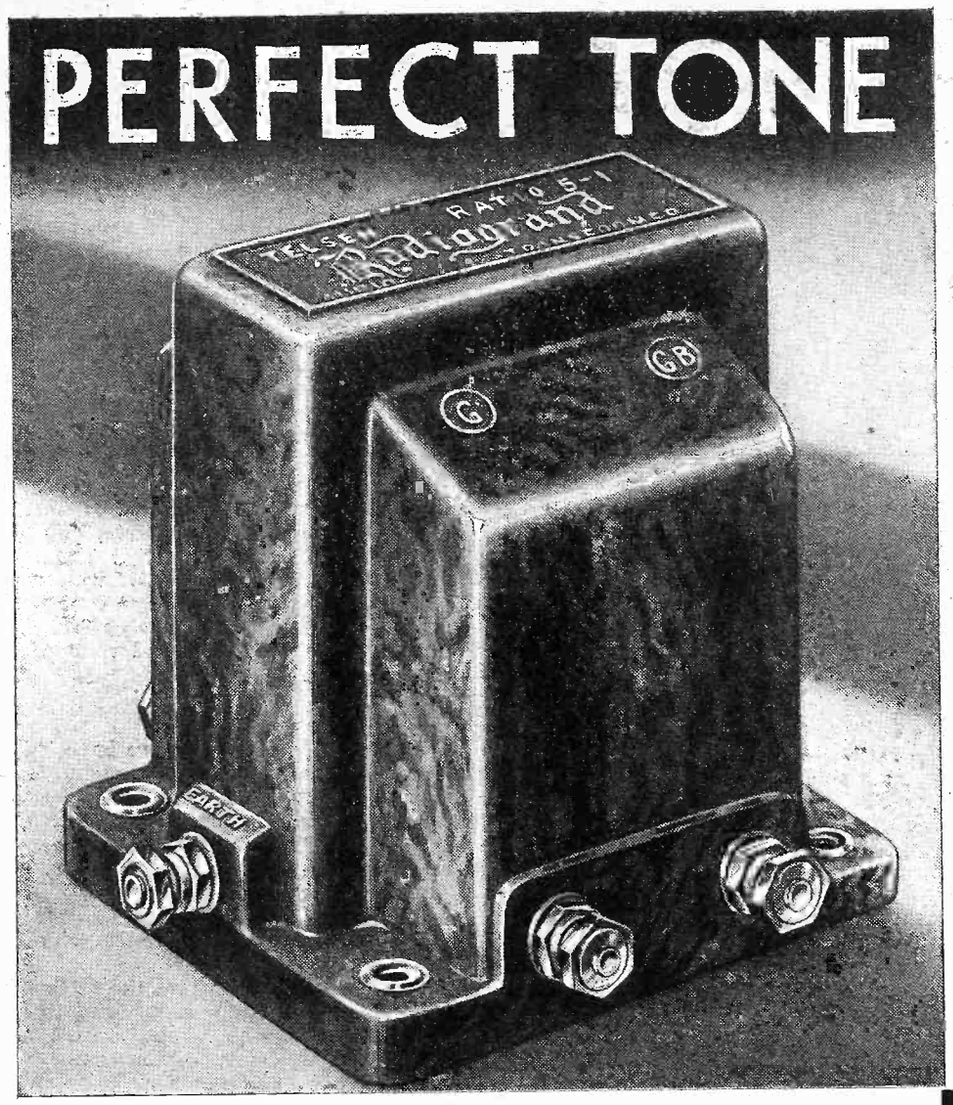
Its Only Drawback.

So far as I can see, the screened-grid detector has only one drawback. This is that it cannot easily be used by itself. Here again it is a question of impedance matching, and a step-down transformer or an auto-tapped choke could doubtless be used.

But for those who use a single-valver and are satisfied with it, I should feel inclined to say "Leave well alone." An S.G. detector, unless properly designed in every detail, used on its own, tends to give a high-pitched effect to the general "background" and "mush" that is rather disturbing.

For a two-valver it is quite ideal, and with care a modest headphone two-valve set can be made into a loudspeaker set, simply by using a screened-grid detector and a pentode note-mag. I am experimenting, incidentally, with pentode detectors for short-wave work, but I intend to keep quiet on that subject until I have some definite results to talk about.

PERFECT TONE



TELSEN TRANSFORMERS

have achieved fame in the radio world on account of the high standard of their quality and performance. Designed and built on the soundest engineering principles, these robust, full-size transformers will give not only efficient but enduring service.

L.F. TRANSFORMERS

"Ace," Ratios 3-1, 5-1 ..	5/6
"Radiogrand," Ratios 3-1, 5-1	8/6
"Radiogrand," Ratio 7-1 ..	12/6
"Radiogrand," Ratio 1·75-1	12/6

OUTPUT TRANSFORMERS

Multi-Ratio Output Transformer, giving three ratios of 9-1, 15-1, 22·5-1 ..	12/6
Output Transformer, Ratio 1-1	12/6
Pentode Output Transformer	12/6

L.F. CHOKES

L.F. Intervalve Coupling Choke, 40 and 100 henrys	5/-
Heavy Duty Power Grid L.F. Choke, 40 henrys	8/-

OUTPUT CHOKES

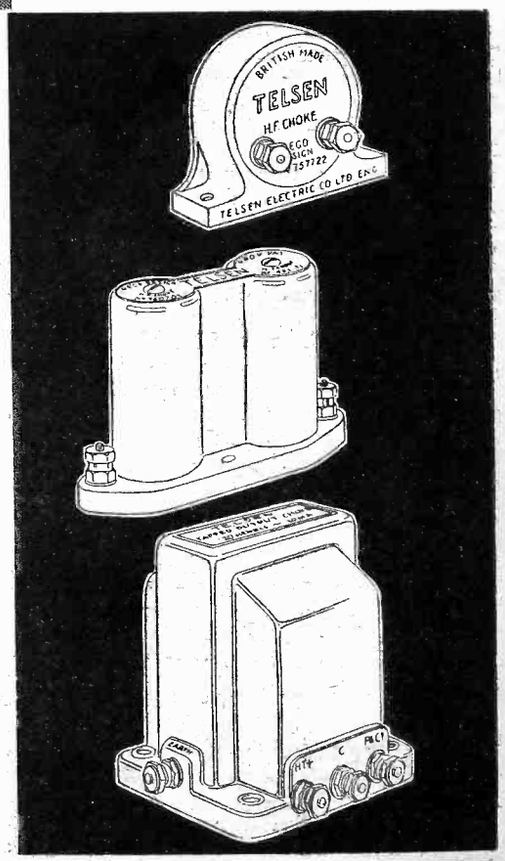
Plain, 20 henrys	8/-
Tapped, 20 henrys	8/6

BINOCULAR H.F. CHOKES

It is the function of an H.F. Choke to present the highest possible impedance to H.F. currents at all wavelengths. Particularly does this apply to the popular tuned-grid arrangement of screen-grid amplification, where the performance of the whole set is limited by the value of the impedance in the anode circuit of the screened-grid valve. It is equally important that this high efficiency should be maintained over the whole broadcast band. **Price 5/-**

STANDARD H.F. CHOKE

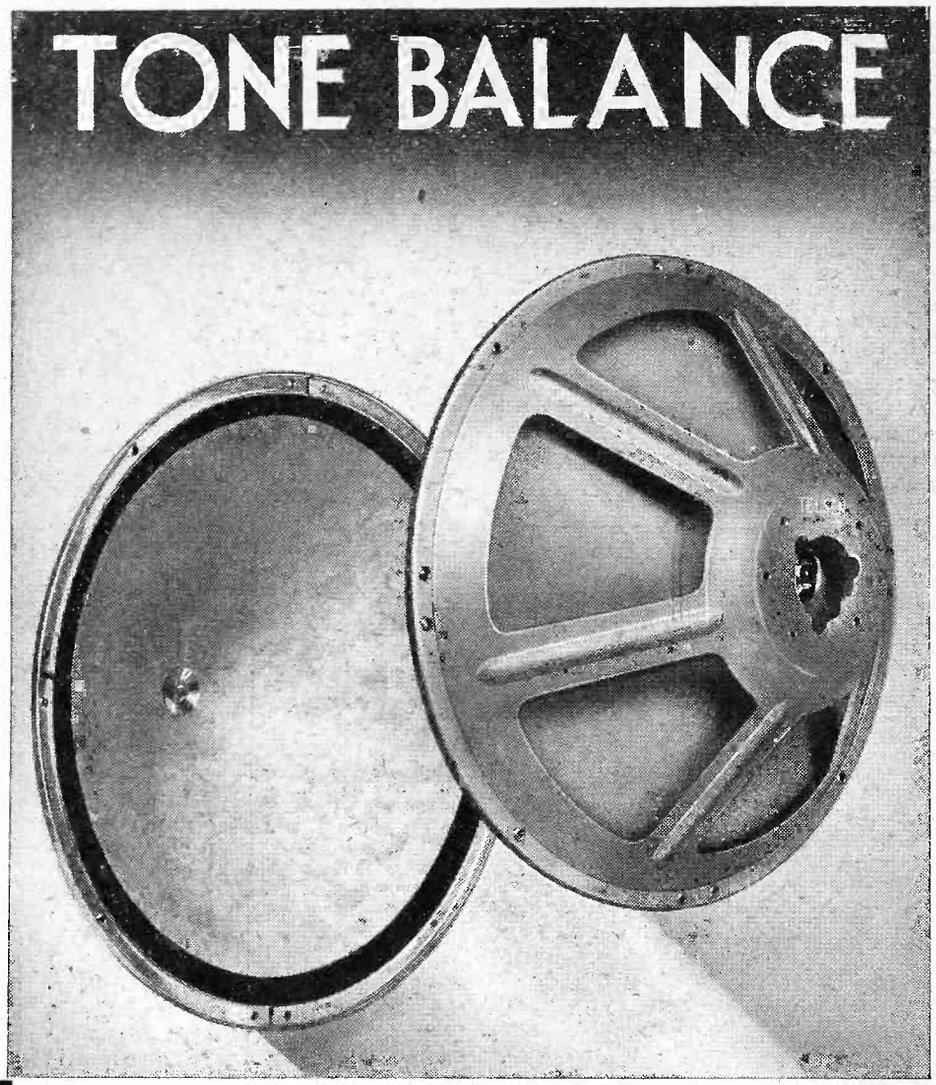
The Telsen Standard H.F. Choke utilises the minimum baseboard space. It is designed to cover the whole broadcast band and has an extremely low self-capacity. The inductance is 150,000 microhenries and the resistance 400 ohms. It has proved very popular and has been incorporated by set designers in many of the leading circuits. **Price 2/-**



TELSEN

THE SECRET OF PERFECT RADIO RECEPTION

TONE BALANCE



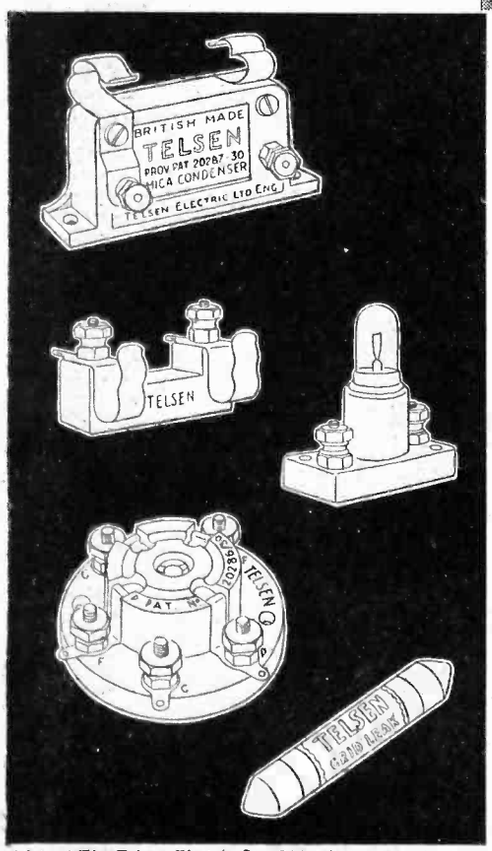
TELSEN LOUD-SPEAKER CHASSIS

has been produced to give an excellent performance with perfect tonal qualities. A fully-floating cone is employed of special damp-resisting material, and the shape and texture have been balanced to give a most pleasing, natural mellowness. Holes are provided for the attachment of most Loud-speaker Units.

Telsen "Popular" Chassis (Diam. 11") .. Price 5/6
Telsen "Major" Chassis (Diam. 14½") .. .. Price 10/6

FIXED CONDENSERS

(Prov. Pat. No. 20287/30). Made in capacities from ·0001 mfd. to ·002 mfd. They can be mounted upright or flat, and the ·0003 mfd. fixed condenser is supplied complete with patent grid leak clips to facilitate series or parallel connections. **Price 6d.**



VALVE HOLDERS (Prov. Pat. No. 20286/30). The Telsen four- and five-pin valve holders embody patent metal spring contacts, which are designed to provide the most efficient contact with split and non-split valve legs, and are extended in one piece to form soldering tags. Low capacity and self-locating.

4-Pin .. .. Price 6d.
5-Pin .. .. Price 8d.

GRID LEAKS. Telsen Grid Leaks are absolutely silent and non-microphonic, and practically unbreakable. They cannot be burnt out and are unaffected by atmospheric changes. Telsen Grid Leaks are not wire wound, and therefore there are no capacity effects. Their value is not affected by variation in the applied voltage. Made in values ranging from ½-5 megohms. **Price 9d.**

GRID LEAK HOLDER. Will hold firmly any standard size or type of Grid Leak. Ample clearance is provided between the terminal screw leads and the baseboard (underneath), preventing any surface leakage upsetting the value of the Grid Leak. The terminals and fixing holes are accessible without removing the Grid Leak. .. .. .. **Price 6d.**

FUSE HOLDER. This is a neat and inexpensive device which should be incorporated in every set as a precaution against burnt-out valves. The Telsen Fuse Holder firmly grips the standard radio fuse, giving a perfect contact. .. .. **Price 6d.**

TELSEN SCREENS .. .. Price 2/- and 2/6

TELSEN

100% BRITISH RADIO COMPONENTS

Advt. of The Telsen Electric Co., Ltd., Aston Birmingham.

CVS—102

MAKING THE "P ECKERSLEY TE

OUR CHIEF RADIO CONSULTANT tells you here how to wire-up this wonderful 3-valver—the first he has ever designed for "P.W." readers!

It achieves amazing selectivity and sets an entirely new standard of interference-free reception. Read this account written specially for you—

By CAPT. P. P. ECKERSLEY, M.I.E.E.

ON looking over what I wrote last week, it occurs to me that before we begin "making" this set on paper I ought to insert a foreword. A foreword about perfection of quality.

In all the world to-day there is no *perfect* radio receiver. Not one.

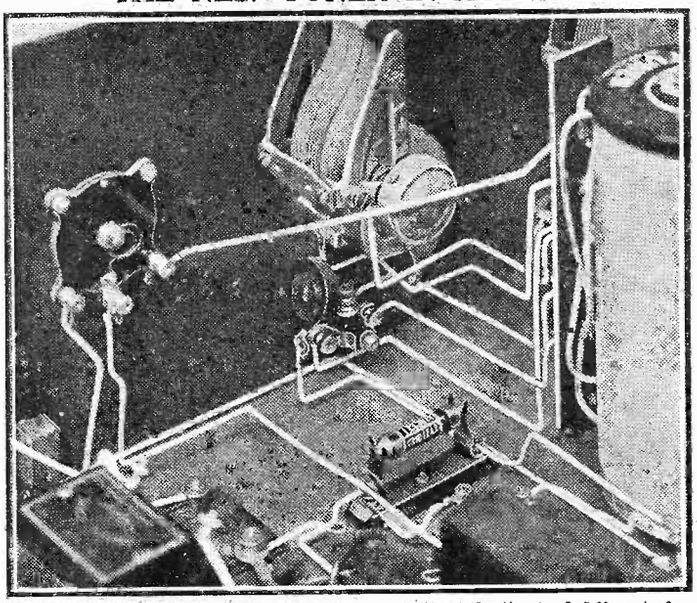
There are, however, some almost perfect ones. And they cost a lot of money, take up a good deal of room, and need too much looking after. And I ask myself, "How near can an ordinary listener hope to get to almost-perfect reception to-day?"

I may as well be frank with the answer. It is, truthfully, "not very near."

An Illusion of Reality.

Why? There are technical reasons, economic reasons, domestic reasons. The competent technician knows them, and is not downhearted.

THE NEW TUNER IN ACTION



For this close-up of the tuner-to-switch connections the "extended" part of the screen has been removed to show up the wiring. This is really quite easy to carry out, and is shown in detail in the wiring diagram which is on a following page.

Still less need the "ordinary listener"—beloved phrase—concern himself with this almost absolute perfection. What the ordinary listener needs in the present state of the art of radio broadcasting is a clear-cut sound-picture that corresponds so closely with the original in the studio that it can give the illusion of reality.

(When you are interested in a talk the speaker should sound "natural," as if he were in the room. His words should be perfectly distinct—f's like f's and s's like s's.)

It Really Does Its Job.

So much is quite possible with the service provided by the B.B.C., and the apparatus provided by the radio trade of to-day. But is that "illusion of reality" a *commonplace* of reception to-day? Not a bit! You know it is not.

For how can many a listener get a clear-cut sound-picture when somebody else's programme butts in and masks his own? When he has a perpetual accompaniment of Bands-Across-the-Sea?

My tuner is directed to that aspect of the problem. And it really does its job in a way that pleases me. (And will please you.)

Decent Selectivity.

I do *not* claim to have produced, in this set, a perfect quality receiver. In fact, as I said last week, I have deliberately adopted a standard amplifying circuit using standard parts to enable most people to get that standard of quality to which they are entitled with the parts they already possess, or know about. But——

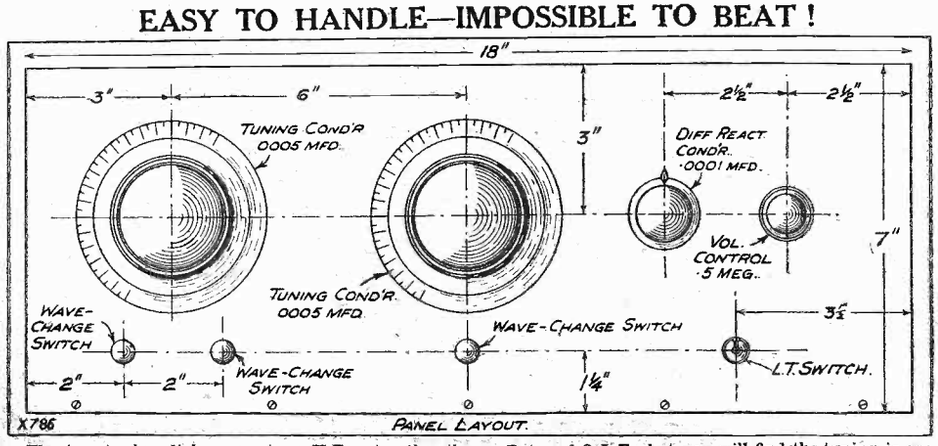
I *do* claim decent selectivity. Better than people are getting with "bandpass," and far, far better than most ordinary sets (excluding super-heterodynes) are capable of giving.

I *do* claim that this tuner, with its

THE PARTS YOU WILL NEED TO MA

- 1 Panel, 18 in. × 7 in. (Permcol, Peto-Scott, Becol, Wearite, Goltone, Parex).
- 1 Cabinet, with baseboard 10 in. deep to fit panel (Gilbert, Peto-Scott, Camco, Ready Radio, Pickett, Osborn).
- 2 ·0005-mfd. tuning condensers (J.B., Polar, Cyldon, Lotus, Igranic, Dubilier, Telsen, Wavemaster, Lissen, Ready Radio, Graham Farish, Ormond).
- 1 Filament switch, snap type (Bulgin, Igranic, Colvern, Ready Radio, B.A.T.).
- 1 ·0001—·00015-mfd. differential reaction condenser (Ready Radio, Cyldon, Telsen, Lotus, Polar, Dubilier, J.B., Lissen, Formo, Graham Farish, Wavemaster, Ormond, Igranic).
- 1 Push-pull "on-off" switch (Ready Radio, Telsen, Bulgin, Peto-Scott, Colvern, Goltone, Lissen, Igranic, Lotus, Wearite, Graham Farish).
- 1 3-point wave-change switch (Ready Radio, etc.).
- 1 Push-pull single pole change-over switch (Wearite, etc.).
- 3 Valve holders (Telsen, Lotus, Graham Farish, Lissen, Igranic, Formo, Clix, Wearite, W.B., Bulgin).
- 1 2-mfd. fixed c Dubilier, T.C.C., Hydra, Ferranti,
- 1 ·01-mfd. mica fix lier, Mullard, Tel Ready Radio, Liss Graham Farish,
- 1 ·0003-mfd. fixed etc.).
- 1 ·0005-mfd. max. denser (Formo, Sovereign, Colve Telsen, Graham
- 1 H.F. choke (Sove Radio, Peto-Sco Tunewell, Varley Lewcos, Parex, Lotus, Atlas, Wa
- 1 ·5-megohm volu Ready Radio, C R.I., Wearite, Va
- 1 2-megohm grid quired) (Telsen, R Varley, Graham Dubilier, Mullard
- 1 25,000 ohm "s (Telsen, Igranic,

EASY TO HANDLE—IMPOSSIBLE TO BEAT!



The two tuning dials suggest an H.F. set rather than a Det. and 2 L.F., but you will find the tuning is as easy as can be desired—whilst the distance-getting and selectivity give all the "feel" of a good H.F. stage in action.

ACCESSORIES WE

LOUDSPEAKERS.—Blue Spot, Amplion, H.M.V., Marconiphone, W.B., Graham Farish, Epoch, R & A, Celestion, Undy, B.T.-H.

VALVES.—1 Det. (Cossor H.L.210, or suitable Mullard, Mazda, Osram, Marconi, Six-Sixty, Tungsram, Lissen, Dario).
1 L.F. (Mullard P.M.1 L.F., etc.).
1 Output (Marconi P.2, etc.).

(If other o adjust G.B. Milliamp. cons at 120 volts H. BATTERIES.— super-capacity Ready, Drydex Ediswan, Colu G.B., 9 volts ((Note. If mor H.T. used, G

A WONDERFUL T

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REE

IS ENTIRELY UNIQUE RECEIVER.

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holder if re-
adio, Igranic,
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el, Loewe).

" resistance
, Sovereign,

Ready Radio, Peto-Scott, Bulgin, Lewcos, Goltone).

2 100,000 ohm "spaghetti" resistances (Telsen, etc.).

1 L.F. transformer (Varley, Nicore I., Ferranti, Lotus, R.I., Climax, Formo, Telsen, Igranic, Graham Farish, Lissen, Goltone, Atlas).

1 "Eckersley" Tuner (R.I., Lewcos, Goltone, Sovereign, Wearite, Melbourne, Formo).

1 G.B. battery clip (Burton, Bulgin, Belling & Lee).

1 Radio-gram jack (Igranic P 62, Lotus).

1 Metal screen, 2¾ in. × 7 in. (Parex, Peto-Scott, Ready Radio, Wearite).

2 Terminal strips, 2½ in. × 2 in.

1 Terminal strip, 7¼ in. × 2 in.

10 Indicating terminals (Belling & Lee, type R, Bulgin, Clix, Igranic, Goltone, Eelex).

1 Fuse and holder (Bulgin, Belling & Lee, Peto-Scott, Ready Radio, Wearite).

G.B., H.T., and L.T. plugs, etc. (Clix, Eelex, Belling & Lee, Igranic).

Glazite, Quickwire, Jiffilinx, Lacoline. Flex, screws, etc.

RECOMMEND.

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120 volts
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be available up to 15 volts).

ACCUMULATORS.—Exide, Ediswan, Lissen, Pertrix, G.E.C.

MAINS UNITS.—Should supply up to 20 milliamps at 120 volts. (Regentone, Ekco, Tannoy, Atlas, R.I., Heayberd, Lotus, Tunewell, Formo). (State voltage and type of mains, and give details of set when ordering).

REE BY "P.P.E."

novel resistance-coupled circuits, is a definite advance on the older methods of simple station separation. It is just as simple, it is far more logical and—best of all—*it works better*.

(I hope that when you have finished building the set you will write and tell the Editor what you think of it.)

Follow The Design.

Now for some advice about the building of the set, which I am sure you will not find a difficult task. The components you will need are conveniently set out in a special list.

I am assuming that you will collect a similar set of parts for yourself, and that you are going to lay them out and wire them up just as in the original. The Editor has warned me that some of you are likely to want to "compress" the whole thing on to a baseboard about half the size stated. If so, your blood be upon your own head!

Wiring-Up.

With such a deviation it is not, and never can be, admissible as an Eckersley Three. If you want to get results like those given by the original set you simply *must* stick to the original scheme of set building. That is elementary.

Another thing I am told about you is that whereas some will wire the set beautifully, making it a work of art, others will bang the bits together and lash them up any old how. Is that so? Have *you* a guilty conscience?

Exactly-to-Scale Diagram.

All I can say about the workmanship is that if the job is worth doing at all, it's worth doing properly—with precision and care.

Good workmanship is going to pay for itself in good results. And it is so much more satisfactory in the doing. Need I say more?

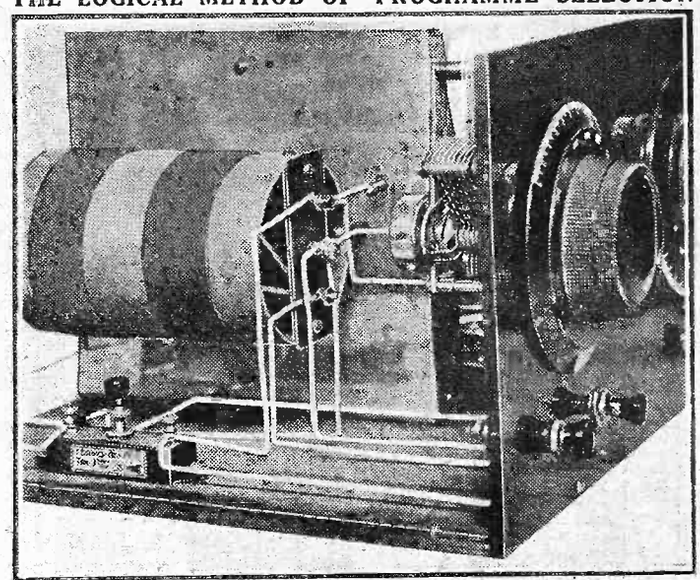
If I were making the set for home use I should deliberately "take my time" over it, adhering faithfully to the specification.

The "wiring diagram" has been drawn to give the correct relative positions of the parts on baseboard and panel. It is drawn exactly to scale, and enables you to make your set a duplicate of my own model.

You can measure the exact distances between all the various components on the baseboard by making a "ruler" from the little scale drawn on the diagram itself.

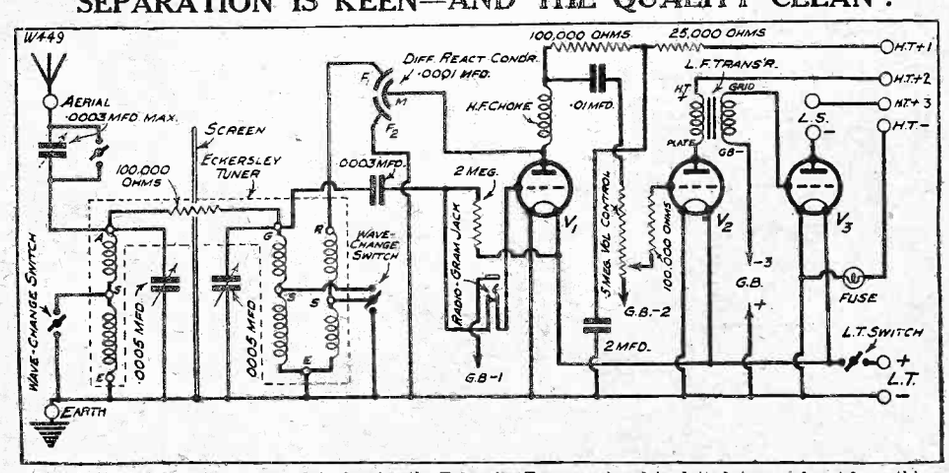
(*Continued on next page.*)

THE LOGICAL METHOD OF PROGRAMME SELECTION



A view of the first tuned circuit with the aerial-selectivity condenser in the foreground to the left. After being dealt with on this side of the screen (part of which has been removed for photographic purposes), the high-frequency currents are passed by the resistance to the second tuned-circuit.

SEPARATION IS KEEN—AND THE QUALITY CLEAN!



Here is the full circuit arrangement, showing the Eckersley Tuner enclosed in dotted lines. Apart from this it will be seen that differential reaction, radiogram switching, decoupling and volume control are all incorporated.

MAKING THE "P.W." ECKERSLEY THREE

(Continued from previous page.)

You can then place the parts exactly as mine are placed, and screw them in position. I don't think this part of the work is going to offer anybody the slightest anxiety.

Simple to Assemble.

Even a novice who is handy with tools should get it right first time. But I don't think he could afford to hurry over it, for it is very easy to place a valve holder down on the right spot, only to find when it is screwed in place that its grid terminal (G) is where the plate terminal (P) should be and vice-versa.

So what I suggest is that you follow the diagram with care, and the determination to get your copy of the set exactly like the original.

Holes in the panel can then be made in accordance with the sketch showing dimensions. It is all worked out there, and the drilling and cutting and contriving is really quite an interesting way of passing an evening.

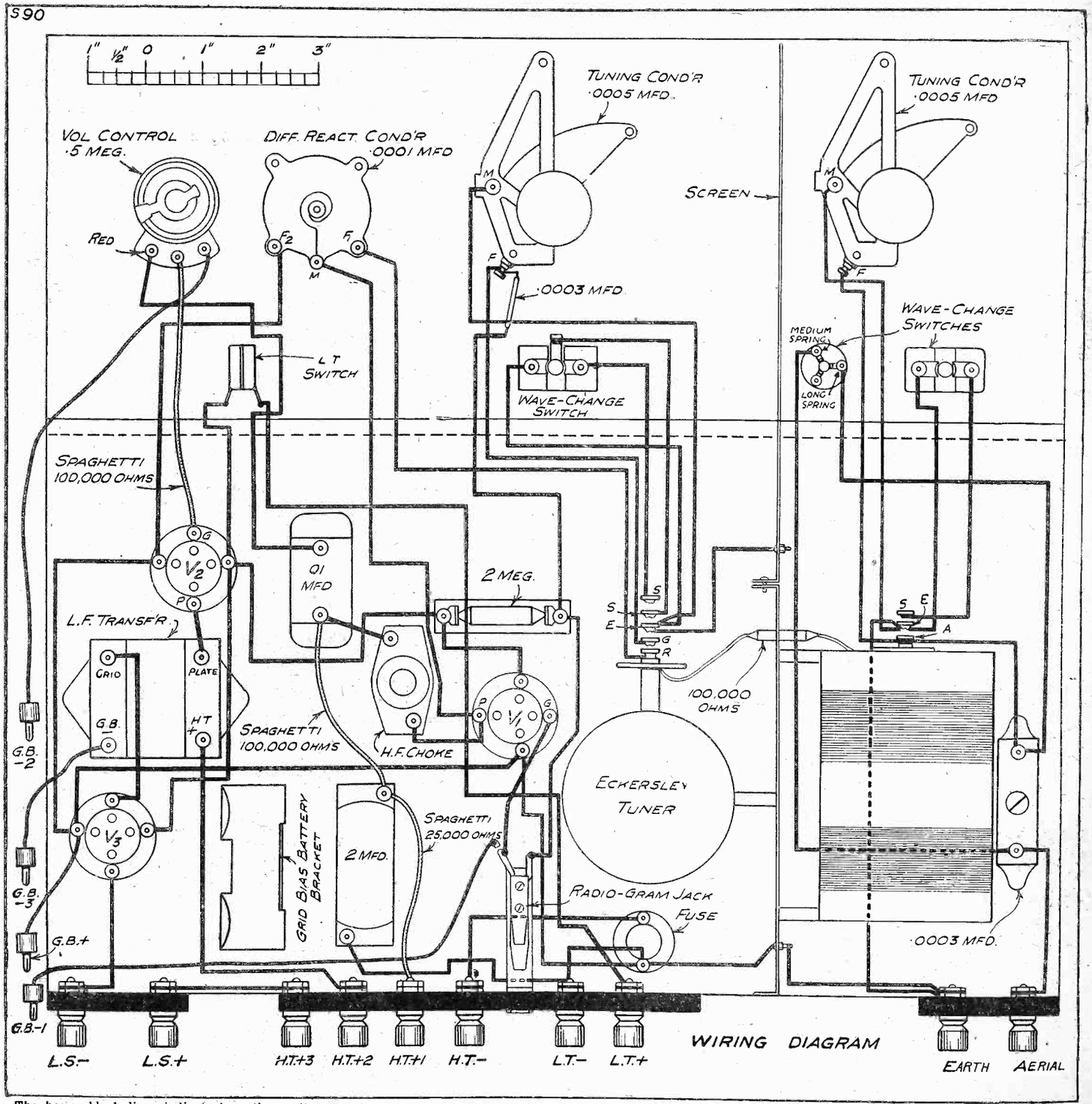
I should mount all the terminals, etc., on the little strips and all the controls on the panel before fixing strips and panel to the baseboard. But I expect you already know by experience that this is usually the most trouble-free method of tackling a set.

Just Follow the Diagram.

It would seem advisable, also, to leave the panel until most of the other wiring —valve holders, terminals, and so forth —had been completed, because of the easy access so obtained. But that again is "up to you."

The thing that matters is to get the components in the right relative positions first. Then to connect them together as indicated by the thick lines in the wiring diagram.

HOW TO WIRE YOUR COMPONENTS FOR THE ECKERSLEY THREE



The heavy black lines indicate how the various terminals should be connected together, but the actual "run" of the wires is best seen from the photographs of Capt. Eckersley's set, with which these articles are being illustrated.

P.W. ECKERSLEY Three

		£	s.	d.
1	Ebonite Panel, 18 x 7 ins., drilled to specification		5	6
1	Polished Oak Cabinet, 18 x 7 x 10 ins.	1	0	0
2	J.B. ·0005 mfd. Popular Log S/M. Condensers		17	0
1	ReadiRad "On-Off" Snap Switch		2	9
1	,, ·00015 Differential Condenser		2	6
1	,, Push-Pull Switch			10
1	,, 3-point Wave-Change Switch		1	6
1	Bulgin P.P. Single pole Change-over Switch, S.33		2	0
3	Valve Holders		1	6
1	T.C.C. 2 mfd. fixed Condenser, Type 50		3	10
1	T.C.C. ·01 mfd. fixed Condenser, Type S.		2	6
1	T.C.C. ·0003 mfd. fixed Condenser, Type 34		1	6
1	Sovereign Compression Condenser, ·0003 max.		1	3
1	ReadiRad H.F. Choke		4	6
1	,, ·5 meg. Volume Control		5	9
1	,, 2 meg Leak and Holder		1	4
1	Lewcos 25,000 Spaghetti Resistance		1	6
2	,, 100,000 ,, ,,		3	0
1	R.I. Dux Transformer		6	9
1	R.I. Eckersley Tuner		15	6
1	Pr. Bulgin G.B. Clips No. 1			6
1	Lotus Jack, J.K.1		2	0
1	Aluminium Screen, 2¾ x 7 ins.		1	0
2	Terminal Strips, 2½ x 2 ins.			9
1	Terminal Strip, 7¼ x 2 ins.			9
10	Belling-Lee Terminals, Type R.		2	6
1	ReadiRad Fuse and Holder		1	3
4	Belling-Lee Wander Plugs			8
1	Packet Jiffilinx for wiring		2	6
3	Valves as specified	1	7	6
	Flex, Screws, etc.			7
		£7	1	0

Kit "A" (Less Valves and Cabinet) **£4:13:6**

OR BY EASY PAYMENTS

8/9 DOWN and 11 monthly payments of 8/9

Kit "B" (With Valves less Cabinet) **£6:1:0**

OR BY EASY PAYMENTS

11/3 DOWN and 11 monthly payments of 11/3

Kit "C" (With Valves and Cabinet) **£7:1:0**

OR BY EASY PAYMENTS

13/- DOWN and 11 monthly payments of 13/-

RECOMMENDED ACCESSORIES

1	Pertrix 120 v. H.T. Battery	15	6	
1	Pertrix 9 v. G.B. Battery	1	6	
1	Pertrix Accumulator Type P.A.C.3	11	0	
1	Blue Spot 44R. Loudspeaker	£2	12	6

The Ready Radio H.T. Eliminator (with trickle charger combined) type B.S., is especially suitable for this set.

Price £5:17:6

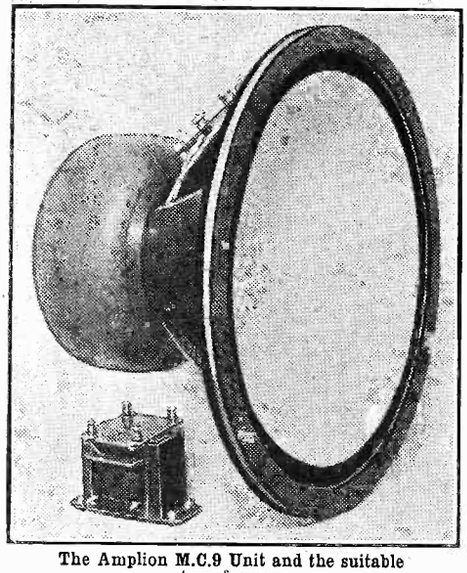
FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?

AN AMPLION ACCESSORY.

THERE are definite grades of quality in moving-coil loudspeakers just as there are in most other things. If a speaker happens to incorporate the moving-coil principle, that does not necessarily mean it achieves a standardised degree of perfection any more than, as I have said before, it follows that it is better than, say, a good electro-magnetic type.

EXCELLENT MOVING-COIL SPEAKER



The Amplion M.C.9 Unit and the suitable transformer.

There are good moving-coil speakers and there are moving-coil speakers which are very good.

The Amplion M.C.9 is in this latter category. It is of the permanent-magnet type, and the unit costs £6; but in my opinion it is very well worth that.

It is indeed a magnificent instrument, and is sensitive and can handle any input properly, whether it be of the small order met with in the smaller kinds of sets or the hefty output of a really big set.

And its response is definitely of the highest class. In short, it is a speaker one can recommend without qualms to the most discriminating "fan."

AN EMPIRE PRODUCT.

Mr. James J. Sheehan, of Deauville Road, London, S.W.4, has forwarded us a selection of Erie Fixed Carbon Resistors. They are made in Canada and he is handling their distribution in this country.

They are available in all the usual values of power-handling ranges, running from $\frac{1}{5}$ watt up to 5 watts, and they can be used for all normal purposes, as they are of a quite non-inductive character.

On test my samples show up exceedingly well, for their resistances are constant at varying voltages and measure up exactly to their specifications.

They are also very neat and compact and should achieve popularity in this country.

Since writing the above I learn that these Erie Resistors are to be manufactured in this country—that fact was briefly recorded in our last issue.

However, Mr. Sheehan will continue to be in charge of sales.

FOR PRIMING RETAILERS.

The Gramophone Co., Ltd., has issued an excellent little book to the trade. It is entitled "His Master's Voice Vade-Mecum," and is designed to help dealers and their assistants who have not an extensive technical knowledge. I must say it seems to be an excellent scheme, and one which should ensure that the thirteen H.M.V. models are handled in the manner they deserve. The 64 pages of the little book bring out all the good points of the instruments in a "Q. and A." manner, and cover all the pertinent questions that potential purchasers are likely to ask.

FOR THE "TELSEN" THREE.

Messrs. J. J. Eastick inform us that they are marketing a "Byldurone" cabinet especially for the "Telsen" Three. The price of this easily assembled cabinet is 9s.

A POPULAR TERMINAL.

Such has been the preference for the Belling & Lee Type "B" terminal (price 6d.) over the Type R, where constructors have had a chance to choose between them, that Messrs. Belling & Lee have inaugurated a special sales campaign to ensure that adequate stocks of the Type B are held by all dealers.

THESE ARE WORTH NOTING.

I have received a number of components from our old friends Lissen, Ltd., and I note that there is not the slightest need for me to wish unmade a remark I made on this page about eight years ago.

It referred to the general cleanness of lines, polished finish, inexpensiveness, and technical quality of Lissen's productions. I wonder how many of you present readers were "P.W."-ites then!

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 undertake to return them, 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.

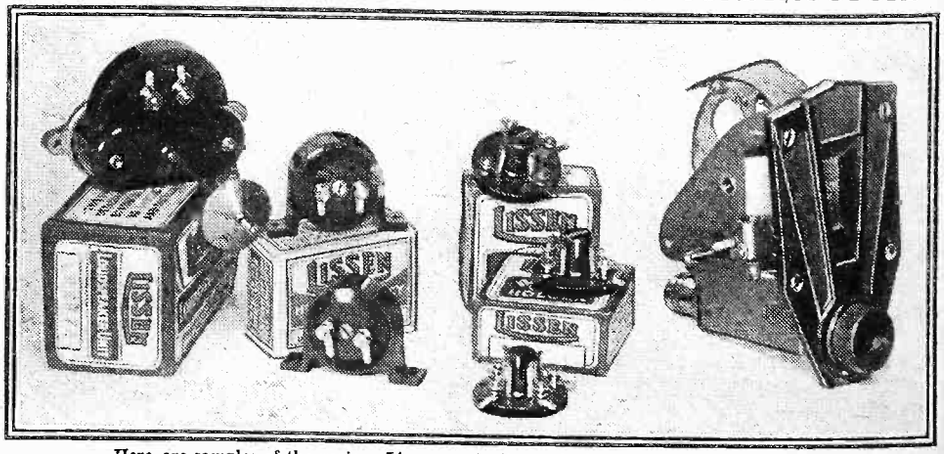
These new components include the disc H.F. choke (2s.), the new rigid valve holder (4½d.), and the illuminated drum control (8s. 6d.). I particularly like this last; it is a fine piece of work, and should strongly appeal to constructors both on account of its appearance and smooth action.

Then there is the Solenoid loudspeaker unit, which at 5s. 6d. appears to me to be a most attractive proposition.

A "TELSEN" THREE CABINET.

The Carrington Manufacturing Co., Ltd., inform us that they are now in production with a Camco cabinet suitable for the famous "Telsen" Three kit set. The price is 10s., and it should be noted that the cabinet is equally suitable for any other set having the internal dimensions of 14 by 7 by 7 in. deep.

LISSEN PRODUCTIONS OF INTEREST TO CONSTRUCTORS



Here are samples of the various Lissen productions which are dealt with on this page.

THE GREAT MOMENT

TUNING IN THE TELSEN 3

He spent just an evening assembling his Telsen 3—an evening's easy and delightful work. Now he tunes in for the first time—immediately, in comes the National at full strength—then the Regional—and no overlap! . . . He alters the switch and begins to tour the Continent—In come Hilversum, Berlin, Radio Paris and half a dozen more—clear, separate and at full strength. . . . And he made the set himself in an evening!

Buy your Telsen 3 Kit now and tune in perfect radio tomorrow night.
Send for illustrated folder of "The Telsen 3" to The Telsen Electric Co., Ltd., Aston, Birmingham.

39/6

CVS—133

THE MIRROR OF THE B.B.C. By O.H.M.

THE B.B.C. BOARD

NEW YEAR RESOLUTIONS—WEST COUNTRY PROGRAMMES.

THE King has approved the reappointment of Lord Gainford to be Vice-Chairman of the British Broadcasting Corporation, and of Viscountess Snowden and Dr. Montague J. Rendall to be Governors of the Corporation for a period of one year.

The King has also approved the appointment of Mr. Harold G. Brown to be a Governor for a period of five years.

Mr. J. H. Whitley, the ex-Speaker of the House of Commons, remains Chairman of the Board for a further four years in accordance with the terms of his appointment.

Mr. Harold G. Brown is appointed a Governor in the place of Sir Gordon Nairne, whose term of office has expired. Mr. Brown is deputy chairman of the Legal Insurance Company, a director of the Debenture Corporation Limited, and a member of the firm of Messrs. Linklaters and Paines. He is 55, and has been a member of many departmental committees.

Mr. Brown's experience is expected to be of particular value in the management of the commercial and financial side of the B.B.C.'s affairs. As the Charter of the Corporation comes to an end on January 1st, 1937, Mr. Brown's appointment will coincide with the period that still remains before its expiry.

Lady Snowden, Lord Gainford, and Dr. Rendall have accepted invitations to remain in office for a further period of one year, when the appointments to the Board will again be considered.

It is understood that the new Governor's work on the B.B.C. board will chiefly be concerned with financial aspects of the Corporation's activities.

New Year Resolutions.

A friend at the B.B.C. asked me the other day to prescribe for his "edification," mark you, New Year Resolutions for the organisation which it is his job to defend and extol. I accepted the challenge. Here it is for what it is worth:

I, the B.B.C., solemnly promise that I shall strain every effort during 1932 to accomplish the following:

(*a*) Complete the Empire short-wave station as the most efficient and elastic instrument of its kind; take a bold and generous line about its programmes, avoiding Jingoism while stimulating worthy pride of achievement, recognising that the British Commonwealth of Nations justifies its existence just so long as it serves the larger purpose of pointing the way to sane world stability, tolerant, and comprehensive, yet disciplined in the essentials of the art of living.

(*b*) Face-up to the necessity of active programme devolution to give adequate facilities and opportunities to Regional centres, thus including in the B.B.C. monopolistic system the ingredients of healthy rivalry that are essential to the maintenance of a justifiable monopoly.

(*c*) Disavow the inexcusable ineptitudes and prejudices which have debarred such wonderful microphone personalities as Captain Eckersley from having the free play which would make for brighter broadcasting.

(*d*) Enrich week-end broadcasting and introduce appropriate alternatives to religious services.

(*e*) Desist from "eye-wash" economy, and extend the generous attitude towards Empire Broadcasting to the staff and to the entertainment industry generally, recognising the responsibility which should exist to all artistes, playwrights, composers and musicians.

The Human Touch.

(*f*) Become more human and informal, stop standardisation of speech, and include announcers and speakers of distinctive yet cultured accents.

(*g*) Cure the curse of departmentalism, establishing the ascendancy of a basic entertainment value test, thereby incidentally greatly improving the ethical and instructional service rendered by the B.B.C. to the community at large.

Get on with that and finish the Scottish Regional and I shall be your beholden slave, B.B.C.!

West Country Programmes.

Enviable Eisteddfod successes have been gained in recent years by the Rhondda Ladies Choir, which is singing during the Welsh programme for West Regional listeners on Saturday evening, January 23rd.

On two occasions the Choir has won the first prize in the great Welsh National Contest—at Liverpool and Llanelly—and this year tied for the premier honours at Bangor. Prizes have also been gained at Pwllheli and Swansea.

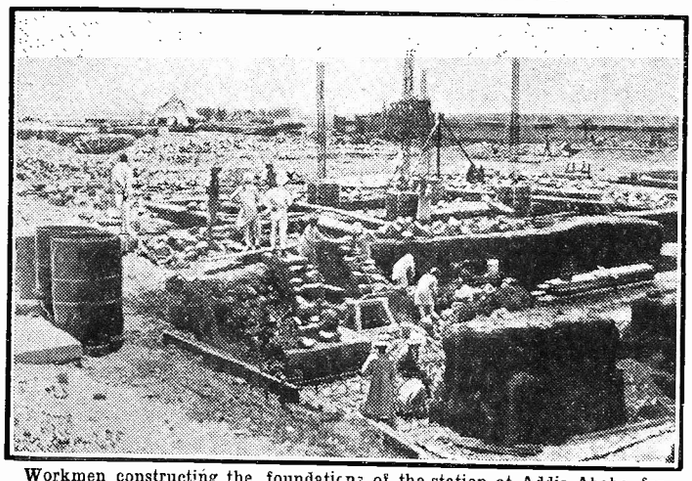
The programme on January 23rd will also include items by Llew Morris, a Welsh elocutionist who for many years has figured in the Eisteddfodau prize list and in the competitions in Mid-Wales.

This year at Bangor he secured the chief award for elocution in the well-known poem "Gwlad y Bryniau" ("The Land of the Hills") by Professor T. Gwynn Jones. Later the same evening West Regional listeners will hear a programme by the International Staff Band of the Salvation Army relayed from the Pavilion at Bath.

This Band is, of course, the "big noise" in Salvation Army circles, and has the distinction of performing exclusively for some months any new items before they are released. Another outside broadcast of outstanding interest is the annual concert arranged by the Cinderford Miners' Welfare Association which will be relayed from the Institute Hall on Thursday, January 21st.

Artistes of national repute are always engaged for this event, and this year they will include Dorothy Silk (soprano), Margaret Balfour (contralto), Francis Russell (tenor), and Roy Henderson, the well-known baritone.

ABYSSINIA'S FIRST STATION



Workmen constructing the foundations of the station at Addis Ababa, for which a concession has been granted by the Emperor to the Italian Government.

THOSE XMAS PROGRAMMES

Our Broadcasting Critic Airs His Views. What Are Yours?

THE B.B.C.'s Christmas bill of fare this year is, I think, considerably less exciting in retrospect than it was in anticipation. True, there was the usual attempt to cater for all tastes, but, despite the richness in variety, there was a noticeable variety in richness. The Story of Bethlehem (on Christmas Day) was told and re-told in carol and song; cinema organs, with much diapason and more tremulant, contributed to the festive spirit; football results had not to yield pride of place to news (for, apparently, there was no news); John Coates insisted on singing New Year songs; Aladdin told the world again of his love affair, and Viscount Snowden begged for money in a speech which, for length, I think, constitutes a record in the appeal series.

"Half the World Away."

It was a great disappointment to me that the Empire programme, "Half the World Away," had to be postponed, for this appeared to be the only novelty on the holiday bill. And it seemed a pity that, with uncertainty existing, no "second string" was arranged beforehand.

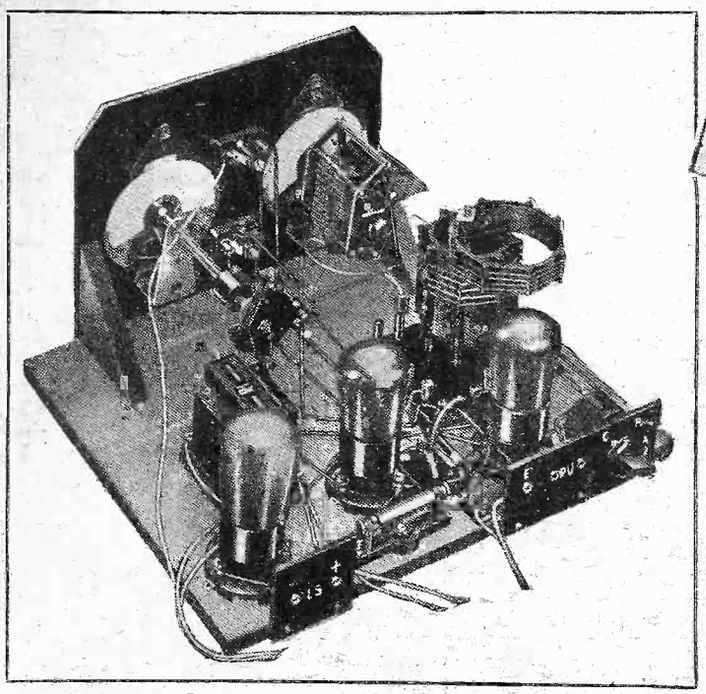
Of the Carol Services, I unhesitatingly

(*Continued on page* 1060.)

Full size 1/- plan . . . Free

Go to your radio dealer. Ask him for your free copy of the Meteor Folder, which describes fully the most interesting receiver ever designed and includes full-size plan and wiring diagram with complete building instructions. The easiest set to build. No drilling or cutting, no soldering—a screwdriver and pliers are the only tools you need. Quality components throughout.

If any difficulty in obtaining your Free Meteor Folder, post coupon now to Ready Radio Ltd., Eastnor House, Blackheath, S.E.3.



70 Extra Stations

Do you realise that there are over 70 Short-Wave Stations in all parts of the World transmitting programmes which cannot be heard on the ordinary type of receiver? Think what you are missing by not hearing them. Imagine the thrill of tuning in America, Africa, Australia and other far distant countries on your own set.

The Meteor combines all the attractions of quality performance, simplicity of operation, sensitivity, selectivity and handsome appearance, with the fascination of World-Wide reception on ALL-WAVELENGTHS.

With a pick-up connected to the sockets provided, your Meteor becomes an electrical reproducer of gramophone records at a flick of the Radio-Gram switch.

METEOR III KIT

Complete Set of quality components, including panel (cut and drilled), baseboard, Jiffilinx, flex, screws, plugs, etc.

75/-

or 9/- down and 7 monthly payments of **10/6**.

STANDARD CABINET KIT

Complete Kit with Standard Cabinet to house set only.

89/6

or 11/- down and 8 monthly payments of **11/-**.

CONSOLETTE CABINET KIT

Complete Kit with Consolette Cabinet to house set, speaker and batteries.

£5.0.0

or 11/- down and 9 monthly payments of 11/-.

Choice of Recommended Accessories:

Mullard Valves				**Loudspeaker Chassis**	
1—P.M.2 DX	8	6		R. & A. Type 40 Reproducer	16 6
1—P.M.1 L.F.	8	6		or	
1—P.M.2.	10	6		Celestion Chassis type M.12	1 15 0
Batteries				or	
Pertrix 120-v. Super capacity	1 5	6		Blue Spot Special Chassis & 66 P. Unit	1 15 0
or				**Gramophone Pick-Up**	
Pertrix 120-v. Standard	15	6		B.T.H. Minor	1 7 6
or				or	
Ever Ready 120-v. Popular Power ...	1 4	0		B.T.H. Senior	2 5 0
Pertrix 9-v. G.B. ...	1	6		**Volume Control**	
or				ReadiRad 5 meg. ...	5 0
Ever Ready 9-v. G.B.	1	0		**Gramophone Motor**	
Accumulators				Collaro Type B.30 with Unit Plate and Automatic Stop	1 13 0
Fuller 2-v. 20 amp. type S.W.X.H.5	8	3			
or					
Pertrix 2-v. 20 amp. type P.X.C.2	9	0			

READY RADIO

METEOR III

Special Features of the Meteor:
18 to 1 Slow-Motion Drive on both tuning and reaction; extended anti-capacity reaction control; adjustable selectivity; Kendall loose-coupled air-spaced coils; Radio-Gram Switching, etc., etc. Mullard Valves are recommended. Designed by G. P. Kendall, B.Sc.
Daily demonstrations of this wonder receiver at the Ready Radio Showrooms: 159, Borough High Street, London Bridge, S.E.1 (2 mins. from London Bdg. Stn.)

G. P. Kendall, B.Sc., the designer of the METEOR III, has written a book entitled: "Ten Hows for Modern Radio Constructors." It settles every radio problem for you. Send four 1½d. stamps for your copy now.

ALL BRITISH

Name.....

Address.....

P.W. 9/1/32 **BLOCK LETTERS—IN INK—PLEASE**

STATIONS WORTH HEARING

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.

WE continue in first-class conditions for reception of far-away stations. Reception may have been as good in past years in mid-winter, but I don't think that it has ever been better than it is just now.

There are no atmospherics, fading is seldom very marked and the general strength of foreign broadcast transmissions is excellent. One factor that does make reception this year better than in any that has gone before is the almost entire absence—at any rate, at an inland receiving station—of spark signal interference.

Less "Spark" Interference.

Old hands who look back a year or two may recall how our own G N F and the French F F B, to mention but two of the thousand and one spark transmitters using wave-lengths within the broadcast band, used night after night to play havoc with programmes from abroad and sometimes even with those from home stations.

Daylight reception has been extraordinarily good for some little time now on both medium and long wavebands. With a respectable aerial and one good high-frequency stage the number of foreign stations receivable in broad daylight is quite amazing. Take a turn round the dials on the medium waveband during the afternoon when next you have the opportunity of so doing.

The big Prague station now seems to be using the whole of his 120 kw., as you will find if you tune your set to 488·6 metres. I am wondering whether Langenberg has put up his power somewhat, for unless the set is particularly selective both he and Prague have quite a marked wipe-out; so much so that between them they sit rather heavily upon the North Regional, which is just over two hundred miles from me. With a selective set there is, of course, no difficulty in separating the three stations.

A Strong Station.

Notice, by the way, that Florence is now occupying the 508-metre wave-length, which originally belonged to Milan and was recently turned over for a spell to Naples. Florence is very strongly received, and you should certainly not fail to go for him. Milan is now working on 331·5 metres, or just a little way below Brussels No. 2.

Naples is sharing the wave-length of 319 metres with Dresden and Sofia, so that it will be impossible at most times to receive him clear of interference. Another change that you should note, this time on the long waves, concerns Reykjavik, whose normal wave-length is 1,200 metres, with Stamboul as a partner. At present he is working on 1,174 metres, which means that he is only just above Kalundborg, and is receivable only when the Danish station is silent.

Some Good "Fare."

Wave-lengths between 220 and 300 metres are better worth attention just now than they have been for a long while. This part of the band is often left largely unexplored by long-distance enthusiasts mainly because after repeated trials they have found it rather hopeless.

But it is certainly worth a visit when conditions are reasonably good, and I feel sure you will be rewarded for your trouble.

SHORT-WAVE NOTES

News and views regarding an exciting and fascinating waveband.

By W. L. S.

IN spite of the fact that conditions are not yet really good, there is rather more "station news" this week. In a spirit of mild devilry I am resolutely keeping to my single-valver, and I find that I receive on it most of the stations that readers report to me.

Here is an example of a typical "bag" during a few scattered periods of reception, each of only a few minutes, on a recent Saturday. Between 1415 and 1430 I found Moscow (50 metres) R7, steady; an unknown station on 49·7 metres, broadcasting tangos, at R7-3, with quick fading; and F 3 I C D (Chi-Hoa) on 49 metres at R4, steady.

An Interesting Evening.

Half an hour, between 1730 and 1800, was spent listening to W 2 X A D on 19·56, during the whole of which time he was R6-3, with quick fading. Finally, twenty minutes from 2300 onwards were sufficient to identify W 9 X F, W 3 X L, and W 8 X K, all between 50 and 46 metres, mostly R5, with stronger signals from W 3 X L than the other two; and W 2 X A F and W 1 X A Z on 31·48 and 31·36, the former being R6 and the latter R3.

What crosses my mind is this. If I can find all those Americans in a few minutes with a *very* ordinary one-valver, what are some of these people up to who use three or four valves and lament on the absence of distant stations?

On the following day, incidentally, Chi-Hoa was R5-6 at 1400, and the programme was sufficiently clear to be quite enjoyable.

A friend of mine was good enough to 'phone me and draw attention to an extraordinary "outcrop" of Russian telephone services on various wave-lengths. Although I did not find all that he mentioned, I did succeed in getting some of them, and a few more "off my own bat."

Many New Russians.

Some of them are quite "DX," such as Tachkent, who works with Moscow. He is on about 38 metres, while between 45 and 50 metres one can hear Bakou working with Moscow, Leningrad and Samara. In most cases one can hear both ends of the conversation, the distant station apparently being received on a loud speaker in the same room as the "mike." For all that, my education was so neglected that my knowledge of Russian is quite inadequate for such occasions!

"W. D.," of Alloa, obliges with some direct news from Bandoeng. P L E continues his famous Tuesday afternoon transmissions, and three transmitters are being used for the telephone service to Europe. They are P M B, 14·5 metres; P M C, 16·5 metres; and P L V, 31·8 metres. All three are crystal-controlled with 80 kw.

"W. D." also has reliable information that W 6 X N, Oakland, California, has been closed down for some time. So don't wear out your ears any more trying to find him. J N A, on code, on about 47 metres, *is* genuinely Tokio, in spite of the terrific signal he puts over.

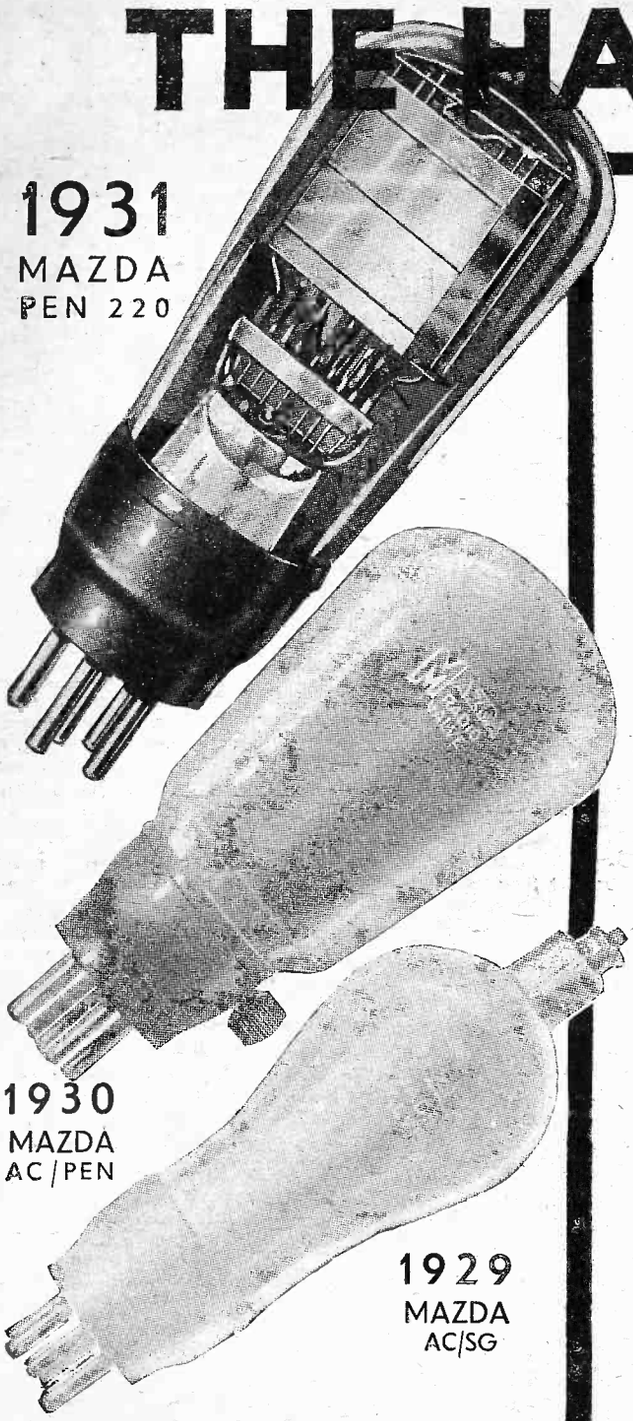
"M. S.," of Harlow, is a regular glutton for publicity. He now comes back for enrolment in the H.A.C. Club, having bagged V K 2 M E (Sydney) for the first time. Thanks for the list of amateur telephony, "M. S."

Times to Listen.

It appears to be time to mention the doings of the "hams" once more. Apart from the consistent arrival of Australian signals on 20 metres round about mid-day, there is little to say about that band; "40," however, is very lively after 2 p.m. or thereabouts, for the Far East may be heard during the afternoon and the Antipodes very often throughout the evening. After midnight quite a number of North Americans fill the band and, naturally, European signals are prolific all day.

Twenty-metre conditions are definitely improving at the moment, and January might well turn out to be a good month.

MAZDA DOES THE HAT TRICK!



1931
MAZDA
PEN 220

1930
MAZDA
AC/PEN

1929
MAZDA
AC/SG

For the THIRD YEAR in succession MAZDA wins "THE BLUE RIBAND" of RADIO . . . . . .

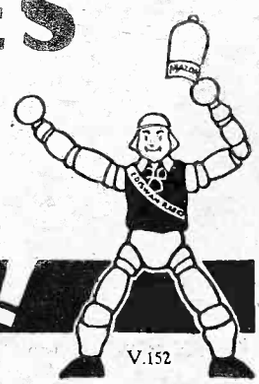
Again — for the third time in succession — a Mazda valve has won the highest possible commendation — the vote of "Wireless World" readers for the best valve at Olympia.

The success of the Mazda Pen 220 is due to the unceasing research and untiring experiment which has always placed Mazda in the forefront of radio valve development. In 1929 the Mazda AC/SG startled radio engineers and captured the "Wireless World" vote. In 1930 the Mazda AC/Pen reigned supreme (as it still does) over other mains output valves. And now, in simplifying the difficulties of portable receiver design, the Mazda Pen 220 once again justifies and confirms the supremacy of "the finest range of valves the world has known."

The amazing

MAZDA
THE BRITISH VALVES

LOOK FOR "EDDY" IN YOUR DEALER'S WINDOW



Another Mazda Achievement for . . . . .

EDISWAN RADIO

THE EDISON SWAN ELECTRIC CO. LTD.
Radio Division: 155 Charing Cross Road, London, W.C.2

V.152

All Editorial communications should be addressed to the Editor, POPULAR WIRELESS, Tallis House, Tallis Street, London, E.C.4.

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

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

QUESTIONS AND ANSWERS

THE "FULL-RANGE" TWO.

P. C. (Canterbury).—"Being taken with the look of the 'Full-Range' Two, I mentioned it to a friend, who hooked up the circuit roughly, with uncommon good results.

"He has now gone to Malta, and when he returns in April or May, I hope to get him to finish the job properly with Extenser tuning. At present he has put in a variable condenser of ordinary kind, and he left out the long-wave coil altogether; so I have to stick to medium waves only.

"Could I cover long waves as well if I put in a long-wave coil, as per description in 'P.W.' November 28th? And what would the connections for a wave-change switch be, while I use the ordinary variable condenser?"

It is quite O.K. to use a 3-point wave-change switch and ordinary variable tuning condenser, for this set. You will need the Hank coil and the long-wave coil, in addition to the P.J.1, as described in the article.

Mount the wave-change switch on the panel to the left of the on-off L.T. switch, and then connect up as follows:

Moving vanes of the variable condenser to E on long-wave coil, to earth terminal, to one set of fixed vanes on the differential, to two filament terminals of valve holders, to G.B.+, to H.T.— and L.T.— [illegible], and also to one contact of the new wave-change switch.

A second contact on the switch will go to Y on P.J.1, and to 2 on the long-wave coil.

The third contact on the switch goes to X on the P.J.1 coil and to one end of the Hank coil, the other end of which goes to a tap on the long-wave coil quoit, as explained in the article.

(Be sure to get the right type of wave-change switch—the kind that "closes" with all three contacts joined together, and opens with all three separated.)

WHY IS TUNING SO SHARP ON THE SHORT WAVES?

"MAGIC" (Canterbury).—"I know it is a well-accepted fact that tuning on a short-wave set is much more tricky than on the ordinary wave-lengths. And I have proved in practice that there is something altogether different about the tuning of a set when the short-wave coils are inserted, instead of the medium-wave coils.

"But I have never seen this explained. Is there a simple explanation, or is the reason for it something that is too involved to explain without confusing technicalities?"

Well, the full explanation would be rather tedious, except perhaps to the studious, but there is a simple way of looking at it without going into exact quantities or formulae. But even that simplified explanation involves the question "What *is* tuning?"

That in itself is a big question. But we may answer it briefly by saying that tuning, in the commonly-used sense of the term, is an alteration of the capacity of an oscillatory circuit, which alters its frequency of resonance.

That, perhaps, looks a little formidable as a statement, but it simply means that given a certain capacity (and a certain inductance) you will always get resonance effect to currents occurring a certain number of times (frequency) per second.

When the capacity is altered, this frequency is altered. (Altering frequency is altering *wave-length*.)

Now all broadcasting is based on the fact that transmitting stations using different frequencies (or "wave-lengths," if you like) can be "tuned in" on a receiver by altering its capacity, first to make it correspond with one station's frequency, then to another's, and so on.

In effect, your tuned circuit (condenser and coil) has to exactly match the transmitting station's tuned circuit (condenser and coil). And here is a simply-stated reason why the tuning on medium waves is very much easier and less critical than tuning on the short waves:

Amount of Capacity Required.

On the medium waves, two different stations, even with very similar wave-lengths, will have quite a large difference existing between the coil and condenser values they use. So the receiver which tunes first to one of them and then to the other will have to have its capacity changed quite appreciably in order to be resonant first with one station and then with the other. That means quite a big condenser movement.

But on the short waves, the transmitting stations must *all* use very small capacities (and very small coils). And a *minute* difference in the capacity used by two such stations is sufficient to separate one's transmission from the other's.

Therefore, to "match" first one transmitting circuit and then the other, in the receiver, only a *tiny* change in its tuning capacity is necessary on these short wave-lengths—which, of course, means very "sharp" tuning!

It is all a question of exactly "matching" the two wave-lengths—transmitter's and receiver's. And on the medium wave-lengths, where transmitters use fairly big differences in capacities, it is fairly easy to get the receiver's capacity right. So tuning is not very "critical" or difficult.

But on the short waves, where the capacity-differences are really very small indeed, it is not so easy to exactly "match" the receiver with the transmitter.

MAKING A "SELECTOR" COIL.

"JOHNNY" (Ilford).—"To save expense I should like to make the 'Selector' coil for myself as I understand it is fairly straightforward, and not above the capabilities of a constructor like myself, who has made two or three sets. What is the best way of going about it?"

The winding itself is extremely simple, although a number of tappings have to be made. The mechanical details require to be carried out with some care if a satisfactory coil-unit is to be produced and reliable action of the "Selector" switch obtained.

Anyone with a fair amount of experience of constructional and coil-winding work need not hesitate to tackle the job, for it is not really difficult. *Slight* differences in the method of assembly will make no difference to its working, but the winding must be correctly proportioned and correctly wound.

Essentially the "Selector" coil unit consists of a tapped single-layer winding of 84 turns in all, wound on a tube former, with a stud switch to vary the amount of coil in circuit, in steps of four turns at a time. This is found to give, in practice, quite sufficiently close tuning for an aerial circuit.

The tubing should be of good insulating material such as "Pirtoid," with a diameter of 3 in., length 3½ in. In each end of this a wooden crosspiece is fitted, one to provide a means of mounting to the panel (two screws) and the other to form the attachment for a disc of ebonite of about 2¾ in. diameter, on which the studs and arm of the "Selector" switch are mounted.

Details of Switch Spindle.

The switch has 18 studs, and the arm is fixed on the end of a brass spindle running right up the centre of the coil and out through a hole in the panel. Holes for this spindle are required in the wooden crosspieces, of course, and a knob is placed on the end to enable the switch to be rotated. Some simple kind of pointer is desirable on the knob, to indicate roughly where the switch arm is at any given moment.

The tube carries three small terminals, marked A, B, and C, and a convenient position for these is at the end furthest from the panel. The actual positions do not matter much, but it is best to see that they read A, B, C from right to left as you look at the coil from the back of the set in which it is mounted.

The winding comprises 84 turns of No. 24-gauge wire (either double-cotton- or double-silk-covered will serve) in a single layer. Begin at the end of the tube nearest the panel and wind on 20 turns.

From this point take a tapping to No. 1 stud on the switch. This is the stud on which the arm rests, when the knob is turned fully to the left.

Now put on 4 turns, tap out to No. 2 stud, 4 more turns, tap to No. 3, and so on, until 84 turns are on. Take the finishing end to No. 17 stud, leaving No. 18 blank for another purpose.

Now the internal connections of the unit. Terminal A is to be wired to the arm of the switch, and C to the start of the winding. The 18th stud, blank until now, is to be wired to terminal B.

That really completes the job, but there remain one or two details to be discussed. The appearance of the unit, for example, would be improved by a covering of Empire cloth over the winding. It is easily stuck in place with a few little dabs of molten Chatterton's compound.

By the by, it may be a help to you in placing the winding on the tube to know the actual length which it occupies. Well, with No. 24 double-silk-covered wire, wound reasonably carefully, the 84 turns should cover approximately two inches of the tube.

If you bear this in mind when starting the coil you will be able to get your winding nicely in the middle of the former. It doesn't matter electrically, of course, but it looks neater this way.

As you will have realised by now, the length of 3½ in. given for the tube is somewhat longer than you need, but we chose this size for two reasons. In the first place it is a standard size in the "Pirtoid" range of tubes, and secondly it just allows room for double-cotton-covered wire to be used, if desired.

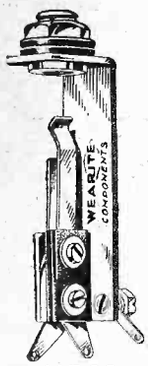
The length of the winding in this case would be approximately 2¾ in. Of course, the winding length will vary a little according to the neatness with which you make the tappings and the closeness of the turns to each other, which in turn depends on your skill in winding.

The tappings, by the way, are quite easily made in the following fashion: As you reach each point, push a hole in the tube with a sharp-pointed scriber or other tool which will not injure the adjacent turn of the winding, and take a loop of the wire through and so to the appropriate stud of the "Selector" switch.

(*Continued on page* 1058.)

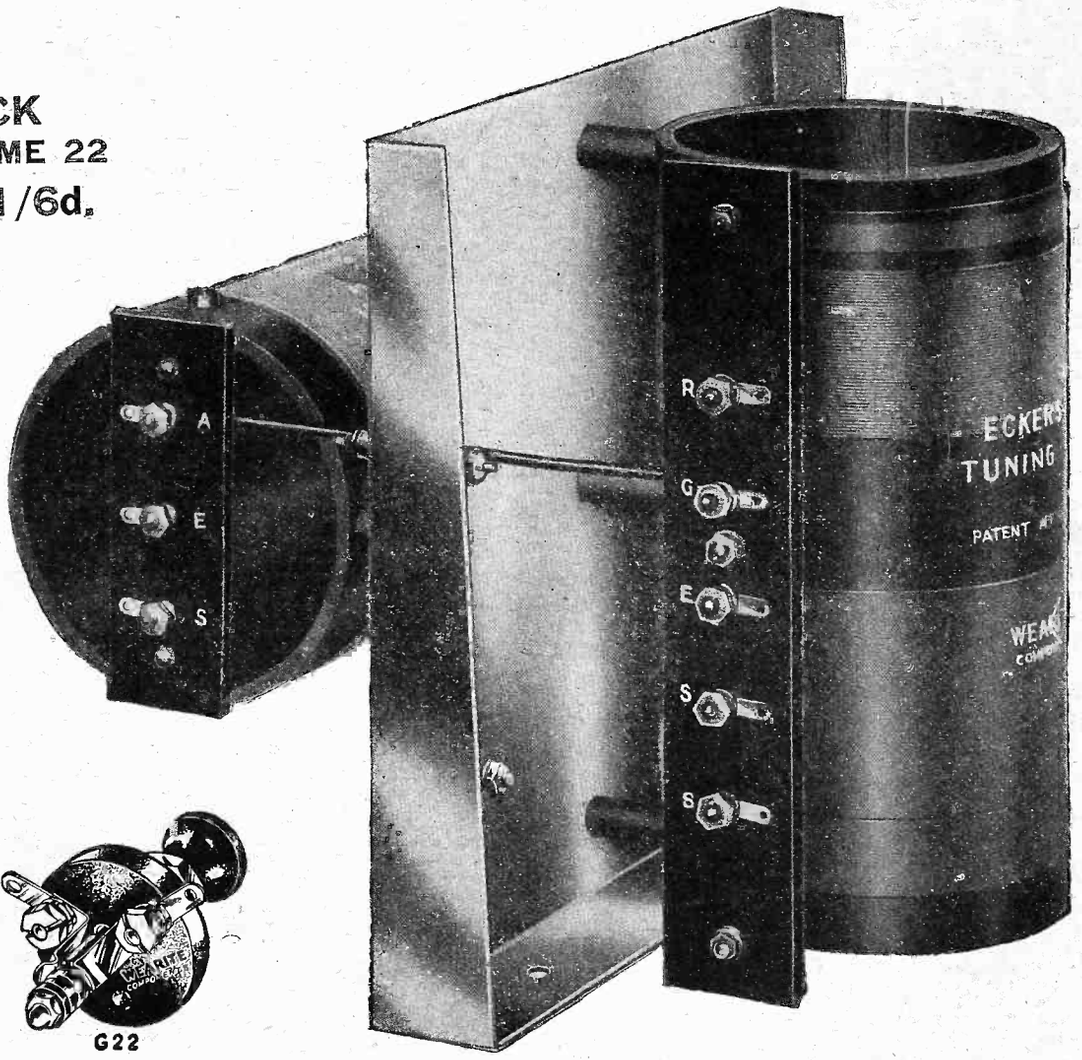
WEARITE COMPONENTS FOR THE

P.W. ECKERSLEY THREE

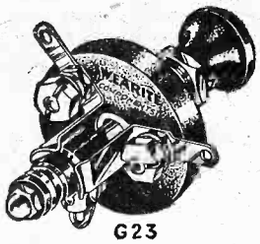


ME22

JACK
TYPE ME 22
Price 1/6d.



THREE POINT ON-OFF SWITCH
Price 1/6d.



G23

L.T. ON-OFF SWITCH
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G22

ECKERSLEY TUNER
FULLY APPROVED
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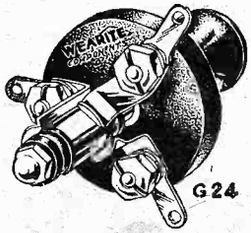
H.F. CHOKE
(HFS TYPE replacing HFO)
Price 6/6d.



G24

SINGLE POLE CHANGE-OVER SWITCH
Price 1/9d.

WRIGHT & WEAIRE
LIMITED,
740, HIGH ROAD,
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Phone: TOTTENHAM 3847/8/9.

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page 1053.*)

INSERTING A PENTODE IN PLACE OF A POWER VALVE.

A. B. T. (Shomcliffe).—"The good old P.240 has given up the ghost, and I have been thinking about putting in a pentode in its place to give greater power.

"I suppose the only difference required would be to put in an extra H.T.+ lead for the extra terminal on the pentode (apart, that is, from altering G.B. and H.T. as recommended on valve-slip)? Are there any other points to watch in a change-over like this?"

Yes. We are not at all sure that you are going to enjoy using a pentode instead of a power valve, as to get the benefit of the pentode it must be used in a suitable circuit.

The super-power valve generally follows an L.F. stage which develops considerable magnification. And you must remember that a pentode cannot handle considerable magnification on its grid.

The whole beauty of this class of valve is its ability to give a big power output from a comparatively small input. And so generally it comes *next to the detector*.

If you propose to use it after a stage of L.F. you may find it is hopelessly overloaded, so we recommend you to use another super-power valve.

The necessity for keeping input low does not arise with this class of valve, and properly biased and H.T.'d, it will handle all the power you can give it, we expect.

WHICH STATION WAS THAT?

"LATE BIRD" (Erdington).—"Which is the French station immediately above the Midland Regional? I happened to leave the set on after closing time, and heard this station giving a list of what appeared to be addresses, including two English ones. And one of these was very plainly given as 'Westbourne Park.'

"From the list, I see that although there is no French station listed above Midland Regional, there is one called 'Radio-Suisse Romande" in Switzerland. I believe the Swiss stations speak in French, and should be glad if you can confirm this, as it will be my first foreign programme.

"Also what is the distance (roughly) from Birmingham, and is this a record for two valves?"

The station immediately above the Midland Regional is, as you say, the new Swiss Regional (at Sottens), which is listed under the name "Radio Suisse Romande." But it generally closes early, and we do not think it was this station you picked up.

Next in ascending order of wavelength comes the Katowice Station, in Poland. And late on Friday nights this station gives a "Radio Circle" programme for its foreign listeners.

The wavelength is 408 metres—quite close to Midland Regional's—and the announcements are in French, usually by a man (with a deep, pleasant voice), but sometimes by a woman.

As you heard "Westbourne Park" mentioned and as this station invites its foreign listeners to write—replies being sent over the ether—we have no doubt that you heard Katowice.

The distance covered was approximately 830 miles—not at all bad for two valves, but certainly not the record!

Radio Suisse Romande is only about 560 miles away, but we feel sure it was Katowice you heard—the announcement of the name sounds like "Kattovecha."

"P.W." PANEL. No. 53. Mains Valves.

The "mains" type of valve was evolved to obviate the necessity for employing accumulators.

* * *

Instead of using a filament, heated by this means, the mains valve has a "cathode" placed in very close proximity to a "heater."

* * *

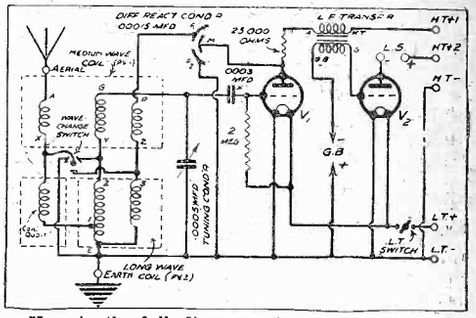
The heater, being insulated from the cathode, can be kept warm by UNSMOOTHED current taken from the mains, and yet maintain a STEADY emission of electrons from the cathode.

* * *

In addition to their convenience and low cost, such valves have proved to possess extraordinarily good working characteristics.

MISSING LINKS, No. 25

A POPULAR TWO-VALVER.



Here is the full diagram of the Detector and L.F. circuit, given last week. The missing "component" has been inserted, and it will be seen that this was a differential reaction condenser.

DID YOU GET THE CONNECTIONS RIGHT?

THE CLIMAX H.T. UNIT.

Climax Radio Electric, Limited, point out that on page 1016 of last week's "P.W." the report on their H.T. unit under the heading "Tested and Found," quotes the price as 52s. 6d. This is incorrect.

Actually, the price is 59s. 6d., and output is 20 m.a. at 120–150 volts.

THOSE XMAS PROGRAMMES

(*Continued from page* 1052.)

award the palm to King's, Cambridge. Its unique festival of nine lessons and carols was as beautiful in conception as it was in execution. Beautiful carols, beautifully sung, nine lessons beautifully read is my humble verdict.

I say frankly that John Coates' song Recital nearly spoilt my Christmas evening. It was far too long, and most of his songs, despite their words, were unsuitable. The Dirge is all right in its proper place, but at a party it is very inappropriate. He started well, however, and I liked his explanatory notes interpolated between his songs.

"*What* Nonsense" would have been a more suitable title for the deputy number. We were told it was the hasty production of an all-night sitting. It contained nothing new, and apart from "the rescuer with a bit in his mouth," I could not raise a smile. The "bit of all right" was, however, "the only bit of all right" of the whole thing, but quite insufficient to redeem it.

Where Was "Stainless?"

However, I found that "Watt Nonsense" was not entirely devoid of merit. Stanley Holloway's impersonation of Henry Ainley was clever—I wish there had been more of it. But the patter! Our radio stars must remember that they cannot go on putting the same stuff over every time they appear before the microphone. Claude Hulbert was the worst offender in this respect. If he had asked "Is this the Gents' Underwear Department?" I would have screamed! Yet he got very near it! Alexander and Mose, too, should be thinking of scrapping some of their jokes.

Where was Stainless Stephen on Boxing Day? I always understood December 26th was St. Stephen's Day.

I was struck with the way "Aladdin" adapted itself to the requirements of the microphone. The whole production went with a swing and technical difficulties seemed non-existent. Little or nothing was left to the imagination. Aladdin possesses an excellent voice in spite of a tendency to wobble off the note. But any show with Leonard Henry in it must go!

It must be difficult for our radio artistes to be constantly finding new material, and our sympathies are with them on that account, but the needs of the microphone are so very different from those of the ordinary stage. Whereas it was always possible for a comedian to produce the same stuff night after night (though I often wondered how he could do it)—only because he played to a different audience—the radio comedian is faced with a different proposition. He plays to the world at once, and moving to Cardiff, for instance, does not necessarily provide him with a fresh audience eager to hear him. This is a really serious problem, and until the hum of machinery at the joke factory convinces listeners that our radio stars are endeavouring to face the problem, the popularity of these stars will inevitably wane.

The KELSEY 7-METRE ADAPTOR

(*Continued from page* 1036.)

piece of wire until it fits exactly over the appropriate drawing.

The H.F. choke, which consists of 68 turns of No. 30 D.S.C. wire, wound on the ⅜-in. diameter former, should have the turns spaced out so that they almost fill the full length of the former. When it is finished, fix it in the appropriate position to the front upright support by passing it under the elastic bands which serve also to hold the valve in position.

The Wiring.

Providing you follow the wiring diagram very closely, you are not likely to find any "snags" when wiring up, but take care to follow the original *in every detail!*

The wiring is done with the No. 16-gauge tinned copper wire and, to enable you to make an absolute "Chinese copy" of the original, the actual length of every wire is clearly shown in the wiring diagram.

The connections from the unit to the Adaptor plug are clearly shown in the wiring diagram. The actual plug is very easily made from the base of a defunct valve, but it can, as a matter of fact, be obtained commercially by asking for a gramophone pick-up adaptor plug. Whichever course you adopt, the grid pin will not be required.

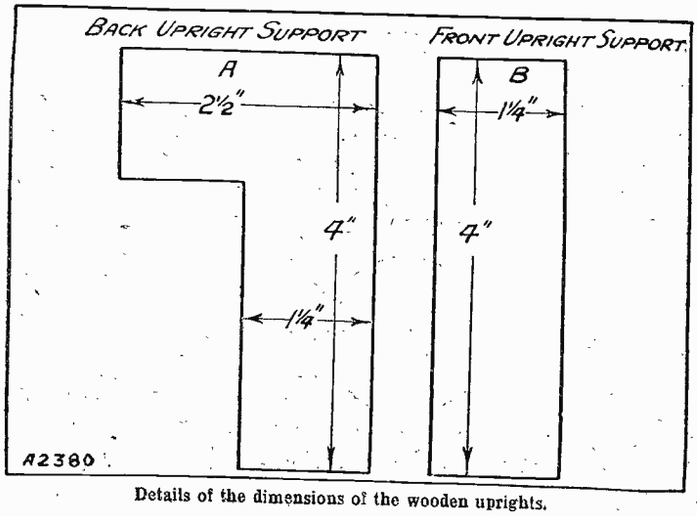
A Few Hints.

In the next issue of "P.W.," a few hints will be given with regard to the operation of this new Adaptor, but meanwhile, in order to enable you to make a preliminary test, I want to conclude with just a few words with regard to the valve for the Adaptor.

In my tests with the original model, I have found that the Marconi H.2 valve is very suitable for work on 7 metres. In the course of test work, I have had occasion to use the Osram H.2 and this valve also oscillates very easily on this low wave-length.

Everything depends upon using a valve that will oscillate satisfactorily, and although you may have one among your present stock that will answer the purpose, if you *do* have any difficulty with oscillation, you would be well advised to follow the original even in this respect.

SUPPORTS FOR THE 7-METRE SET



Details of the dimensions of the wooden uprights.

TECHNICAL NOTES

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

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

Watch the Input.

PEOPLE who use pentode valves are often disappointed with the results for the simple reason that they feed too large an input into the valve, an input which, multiplied by the magnification of the valve, gives an output which it is utterly beyond the power of the valve to deliver.

In other words, the advantage of the pentode is not so much in the greatness of the output—after all, the maximum output from an ordinary pentode is usually not so great as that from a super-power three-electrode valve operating under proper conditions; it is rather in the fact that at a single stage you can amplify from a relatively small input up to all the output which you require for ordinary purposes.

The pentode valve is particularly useful in connection with moving-coil loudspeakers; it tends, however, to emphasise high notes and to reduce bass notes. The impedance of the pentode valve is very much higher than that of the ordinary power or super-power valve, and may have an impedance value running up to as much as 50,000 ohms.

Tuning Adjustments.

A mistake which is commonly made, especially by beginners, is to rely for tuning too much on capacity and too little upon inductance. So far as tuning is concerned, it is true that the adjustment of the circuit depends jointly upon the inductance and the capacity, or upon the product of the two, so that if you keep either of these quantities constant you can obtain any desired tuning adjustment by means of the other.

But we are not concerned only with getting the circuit in tune with the incoming wave-length. What we want is to get it in tune and also to receive the greatest possible amount of energy. In other words, it is not merely the *tuning* but also the question of *efficiency* with which we have to deal.

Spare the Capacity.

Now from this point of view it is desirable to keep the inductance as large as possible, and the capacity as small as possible. Therefore, you should use a tuning coil which is as near as possible to the desired wave-length and only use a very small capacity for making the final adjustments of this.

Perhaps a simple mechanical illustration will help to make this clear. You know that there is a certain kind of metal saw or hacksaw in which the frame of the saw is adjustable by definite steps, so that it can be adapted for taking different lengths of blade, the final adjustments being made by means of a small butterfly nut for tightening up the blade.

Now an alternative to this would be to have a fixed frame and a very long screw. You will see at once the advantage of having the frame adjustable by steps so that you can get it *nearly* right: all you want then is a very small adjusting screw.

If you think of the inductance of the aerial coil as corresponding to the frame of the saw and the capacity of the variable condenser as corresponding to the adjusting screw, you will, I think, see the point which I am trying to make clear. Regard the capacity as merely a means to an end: the really important part of the aerial circuit is the inductance, and it is upon this that you ultimately depend for the received energy.

Acceptor and Rejector.

In this connection, perhaps I might mention acceptor and rejector circuits, which are sometimes a little confusing to beginners. The acceptor circuit consists essentially of a coil and a condenser in series with one another and its characteristic property is that it responds to incoming waves the frequency of which is the same as the natural oscillation frequency of the acceptor circuit itself.

A rejector circuit, on the other hand, consists essentially of a coil and condenser in parallel with one another, this circuit being, of course, included between aerial and earth. The characteristic property of the rejector circuit is that it resists the currents induced by waves the frequency of which is the same as the natural frequency of the rejector circuit.

I should mention, by the way, that the parallel circuit has a very different influence if it is not connected between aerial and earth. For instance, in some cases an oscillatory circuit consisting of a coil and condenser in parallel is used in combination with an acceptor circuit of the kind just mentioned, the two forming respectively the secondary and primary of a loose-coupled tuning arrangement.

Tapped Coils.

In order to adjust the value of the inductance in the aerial coil to a suitable value, whilst keeping the tuning condenser to a very low value, a common arrangement is to use a tapped coil, but remember that the free end of the coil beyond the tapping—the sort of cul-de-sac—which is often referred to as the "dead end," does not contribute to the desired results and, in fact, acts in an adverse way upon the incoming energy. The losses due to this "odd" part of the coil are sometimes referred to as "dead-end losses."

Loose Coupling.

With a loose-coupled arrangement as mentioned above, if the secondary circuit is tuned to the same wave-length as the aerial circuit you get the maximum transference of energy into the receiver.

Any wave-lengths other than the desired one will not be received by the acceptor aerial circuit—or rather they will be received at a less strength than the desired wave-length—and this selective process will be carried a stage further in the transference of the energy from the acceptor aerial circuit to the secondary loose-coupled detector circuit.

It follows that the looser the coupling between the primary and secondary coils, the less will be the likelihood of interference from unwanted wave-lengths. On

(Continued on next page.)

TECHNICAL NOTES

(Continued from previous page.)

the other hand, loosening the coupling too much naturally reduces the strength of the desired wave-length, and so it becomes a matter depending upon the skill and manipulation of the operator to get the best results from the intended station and the minimum of interference from others.

Capacity to Earth.

Now that aluminium chassis are being so largely used in high-class receivers, there are a number of special points which arise which should receive your careful attention. For one thing, you want to remember that you have a large and extended conductor (generally connected to earth), so that there is plenty of scope for capacity effects. Some conductors are bound to be in fairly close proximity to the chassis, and condenser effects will be set up which, of course, will be much more noticeable in the case of conductors carrying high-frequency currents.

Another very important part of the circuit to remember is the grid leak: in order to minimise any unwanted effects here the grid lead should be kept as short as possible.

Every high-frequency component, such as fixed condensers, chokes, etc., should be placed with due regard to possible interaction effects, and it is a good plan not to fix these permanently until you have had an opportunity of testing the set, so as to make sure that you have found the best possible layout.

A metal chassis can be extremely useful, but unless you take proper care, having regard to these capacity effects, you may find that it is not an unmixed blessing.

Metal-covered Baseboards.

By the way, talking about metal sheets, I was examining a set just recently in which the baseboard was covered with metal, and I was not surprised to find that there were *two* accidental contacts between components and the metal on the baseboard!

(Continued on next page.)

TECHNICAL TWISTERS

No. 95. THE TRANSFORMER.

CAN YOU FILL IN THE MISSING LETTERS?

A Transformer consists of two coils insulated from each other, and placed so that any changing . . . . . field due to . . . . . in one sets up a . . . . . across the other winding.

* * *

One coil is called the . . . . . and the other the . . . . . .

* * *

If the . . . . . has . . . . turns than the . . . . . the transformer is of the "step-down" type (such as is commonly used for the heaters of A.C. valves).

* * *

In a "step-up" transformer the . . . . . has . . . . . turns than the . . . . . .

Last week's missing words (in order) were: Overloading, Before, After, Potentiometer, Resistance, Voltage.

TECHNICAL NOTES

(Continued from previous page.)

When you are using a metal-covered baseboard in this way, you want to take very special care with all contacts, as it is the easiest thing in the world to get an accidental electrical contact—in fact, it is not at all an easy thing to *avoid* such contacts—which may quite well upset the operation of the receiver completely, even if they do not cause a disastrous short circuit. Always look out for points of this kind when there is a large amount of exposed metal surface in the receiver.

Looking for Trouble.

When you have got a set all nicely rigged up you sometimes find that there is some noise which is interfering with the reception, and you might try all sorts of dodges without being able to locate the trouble.

In these cases it is better, I always think, to start at the beginning—or, I am going to say, at the *end*, if you please—and go steadily from one end of the receiver to the other in a systematic way.

For instance, if you take out all the valves except the final output stage and then you find that you still hear the noise, it is pretty clear that this is due to the loudspeaker (or the connection to the loudspeaker), or that it is due to something in the high-tension circuit or the grid circuit. Alternatively, it is quite possible, although not very likely, that the noise is due to the valve itself.

You then set to work to examine the high-tension and grid circuits which, incidentally, are the most likely causes of the trouble. It is not very likely that the trouble will be due to the loudspeaker or to the connections to it. At any rate, if the noise continues with only the final valve in position, you have at least narrowed down the field of investigation, and it should not be very difficult to find the cause.

Overhaul the Detector.

On the other hand, if the noise ceases when all the valves except the last one are withdrawn, you then put in the next valve; in many cases this will be the detector.

If the noise reappears as a result of this then, assuming that the valve itself is not at fault (which you can verify as a last resort by substituting another valve in its place), it may be that there is something wrong with the transformer or with the grid condenser and leak, assuming the stage is the detector stage.

I am assuming that you have investigated the high-tension supply in connection with the last valve—that is, the one tested first. The most likely source of trouble with the detector stage is the grid leak and condenser, so you may give particular attention to this.

A Systematic Investigation.

Now we come to the high-frequency amplifier, and if the noise has not reappeared until the H.F. valve is introduced it may be due to a bypass condenser or to a tuning coil or tuning condenser.

All connections to the valve should be examined particularly carefully, as it is surprising what a lot of trouble can arise from a bad contact: and, incidentally, how difficult such a bad contact is sometimes to discover. If the H.F. valve is a screen-grid, the necessity for careful examination of all contacts and connections is all the greater.

There are many other little points which an experienced amateur will know for himself, and the only thing I want to point out is the advantage of making your investigation in this systematic way.

It seems rather obvious in one sense, but it is surprising how many people start all haphazard, trying first this and then that without any proper system, and give themselves many times more trouble in the long run than they would have had if they investigated the matter step by step.

Record Facts.

I was amusing myself the other day working out some interesting little "facts and figures" with regard to gramophone records. For instance, if the needle-point, after it has become flattened by a little wear, has an area of, say, 1/50th in. square—that is, a total area of 1/2,500th of a square inch—and if the force with which the needle point presses upon the record is 4 oz, this is equivalent to a pressure of about 600 lb. per square inch.

When a new needle is put in, and the point is sharper, the pressure per square inch is correspondingly larger and may start out at two or three times that amount. So, you see, there is very good reason why minute particles of the record are broken off and left lying in the tracks to cause surface noise or "scratch"!

The speed of the track under the record is approximately 50 in. per second at the outer edge of a 12-in. record, and a quarter of that amount at the conclusion of the record, assuming that the centre space is 3 in. in diameter.

The speed of 50 in. per second is, roughly, 3 miles an hour. The total length of the track upon a 12-in. record may be as much as 1,000 ft. on each side. It varies, of course, with the length of the selection. On a 10-in. record, up to 600 ft. of track may be recorded.

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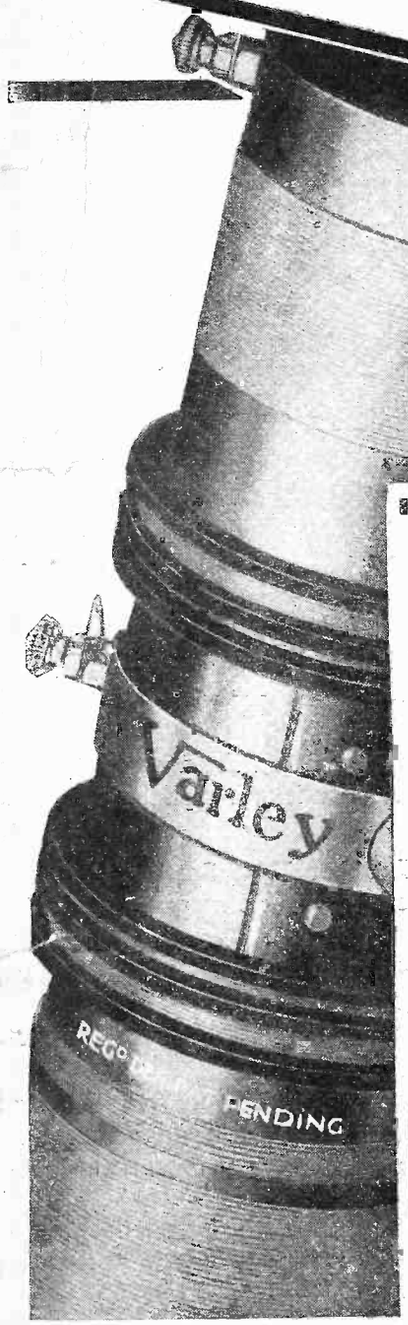

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POPULAR WIRELESS. January 16th, 1932.

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

TELEVISION AND THE B.B.C.

By Capt. P. P. ECKERSLEY

(See Page 1069)

Popular Wireless

Every Thursday
PRICE
3d.

No. 502. Vol. XX. INCORPORATING "WIRELESS" January 16th, 1932.

The 'P.W.' ECKERSLEY THREE

EXTENSER MODEL

Described Inside!

AN OUTSTANDING ISSUE!

The "P.W." Eckersley Three was designed and is described by Capt. P. P. Eckersley, M.I.E.E., himself. He contributes no less than four special features to this week's "P.W." (1) An article about the above magnificent set. (2) Operating notes concerning his first "P.W." receiver. (3) His regular and exclusive "Query Corner." (4) A trenchant and most readable commentary on the present television situation.

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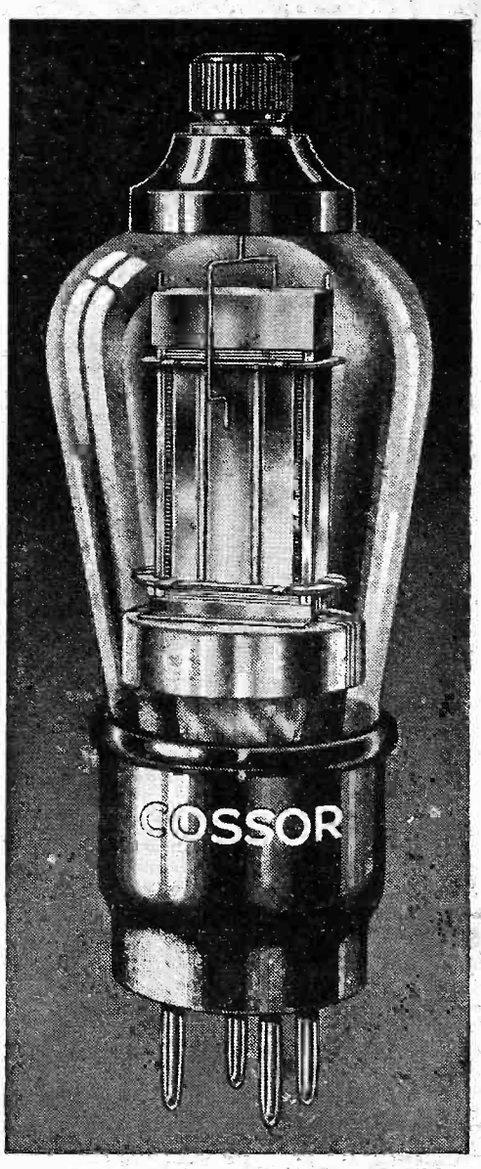

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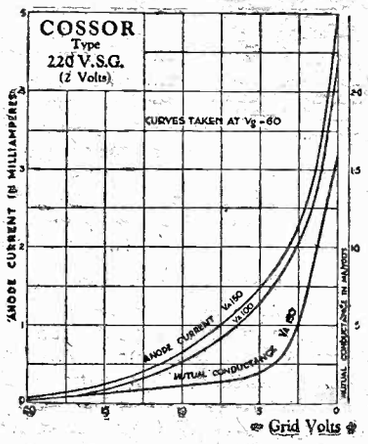

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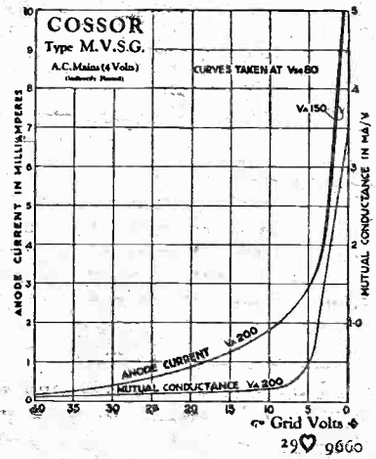

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FOR THE BLIND
JACK'S LATEST HIT
THE SECRET OUT
MORE LETTERS

THE EMPIRE STATION
RADIO TRIESTE
WAS IT BLUFF?
CRYSTAL CLEAR

RADIO NOTES & NEWS

Spanning the Ages.

THERE seems to me to be considerable food for thought in the ceremony which was enacted at midnight on Christmas Eve in Bethlehem, when the Bishop of Jerusalem pressed a button, thereby sending a radio impulse from the Marconi station at Cairo, which impulse was relayed by radio to New York, where it actuated mechanism which set the bells of St. Michael's church a-ringing.

Isn't this a wonderful century when, from the birthplace of the Christian religion, a tiny Syrian town whence sprang nearly 2000 years ago that other tremendous impulse, it should be possible to ring the bells of a Christian church in a land which on the first Christmas Eve was not dreamed of. And to use *Egypt* for the purpose seems particularly appropriate!

Wireless for the Blind.

THE Annual Report of the "Wireless for the Blind" Fund shows that a total of £38,307 has been subscribed, of which £33,762 has been expended on 18,500 sets, all of which have been distributed. Splendid as this effort is, there is still lacking a sum of £4,500 for the completion of the fund's original task, and subscriptions will be gratefully received by the secretary of the fund, 226, Great Portland Street, London, W.1, from whom full details may be obtained.

Jack Payne's Latest "Hit."

ALL admirers of Jack Payne and his band will be pleased to hear that Jack's latest success is his appointment as Honorary Director of Dance Music to the National Institute of the Blind. The Institute issues a lot of Braille music, and as many blind players specialise in dance music, Jack will do a good turn for them by assisting in selecting and arranging "numbers" to be Braille-ised. This is very nice of him, and "P.W." likes him for it.

What Has Been Done.

IN view of the development of the radio relay idea—communal listening!—it is rather interesting to dig up from the pages of a technical publication of December, 1881, the news that the directors of the United Telephone Company invited a number of people at the Bristol Hotel, Burlington Gardens, to hear by telephone an *opera bouffe*, "La Mascotte," which was being played at the Comedy Theatre, Panton Street. The audibility was described as "perfect." *And* I'll bet there was no "jamming."

New B.B.C. Governor.

ALL the speculation about the successor to one of the governors of the B.B.C. has been spiflicated by the appointment of Mr. Harold G. Brown, a solicitor. The press tells us that Mr. Brown has no idea why he was selected; and, with all deference, neither have the general public. He is not even a radio "fan," and is said to have no interest in radio except as a "common or garden" listener. Whenever there is a dominating personality at the head of an organisation, you will find the board or court or committee composed of personalities of lesser dominance. That is not only axiomatic, but cryptic. I can only hope that Mr. Brown will prove to be a "dark horse."

The New Governor Speaks.

I HAVE not, I regret to say, much hope of Mr. Brown. According to one evening newspaper he has no complaints to make about the B.B.C.'s programmes and considers them to be the world's best. *That's* the sort of governor to have!

Mr. Brown thinks that the two chief improvements required are the reduction of interference from "atmospherics," and from all other causes (not including Bach cantatas, I presume!). But I cannot help thinking that Mr. Brown must have been misunderstood or misreported. There is little or no trouble with "atmospherics" in this country, and interference from other causes is the concern of the Post Office.

"Ariel's" Secret is Out.

MY mystery story must now close, though it had a good run. The secret was that Mr. John Scott-Taggart, an authority on radio receivers and an A1 radio journalist, has been secured by "The Wireless Constructor," for whom he will design top-hole sets which he will write about fully in that magazine.

(*Continued on next page.*)

AN OUTSIDE BROADCAST FROM VIENNA

A close-up of the microphone and of the interested spectators around it during the broadcast account of the scene at a "hand-ball" match between Germany and Austria.

"ARIEL'S" RUNNING COMMENTARY ON RADIO *(Continued)*

Scott-Taggart shoves a pretty pen, and everything he says about valve reception deserves the closest attention. "The Wireless Constructor" on sale to-morrow contains his first effort, the "S.T. 300," a worthy successor to the "S.T. 100" of earlier days. I can, with a clear conscience, advise you to blow a tanner on the "Constructor," in order to have a look at S.-T. at his latest and best.

A Few More Letters.

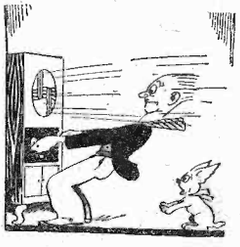
A READER (a lady) of Reading, asks why, if radio waves travel at the speed of light, *I* say waves do not travel. My dear lady *I* do not say that waves travel. You must have been reading the Sunday newspapers, where waves are made to travel marvellously. Oh, Maria, *do* let us respect physics! P. T. (Norwich) seems to fear some connection between radio and his moulting canaries. Do canaries moult? Sir J. Reith has a lot to answer for, then! N. S. (Stow) says that whenever he "sets" down for to listen to this here raydio he can't hear nuthin but talks about gold standards, whereas his obsession is the price of pigs. Why not a pork standard? A crackling notion, but the U.S.A. would say: "Apple sase."

The "Empire" Station.

THOSE who object to the B.B.C.'s project for an "Empire" station to be built and run with some of the money subscribed by listeners might consider the matter from another angle. Have they realised that in the British Merchant Fleet there are hundreds of short-wave receivers, all duly licensed, the owners of which have to rely on short-wave stuff because the medium waves do not carry far enough? Should not our seamen have some little consideration? Life at sea is dull enough for them, goodness knows!

Radio Trieste.

A NEW Italian high-power broadcasting station is now open at Trieste, and it ought to be a matter for self-congratulation amongst Britishers, for the thing was made in flat old Essex, like the new big blighter near Warsaw. Do you get this station? Its unmodulated power is 10 kw. and its wave-length is 247·7 (1211 kc.). I suppose that it will make reference to Italia Irredenta, Mussolini—and all that sort of thing. They say that it comes in here with a hefty wallop—and there you are. Personally, I just tell my young fretworker to tune in anything likely to please Gladys in the kitchen.



"Progressive" Note.

A. G. (Pontypool) calls my attention to the fact that a year ago I prognosticated that "Progressive Four" owners might look, not without hope, for some improvements in that set. Evidently something went wrong with that prophecy, because that "Progressive" didn't progress much further, after all. On whistling up a couple of Technical Hounds—jolly little fellows with logarithmic curves in their tails!—I learned that the exigencies of technical progress demanded development along new lines. I am sorry to have disappointed A. G., but he may rejoice that "P.W." is a "progressive" journal. But I expect that he will be able to use many of his components for the making of a modern set.

"Was It Bluff?"

UNDER this heading the "Telegraph and Telephone Journal" of the Post Office discusses the insinuation that the so-called Detector Van campaign against "pirates" was not technical but psychological. It says: "In the sense of falsity this campaign was no bluff. The Post Office cars are in fact, fitted with up-to-date direction-finding apparatus which is used with great success daily . . . in dealing with complaints of interference and illicit transmitting." The bluff, my dear civil servants, was in allowing the uninstructed public to believe that these cars could and did detect the presence of radio sets in their houses. (And why do you take a Shakespearian aphorism, misquote it, and then call it our national proverb?)

SHORT WAVES.

"Sir Henry Wood began his Promenades a generation or more ago in a similar way, and justified it by success; the audience learned, much as children who play upon chocolates learn to work, as men, on beef and mutton."—Sunday Paper.

You should hear our Gladys, aged nine, playing a solo on the caramel. It is full of glutinous charm.—"Punch."

* * *

HE HAS ONE!

According to an article on wireless research, there is a set at Slough which records nothing but atmospherics. I've got a set exactly like it.—"Sunday Pictorial."

* * *

"Eggs by wireless. Hens love Jazz and it makes cows yield more milk," we read in the "Sunday Dispatch."

Congratulations, B.B.C.! Justification at last!

* * *

We are told that the Continental stations, in contrast to our own, come through "with music like sparkling wine."

But the B.B.C. may think this sort of stuff much too "heady" for our consumption.

* * *

"Loudspeaker in hospital ward," runs a headline in a daily newspaper.

That's probably the one father threw out of the window on New Year's Eve.

* * *

In seventeen-hundred-and-eighty-one
When George the Third was Britain's King,
Our rulers wise
Did a law devise
To make of Sunday a joyless thing . . . .
And the B.B.C. are still carrying on the old tradition!

It Can't Be Done.

FAR be it from me to try to cramp the style of the Post Office in such beneficent work as "pirate" hunting, but when it is stated in the "Telegraph and Telephone Journal" that "the Post Office can detect pirates," I join issue and say that it can do no such thing. Even if this marvellous van can detect re-radiation from a receiving aerial and say which particular aerial is the culprit; and even if this aerial is in the backyard of No. 10, Doughnut Alley, and there is no record of a licence issued for that address, I still maintain that the evidence of "piracy" is inconclusive. There are several reasons for that. Think it over. But the "bluff" has been successful, and so we, like the world, overlook its defects.

Crystal Clear.

JUST by way of a bracer before we clamp our noses down to the jolly old grindstone, let us admire this fair gem from a Bristol newspaper: "We are all familiar with the action of an iron nail and magnet. This is known as magnetism, and consists of lines of force."

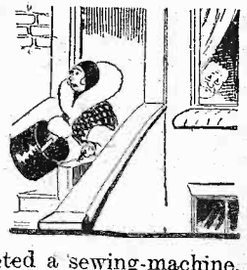
It is like a picture by a master—*one attempt to improve upon it would spoil it!* However, if the magnet happened to be drawn to the nail—what is "this" then "known as," and of what does it then "consist"?

Straight from the Shoulder

GEE WHIZZ! How's this for a wallop? Writing of the B.B.C. in "The Spectator," Mr. Harold Nicolson says, "With few exceptions these Governors are, I regret to state, a pack of ninnies. I repeat these wounding words. A pack of ninnies. And thank goodness at the end of the year four of them are due to retire." Mr. Nicolson was angry, because the B.B.C. jibbed when he wanted to broadcast about the books of D. H. Lawrence and James Joyce. Well, the Board may be ninnies, but certainly not because they jib at advertising Lawrence's books.

Fourpenn'orth of Wit.

THE Christmas number of the "Mullard Magazine" is the zippiest thing in "House Organs" that my weary eyes have rested upon for a long time. Some of the humorous articles in it struck me as the genuine stuff. What about these "spoof" letters? "I have followed your blue print exactly and find I have constructed a sewing-machine. Is this right?" And: "Since I built your 'Musty Two' my wife has left me. Again thanking you, etc." You ought to see a copy of this little mag. It's alive from the neck up.



ARIEL.

TELEVISION and the B.B.C.

BY CAPT. P. P. ECKERSLEY M.I.E.E.

THE B.B.C. announce that such improvements have been made in television that they are considering closer co-operation—that is—with television.

Working Under Pressure.

The B.B.C.'s watchword is "Caution, and never make a mistake." One need not go into the question whether or not it was a mistake to go into television at all, but it was, at any rate, a submission to sentimental pressure. The implication now is that it was quite right to give transmissions, because, in consequence, great developments have been made. I think developments can be made in laboratories and without service when the art is undeveloped.

But *what* developments have been made? Are we, the four million odd, less the few who have television sets to have our programme time taken up just for developments?

After all, we have heard again and again of developments, but have we ever seen a worth-while picture transmitted by television? *De gustibus non disputandum*, and it is hard to lay down a factual specification to define a worth-while picture. I will try later.

Not Permanent.

Some people say that the romance of television is enough to justify almost any old picture being sent. I do not think so. The only true basis for a service is service. Public interest should be derived by permanently interesting the public. And the public, while admiring technical ingenuity and welcoming the effort, do not feel, as yet, that television has, for them, a continuous appeal.

"Some people say that the romance of television is enough to justify almost any old picture being sent; I do not think so"—remarks our Chief Radio Consultant in this trenchant review of recent developments.

I think the B.B.C. have placed themselves or, more truly, been forced by outside forces to be placed in a very difficult position. All agreed, when I was there, that technically the 9-kilocycle band was a definite bar against eventual success.

The Kilocycle Handicap.

So there is this limitation to face as much to-day as ever. The limitation could be overcome by using other wave-lengths. Are the B.B.C. contemplating using the new 7-metre transmitter for television and using a 100-kilocycle sideband?

Again, what if someone else came along with a better process than the one now used? It would be very difficult for them to decide what to do unless they *do* use another wave-length and let each system "take it in turn."

"A Sincere Opinion."

Perhaps ideas like these are behind this latest statement. All of which would be highly interesting to us who pay the B.B.C. its money, and are entitled to know about things foreshadowed and things going on.

I do not want it to be thought that I am stupidly antagonistic to television. Mine is a sincere opinion—a sincere opinion but a different opinion from that held by others who are otherwise doubtless quite sane. I can*not* see what worth-while service can be given on a 9-kilocycle sideband transmission. I can*not* see it.

Nor can a lot of other experts. And nobody except the inexpert attempt to argue the point. I understand the sentimentality of those who say I am biased, jealous, foolish, and intolerant. Their attitude may have a highly factual basis, but the question, "Can worth-while television be given on a 9-kilocycle basis?" still remains unanswered.

The Truth.

I am an expert. But in spite of that I do realise that the future of television lies in its giving a picture which is worth looking at, and which has entertainment value. I am an expert and I cannot see how such

(*Continued on next page.*)

WHAT THE FUTURE MAY BRING

When television ultimately becomes a practical proposition we may be able to "look in" at a concert in Vienna (above) or a variety show in New York. Even better still, we may have first-class "talkies" broadcast to our homes.

TELEVISION AND THE B.B.C.

(Continued from previous page.)

a picture can be given using a 9-kilocycle band width.

But it's quite possible to be wrong. One can only cite the facts as one sees them, discuss the question both with fellow-experts and the sentimentalists and try to be fair. But one must never try to avoid facts.

Perhaps the B.B.C. know something—perhaps Mr. Baird has discovered something, perhaps they can do it all on 1 kilocycle, perhaps short and ultra-short waves are to be used, perhaps, as I said before, I am wrong.

"Tired of Promises."

I should be sorry to be wrong from a purely selfish point of view, but I would gladly swallow all my disappointment and kick myself for a fool in not seeing some obvious point if it were proved that television—i.e. transmission of the worth-while picture—was in fact achieved.

The B.B.C. have no right to say what they have said without qualifications. The public are tired of promises. Every month some revolution—and much the same result. They have televised something in daylight or nightlight or in Australia or at the bottom of the sea. Yes, we have heard all about that, but, was what they televised worth looking at ?

Nothing that I have ever seen in America, Germany, France, or England has been intrinsically worth putting on a service basis. I have seen much better pictures given by processes other than Baird's. They have, quite possibly, only been better because they used more sidebands.

A Limited "Band."

The B.B.B.C. (Baird British Broadcasting Corporation) have only got 9 kilocycles to play with. Why *play* with it ? Why raise public hopes if the public is not informed why it should hope ?

Let the question be definitely answered one way or another. Let the B.B.C. answer these questions :

1. What are the new developments in television which make them seek closer co-operation with the Baird Company ?

2. Are these new developments going to make it possible to give us a worth-while service ?

3. Will they agree that a worth-while service can be defined as one giving a moving picture (with sound) as good as that given by a home cinematograph (without sound) ?

4. If they agree that (3) is a fair definition, can the new developments and the 9-kilocycle sideband give this true service ?

5. Incidentally, is synchronisation with these new developments good enough to achieve (3) ?

It's no good beating about the bush ; let's all be frank about it. Let's realise that television has two problems—(1) to get a worth-while picture from room to room ; and (2) to broadcast that picture to all and sundry. Have either of these problems been solved, and is it worth while messing about on a public service system until they both have been solved ?

Too Cautious

I don't know ; presumably the B.B.C. does. Let them stop this ultra-cautious attitude and take the public into their confidence, then we can all judge how much of truth and how much of "politics" lies behind their latest statement.

This is one of the few times I would almost welcome being wrong. I should be the first to have television if I could get a worth-while picture in my own home.

Even now I am rushing away to buy tickets for a talkie. Why should I do that if that talkie could be delivered at my door ? Come on, B.B.C., come out of that shade ; we shan't hurt you ; don't be afraid ; you only need stick your *head* out !

CORRESPONDENCE

THAT FLASH
SPARK TRANSMISSIONS
ALTERNATIVE PROGRAMMES
REVERSING A LAYOUT

THAT FLASH.

The Editor, POPULAR WIRELESS.

Dear Sir,—In answering a recent query I said that I didn't exactly understand what happened to make a brilliant flash when the glass container of a valve was broken. I have received the following letter from Mr. W. R. Cumming, of Dumfries, which I am sure should be of interest to your readers :

"I have just noted your call for help in explaining the flash when a valve is broken open, as described by J. L. (Ilford).

"The correct explanation is that on the vacuum being opened a quantity of air rushes into the valve with an extremely high velocity, creating eddy currents in the entering air and thereby generating small static charges of electricity, which, cumulatively, give the effect of one brilliant flash.

"The same effect may be noted on opening the steam cocks on a high pressure Papin Digester."

Yours faithfully,
P. P. ECKERSLEY.

SPARK TRANSMISSIONS.

The Editor, POPULAR WIRELESS.

Dear Sir,—Your contributor who writes "Stations Worth Hearing" has put forward his views of spark transmissions, particularly below and about 270 metres. We in Bournemouth also suffer from this, and a good many stations are blotted out. Of course, the safety of shipping must come first. The Isle of Wight being close to us, we here get the full benefit of the Niton station, and to tune-in on anything lower than about 270 metres—well, the result from the loudspeaker, the less said about it, the better. I can assure you there will be great thanksgivings when spark stations do finally close down.

To close, I wish you and your paper of the best for the coming year, and thank you for many a pleasant hour.

Yours faithfully,
H. N. COLLINS.

Bournemouth.

[ED. NOTE.—Niton works on a wave-length of about 600 metres, so the interference complained of is probably a harmonic. It should also be noted that at the last Washington Convention all nations agreed to ban spark transmitters after December 31st, 1939.]

ALTERNATIVE PROGRAMMES.

The Editor, POPULAR WIRELESS.

Dear Sir,—In your article "For the Listener" in "P.W." for November 21st, your contributor remarks that a majority of listeners may not be interested in the National programmes.

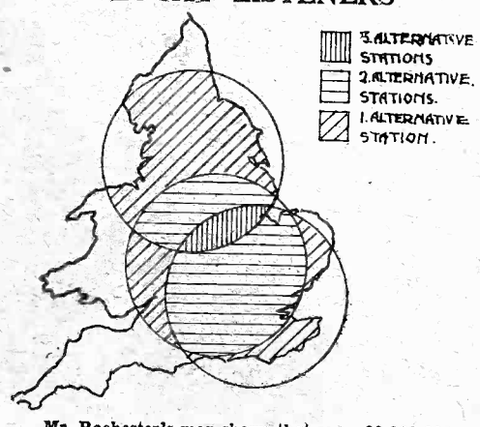
Is it not true that, while those in the position of the West Country listener may fairly be dissatisfied, the great majority of listeners in England and Wales have one or more alternatives available ?

The writer, possessing a very moderate set (detector and pentode), but fortunately situated within 100 miles of Daventry, Brookmans Park and Moorside Edge, has three alternatives to the National programme, though one must admit that often two of these are doing the same thing.

A little time spent with a map like the enclosed, and the recent census returns, gives the following results :

The circles indicate 100 mile range from the respective stations.

Approximate population within 100 miles of 3 (twin) stations	2 millions.
Approximate population within 100 miles of 2 (twin) stations	15½ millions.
Approximate population within 100 miles of 1 (twin) station	15½ millions.
Total population with one or more alternatives available	33 millions.



Mr. Rochester's map shows that some 33,000,000 people should be able to tune-in alternative programmes on moderately good sets.

The total population (England and Wales) is nearly 40 millions, there are therefore about 7 millions at present unable to get an alternative station, and 33 millions who can.

Among listeners there are, of course, some crystal and 1-valve sets, but even if we all had sets capable of hearing no farther than 50 miles there would still be about 21 millions out of 40 millions within range of one or other of the twin stations.

Yours faithfully,
CHAS. D. ROCHESTER.

Northants.

REVERSING A LAYOUT.

The Editor, POPULAR WIRELESS.

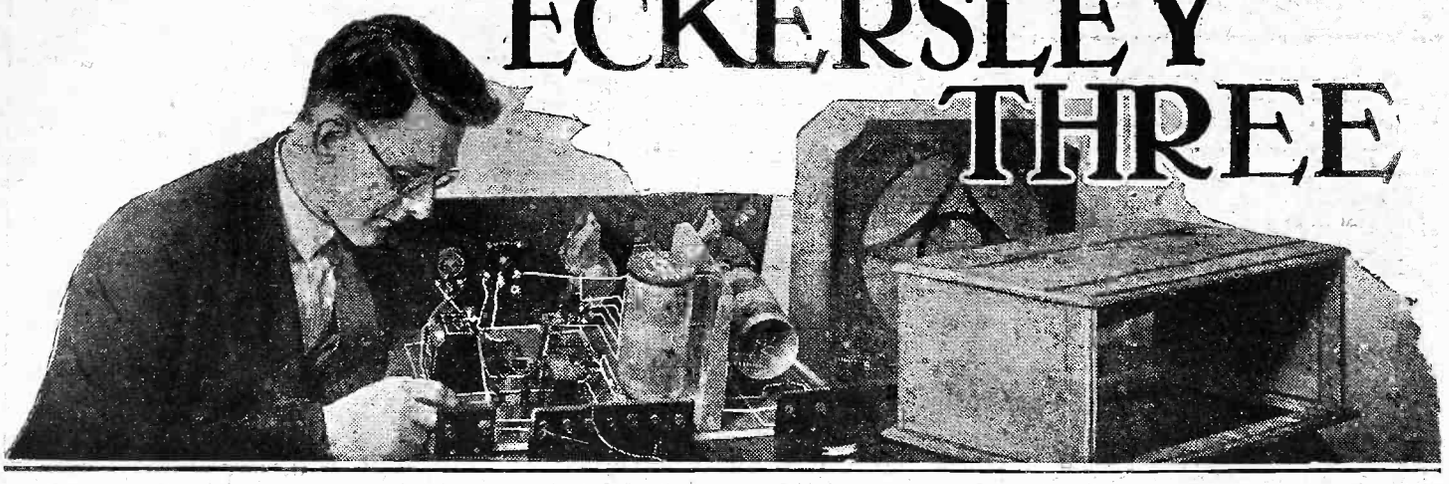
Dear Sir,—In the majority of "P.W." sets the aerial and earth terminals are placed on the left-hand side of the baseboard, looking from the panel. There are no doubt many of your readers, myself for one, who, owing to the position of the set in the room, would prefer these two terminals on the right. In my own case, the set stands in the recess between the chimney breast and the wall, the aerial and earth leads coming through the wall on to the right side of the set ; consequently, if the terminals are on the left side, these wires would cross the battery leads. A little point, no doubt, but one worth considering. The method I adopted to overcome this difficulty is as follows :

Lay the Blue Print on a sheet of white paper of the same size, and attach it at each corner so that it will not move. Then place these on top of a sheet of carbon paper with the sensitive side uppermost. This sheet need not be as large as the Blue Print. With either a hard pencil or a stylus, trace over the lines on the Blue Print, taking particular care to show where a wire crosses another or joins it. If the carbon sheet is not large enough to cover the whole print, one half only should be traced first, and the carbon moved to the other half. It is advisable to lay a sheet of cardboard on the print on which to rest the hand when tracing any component free-hand to prevent finger-marks, etc., from showing on the copy. Lettering should not be traced, as it will come out reversed, but it is advisable to mark the plus and minus signs, so as to avoid a possible wrong connection. When all the tracing is completed, and the copy detached from the original any letters should be written in. The copy will then be finished, and the components can be mounted straight on to the baseboard without referring to the original Blue Print.

Yours truly.
S. R. SMITHURST.

Sidcup, Kent.

OPERATING THE "P.W." ECKERSLEY THREE



This is the first set described constructionally for "P.W." readers by our Chief Radio Consultant. It gives really amazing selectivity for a "Detector - and - Two - L.F. Circuit"—that extremely popular combination for long-distance loudspeaker reception—and yet, as this article shows, the operation is perfectly straightforward and easy.

Designed and Described by Capt. P. P. ECKERSLEY, M.I.E.E.

LAST week I dealt with the making of the "P.W." "Eckersley" Three, and before I go on to the operation of it, there are just one or two points that I should like to make perfectly clear.

As it is such a simple matter to make the set, it may interest many who have never built a three-valver before. Are you one of those lucky people? If so, I envy you the thrills that are coming!

But I see one little difficulty you may have to meet. That of differently-shaped components, if the makes you choose are not the same as in the original set.

The Wave-Change Switches.

You will have to solve any such minor problems on the spot; but it should not be at all tricky, for the diagrams and photographs together amount to a complete guide, and I am sure helpful friends and dealers abound and will joyfully voice their opinions.

I have just remembered something else that is of greater importance. And that is the necessity of buying the right types of switches. Perhaps I had better briefly describe their functions.

The on-off switch you know all about. It is the three wave-change switches that need watching.

For the long waves they are pushed in. The first one (on the left, looking at the front of the panel) disconnects the first-section S terminal from its E terminal (etc.) on the tuner.

Series Aerial Condenser.

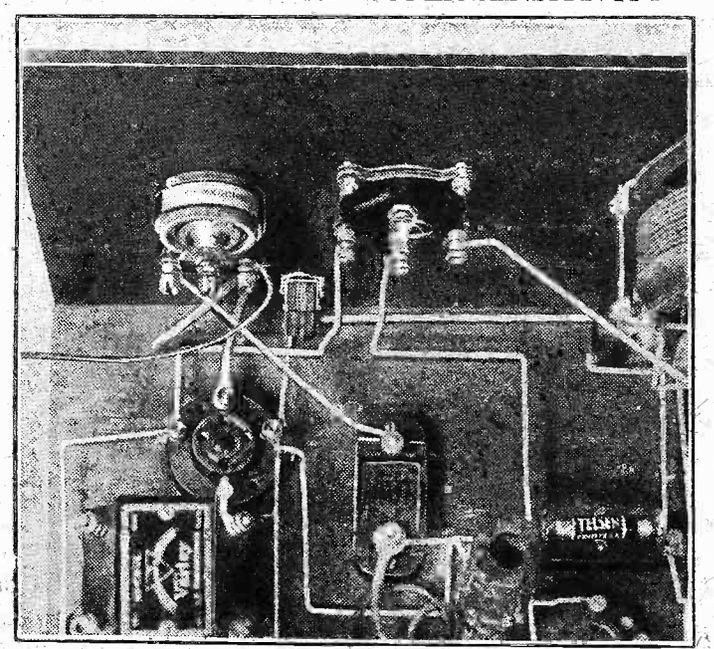
The second switch when pushed in connects one side of the ·0003-mfd. condenser (and aerial) to the other side of it (and to A terminal on tuner, etc.) In other words, it "shorts" the ·0003 condenser for long waves.

The third wave-change switch acts very similarly to the first one, but has an additional contact wired to the additional S terminal on that part of the tuner.

Be sure to get the right sort of switches, or naturally the set won't work as it should!

The actual wiring is a pleasant task. You can solder the joints if you like, or tighten up with pliers in the usual way. So long as there is good permanent connection it will be satisfactory.

FOR VOLUME AND SUPER-SENSITIVITY



This close-up of the controls placed at the right-hand end of the panel (and seen here from the back), illustrates the wiring of the volume control and differential reaction condenser. The volume control should be turned full on before searching for distant stations and left like that, while the stations are brought in with the tuning dials and reaction if necessary.

The "Eckersley" Tuner is provided with a screen of its own, but this is backed up by using a second screen to continue the shielding effect between the condensers.

This will be quite clear from the diagrams and photographs, I think.

Trying Out the Receiver.

When you have finished all the wiring to your own satisfaction check it up against the wiring diagram again, just to make sure. And now I think we will "connect up" the batteries and discuss the operation of the set.

I think one of the most fascinating points in set building is that it's fun building and it's fun operating. So many things one just makes—and then looks at. This thing is a full-scale model and it works.

From the particulars already given, you will have noted that the "Eckersley" Three has no out-of-the-way requirements in accessories such as valves, batteries, and so on. All these are of the type ordinarily used for such a circuit. But the results you will get with this set are going to be quite out of the ordinary.

Of that, more anon. Our first concern is to use the right valves, batteries, etc., correctly connected to the various terminals.

Regarding the Valves.

The importance of using the valves as recommended by their makers—adequate H.T. voltage, corresponding grid-bias voltage, etc.—need not, I think, be stressed again, in view of the fact that warnings under this head have been appearing in POPULAR WIRELESS for years. (You can't possibly get good results from valves that are not being run under the recommended conditions.)

I am going to assume that you have got the right types of valves (as recommended under "accessories"), and that you have placed the detector in the V_1 valve holder, the L.F. valve

(*Continued on next page.*)

OPERATING THE "P.W." ECKERSLEY THREE

(Continued from previous page.)

in the V_2 valve-holder, and the output valve in that marked V_3 on the wiring diagram. "All present and correct?"

Your accumulator being correctly connected to the L.T. terminals, your radiogram plug is withdrawn, your loudspeaker connected, and your aerial and earth joined up.

ACCESSORIES WE CAN RECOMMEND.

LOUDSPEAKER.—(Blue Spot, Amplion, H.M.V., Marconiphone, W.B., Graham Farish, Epoch, R & A, Celestion, Undy, B.T.-H.)

VALVES.—1 Det. (Cossor H.L. 210, or suitable Mullard, Mazda, Osram, Marconi, Six-Sixty, Tungsram, Lissen, Dario).
1 L.F. (Mullard P.M.1 L.F., etc.).
1 Output (Marconi P.2, etc.).
(If other output valve used, adjust G.B. voltage accordingly. Milliamp. consumption of above at 120 volts H.T. = 16 m.a.)

BATTERIES. — H.T. 120 volts., supercapacity (Pertrix, Ever-Ready, Drydex, Lissen, Magnet, Ediswan, Columbia).
G.B., 9 volts (Drydex, etc.).
(Note. If more than 120 volts H.T. used, G. Bias should be available up to 15 volts).

ACCUMULATORS. — Exide, Ediswan, Lissen, Pertrix, G.E.C.

MAINS UNIT.—Should supply up to 20 milliamps. at 120 volts. (Regentone, Ekco, Tannoy, Atlas, R.I., Heayberd, Lotus, Tunewell, Formo). (State voltage and type of mains, and give details of set when ordering).

The H.T. voltages needed at the various + terminals will depend partly on the valves you have chosen, and partly on the H.T. at your disposal.

Detector High-Tension.

H.T.+1, which feeds the detector valve, generally needs at least 100 volts. Preferably more.

The H.T.+2 terminal supplies the anode of V_2 (the L.F. valve), and H.T.+3 terminal supplies the output valve, V_3. This latter will probably require all the voltage you can give it, but in each case you should be guided by the valve-maker's recommendations, both for H.T. and grid bias.

Incidentally, perhaps I ought to mention that the G.B. —1 lead is for the gramophone pick-up. (If this is not in use, G.B. —1 can be ignored, but when the pick-up is employed G.B. —1 plug will generally be needed in the 1½-volt socket on the G.B. battery.)

The flex lead marked G.B. —2 provides grid bias to the L.F. valve (in the V_2 valve-holder). The G.B. —3 lead is for the output valve (V_3).

Before switching on put your reaction condenser at zero, and your volume control at maximum.

On the Long Waves.

Try the long waves first, by pushing in the wave-change switches. The quality from Daventry 5 X X, and the strength of foreign stations such as Radio-Paris, Eiffel Tower, Kalundborg, and so on, will at once enable you to judge if the set is working up to your expectations.

The tuning will be a good deal "sharper" than is usually experienced, but you should find it quite easy to pick up many different long-wave programmes.

Although non-selectivity troubles have never been so bad on long waves as on the "medium" ones, you may, even on long waves, get a hint of the keen tuning that is possible. But to appreciate this fully, pull out the wave-change switches and try the set on the medium waves.

Tuning-In the Programmes.

Screw down the selectivity condenser control (this is the ·0003 mfd., on the baseboard) until you get used to handling the set. (This adjustment can later be slackened off a little to increase selectivity still further, if desired.)

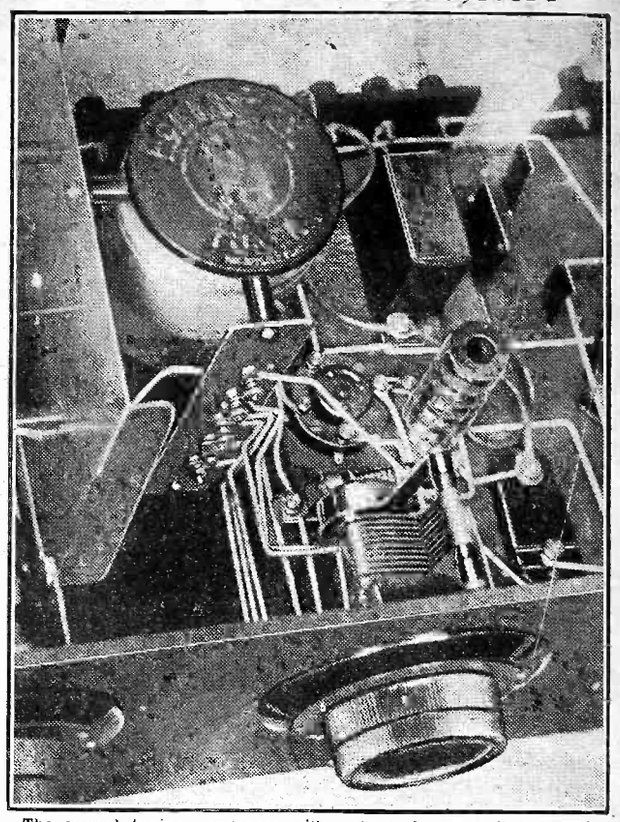
At first you will probably wonder where all the stations have gone! For unless both dials are adjusted accurately the set is amazingly silent. No squeaks, no whistles, no mutterings from afar.

You will find the second dial is critically "sharp." When you tune-in a whisper on this leave it set accurately, and slowly bring round the first dial to the exact position where the programme leaps out.

A final light touch on the adjustments, and there you are—your programme is picked out from among the others with a precision and a degree of clear-cut definition that will, I think, delight you.

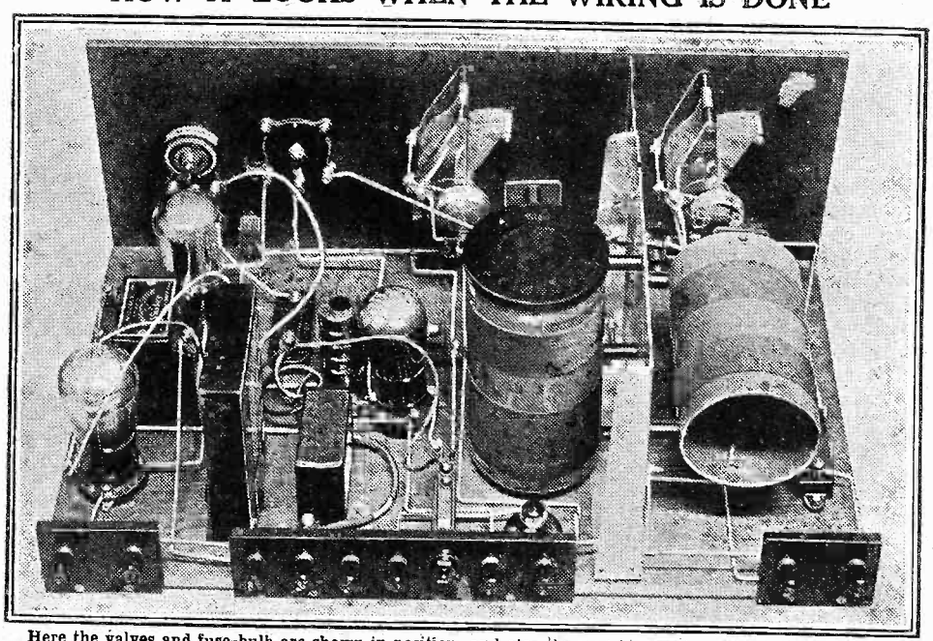
I could say much more, but now I think it is your turn. How do you get on with the sharp tuning? How do you like the cleaned-up clear-cut programmes? In a word, how do *you* like the "Eckersley" Three?

SECOND CIRCUIT SELECTIVITY



The second tuning condenser will probably be much "sharper" than the aerial tuning, so the latter is set approximately whilst the exact adjustment is being found for the grid circuit. Then the final touch on the first dial brings in the programme at full strength, clear of interference. (For this photograph the screen-extension was lifted out. It is shown in the photograph below.)

HOW IT LOOKS WHEN THE WIRING IS DONE



Here the valves and fuse-bulb are shown in position, and also the grid-bias battery in its clip. Note the flexible grid-bias lead coming from the volume control (G.B.—2) which generally goes in at 1½-3 volts. The G.B.—3 lead, which controls the last valve's bias, is a short lead, taken from the G.B.— terminal of the L.F. transformer. Give this the G.B. voltage recommended by the valve-maker for the maximum H.T. you are employing.

COMBINING TWO CONTROLS

A volume control is to cut down strength, but a reaction condenser increases strength. Logically they should both be controlled by one knob, and below you can read how this simplification is attained with the ingenious scheme devised

By A. S. CLARK

ONE of the aims of all set designers of to-day is to reduce the number of controls, *without* reducing the efficiency of the receiver. Beyond a certain point this becomes a very difficult matter, because there are certain "variables" that simply cannot be dispensed with.

But the alternative where these indispensable knobs are concerned is to combine their functions in a single one-knob component. The Extenser as an ideal in this line hardly requires mentioning, its success having been so widespread.

"Where," you may ask, "can a similar principle be pursued so far as the other controls are concerned?" Well, on nearly all the larger sets are to be found a reaction condenser and a volume control, both of which serve to vary the loudness of reception.

A Novel Idea.

One merely carries on altering the volume when the other has finished; for bringing in distant stations by means of reaction is exactly the same thing as increasing the volume of reception of that station, even though it were inaudible before the application of reaction.

Since volume should always be set at maximum, so far as the volume-control is concerned, before reaction is used, it becomes a logical idea to combine these two controls in one. The scheme I am going to describe provides a convenient way of combining a reaction condenser and pre-detector volume control.

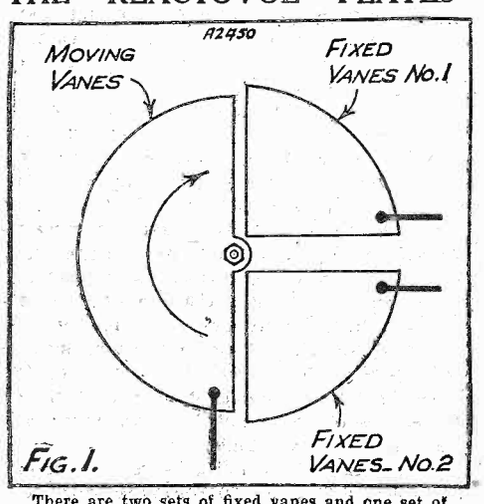
Pre-detector volume controls are generally admitted to be definitely superior to post-detector ones, which is all in the favour of my idea. The argument that a pre-detector volume control is inoperative on record reproduction is effectively countered by the fact that the best, and in fact proper, place for the pick-up volume control is immediately across it and mounted on the motor-board or similar point.

Straightforward Construction.

In the component indicated in the diagrams, reaction is obtained by a plain reaction condenser, and a condenser effect is used to control volume. A condenser of variable capacity in series with the aerial lead, or with the lead from the anode of a parallel-feed H.F. valve, will provide all the control of volume that is normally required.

Naturally, a small minimum capacity would be needed, but that is a point which merely concerns the constructional details of the special component. Actually, the latter is not at all unlike a differential reaction condenser—a component with which everyone is familiar.

THE "REACTOVOL" PLATES



There are two sets of fixed vanes and one set of moving vanes, the latter having twice the area of one of the former, one of which concerns volume controlling and the other reaction adjustments.

In Fig. 1 you see the shape and disposition of the moving and of the fixed plates, of which there are two sets. The moving vanes are similar to those of an ordinary differential condenser, but the two sets of fixed ones are like one set of ordinary fixed ones cut in half.

The vanes are shown at minimum capacity, and as they are rotated in the direction of the arrow the capacity in relation to No. 1 fixed vanes increases until it is at a maximum when a movement through 45° has been made. Up to this point the capacity in relation to the No. 2 fixed vanes has not varied, but has remained at zero.

Automatic in Action.

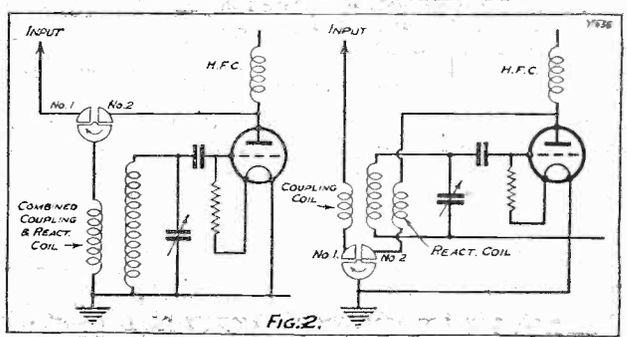
When the rotation is continued, though, the capacity in relation to the No. 2 fixed vanes will now increase until it also will be at a maximum after 90° movement. But while this second section is increasing in capacity, that of the first will remain at maximum.

Do you see the idea? No. 1 vanes will control the volume, and No. 2 reaction. Not until the volume-control capacity is at a maximum will reaction come into play.

All we have to do is to arrange that the moving vanes shall be at a common potential both as regards reaction and volume control circuits. This can be effected in a number of ways, two convenient schemes being indicated in Fig. 2.

The first arrangement is the simpler of the two, but employs the same winding as coupling and reaction coil, a point which many designers do not like. However, it has the advantage that it lends itself to really simple wave-changing much better than the second arrangement, which has separate reaction and coupling coils.

TWO WAYS TO WIRE UP



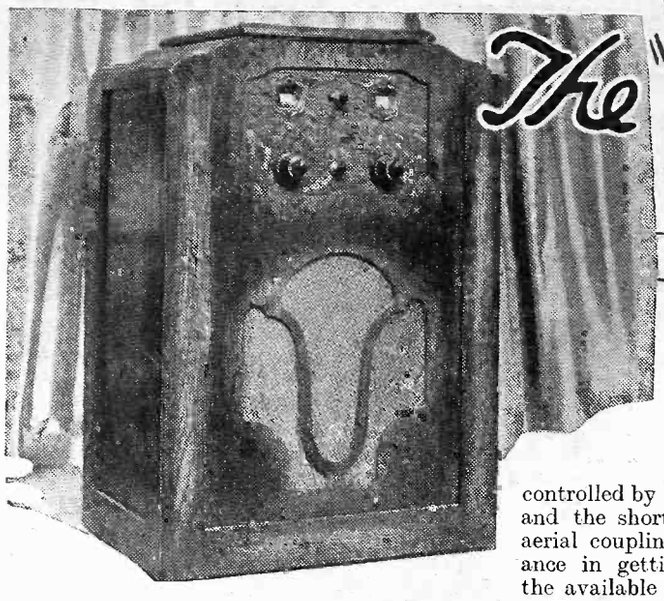
Here are two suggested methods of connecting the "combined" component into circuit. Single-band tuning is illustrated, but dual-range switching could quite simply be devised for use in the two circuits illustrated.

A small point where the second circuit scores is in having the moving vanes of the—I think I'll call it the "Reactovol"—condenser at earth potential. In either case the point marked "Input" can go to the aerial direct, or to the anode of a preceding H.F. valve.

Easily Understood.

In the light of the explanation given in connection with Fig. 1, the working of the "Reactovol" condenser in the two circuits is particularly easy to follow. As the condenser is rotated in the direction of the arrow the capacity in series with the input winding increases, and so the volume of reception goes up until it is at a maximum so far as the volume-control is concerned.

Further movement will not affect the input capacity, but it *will* commence a coupling up with the reaction coil, which will increase till the reaction section of the "Reactovol" is at maximum.



The "METEOR" III

A description of a very interesting set.

By A "P.W." STAFF TECHNICIAN.

THE "Meteor" Three is a receiver marketed in kit form by Messrs. Ready Radio—a fact which will no doubt be well known to most readers of "P.W." It is an all-wave instrument and embodies the principle originated by those famous "Explorer" sets which were described in "The Wireless Constructor."

That is to say, two interchangeable coil units are provided. The one is a "dual-waver," and when this is in position the set can be operated as an ordinary wave-change receiver for the reception of medium or long waves.

With the other coil unit in place it is possible to receive the short waves.

This is a very excellent scheme, and we congratulate Messrs. Ready Radio for extending its popularity.

There is no doubt at all but that the great listening public is getting "short-wave minded" and, after the usual lag, we anticipate that commercial sets will begin to cater more for the new demand.

In the meantime, constructors have the "three-band" field almost entirely to themselves, and the success which the "Meteor" Three already has achieved must surely be proof that they are taking full advantage of it.

The "Meteor" Three has a detector 2 L.F. circuit. The first L.F. valve is resistance-capacity coupled and the second transformer coupled.

Excellent slow-motion dials are provided for both the tuning and reaction condensers, and this greatly facilitates the operation of the outfit on the short waves.

Provision for a Pick-up.

To reduce hand-capacity an extension rod is provided for the reaction condenser which is set back some few inches from the panel.

Pick-up sockets and a radio-gram switch are fitted at the back. There are also sockets for the aerial and earth and loud-speaker, while the H.T., G.B., and L.T. connections are via leads which come straight out of the set.

The components used are of various makes—various *first-class* makes we should have said, for the selection is, in our opinion, a very happy one.

The coils are of Messrs. Ready Radio's own design, and are as good as any commercial designs at present in existence. The dual-range coil embodies a selectivity adjustment controlled by means of plug and sockets, and the short-wave coil has a variable aerial coupling which is of great assistance in getting smooth reaction over the available 19 to 50 metres or so.

The front panel is symmetrically arranged, there being just the two slow-motion controls (for tuning and reaction) and the on-off and wave-change switches.

Cabinet Alternatives.

A choice between two cabinets is given. There is the standard model, and the Consolette in which loudspeaker and batteries can be housed. These cabinets are most attractive and give the instrument a polished, handsome appearance.

It will be seen from all this that the "Meteor" Three is of a very sound design. But, it may well be asked, wherein lies its claim to originality? And the answer is found in the slow-motion reaction control.

In a three-band receiver of the nature of the "Meteor" Three, such a refinement is of very real value, especially on the short waves, where it is often only the closeness of the reaction adjustment which brings a station from complete inaudibility to full loudspeaker strength.

It is a courageous expedient to provide a slow-motion movement and a tuning scale for reaction in these days when simplicity of control is so widely demanded, for such a step is sometimes liable to be misconstrued by the uninitiated.

It might seem that "Single-Dial Tuning" is sacrificed in the spirit if not in the letter, but in actual fact the handling of the receiver is very greatly improved.

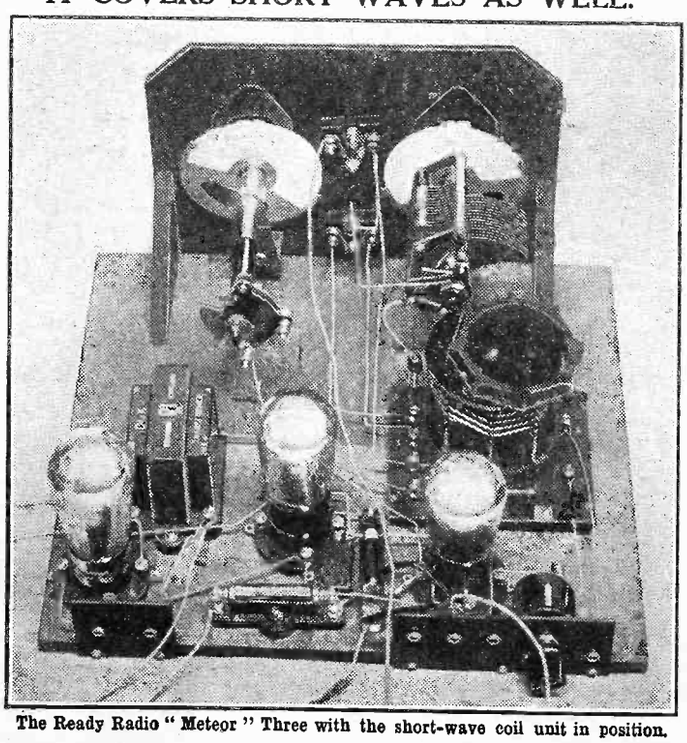
The "ham-handed" operator is enabled to obtain adjustments which would be possible only for the expert if using "plain" dials.

Plenty of Programmes.

There are all too many who think of the short waves as nothing but channels for freak amateur communication, for beam wireless and for mere Morse messages. If they did but realise it, though, you find a whole wealth of new broadcasting entertainment "down there."

Not perhaps with the "service reliabilities" of the "ordinary" waves, but richer in wide variety. And the surprises you get! After having tuned in a weak carrier and found it to convey a faint German programme, you are quite likely to discover that an adjacent and extremely powerful carrier is a New Yorker which comes over with loud-speaker punch.

IT COVERS SHORT WAVES AS WELL.



The Ready Radio "Meteor" Three with the short-wave coil unit in position.

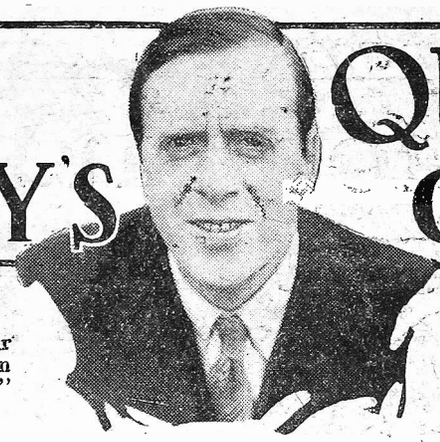
Late Hours!

We can well imagine that many owners of "Meteor" Threes will find it difficult to switch off once they have started in on a really good session. Unfortunately, at the time of writing, short-wave conditions are not particularly good, but it is a bad night indeed when you cannot tune in at least a few stations.

The "Meteor" Three is delightful to handle, and its slow-motion controls render it possible to do much more in the daylight than would otherwise be the case.

These controls are very smooth and quite free from backlash and other such faults.

CAPT. ECKERSLEY'S QUERY CORNER



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 direct to Capt. Eckersley; a selection of those received by the Query Department in the ordinary way will be answered by him.

Those Voltmeter Readings.

H. Q. (Carlisle).—"I have read that it is impossible to check the output voltage of an eliminator by using an ordinary voltmeter.

"Since a voltmeter satisfactorily measures the voltage of a dry H.T. battery, it is rather puzzling that the same instrument cannot measure voltages derived from the mains. Why is there this difficulty?"

I don't know where you have read that you cannot check the output of an eliminator with a voltmeter, but whoever wrote such a statement must have been thinking of a very bad voltmeter or a very overloaded eliminator.

A voltmeter takes *current* to work it. A voltmeter has a certain resistance. A voltmeter has a resistance expressed as so many ohms per volt.

If it had a 1,000 ohms per volt characteristic, then a 100-volt max. scale reading voltmeter would have a resistance of 100,000 ohms. Also, it would take 1 milliamp from the source it was measuring.

But if the voltmeter was a cheap one it might have a characteristic of 10 ohms per volt and take 100 milliamps to read 100 volts. Lots of eliminators have a maximum output of, say, 20 milliamps, and so if you try to measure the voltage with a cheap voltmeter your eliminator cannot supply the *power* to make the voltmeter read!

But the general statement wants watching. All the writer meant was you cannot measure the voltage output of a small eliminator with a cheap voltmeter. Always remember, a voltmeter takes current. And don't, therefore, try and measure volts between grid and filament in series with a grid leak!

An Odd Hum.

S. C. C. (Edgware).—I recently constructed a self-contained frame aerial receiver (det. and 2 L.F.), using an accumulator for L.T. and an H.T. unit from A.C. mains. A faint mains hum is heard unless—

"1. L.T.— lead of the circuit is touched.

"2. This lead is earthed.

"All metal work in the set is connected to this lead, including the L.S. chassis and the box containing the mains equipment, which, by the way, is over 3 ft. from the detector valve, and the A.C. mains lead at its nearest point is 14 in. from the frame.

"What I am unable to understand is, why when either (1) or (2) is tried, the hum ceases, but yet when this lead is connected to a metal fender or similar mass of metal, the hum persists.

"Do you think that joining the core of the mains transformer to L.T. neg. will do any good, although this transformer, as stated above, is already in a metal box. Naturally, I do not wish to use an earth, either artificial or real, unless absolutely necessary."

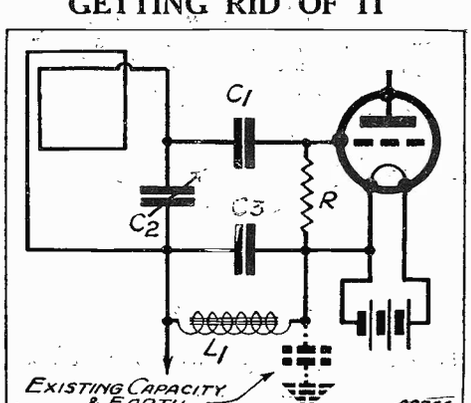
It is extraordinarily difficult to give coherent explanations as to why "hums" come and go—I think, in essence, the fact is that, if you do not directly earth the L.T. negative, then, as regards 50-cycle stuff, the grid of the detector valve is not directly earth potential.

Thus, assuming that the potential of the negative is fluctuating, it will be seen that, owing to the high resistance of the grid leak and tuned circuit plus grid blocking condenser network, the grid potential may fluctuate differently from the filament potential, creating hum.

If this is true, the hum should cease or be reduced if you short grid of detector to filament. This means that some network would have to be built which maintained the potential fluctuation of both grid and filament the same. I should very much welcome the results of experiments you may perform to keep filament and grid at the same potential and see if the hum disappears.

The only way I can see in which this might be done is as shown in my sketch. C_1 and C_2 and R already exist, of course.

GETTING RID OF IT



These are the suggested connections for an L.F. choke (L_1) and a by-pass condenser (C_3) to prevent the unusual humming effects described by S. C. C. (Edgware).

If the impedance of C_3 (By-pass H.F.) in parallel with L_1 (By-pass D.C.) can be made to equal the impedance of C_1, and if phases are right it *might* work. It is necessarily rather sketchy, all this; but it might help. I do hope it will.

Taking Out the Grid Leak.

N. L. (Edgware).—"I have noticed that if I remove the grid leak from the resistance-coupling unit of the first L.F. valve in my receiver, no apparent change in tone or volume results unless I switch the receiver off and then switch on when the tone is very distorted. I am somewhat puzzled by this effect, and should be pleased if you could offer an explanation."

If the set is working, and you then remove the grid leak, there is no path between grid and filament except that due to leaks in insulation and in valve holders, etc. So it may be that the required negative charge leaks away from the grid, very very slowly.

It is, however, re-furnished by some of the stream of electrons which mostly pass between anode and filament impinge on the grid and making up for those leaking away. When you switch off there is no supply, and the charge leaks right away. When you switch on again there are never enough electrons to re-establish the charge.

Sounds all right, I think, but there are other explanations, but slightly involved and less likely to be true than the one I give.

Condenser Capacity for Short Waves.

M. K. C. (Eltham Park).—"I understand that in order to tune satisfactorily on the ultra-short waves a small tuning condenser is essential. My set has a ·0005-mfd. condenser. Can I place a ·0005-mfd. fixed condenser in series with it to reduce its capacity, and so obtain the same effect as a ·00025-mfd. variable condenser?"

Not quite. The formula is that the resulting capacity C_1 of two capacities, C_1 and C_2, in series is

$$\frac{C_1 \, C_2}{C_1 + C_2}$$

Thus, five times five over five plus five is (leaving out the noughts) 2·5. But 2·5 in series with five is 1·66, and not 1·25, as you had hoped.

Thus, the variable condenser does not, if a fixed series condenser of its maximum value is connected in series with it, behave all the way round as a halved variable condenser.

Two variables ganged and placed in series would give a halving effect all the way round. But for ultra-short waves, surely you want to do more than *halve* the condenser value.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?

USING THE MAINS.

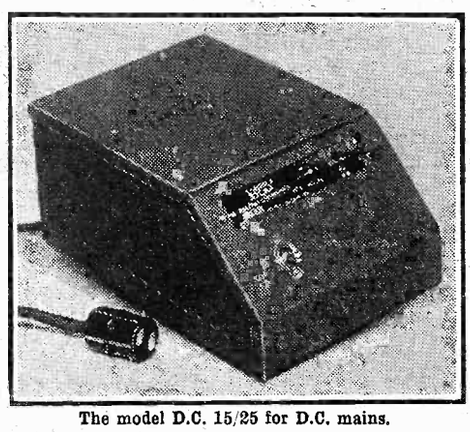
A SPECIAL feature of the new Atlas Mains Unit, Model D.C. 15/25, is that its various output voltages can be obtained on either a 15 m.a. or 25 m.a. load. This is effected by a unique switching arrangement.

The three H.T. tappings provided are 60–80 and 50–90 volts, both having intermediate tappings of minimum and maximum voltages, and a 120–150 volts fixed.

The cash price of this neat little D.C. H.T. unit is 35s. 6d., and it is guaranteed for a period of twelve months.

We carefully tested it on a detector and two L.F. set and found that the smoothing was such that there was no audible hum except during programme intervals and when reaction was applied—a sterling proof

NEW "ATLAS" MAINS UNIT



The model D.C. 15/25 for D.C. mains.

of the sound design of the unit. It is certainly one we can recommend.

NEW "EELEX" TERMINAL.

There is now a new version of the famous T.2.L.C. "Eelex" terminal and one which should appeal very strongly to constructors.

It is a particularly useful type, for it can accommodate any kind of lead-end wire, spade, ring or pin. Personally, I can see no future for any terminal which cannot do this, for accessories are always likely to be equipped with any one of the above connectors.

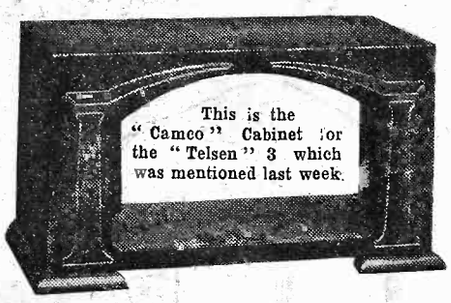
The "Eelex" T.2.L.C. carries plain marking and is in every way a worth-while device.

GOLTONE SCREENED TUBING.

This is a particularly useful material and comprises a braided metal tubing which is very flexible and tough, having an insulating lining.

Its bore is such that with ordinary connecting wire it provides for an air-spaced screening of the leads and does not introduce an appreciable self-capacity.

Both as a mechanical and electrical protection the Goltone Screened Tubing has



great practical value, especially in the larger sets of high efficiency. And at a cost of 9d. per yard it is within the reach of all constructors.

A VERY USEFUL NOTEBOOK.

I have just obtained my copy of Collins' "Wireless" Diary, and I must say I consider it one of the most useful publications which have ever come my way. It is absolutely packed with useful information and covers a much wider field than do most "specialised" forms of diary notebooks.

It is available in various coverings, etc., from 1s. 3d. to 7s., and if I were asked to suggest that one which the majority of constructors would buy I should plump for the 2s. 6d. style, which has a pencil and a Duroskin cover.

SEPARATING STATIONS.

With the longer evenings and better radio conditions which obtain during the winter months, there are doubtless innumerable listeners who have found their sets to be vastly less selective than they had thought them to be during the summer and autumn.

But a good wave-trap will do much to restore the station-separating powers of a set.

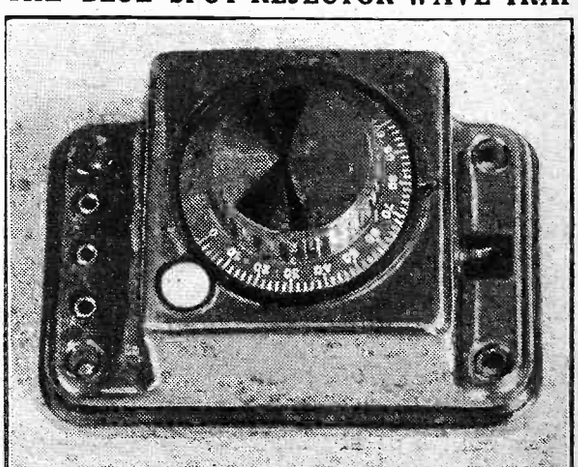
The Blue Spot Rejector Wave-trap is an excellent device for such a purpose. It provides for three alternative degrees of selectivity and it has a smooth adjustment controllable by a knob of generous dimensions—a good point that.

The price is 15s., but it is well worth that, for it is a definite advance on the simple type of wave-trap with its fixed aerial tappings.

On test we obtained striking results, either of the powerful local stations being wiped right out and the volume of those on adjacent wave-lengths being retained practically unimpaired.

The Blue Spot Rejector Wave-trap is as effective as any commercial device of its kind I have tested.

THE BLUE SPOT REJECTOR WAVE-TRAP



An invaluable device for those who are swamped by local stations.

CONCERNING BURNDEPT.

We have received the following communication from Henry E. Taylor, Ltd.:

"We note a paragraph in the issue of your valued publication dated December 5th, page 787, regretting the final winding up of Burndept Wireless (1928) Limited, and, although that Company is in voluntary liquidation, you and your readers may be interested to know that the name and reputation of Burndept is not extinct.

"A Company was formed in August last to purchase the name of 'BURNDEPT' and the Trade Marks, Patents and Goodwill of that Company; two of the Directors comprise the subscriber, who was connected with the Burndept Company from its inception and during the past four years held the position of General Sales Manager, and Mr. L. J. Hunt, who was for many years the Chief Designer and Works Manager of the old Company. We employ on our Works Staff the Burndept Chief Service Engineer and the Chief of the Test Department, and our assembly and other works staff are all picked ex-employees of the Burndept Company.

"It will be the endeavour of our Company to maintain and enhance the reputation of the House of Burndept for quality apparatus.

"We hold a complete stock of components, together with the necessary jigs, tools, etc., for the repair of all Burndept apparatus, and we hope, by hard work, careful and unique design, together with competitive prices and sound management, to reinstate the name of BURNDEPT in the forefront of the Radio Industry."

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 undertake to return them, as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

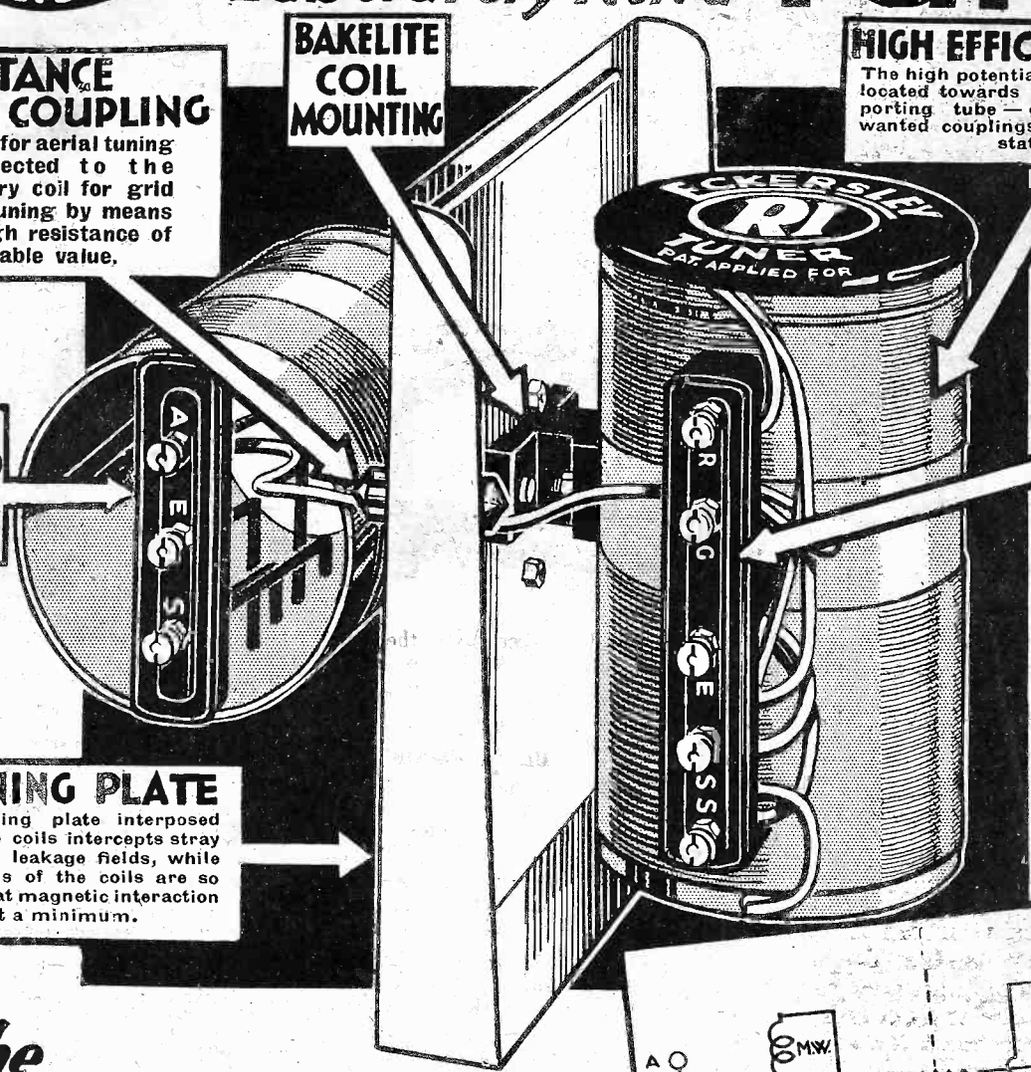
And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are, therefore, framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

The R.I. *Improved and Perfected* ECKERSLEY *Laboratory Tested* TUNER

RESISTANCE COUPLING
The coil for aerial tuning is connected to the secondary coil for grid circuit tuning by means of a high resistance of suitable value.

BAKELITE COIL MOUNTING

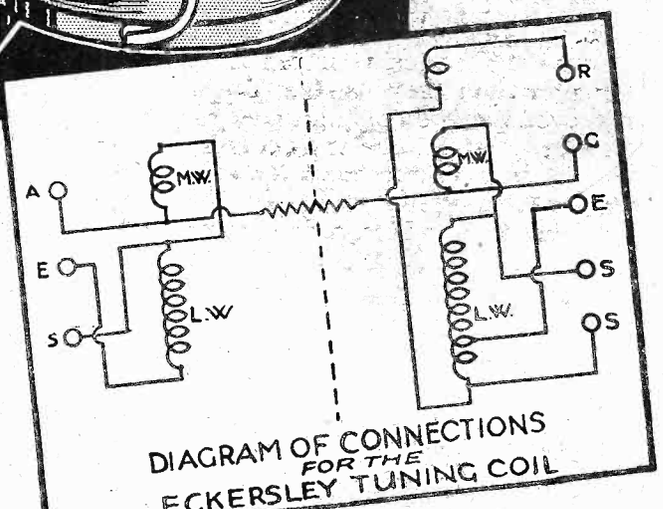
HIGH EFFICIENCY WINDING
The high potential ends of the coils are located towards the centre of the supporting tube — greatly reducing unwanted couplings due to stray electrostatic fields.



BAKELITE MOULDED TERMINAL PANELS

BAKELITE MOULDED TERMINAL PANELS
These greatly enhance the appearance of the Tuner and give definite mechanical improvement and efficiency.

SCREENING PLATE
The screening plate interposed between the coils intercepts stray electrostatic leakage fields, while the positions of the coils are so arranged that magnetic interaction is at a minimum.



for the "P.W." ECKERSLEY THREE

The Eckersley Tuner is revolutionary in principle, design, size and operation, and comprises two coils with magnetic axes at right angles, separated by a metal screen and coupled in an entirely new way by a resistance.

It is $6\frac{3}{4} \times 7 \times 7\frac{3}{4}$ ins. in size—and is not small because "bulk" has been established as absolutely essential to greatest selectivity.

The Eckersley Tuner *tunes first* and cuts out mush, obviates sideband jamming and passes only clear cut signals for first and subsequent amplification as compared to ordinary coupling of two tuned circuits by a valve which magnifies interference.

R.I. produced the original model of the Eckersley Tuner to the inventor's specification and have mechanically improved the constructional details which give an unequalled degree of efficiency. Every R.I. Eckersley Tuner is subjected to the most critical laboratory tests before release.

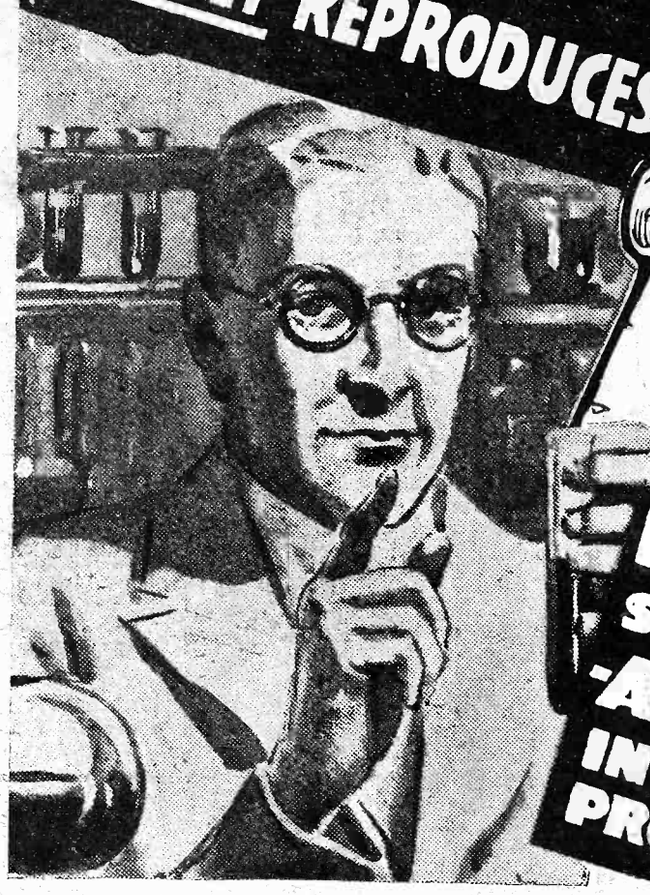
List No. B Y 30. Provisional Patent No. 29404/22.10.31.
Size: $6\frac{3}{4} \times 7 \times 7\frac{3}{4}$ ins.

15/6

The "Secret of the Test-Tubes"

EXACTLY REPRODUCES LABORATORY CONDITIONS

IMPROVED MANUFACTURE



IMPROVEMENTS INCORPORATED IN THE LISSEN BATTERY ENABLE US TO GIVE THE FOLLOWING

Guarantee

This Lissen battery is definitely guaranteed to have a much longer life than a 100 volt Lissen battery bought prior to ...st 1st, 1931.

LISSEN

Longer Life now a scientific certainty -AND GUARANTEED-

IN A COMMERCIALLY PRODUCED H.T. BATTERY

An IMPROVED Lissen Battery! The same Secret Process, the same fine active chemicals, the same big oxygen content in the cells and the identical copious generation of smooth-flowing H.T. current that gave you such good service in the previous Lissen Battery. But now the chemicals remain fully active much longer than they used to do because of improved methods of manufacture which exactly reproduce laboratory conditions in each cell. The power capacity of the battery is scientifically increased, its life lengthened; so that to-day Lissen are able to give you a specific Life Guarantee with every Improved Lissen H.T. Battery sold.

Prices, too, have been greatly reduced, and to-day, when you buy Lissen, you get much longer battery life for much less money.

LISSEN

H.T. BATTERY

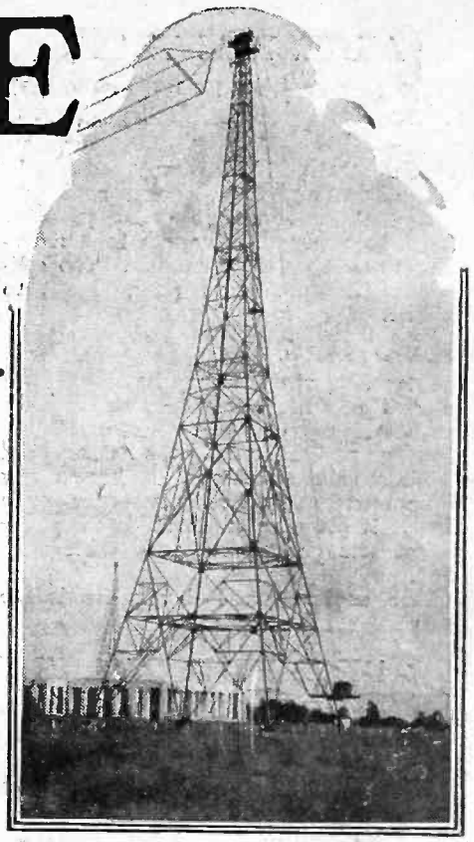
60 VOLT **5/6**

100 VOLT **9/3**

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX.

AFTER FIVE YEARS

"O.H.M." SURVEYS THE B.B.C.



In this concluding article, "O.H.M." presents his summing up and gives some useful suggestions for the future development of the B.B.C.

IN the five preceding articles I have taken you through a carefully detailed survey of the results of impressions and investigations carried on during the last six months after an interval of five years, during which I had been abroad.

I have tried to describe to you the generally well-run, well-disciplined compact organisation of the B.B.C. I have singled out the ablest of a competent staff, and I have called attention to faults as well as excellences, both obvious and obscure.

On the one hand, a fine standard of idealism and public service, a pride in educational æsthetic objects. On the other hand, deficiencies in personal appeal—encouragement of a deadly anonymity, absense of a sense of human sympathy and contact due partly at least to defects in the internal spirit of the organisation, and finally a lamentable failure to trust the public more by taking it fully into confidence about the myriad problems and troubles which engage anxious attention daily.

In Music.

In music the achievement has been a majestic triumph, but something remains to be done to gain the confidence of the outside music profession in the various branches of executant work. Talks, too, have improved out of all recognition: the five years' period of my absence apparently witnessed the gradual realisation by the intelligentsia and the "high-brows" generally of the enormous educational value of the B.B.C.

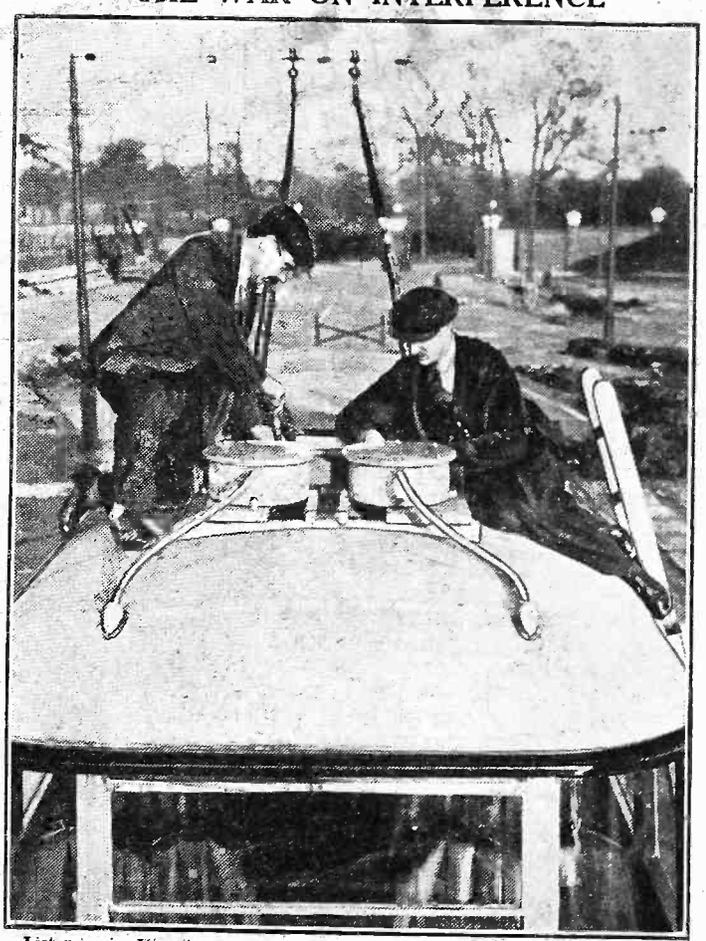
No leader of thought, no scientific authority, no public man, no industrial baron would now disdain the microphone; rather do they all struggle to reach it. The result, for the most part wisely controlled by the B.B.C., is a signal contribution to the intellectual well-being and equipment of Great Britain.

The next thing that wants doing in connection with talks is to gain for them much-needed flexibility, and freedom from the shackles of long-term arrangement. There should be more attention to the vexed problem of topicality: the adventure of the moment should always have priority.

Vaudeville and Plays.

In vaudeville and light entertainment I have pleaded for more spontaneity, and a return occasionally to the old informality. Radio plays seem to be on the right lines as directed by Val Gielgud.

THE WAR ON INTERFERENCE



Listeners in Kingston-on-Thames are indeed fortunate in having a considerate tramway undertaking. The interference caused to radio programmes by electric tramcars is too well-known to need emphasis, but in Kingston at any rate very effective steps have been taken by those in authority to reduce the trouble. This photograph shows engineers fitting choke coils to the overhead trolley system on one of the new trolley buses.

The virtues and failings of B.B.C. administration have been analysed. I have again warned Savoy Hill of the danger of enthroning "administration" on a special pinnacle of its own, divorced from the work of the microphone. I have also criticised the steady encroachment of centralisation at the expense of the Regional centres, pointing out that if this tendency goes unchecked, there will be perhaps an irresistible temptation for the Parliamentary Committee of 1935 to break up the broadcasting monopoly for the period following 1936, when the B.B.C. licence lapses.

And now, with my eyes on the future alone, I would like to sketch out the way in which I think the B.B.C. can and should proceed to fulfil its allotted destiny.

The shadow of 1936 is already falling, and hostile forces are assembling for preliminary consultation.

A Clash Coming?

This time the B.B.C. will have the advantage of an additional ten years of good work, with the consequent growth of the sense of continuity which that lengthened term implies. But just as the position of the B.B.C. will be relatively stronger than it was at the time of Lord Crawford's Committee of investigation in 1925, so the forces against it will be much stronger, more active, and more experienced.

The chance of breaking up the B.B.C. always provides a focus for the various elements of discontent which the B.B.C. fails to placate. The music industry as a whole is hardly as friendly to the B.B.C. as it was in 1925, and I do not see any prospect of its getting more friendly in the next three or four years.

The public concert-giving activities of the B.B.C. and the poaching of instrumentalists for its orchestras have created a permanent body of opposition in the

(Continued on next page.)

AFTER FIVE YEARS

(Continued from previous page.)

entertainment world. The theatre still looks with distrust and apprehension on broadcasting. The Musicians Union probably would be ready to cooperate in a movement to split up the monopoly. The attitude of the newspaper press is not so definite.

Ten-Year Licences.

Since 1925 the tendency has been more to seek advantage by cooperation with broadcasting. On the other hand, the growing realisation of the commercial publicity value of broadcasting has already so impressed at least one newspaper group that it is planning to do all in its power to get some broadcasting for itself after 1936.

Then another cause of vexation is the growing publishing activity of the B.B.C., which, by 1935, will be making a profit of not far short of £500,000 out of publishing magazines and books which the "trade" passionately regards as its own legitimate province. Therefore, if there is any chance of taking publishing away from the B.B.C. the powerful influence of the industry will be thrown into the hostile scales.

Thus, there is every reason for diligent counsel and careful planning in the interval if the B.B.C is to enter the conflict with any substantial hope of success. And this is, of course, just as it should be. I profoundly hope that the B.B.C. is never put on a more permanent basis than a succession of ten years' licences—that is, as long as the monopoly is allowed.

Monopoly is not a good form of control in any circumstances; it happens in the case of the B.B.C. to be the least bad, and and is tolerable only because of the opportunity of recurring review provided by the limited licence.

Support for the Arts.

There has been a good deal of loose talk about a Ministry of the Arts, a kind of Government department that will nurse music, opera, the theatre, painting, and sculpture, and whatever else can make out a case that it is a fine art or a substantial part of one.

All this encouragement and nursing, in so far as it should be done at all, is the natural function of the B.B.C., which can be depended on not to throw money away on fantastic proposals. I advise the B.B.C. to take a more direct initiative in these affairs and at once. The B.B.C. should be more active in aligning all the warring operatic interests so that under its ægis there may be a united effort to ensure that the "subsidy" is not wasted.

Similarly, the music festivals up and down the country should be so helped by the B.B.C. that they would look upon it as their natural patron, rather than as at present a rather reluctant and aloof body. The National Theatre movement, if it deserves to exist, should do so under B.B.C. guidance. The nuclei of repertory, both of stage and screen, should see in broadcasting their natural patron.

The Real Reason.

Artistic development generally should be consciously and generously nourished by the B.B.C. I am not arguing this because it would be of advantage politically to the B.B.C., but of course it would, because every movement of the kind taken up would add to the army of effective supporters in the struggles of 1935 and 1936.

But the real reason is the larger one of national and artistic interest. Let there be an end to the feeling in so many quarters that the B.B.C. is merely a soulless dispenser of canned music and inferior entertainment. Let this be changed into lively appreciation and admiration of what the B.B.C. really is, and of what it is capable of becoming.

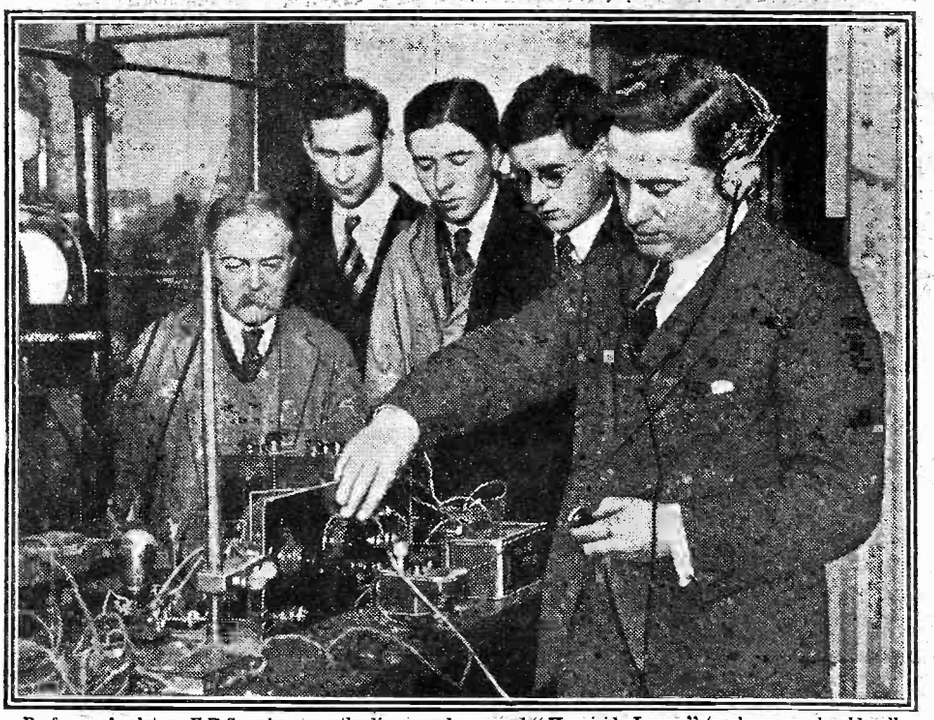
Here, again, there is need of a change in the attitude of the B.B.C. as well. To achieve this leadership in the arts the Corporation must become a much more human and generous thing than it is. There should not be so much the attitude of barter, the tendency to niggle at financial trifles. I am not advising extravagance or loose spending or supporting lost causes. But what I do emphasise is the need for much broader and more statesmanlike outlook.

An Opportunity Ahead.

The responsibility of the monopoly is now much more than the provision of the satisfactory broadcasting service. To the degree in which the additional responsibility is recognised and acted upon, so the hope of the B.B.C. winning in 1935 is strengthened. Those who control the B.B.C. should be prepared to take more definite risks in all such enterprises as Empire broadcasting, and the prudent encouragement of the fine arts.

If, in the next few years, the B.B.C. makes the mistake of adhering too closely to the narrow interpretation of its terms of reference, it will have itself to blame if its constitution is seriously modified. If, on the other hand, it rises to the destiny it deserves, then it will receive a renewed vote of confidence more enthusiastic and unanimous than any that has gone before.

DISCOVERER OF A SECOND "HEAVISIDE" LAYER



Professor Appleton, F.R.S., who recently discovered a second "Heaviside Layer" (perhaps we should call it "Appleton Layer") demonstrating radio apparatus to students in a King's College laboratory. He claims that he has definitely proved the existence of this second layer, and calculates that it is situated about 140 miles above the earth's surface. That is, roughly 80 miles higher than the original "Heaviside Layer."

CORRESPONDENCE

The Super-Quad, and a "Hum" Tip

A SUPER-QUAD SUCCESS.

The Editor, POPULAR WIRELESS.

Dear Sir,—We have to-day completed the assembly of a "Super-Quad" for demonstration purposes, and wish to compliment you on a very fine set. For ease of control and simplicity of assembly, it is one of the finest sets we have handled to date.

We carried out the test of the "Super-Quad" at dusk on a badly screened aerial in the centre of Belfast, and on the broadcast band (200-600) received 25 stations at full loud-speaker strength.

Hoping for more circuits like the "Super-Quad," and wishing you continued success,

We remain, yours truly,

J. DOHERTY.
(The Belfast Radio & Electrical Co.)

Belfast.

STOPPING "HUM."

The Editor, POPULAR WIRELESS.

Dear Sir,—I have read with interest the article on "Hum" in POPULAR WIRELESS recently. I have an "Ekco" Eliminator, and have been trouble-free until a new generator of exceptional size was installed in the electricity station in this district.

I have tried various fixed condensers without much effect, but found a considerable improvement by earthing to the water supply pipe. I then tried the earth connection of the casing of the eliminator being connected entirely by itself to my original earth, and the hum has practically ceased. It is now only just audible with the set silent.

I have mentioned this as you do not propose a separate earth such as this in your article, and as it has cured my trouble it may be of help to others.

Yours truly,

W. H. WRIGHTSON.

Shorcham.

STATIONS WORTH HEARING

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.

EXCELLENT conditions continue to be with us and the omens indicate that we are in for a thoroughly good wireless year in 1932. One reason that I have for making this prophecy is that daylight reception upon the short waves is so astonishing just now.

A few mornings ago having half-an-hour to spare I ran round the medium wave-band with a standard commercial set containing two screened-grid high-frequency amplifiers, a grid detector and a power output valve. This was used in conjunction with a good indoor aerial.

Battery Operated.

The set, by the way, is battery operated, even better results might have been obtained from a mains outfit, for A.C. mains valves are, of course, more efficient as amplifiers than the battery variety. The bag was surprising. I did not use telephones, but tuned-in straight on to the loudspeaker.

Working upwards from the bottom of the band, I first of all heard one or two stations rather faintly, but did not bother very much about them. Then I came upon Leipzig, from whom full loudspeaker volume was easily obtainable. Turin and Heilsberg were equally well received. Hilversum did not appear to be working at the moment, but Göteborg came in with a roar. The next station heard was Stockholm, who was very strong.

Between his wave-length and the top of the medium wave-band a wonderful bag was obtained, Beromunster, Langenberg, Prague and—most surprising of all—Vienna, all giving a fine account of themselves. It is a very long time since more than an occasional feeble sound could be heard from foreign stations on the medium band in broad daylight.

In the almost entire absence of atmospherics in which we have been rejoicing of late, daylight reception upon the long waves has been superb. Some listeners may have been surprised not to have found Radio-Paris stronger in the daytime, but I believe that he has not been using full power on most days until after dark.

For Long-wave Listeners.

There are splendid opportunities on the long waves nowadays for the reception of alternative programmes since Oslo, Kalundborg, Motala, Warsaw, Eiffel Tower, Zeesen, Radio-Paris and Huizen are all good transmissions. Those who dwell in the north may fare better than I do in the matter, but even with my big seven-valve set in use I can never obtain more than weakish reception from either Lahti or Reykjavik, though the former is rated at 54 kw., and the latter at 21 kw.

The number of good stations waiting to be tuned-in on the medium band is immense at the present time. After dark there are all sorts of interesting little transmissions between 200 and about 230 metres.

Varying Conditions.

They vary enormously from night to night, but there are few evenings when you will not find them coming in strongly and well. Working upwards, Cologne, Nurnberg, Trieste and Leipzig are all likely to reward you, and if you suffer from blanketing by the London station you are more than likely to find Horby, Toulouse P T T and Gleiwitz when the shorter-wave Brookmans Park transmitter is not working.

Hilversum is nearly always worth attention and so are Bordeaux and Genoa, though both of these stations suffer from occasional heterodynes. Marseilles I do not often hear nowadays, though he makes an appearance every now and then in the log. Grenoble is another intermittent capture. Göteborg, Breslau and Brussels No. 2 are always waiting to supply entertainment.

SHORT-WAVE NOTES

News and views regarding an exciting and fascinating wave-band.

By W. L. S.

THE appointed day for the second "P.W." Short-Wave Receiving Contest draws near! I hope that all the receivers are duly "hotted up" and equipped with freshly-charged accumulators and noiseless H.T.B.'s in readiness for the great event.

For the benefit of those who did not read the preliminary notice, here are the details. Starting at midnight on Saturday, January 23rd, and continuing until the same hour on Sunday, January 24th, you will listen below 100 metres and log everything that you hear. There are two classes into which the entries will be divided: (*a*) amateur signals only; and (*b*) short-wave broadcasting stations.

The Longest Log Wins!

You may enter both if you like, or you may restrict yourself to either. The winner of class "*b*" will be the reader who sends in the longest list of different stations logged, provided that they all check with the known details regarding programme, time and wave-length.

In class "*a*" the winner will probably be the man who logs the greatest number of different countries, but points will be awarded on a sliding scale. I shall certainly award more marks for each country outside Europe than for those inside!

All you have to do, in order to compete, is to listen during the whole of the period mentioned, or as much of it as you feel up to, and to send in your log to me afterwards, c/o "P.W.," and marked "Short-Wave Contest."

The prizes for each section are only the honour of seeing your name mentioned in a conspicuous position in your favourite weekly, but think of the thrill!

Next week I will give some last-minute information regarding conditions and the times that are likely to be best for different directions.

Ready for the Spring.

This is going to be an exceptional spring for competitions. The A.R.R.L. have arranged a novel "Good-Will Contest" for February, about which I will say something a little later on. The R.S.G.B. is running a "British Empire Radio Contest," also during February, in addition to special tests on 10 metres, 80 metres and 160 metres. And "P.W.," if this first competition is a success, will certainly run another before the summer (if any) commences.

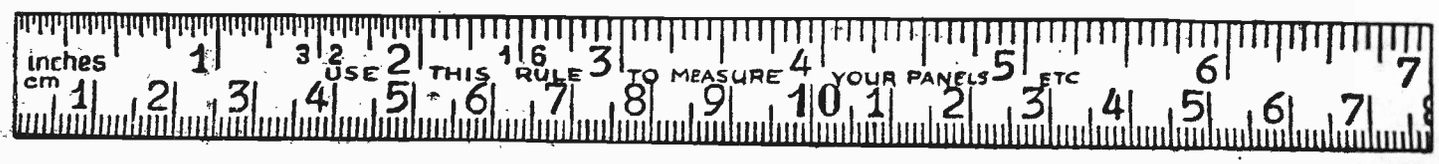
And now for business. There is another crop of requests for me to publish details of a single-valve short-wave set, which I am duly doing. It will, I hope, be in the Editor's hands very shortly.

If those who have asked for particulars of 80–100 metre coils for the "S.G.4" will refer to these notes in the issue of "P.W." published a fortnight ago, they will find them set out in full.

"Riddled Baseboard!"

My regular correspondent, "J.B.M." (Glasgow), reports good reception once more of W 3 X A L, and concludes by threatening to change his name to "riddled baseboard"! Yes, I've had that feeling, "J.B.M." I have to buy a new stock of wood very frequently.

"R. B.," of Eastbourne, shortly coming to live in London, wants to call on some enthusiasts and work up a few S.W. acquaintances. Well, "R. B.," I don't think you'll find any difficulty in that. Short-wave folk seem to be a very friendly crowd, on the whole. Just look up the call-book and call on any amateurs near your new home, and you will be "well away."

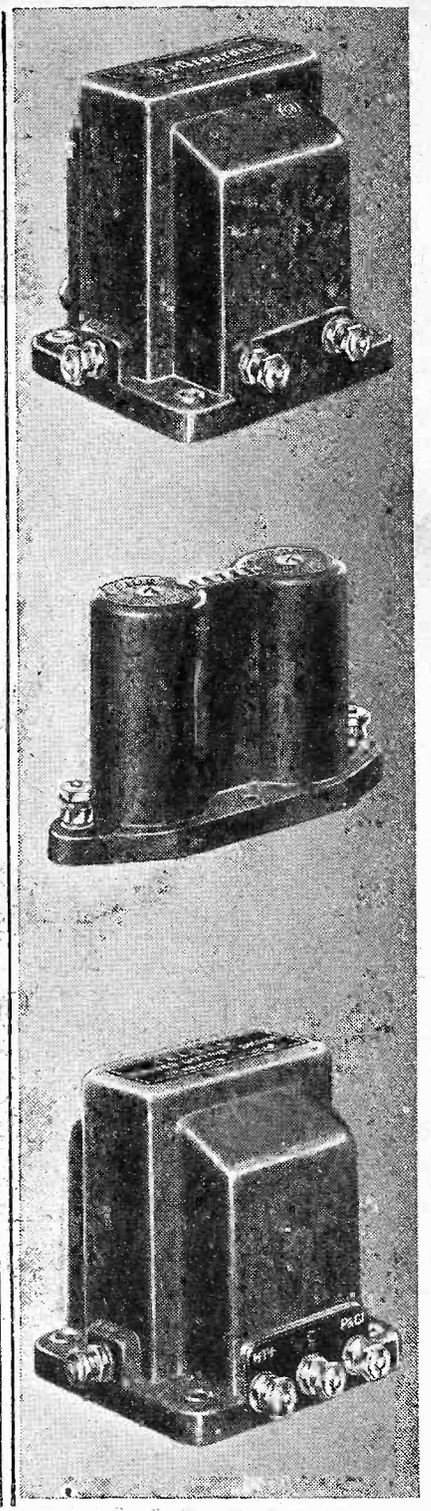


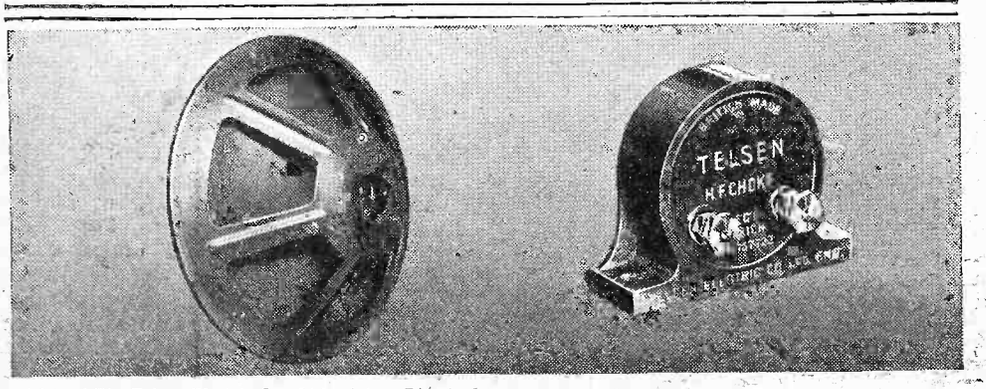
"CHANGING over to Telsen is like taking the wool out of your ears"—that is the verdict of an enthusiastic Telsen constructor which inspired the illustration on the opposite page. Telsen Components in your set give you a realism which is astonishing—they enable you to sit back and **hear,** without straining forward to listen—they bring every item on the programme "nearer, clearer, more lively than before."

L.F. Transformers	from 5/6
Output Transformers	... 12/6
L.F. Chokes	from 5/-
Output Chokes	from 8/-
Binocular H.F. Chokes	... 5/-
Standard H.F. Chokes	... 2/-
Loud-Speaker Chassis	from 5/6
Fixed Condensers	... 6d.
Mansbridge Type Condensers	from 1/6
Valve Holders ...	4-pin 6d., 5-pin 8d.
Grid Leaks	... 9d.
Grid Leak Holder	... 6d.
Fuse Holder	... 6d.
Telsen Screens	2/- and 2/6

TELSEN

100% BRITISH RADIO COMPONENTS





My Amusing Letters from Listeners

BY ALBERT SANDLER

LETTERS from listeners! Letters from listeners! They come in scores by every post, and their reading takes hours, yet read they must be. It is a hard task, although often pleasurable.

Many are letters of appreciation; others are requests for favourite musical pieces: some abuse me, some praise. From all classes of people they come, and from all countries. I have had letters from as far away as India and Africa, thanking me for sending "a breath of England."

They come in all kinds of envelopes, scented, coloured, stained and greasy. Others arrive in wrappers which it would be a courtesy to designate "envelopes" at all. Yet I look forward to all of them, as I say, for not only do they prove that I am appreciated by a public, but some are also highly amusing.

A short time ago, one came from a little girl who, after informing me that she was always allowed to stay up to hear my concerts, timidly went on to ask for a photograph. This was sent, and a few days later there came her reply.

Starting Young!

The young lady could judge from the photograph that I was a nice boy, and would I send her a gold watch? Unfortunately for her hopes, I had to reply that I couldn't give gold watches to everybody. It is amazing how early nowadays gold-digging starts!

On another occasion, when I had played the violin solo "Tambourin Chinois," a lady wrote to me indignantly declaring that she didn't think it fair I should do all the work—and why didn't the orchestra help more?

Offers of marriage come by the score as well as dozens and dozens of begging letters asking for money or help of some kind—although I am married! Naturally, I help where I can, but, being no millionaire, there must be a limit to my generosity.

And as for the "help supplicants," you would be surprised were I to tell you how many musicians think they can fill the Albert Hall if only given the chance. In this respect, I recall a letter from a pianist asking for an audition, to which I agreed.

He certainly played splendidly, but when I asked him to play by ear, and hummed a tune over to him, it was pathetic to witness the puzzled expression of his face. At first, I could not understand it and then I realised—he was stone deaf!

The famous violinist, whose broadcasts from the Park Lane Hotel—and formerly from the Grand Hotel, Eastbourne—have made him so popular with radio audiences, here gives "P.W." readers a diverting peep into his post-bag.

Another musician wrote to thank me for, as she put it, having inspired her. Through listening to me, she said, she had won a scholarship.

An Enthusiastic Violinist.

Personally, I doubt whether I can be as good as all that, even though on top of this there came a similar letter from a second young lady who was an enthusiastic violinist and who declared that I helped, for whenever I played over the wireless, she stood in front of the loudspeaker and kept in time with me. You can't believe everything!

A VALUABLE "STRAD"

Albert Sandler is the fortunate possessor of a very valuable Stradivarius violin.

On the other hand, not all my post-bag is amusing. Some of the letters are very sad indeed. I treasure one from an old lady who said that although she had lost all her sons in the war, my music somehow helped her to bear her troubles more easily.

Not All Amusing.

In similar vein was that from the man who wanted me to play Massenet's "Elegie." "My wife used to play it," he said, "and when you do the same, I seem to see her beside me, smiling and playing. She who died over twenty years ago." To receive a tragic letter such as this can hardly be compensated for by fame itself.

But I should be thankful that listeners content themselves with writing, and rarely attempt to telephone or call on me. If they did, a squad of police would become necessary.

The one exception I can remember was only the other day when a girl rang up and asked in anxious tones if I would play "O Sole Mio" that evening, for it always made her beloved romantic, and she was sure he was on the verge of proposing. I played the piece and soon heard of the engagement.

Naturally, when I receive a request, I always do my best, but I have only a certain amount of time at my disposal and the rendering of a desired item is not always practical.

I am sometimes asked to play at least twenty pieces when I have, at the most, time for only ten. One gentleman sent me seven complete programmes.

"Let's Hope He Understood."

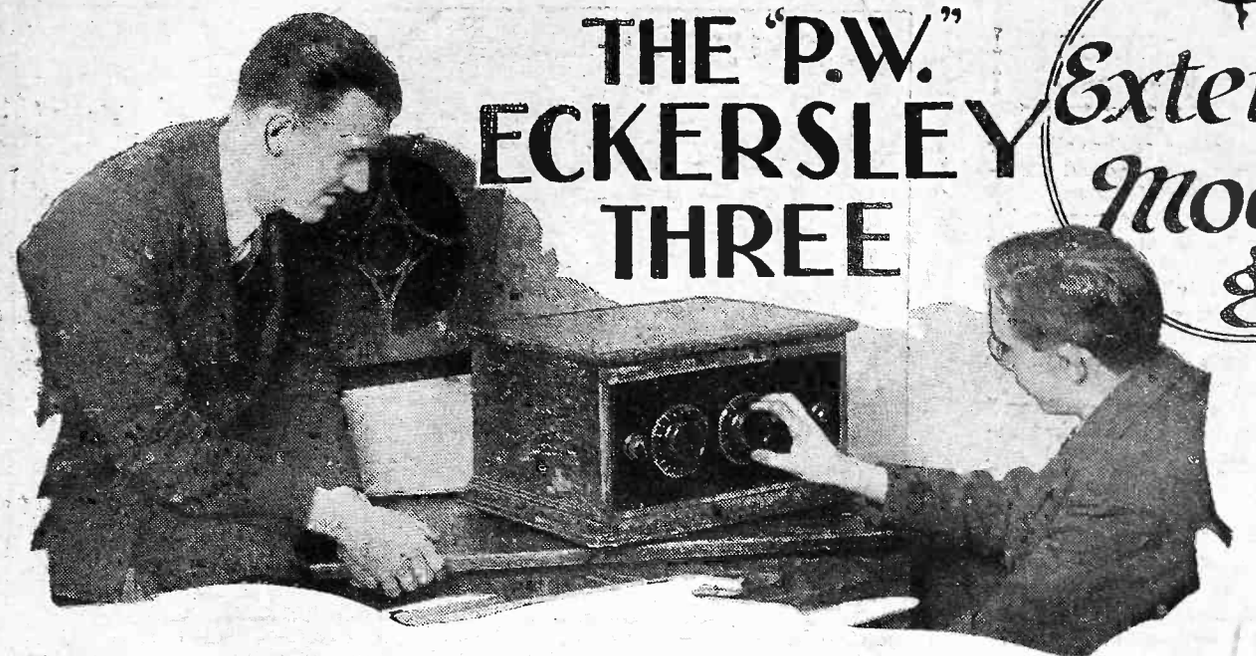
I admit that they were well balanced, but the gentleman had to be content with my choosing from all that lot one item only. Let's hope that he understood my plight, for some people get remarkably vindictive when their wishes are not gratified.

Still, the letters that please me most are those of appreciation. Better these than all those from autograph hunters who want me to return their albums with my name appended and to pay the postage, or any other. And here I must mention Newcastle.

The inhabitants of this city particularly overwhelm me with thanks after I have broadcasted. Why more from them than from any other town? A mystery, I'm afraid, but there it is!

THE "P.W." ECKERSLEY THREE

Extenser Model



First details regarding this up-to-the-minute receiver. Its sensitivity, ease of tuning and wonderful station separating powers will astound you. And it is designed and described by Captain P. P. ECKERSLEY, M.I.E.E.

THEME with variations! But it's all music. Music with this variation; that it's only music and not music and monkey chatter. Monkey chatter is a name for sideband jamming. It has no reference to broadcast talks native or imported. But my tuner cuts out the monkey with very little monkeying. I feel childish—happy New Year! Will it be? Yes, as the advertisements say, because of no need to wear a band pass!

Could Not Be Surpassed.

In my original model of the "P.W." Eckersley Three my main endeavour was to produce a three-valve receiver which for selectivity, volume, and general efficiency could not be surpassed at the price.

But it had switches for wave-changing—two knobs which had to be pushed or pulled according to the wave band required.

Simpler Method.

There exists a much simpler method of control entirely eliminating the use of panel wave-change switches. I am referring, of course, to the "Extenser" scheme so well known to all "P.W." readers.

Therefore, in describing the "Extenser" version of my first model, I do so with the knowledge that there are many readers of "P.W." who prefer to have their wave-changing carried out instantaneously and automatically, and who dislike having to operate two switches whenever they wish to go over from one waveband to another.

The supreme case with which the Extenser enables one to glide noiselessly from medium to long waves and from long to medium waves is altogether delightful.

As before, I have included in this version a useful refinement, viz. a gramophone pick-up, the set thus being a fully-fledged radiogram.

Three Valves for Pick-up.

I was at first undecided whether or not I should insert this jack in the transformer stage, using two valves for gramo, and thus relieving the constructor of the need for volume controlling his gramo. input.

On second thoughts I exercised the prerogative, usually attributed to the female of the species, and placed the jack in the detector stage, my reasons being:

(a) That pick-ups vary in sensitivity and two valves would not give a sufficient "safety factor" to suit all types.

(b) That it is better to have too much magnification and to be able to reduce it to the required degree than to have too little. Also, a volume control of suitable resistance across the average pick-up is useful for cutting out scratch.

So to those to whom the advantages of automatic wave-changing makes its appeal, I would say "go ahead and you will be delighted with the results if you remember":

First, that the existing kilocycle spacing of stations makes *perfect* quality impossible of achievement.

The ideal design would give a substantially even response from, say, 30–10,000 cycles.

But, if you design a receiver for quality and quality only, you get—what?

High Selectivity.

An intolerable background of station interference—side-band jamming, mush, more mush.

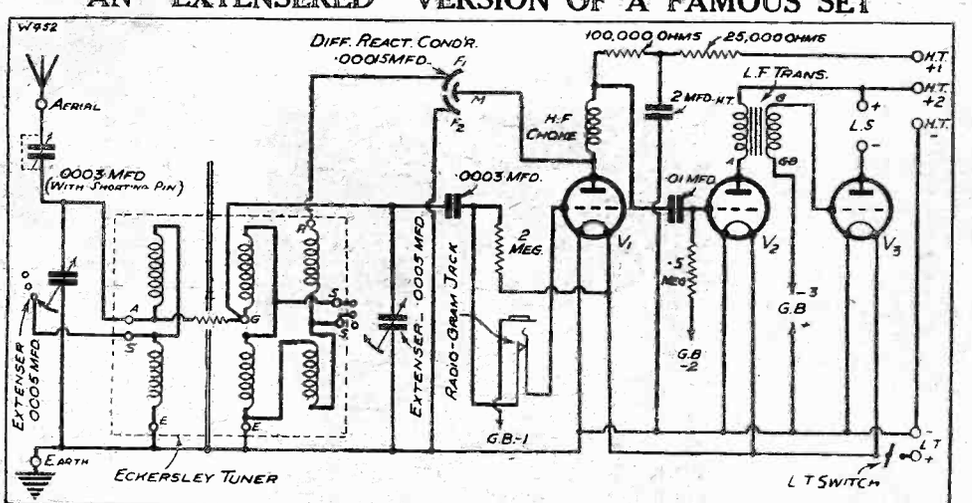
Selectivity we must have and the degree of selectivity must be sufficient to give us the wanted programme absolutely free from the chaos imposed by the present-day spacing of stations in the broadcast wave-band.

It is unfortunate that this freedom from jamming can *only* be gained at the expense of "top." But you *can't* have it both ways. If you have the "top stuff" you have *got* to have the "*jammers*," too.

Surely it is better to lose some of the top frequencies for the sake of clearness. We have all listened on the 200–500 metre

(*Continued on next page.*)

AN "EXTENSERED" VERSION OF A FAMOUS SET



A novel circuit which will amaze you by its efficiency and selectivity. It is designed around the Eckersley Tuner, that ingenious component which makes absolute child's play of station separation, and it is fully extensered.

THE "P.W." ECKERSLEY THREE

(*Continued from previous page.*)

band at some time or other, and we all know what many of the stations sound like—ouch! I know which I prefer.

My tuner gives you all the permissible "top" together with an amazing absence of background mush.

And with this selectivity there is a remarkably high sensitivity—a sensitivity of an order far greater than the usual run of selective circuits, including, of course, the average band-pass device.

Now, my remarks concerning "top" cut off may lead you to suspect that the output from my tuner is "boomy" and muffled. Nothing of the kind. You will be surprised at the general brightness of music and the crispness of speech.

Construction is Very Simple.

The construction of the Extenser version is a very simple task calling for no special skill. The components can be purchased as a complete kit by those who are out for the utmost simplicity, and in these cases the panel is supplied ready drilled.

Thus, the kit-buyer has only to mount the parts on the drilled panel, screw down the remaining components on the baseboard and then wire up from my wiring diagram.

There are others, possibly, who will already possess some of the components mentioned in the list, and who may only need the tuner and perhaps the two Extensers to complete the equipment.

Their task is equally easy and the necessary dimensions for drilling the panel are given on the "panel lay-out" diagram.

Now, before I proceed to give details for building, I would like to say something about the circuit itself.

The Series Aerial Condenser.

The aerial is connected direct to a series aerial condenser, and I have chosen for this position one of those compact solid dielectric jobs which have a "shorting" strip. The "shorting" strip doesn't function until the moving vanes are fully engaged or disengaged. Then it makes contact between the two sets of vanes and so cuts the control out of circuit.

A neat scheme! The idea is this. The aerial side of the tuner is directly in the aerial circuit and in consequence the aerial load is applied across this section of the unit. If you connect the aerial turns "bang" in the aerial circuit you can't tune down to stations like the London National.

If, on the other hand, you arrange the aerial turns so as to tune the National you come up against a "snag" at the upper end of the waveband.

You won't be able to tune up to say 500 metres (that is, with standard tuning capacities of ·0005 mfd.).

A Valuable Control.

But if you insert a variable condenser in the aerial circuit you can vary the aerial coupling and so cover the wave-band with ease.

Moreover, when listening to a station like the North Regional, you can have practically full aerial coupling with a consequent gain in volume.

I have placed this series condenser on the panel for convenience, because it is a valuable control as you will find when you operate the set.

The tuner is, of course, quite standard with the exception that the appropriate terminals are joined to Extenser self-changing contacts instead of to switches.

The action of the tuner has been dealt with in preceding articles, and I do not propose to take up space in recapitulation.

Connections for Wave-Changing.

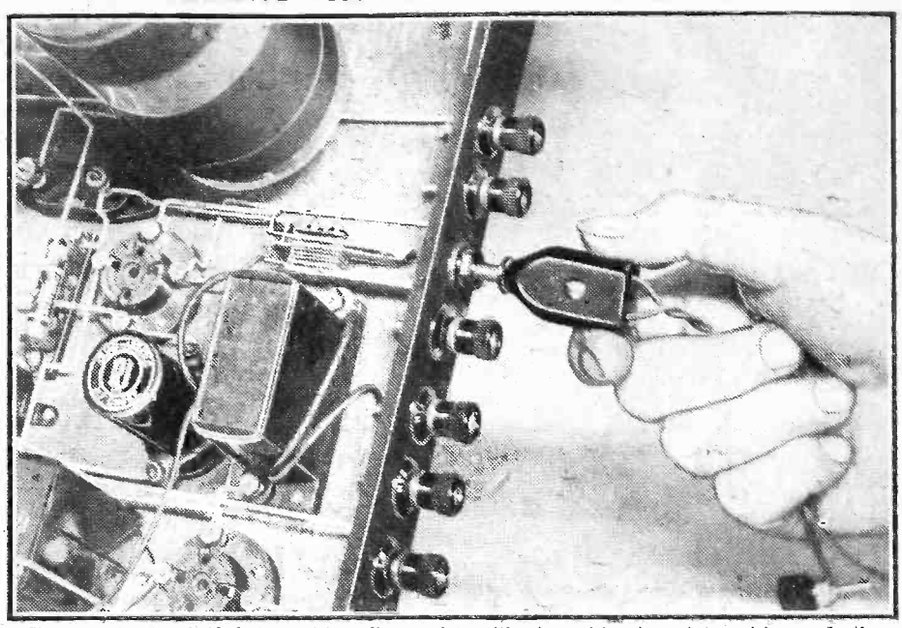
The simplicity of the wave-changing can be seen from the wiring diagram—the first Extenser needing only one connection to the self-changer contacts and the second Extenser two.

The terminals in question are marked "S" on the tuner.

The remainder of the circuit is a perfectly straightforward grid-leak rectifier followed by two (resistance and transformer) L.F. stages.

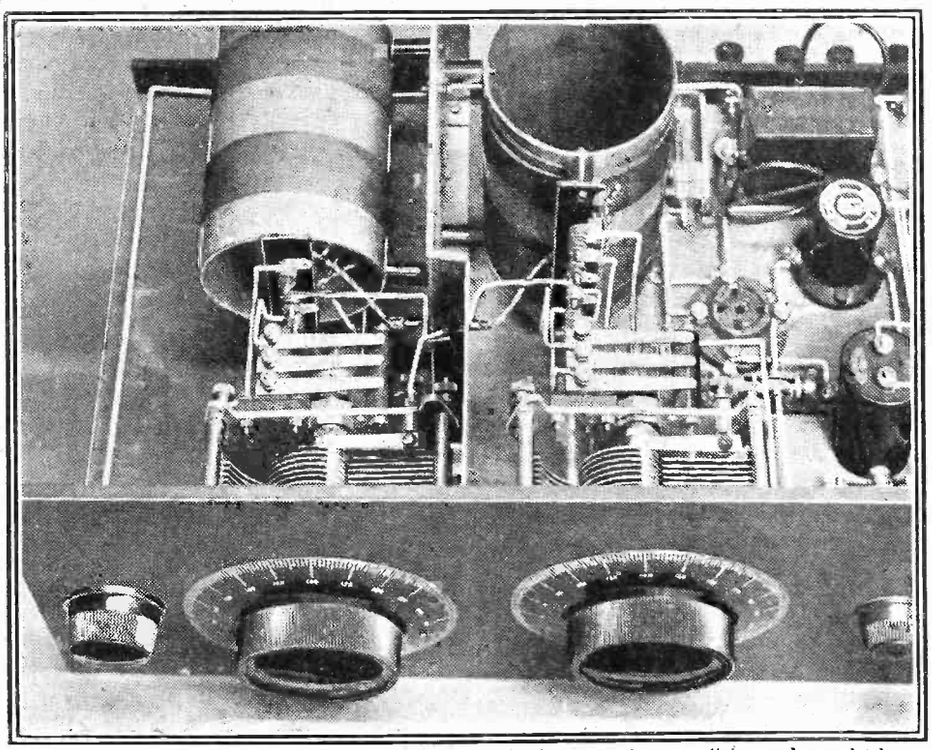
And that's that!

MAKING PROVISION FOR A PICK-UP



Many constructors hold that no set is really complete without provision for using a pick-up. In the "Eckersley" Three this point has not been overlooked, and a plug is provided for this purpose on the back terminal strip.

FROM WAVE-BAND TO WAVE-BAND AUTOMATICALLY



The use of Extensers for tuning eliminates the necessity for wave-change switches, and completely does away with the confusion caused by the same dial reading indicating two different wavelengths. With the Extenser, two-figure dial readings represent medium waves, and three-figure readings long waves. The change from one wave-band to another is carried out automatically by the self-changer contacts, which can be seen mounted near the Extenser shafts.

THE MIRROR OF THE B.B.C. By O.H.M.

B.B.C. OFFICIALS TO VISIT AMERICA?

THE RISE OF JACK WATT—MORNING SERVICES—NEWS FOR THE EMPIRE—THE WEST REGIONAL STATION—THOSE TALKS.

I HEAR there are good prospects of both the Chief Engineer (Mr. Noel Ashbridge) and the Director of Programmes (Roger Eckersley) going to America this summer. Possibly it is the development of foreign relays; anyway, something has stirred up the B.B.C. about travelling.

I heard the other day of a youthful member of the Productions Department going to Germany in quest of new ideas and methods. This seemed to me admirable and the only surprising thing about it is that it had not been thought of before.

The Rise of Jack Watt.

The rise of Jack Watt, the brilliant young dramatic producer on the B.B.C. staff, was accurately foretold in this column. His work has been of the very highest order and he possesses the decisive advantage of unremitting diligence superimposed upon undoubted genius.

When, less than two days before Christmas, the Empire Programme was cancelled, it was at once immediately apparent that something really big would have to be done. And while others were fruitlessly pondering the problem, Jack Watt volunteered to handle the job properly, even in the limited time given to him. He worked continuously for 48 hours. The show he produced more than fulfilled his promise.

Morning Services.

The popularity of the week-day morning religious services is beyond dispute. This programme feature was originated about five years ago by the Rev. Hugh K. Johnston (Senior Curate at St. Martin-in-the-Fields).

He has developed it with consistent simplicity and directness of purpose. Now, however, he has left St. Martin's, to become Vicar of Cranleigh, near Guildford. This creates a problem of some difficulty. On the one hand, Mr. Johnston naturally wishes to continue in general control of the remarkable work which he has founded.

On the other hand, the B.B.C. has doubts about the desirability of the kind of remote control which this would entail. Listeners generally are hoping that some arrangement will be made to render possible the continuance of real connection between Mr. Johnston and the morning service.

The most sensible idea I have heard is for a working partnership between Mr. Johnston and Mr. McCormick, who is still in charge at St. Martin's. It is believed that Mr. Johnston would find it convenient to take the service two or three times a week; if this is so, then his former chief might be prevailed upon to take the other mornings.

News for the Empire.

The inclusion of news in the G 5 S W transmissions is belated. Listeners overseas have been agitating for years against the curious state of affairs, which gave them nearly everything except what they really wanted, that is, day to day news of the homeland.

The real obstacle has been the attitude of press interests in the Dominions and Colonies. When the matter was raised first, some three years ago, these interests took serious umbrage at the suggestion and it has only been steadily growing pressure of outraged public opinion that has finally worked the change.

The West Regional Station.

In the B.B.C. announcement of the granting of the contract for the erection of the West Regional Station at Washford Cross, near Watchett, Somerset, there was a significant reference to the intention to use stone which would harmonise with the surrounding country.

There is behind this a story of keen local interest. When it was first rumoured that the B.B.C. proposed to build a station in the Watchett area, much alarm was felt throughout Somerset that one of its most beautiful countrysides would be desecrated by an ugly building. The B.B.C. has met the situation by consulting local artistic opinion, and by promising to do no damage to existing amenities.

Those Talks.

Say what you will about the dullness of the broadcast talks, and how much you yourselves dislike them, we are still, in 1932, confronted with the irrefutable evidence that talks—and even worse, in the opinions of those who shout the loudest, broadcast adult education—are increasing in popularity, and are undoubtedly as important parts of the B.B.C. work as anything which goes on.

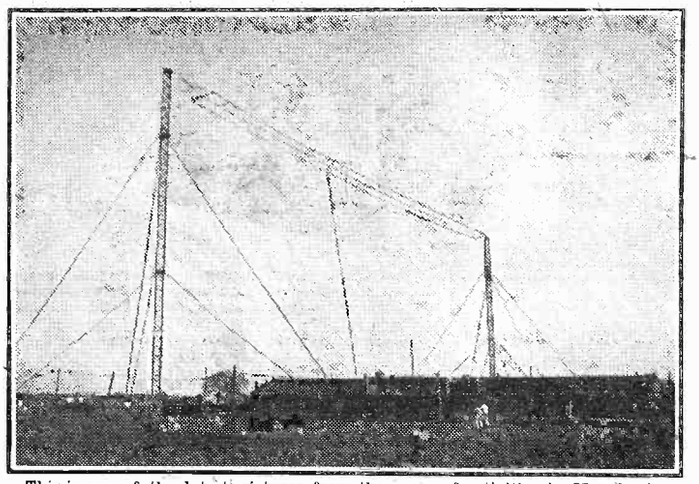
Often in the past my notes have included a paragraph giving details of the continued development of broadcast adult education and group listening in one or other of the different regions. This week news comes to me of a particularly interesting social experiment which is being made in Yorkshire in connection with the morning talks at 10.45 a.m.

Yorkshire is a county which, unfortunately, has more than its share of unemployment.

This fact is well-known to the Yorkshire Area Council for Broadcast Adult Education, which is endeavouring to bring together listeners in various localities who will not only listen to the morning talks, but who will also discuss the subjects dealt with.

A lead has been given in Middlesbrough and in York, where the Unemployment Social Committees are organising listening groups. A room in which a receiving set is installed is provided, and a leader is also present to direct the discussion.

ON THE MANCHURIAN FRONT



This is one of the latest pictures from the scene of activities in Manchuria, and shows the Tsitsihar wireless station, which was occupied by the Japanese troops.

THE LISTENER'S NOTEBOOK

A Rapid Review of Recent Programmes.

WELL, what did you think of "Eric, or Little by Little"? It was certainly carried through at quick-fire speed, and it held my attention throughout.

I suppose that, as a radio play, it could be considered a success, though I would like to hear what Mr. Du Garde Peach has to say about this. It certainly fulfilled the conditions of a radio play, according to the rules laid down by Mr. Peach. "Eric" had a story to tell, and it had an idea behind it.

* * *

Held as my attention was, I must confess, however, that I was often guilty of what is called in the theatre, I believe, "unseasonable laughter." In the tensest moments I giggled. Even when Edwin, after the amputation of his leg, gave way to a heart-rending soliloquy on gathering primroses and other "dear flowers," I giggled.

Even when I knew that Edwin's brain and intellect were permanently affected, I giggled. In Eric's moments of temptation, and in the consequent agonised outpourings of his conscience-stricken youth, I giggled. And I must say I couldn't help it!

Let me add that I wasn't hysterical, nor could my giggling be attributed to any of the other causes which are supposed to produce this "unseasonable laughter."

The fact is "Eric" is not of this age, and sloppy sentimentality and priggishness, so characteristic of the play, far from moving

(*Continued on page* 1103.)

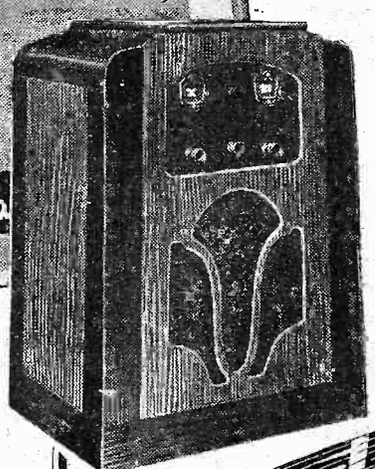
Free—

Ask your radio dealer for your Free Copy of the Meteor III Folder, which includes Full-Size Plan and Wiring Diagram with complete building instructions. You can build the Meteor III in an hour or so—the most fascinating radio set ever designed. It gives world-wide reception on ALL WAVE-LENGTHS—Long, Medium and *Ultra-Short*. In addition, with pick-up connected, the Meteor becomes an electrical reproducer of gramophone records at a flick of the radio-gram switch.

Wonderfully selective and sensitive—big volume—delightful quality—equal in appearance to a 15-guinea model—at a price you can easily afford.

No longer is there any need for you to use a separate receiver for Ultra-Short-Wave Reception of America, Australia, Africa and other far-distant stations. The Meteor fulfils every ideal of the radio enthusiast and the ordinary listener.

Designed by G. P. Kendall, B.Sc.



METEOR III

METEOR III KIT

Complete Kit of Components

75/-

or **9**/- down and 7 monthly payments of **10/6**

METEOR III STANDARD CABINET MODEL

(Complete Kit of components and cabinet to house set only)

89/6

or **11**/- down and 8 monthly payments of **11**/-

METEOR III CONSOLETTE CABINET MODEL

(Complete Kit of components and cabinet, as illustrated, to house set, speaker, and batteries—equal in appearance to a 15-guinea model)

£5.0.0

or **11**/- down and 9 monthly payments of **11**/-

Choice of Recommended Accessories

Mullard Valves
1—P.M.2 DX .. 8 6
1—P.M.1 L.F. .. 8 6
1—P.M.2 .. 10 6

Batteries
Pertrix 120 v. Super capacity 1 5 6
or
Pertrix 120 v. Standard .. 15 6
or
Ever Ready 120 v. Popular Power .. 1 4 0
Pertrix 9 v. G.B. 1 6
or
Ever Ready 9 v. G.B. 1 0

Accumulators
Fuller 2 v. 20 amp. type S.W.X.H.5 .. 8 3
or
Pertrix 2 v. 20 amp. type P.X.C.2 .. 9 0

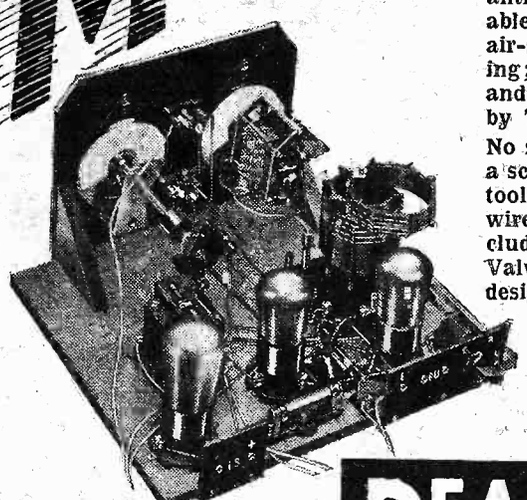
Loudspeaker Chassis
R. & A. type 40 Reproducer 16 6
or
Celestion Chassis type M.12 .. 1 15 0
or
Blue Spot Special chassis & 66 K. Unit .. 1 12 6

Gramophone Pick-Up
B.T.H. Minor .. 1 7 6
or
B.T.H. Senior .. 2 5 0

Volume Control
ReadiRad 5 meg. 5 9

Gramophone Motors
Collaro Type B.30 with Unit Plate and Automatic Stop 1 13 0

ALL BRITISH



Note these special features of the Meteor: 18 to 1 Slow Motion Control on both tuning and reaction; Extended anti-capacity reaction drive; Adjustable selectivity; Kendall loose-coupled air-spaced coils; Radio-Gram Switching; R.I. Transformer; Graham Farish and Lewcos Resistances; Condensers by T.C.C.

No soldering, no cutting, no drilling—a screwdriver and pliers are the only tools you need. All the necessary wires, flex, screws, plugs, etc., are included in the Meteor Kit. Mullard Valves are recommended by the designer.

Daily demonstrations of this wonder receiver at the Ready Radio Showrooms: 159, Borough High Street, London Bridge, S.E.1

(2 minutes from London Bridge Station).

Ask your radio dealer for your Meteor Folder. If he is out of stock, post coupon now to:—Ready Radio Ltd., Eastnor House, Blackheath, S.E.3. If you also enclose four 1½d. stamps we will send you Mr. Kendall's latest book entitled "Ten Hows for Modern Radio Constructors." Packed full of useful information.

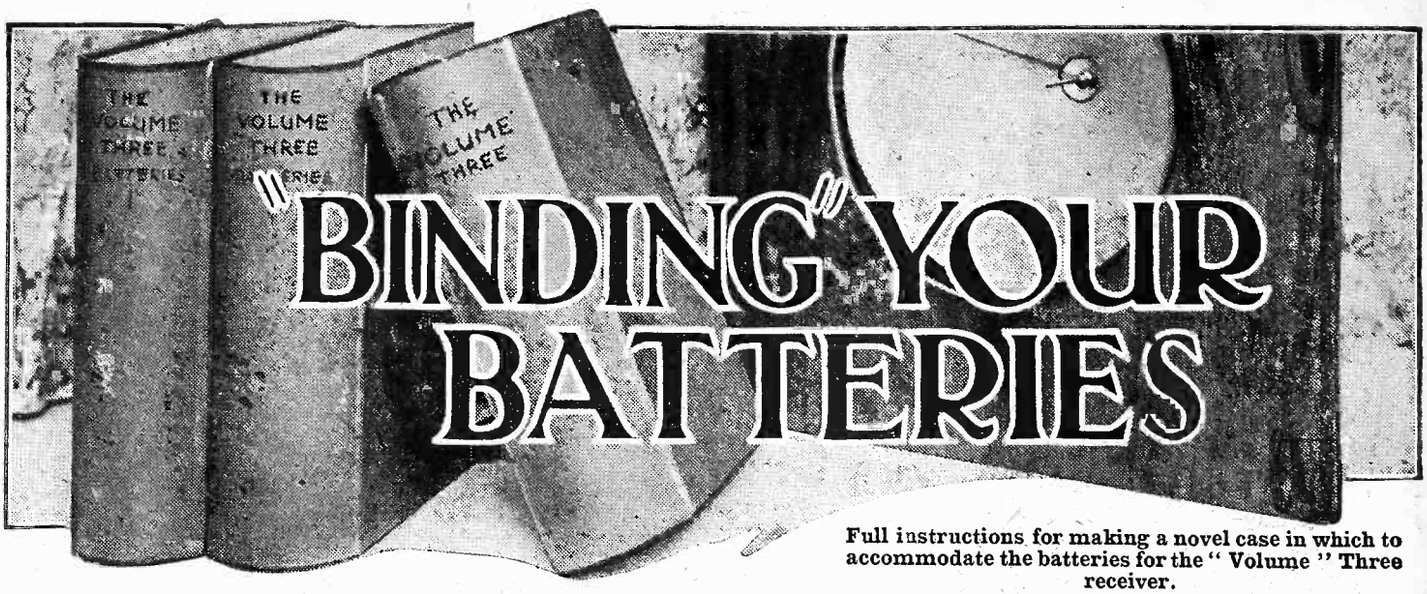
READY RADIO

Name.....

Address.....

.....

P.W. 16/1/32. **BLOCK LETTERS—IN INK—PLEASE.**



"BINDING" YOUR BATTERIES

Full instructions for making a novel case in which to accommodate the batteries for the "Volume" Three receiver.

By S. GASSMAN.

MANY of you are no doubt familiar with that little receiver recently described in "P.W.," the "Volume" Three. You may remember that it was suggested that you should place it among your books on your bookshelf with your batteries hidden from sight. A description of a battery number for it was also promised.

Will Suit Many Sets.

If you haven't built the "Volume" Three, there is no reason why you shouldn't construct this battery case as an addition to your existing receiver, assuming that it is a battery set. You can hide your batteries inside the two interesting looking volumes, then place them by the side of your set and so lend it an academic distinction!

Then, again, should you have a mains unit or H.T. battery of large dimensions, then modify or add to this battery case. You will find that it will accommodate most of the popular sizes of H.T. and G.B. batteries and a fairly large accumulator. The actual space inside is 10 in. by 6½ in.

It will be seen from the photographs and diagrams that the battery case is just two volumes permanently fixed together.

The case is made of ¼-in. wood throughout, whilst the curved front is of copper sheet, the whole being finally covered with coloured paper or cloth.

The Wood Required.

The sizes of wood required are two pieces which are the sides of the case, both 11 in. by 8 in., and a top and bottom, both 6½ in. by 9 in. The copper foil measures 11 in. by 9¼ in., and is of gauge number 22.

In the diagram of the curved top the dotted line nearest the curved front indicates the positions of the front edges of the two sides. The other dotted line, ¼ in. behind, is the line on which the compass point is placed when making out the two arcs of 1⅝ in. radius.

Having cut the sides and top and bottom to size, they are then screwed together, as shown in the diagrams.

This screwing operation requires 1 dozen ½-in. countersunk wood screws. The screw-holes should be well countersunk.

The metal front is made of two pieces of copper sheet, 11 in. by 4⅝ in. This sheet is thin enough to be cut with a large pair of scissors, whilst the screw-holes are easily drilled or pierced. The screw-holes here again should be well countersunk.

There are three at either end of both strips of foil, and they are equally spaced, their centres being 3/16 in. from the irrespective ends.

The last constructional operation on the *framework* of the double volume is to bend the pieces of copper sheet to conform with the curved front and then to screw them to the case. A dozen wood screws of the same size as before are again required.

The case should now have some semblance to the two volumes it is eventually to become.

Choose a Suitable Colour.

The choice of the covering material now requires our consideration. If you have built the "Volume" Three, then the covering will probably be the same. If you haven't, then the choice of the colour will most likely depend upon the colour of your existing books, furniture, or radio set. As to the material, either paper or cloth will do. The "Volume" Three and this battery case were actually covered with red paper.

Two sheets of covering material are required, and they both measure 12 in. by 13 in. A sheet of covering is laid on one of the sides of the cases with one of its 12-in. edges along the edge of the line down the centre of the curved front.

The covering overlaps ½ in. along the top and bottom edges of the case, whilst the piece overlapping the back edge will cover the ¼ in. thick edge. The material is then ready to be stuck down with seccotine or glue.

It is necessary, when glueing the over-lapping curved portion, to cut it along its edge every ½ in. or so. This allows the covering to fold down so that it is easily glued. The over-lapping pieces along the various edges should also be glued, and any surplus covering cut off.

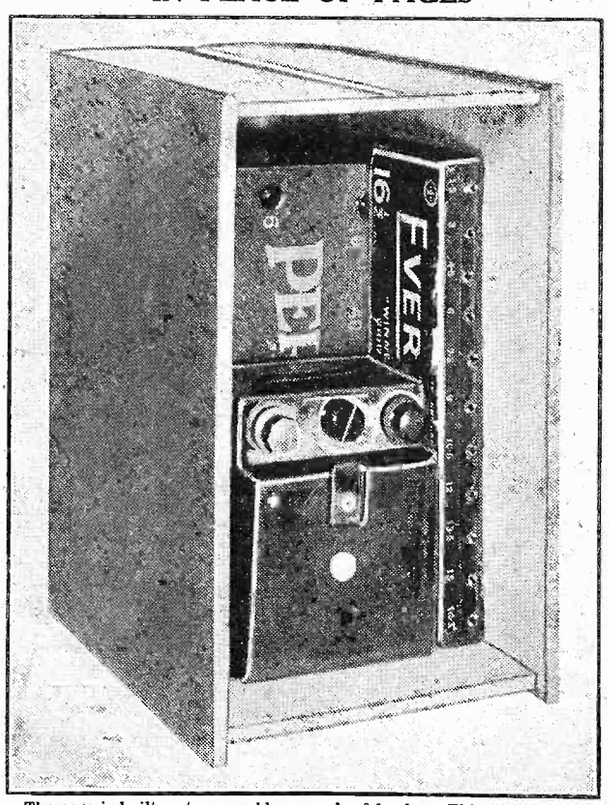
Putting in the "Leaves."

One volume is now nearly completed and the same operations should be repeated on the other half of the case.

Having done this, the pleasant task of building these two volumes is almost finished. There remains but the closely ruled sheet of paper representing the leaves of the book, as seen in a plan view, and the two dummy edges along the centre of the top.

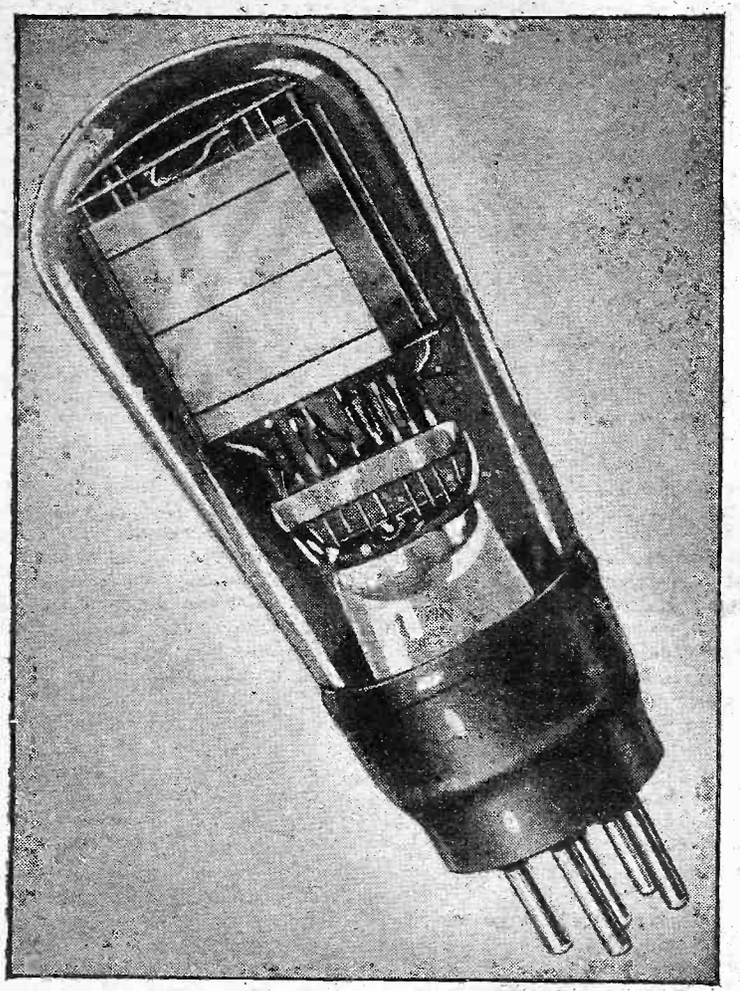
(*Continued on page* 1094).

IN PLACE OF PAGES



The case is built up to resemble a couple of books. This view shows very clearly how the batteries are accommodated.

THE NEW LOW CONSUMPTION HIGH EFFICIENCY PENTODES



★FOR THE MAN WHO USES BATTERIES

PEN 220

Here is the solution to the output stage problem in battery operated receivers. The Mazda Pen 220 gives an astonishingly high undistorted output for an anode current of only 5 m/a. It is the ideal output valve for portables.

PRICE 20/-

★FOR THE MAN WHO HAS AN ELIMINATOR

PEN 220A

A valve which delivers a huge undistorted power output for an anode current of not more than 18 m/a, the Pen 220A needs only 150 volts on the anode and can be made to give excellent results with 120 volts and a current of only 12 m/a. It is undoubtedly the valve for the man who wants really magnificent volume for the operation of large moving coil speakers.

PRICE 20/-

The amazing

MAZDA THE BRITISH VALVES

EDISWAN RADIO

The Edison Swan Electric Co. Ltd. (AEI Associated Electrical Industries Ltd.) 155 Charing Cross Rd., London, W.C.2

V.147

"BINDING" YOUR BATTERIES

(*Continued from page 1092.*)

Our next job, then, is to cut a sheet of note-paper 9 in. by 6½ in. and to rule it along its length with a finely-pointed pencil, the lines almost touching one another. This little job requires a fair amount of patience, but the results eventually obtained are well worth it.

This sheet of ruled paper is to be cut to the size and shape of the top. The necessary dimensions are given in one of the diagrams. It is then ready to be glued.

Smoothing the Paper.

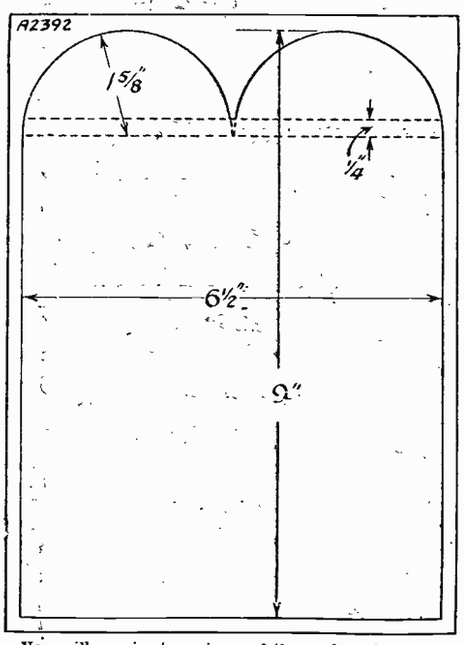
Should this sheet of paper refuse to lie flat, that is, should it have a number of air-bubbles beneath it, then a good remedy is to pierce these bubbles with a pin or needle, finally rubbing the surface gently with a handkerchief, so expelling the air.

The dummy edges along the centre of the top side can be made of a strip of cardboard or wood about 8 in. long, ½ in. wide and ¼ in. thick. This is covered with a spare piece of covering and then glued to the top, along its centre. An ink-line down the middle of this strip will give the illusion of the two inside edges of the twin volumes.

These operations may, if you wish, be repeated on the bottom.

This completes the necessary details for building this novel battery case, and with the assistance of the photographs and diagrams it should offer no difficulties.

FOR TOP AND BOTTOM



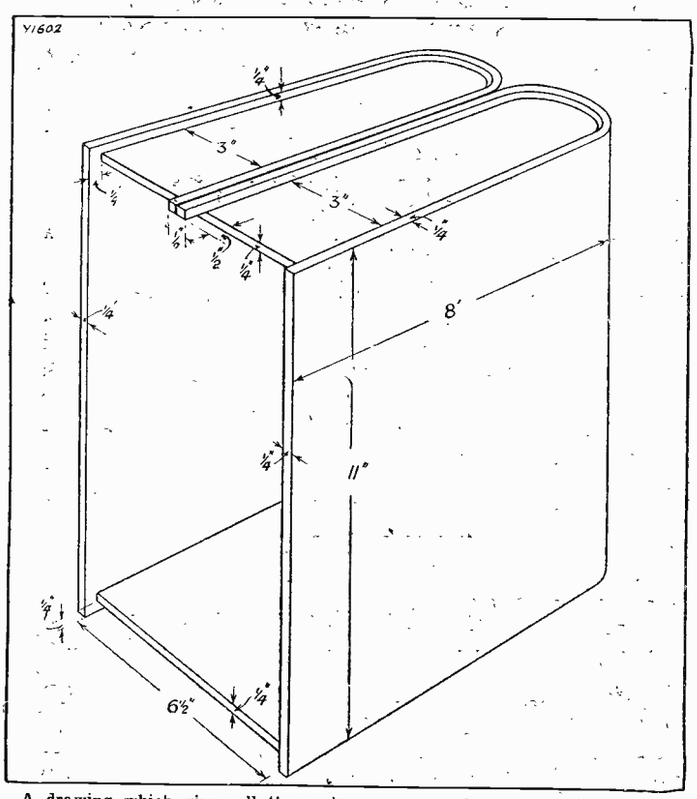
You will require two pieces of three-ply cut to the shape and size illustrated above. These will form the top and bottom.

Packing in the Batteries.

The way in which the batteries are packed in depends upon the batteries themselves. In the photo on the first page of this article a portable non-spillable type of accumulator is shown, but there is ample room for one of the normal type.

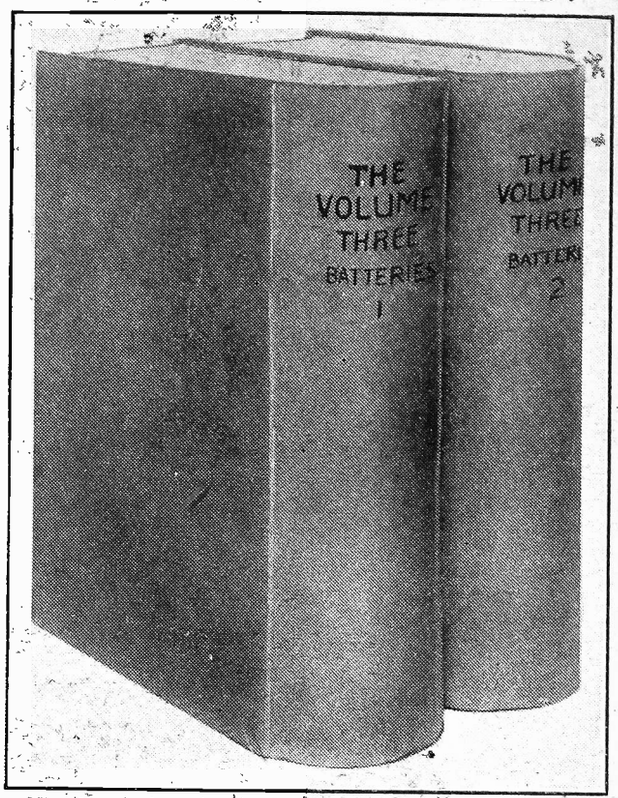
This battery case will shortly be followed by a loud-speaker in volume form which will complete this novel "book" series of radio set and accessories.

ALL THE MAIN MEASUREMENTS



A drawing which gives all the main measurements necessary for making this unusual battery container.

TWO BOOKS ABOUT BATTERIES!



After the actual construction has been completed the "Volumes" are covered with coloured paper or thin cloth. If the work is carried out carefully the result is very effective.

CHARGING FROM A CAR

How small accumulators can be economically charged.

NOT many owners of motor-cars seem to make use of the battery in their car for charging their small wireless accumulators, but this provides an extremely economical, as well as simple, means of keeping cells up to scratch, so long as they are not too large.

Many cars are fitted with a 12-volt accumulator, and, by connecting the one used for wireless in series with a lamp, which will pass the correct amount of current, across the supply, it may be charged efficiently and cheaply.

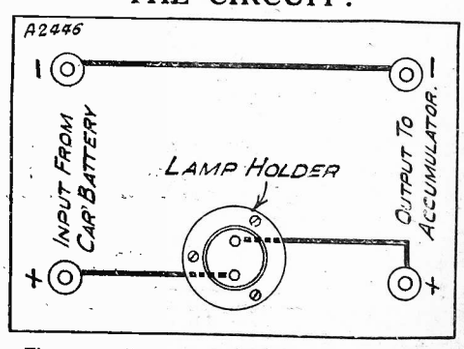
A charging board should first be made by mounting a batten lamp socket on a small piece of wood between two pairs of terminals and wiring these up as shown in the diagram.

Care must be taken not to allow the leads to touch. If there is already an ammeter on the facia-board of the car, it will not be necessary to provide another to ascertain the charging rate of the accumulator. This will be about 2 amps. with a 24-watt lamp, and about 3 amps. with a 36-watt lamp.

If the car battery is a 6-volt one, and a good deal of daylight driving is done, the best plan is to get an exactly similar one for the wireless supply and to use them alternately, so that the dynamo is charging each while it is being used for lighting the car lamps.

R. C. F.

THE CIRCUIT!



The connections are as simple as can be, only three wires in all being required.

All Editorial communications should be addressed to the Editor, POPULAR WIRELESS, Tallis House, Tallis Street, London, E.C.4.

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

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

QUESTIONS AND ANSWERS

"GOOD-NIGHT" FROM ROME.

P. D. (Charlton).—"I have become very interested in the young lady who announces the Rome programmes with such beautiful clearness—or are there two lady announcers at Rome? My wife suggests that one of them (if there are two) belongs to Naples, as seems likely when the programme is generally "Roma-Napoli.'

"Can you tell me what the Italian words mean which she uses after the final martial air has been played at the close of the programmes?"

There *are* two lady announcers at the Rome station, as well as one male announcer. It is hoped to publish an account of Rome's announcing staff, with photographs, in "P.W." shortly, so you should look out for that.

The "martial air" you refer to is really two—the Royal Italian March and the Fascisti Hymn.

The announcement is equivalent to "That is the end of the programme. Good-night, everybody." The Italian words used are "Fine della transmissione. Signori, Buona Notte."

In English they sound like "Fe-nay lá trans-missy-o-knee. Signori, Bu-onna Not-te."

THE WORLD'S SHORTEST BROADCASTING WAVE-LENGTH.

"LOW-DOWN" (Nr. Belfast).—"I notice that the official list gives Nancy, in France, as the station that uses the shortest wave-length in Europe. I recently thought I heard telephony much lower down than this.

"What is supposed to be the shortest broadcasting wave-length?"

It is difficult to say now that ultra-short-wave experiments are being carried out in many countries.

There are at least three other stations using the same wave-length as Nancy, viz. Sydney, N.S.W. (V K 2 M E), Kootwijk, Holland, P C P, and St. Assize, France. Below this quite a number of stations broadcast more or less regularly, as under:

Metres.		
15·45	.. .. ..	St. Assize, France.
15·3	.. .. ..	Nauen, Germany.
15·2	.. .. ..	Madrid, Spain.
15·14	.. .. ..	Deal, N.J.
15·12	.. .. ..	St. Assize, France.
15·07	.. .. ..	Buenos Aires, Argentina.
15·04	.. .. ..	Nauen, Germany.
14·97	.. .. ..	,, ,,
14·65	.. .. ..	Malabar, Java.
14·49	.. .. ..	Buenos Aires, Argentina.
14·3	.. .. ..	,, ,,
14·3	.. .. ..	Ocean Township, N.J.
14·28	.. .. ..	Podebrady, Czechoslovakia.
14·06	.. .. ..	Nauen, Germany.
14·00	.. .. ..	Ocean Township, N.J.
7·85	.. .. ..	Amsterdam, Holland.
7·05	.. .. ..	Berlin, Germany.
5·8	.. .. ..	Moscow, Russia.

SIMILAR TYPES OF VALVES.

G. N. (Brixton Hill, S.W.).—"The last one was an M.H.L.4, and the only A.C. valve I now have is a D.W.1508. Will that do in the same valve holder, without any alterations to the set?"

Yes, the valves are of similar types, and no re-wiring will be necessary.

USING A RESISTANCE INSTEAD OF A CHOKE.

R. O. (Fleet).—"Trying to discover the cause of a very irritating crackle and sometimes complete stoppage of the programme I noticed that the bottom terminal of the H.F. choke appeared to be quite loose. I undid the H.T. negative plug from the battery and then gently inserted a screwdriver, but alas it kept turning and turning, the nut, apparently, having become loose underneath the choke.

"In the end I gave up trying to tighten it more, replaced the H.T. negative lead and switched on. Nothing doing!

"At first I was afraid I had damaged something. But feeling pretty sure that 'P.W.'s' advice to take out the H.T. negative plug before alterations to the set were carried out was a safeguard, I came to the conclusion that perhaps I had now busted the choke!

"This seemed all the more likely because when H.T.+$_2$ plug was taken out of battery I got a strong click. But when H.T.+$_1$ (to choke and detector valve) was moved it made no sound.

"After thinking it over a bit I remembered I had a high resistance "spaghetti" on hand, and that such a resistance has sometimes been used instead of an H.F. choke. So I tried it.

"Pulled out the choke altogether, put in the spaghetti in its place, and switched on. It went grand!

"I think it is even better than before, and all the annoying crackle is gone. But to get good reaction I now need H.T.+$_1$ on 98 volts, whereas before I used to run it from 75.

"Is that doing any harm, or will it be all right if I leave the spaghetti in instead of the choke?"

Leave it by all means, as the arrangement is proving satisfactory. The fact that you need extra voltage on H.T.+$_1$ is only to be expected, and you will not find your battery run down any faster, or any troubles of that kind.

THE ECKERSLEY TUNER.

"RESISTANCE" (Crouch End, London, N.).—"What is the value of the coupling resistance that goes through the screen in the new Eckersley Tuner?"

The value is 100,000 ohms.

USING THE "POP-VOX" FOUR WITHOUT EXTENSERS.

H. S. S. (Huddersfield.)—"I am so struck with the simplified tuning of the 'Pop-Vox' Four that I want to take my Extensers out of it to use again in my latest set. That is, providing I need not scrap the 'P.V.' Four!

"What I want to do is to pass it on to a friend, and he is quite willing to take it on without Extensers if he can use wo ordinary variables for tuning, that he has on hand.

"His idea is that I ought to be able to keep the Extensers and put his variables in their place, with a couple of switches to push in or pull out for changing between long and medium waves.

"Can this be done, and if so please give wiring in words, as I prefer to work 'from the book' instead of a sketch?

(*Continued on page* 1098.)

TECHNICAL TWISTERS

No. 96. TRANSFORMERS.

CAN YOU FILL IN THE MISSING LETTERS?

Transformers that are used preceding the detector are called . . . . . transformers.

* * *

Such a "transformer" can consist of a pair of . . . . . coils, or can be two . . . . . on a coil unit, one acting as primary and the adjacent one as secondary.

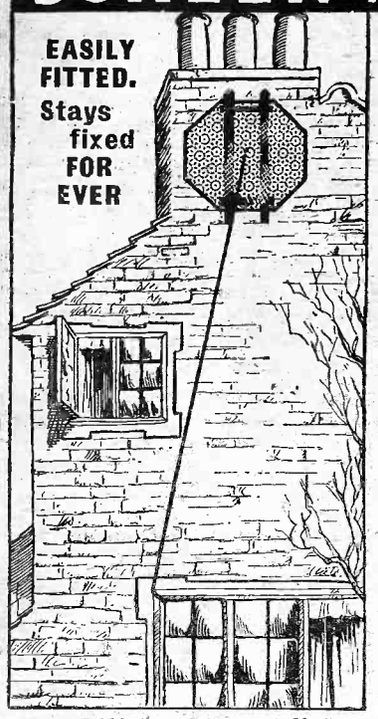
* * *

In these cases the principle is fundamentally the same as that of an L.F. transformer, but there are wide differences between H.F. and L.F. transformers, the latter, for instance, having a metal . . . .

L.F. transformers also have a great number of turns of wire in each winding, and this and the . . . . cause them to be very heavy compared with an H.F. transformer.

Last week's missing words (in order) were: Magnetic, Current, Voltage, Primary, Secondary, Primary, More, Secondary, Primary, Fewer, Secondary.

ELECTRON SCREEN AERIAL



EASILY FITTED. Stays fixed FOR EVER

ABOLISH THAT OLD MAST!

THIS wonderful new aerial is scientifically designed to give greater selectivity and Volume.

No more unsightly masts are necessary—the Electron Screen Aerial can be easily fixed to a chimney or any high part of the house. Very satisfactory results can be obtained by fixing this aerial inside the loft or attic.

Each outfit is supplied with 4 large galvanised nails. There is no more fear of your mast being blown down by gales. Once fixed, the Screen Aerial is permanent. Four rubber buffers are attached to the solid wooden frame ensuring perfect insulation.

From your dealer or direct from Electron Works, EAST HAM.

Price **15/-** *Carriage 9d.*

For your "lead-in" always use

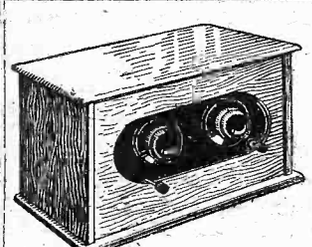
SUPERIAL 75 ft. 2/6

100 ft. - - 3/6 50 ft. - - 1/9 25 ft. - - 1/-

No brackets, lead-in tubes or insulators necessary.

The NEW LONDON ELECTRON WORKS Ltd.

Telephone: Grangewood 1408-9—1363 **19 EAST HAM LONDON.E.6** *Telegrams: "Stannum, London"*



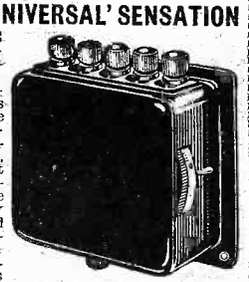
"INTERNATIONAL" STRAIGHT 3 VALVE SET, 45/- Each.

Those who desire entertainment from B.B.C. Broadcasts or from European stations without complicated adjustment will readily appreciate the advantage of a Straight 3-Valve Set, employing Dual Range Tuning for Long or Short Waves, Super Detector, and two first-class Stages of amplification. The whole mounted on a special metal Chassis and fitted in a solid Oak Cabinet. This is a fine set because not only will it do justice to your Loud Speaker by feeding it with pure output at full volume, but its simple Tuning will be welcomed by the family, the least expert of whom can Tune in Foreign Stations with ease.

IF COMPLETE WITH VALVES AND BATTERIES 70/-.

2/6 reduction off above two prices if this advert. is sent with order.

ANOTHER 'UNIVERSAL' SENSATION



GECOPHONE combined Wavetrap and Coupling Unit.

This new Gecophone device is an effective means of improving the selectivity of any set, even in the most difficult situation, alternative programmes may be received clearly and without interference. Ideal for separating stations under the Regional Scheme. An amazing bargain.

List Price 18/6. Our Price 3/6.

Radio and Bargain List Post Free on request

UNIVERSAL ELECTRIC SUPPLY Co LTD

(Dept. P.W.) 4 & 8 Brown Street, MANCHESTER

Estab. 1892. 'Grams: "Uniselco, Manchester."

B.T.H. C2 LOUD SPEAKERS

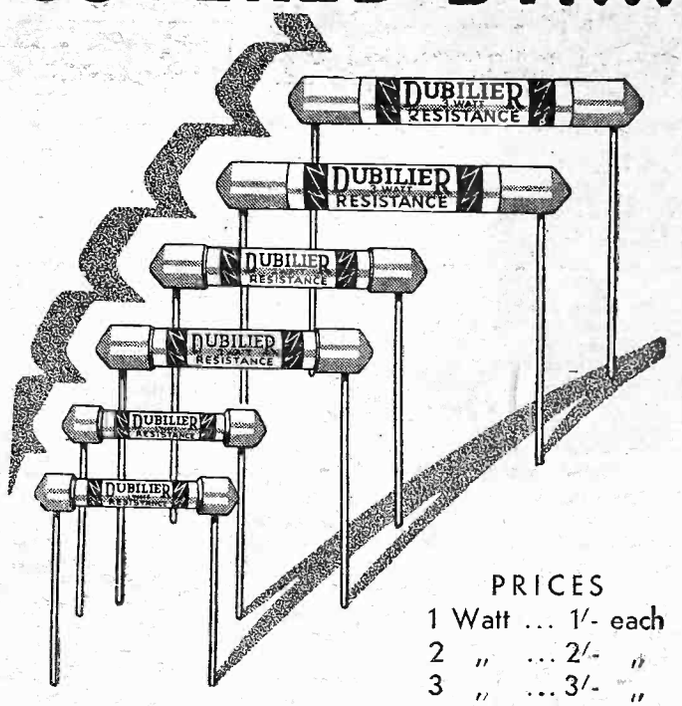
BRAND NEW EX-FACTORY. As Illustrated.

List price 45/-

OUR PRICE 15/- EACH Carr. Paid

15/-

ALL YOUR RADIO RESISTANCE REQUIREMENTS COVERED BY....



PRICES

1 Watt ... 1/- each

2 " ... 2/- "

3 " ... 3/- "

...DUBILIER METALLIZED RESISTANCES

These Dubilier resistances are made under a patented process in One, Two and Three watt types and are available in values to suit every requirement.

They are suitable for voltage dropping, decoupling and providing automatic grid bias voltages, and wherever a reliable resistance is required.

They can be mounted in clips; but connecting leads are fitted in addition.

DUBILIER

CONDENSER CO. (1925) LTD.

Ducon Works, Victoria Rd., N. Acton, London, W.3

D.1.

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 1096.)

"Also, what sort of switches, and are they both alike?"

There is no reason why you should not get good results by taking out the extensers and fitting the new wave-change switches which will then be required. Place them under the ordinary variable tuning condensers—there should be ample room on the panel.

You probably know the *type* of wave-change switch which is necessary. It has a long-wave or "open" and a medium-wave or "closed" position, and in the former (which is generally when the knob is pushed in) *all* the switch contacts are separated from one another.

In the "closed" position (when the knob is pulled out) all the contacts come together.

Both the switches you will need will be of this *type*, but one must be a "3-point" and the other a "4-point" to carry out the necessary circuit alterations.

First Condenser and Switch.

It is in the case of the *first* extenser that a 3-point switch is necessary. Two of the switch contacts will be equivalent to the extenser contacts, whilst the third switch contact is joined to the moving vanes terminal of the first tuning condenser.

For the *second* extenser a four-point switch will be required. Three contacts of this switch are equivalent to the three extenser contacts, and the fourth contact of the switch is connected to the moving vanes terminal of the second tuning condenser.

Thus the complete wiring of this part of the set will be as follows:

Fixed vanes of the first variable condenser to Grid of V, and "G.", exactly as the extenser's fixed vanes were connected.

Moving vanes of the first variable condenser to E. on the long-wave coil, to the negative G.B. and one side of '01 mfd. condenser (as before), and to one of the 3-point switch contacts.

Another of the 3-point switch contacts goes to "X" on the P.J.2 and to the '001 condenser.

The third contact on that switch goes to Y. on P.J.2 and to 2 on the long-wave coil.

Now for the second tuned circuit—that between the S.G. valve and the detector.

Fixed vanes of the variable tuning condenser go just as the fixed vanes of the extenser did—to grid condenser and to G. on P.J.3

Moving vanes go to screen to earth, to all the other points previously connected to moving-vanes of the extenser, and also to one of the contacts on the 4-point wave-change switch.

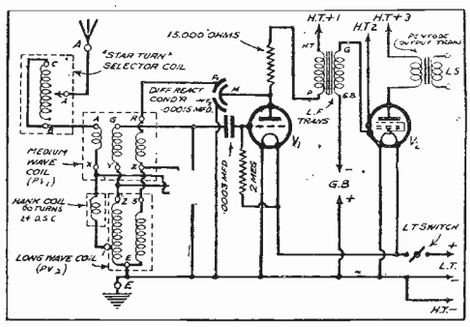
Another of the contacts on this switch must go to 3 on the long-wave coil and to Z on the P.J.3.

Another of the contacts of this wave-change switch must be joined to 2 on the long-wave coil and to Y on P.J.3.

The remaining contact on this 4-point wave-change switch should join with X on the P.J.3 and 1 on the long-wave coil.

MISSING LINKS, No. 26

A DETECTOR AND PENTODE CIRCUIT



Here are the connections for a two-valver employing a pentode, but one of the "components" has purposely been omitted. Can you fill it in correctly?

LOOK OUT FOR THE ANSWERING DIAGRAM NEXT WEEK.

That completes the change-over wiring, which should be kept as short and direct as is possible consistent with good spacing.

THE VALVE WITH A LOOSE TOP.

"CHARLIE" (Headingley).—"The set had been going very satisfactorily, but before Christmas I thought I ought to have a look over it to make sure the flex leads were not wearing through, or anything like that. Judge of my surprise when I found the L.F. valve with a loose top.

"At first it appeared to be loose in the holder, but when completely taken out of the set I discovered that the actual glass part had come apart from the black base, and tottered about quite noticeably if tapped.

"There is no bad effect on reception as far as I can tell, but I wondered if I ought to do anything about it?"

No, it will be all right if you do not move it, we expect. The base sometimes parts company from the bulb to some degree without affecting the vital connections between the two.

But don't move it more than absolutely necessary. And if you must pull it out at any time, be sure not to pull on the glass, but on the base itself.

CONDENSERS IN SERIES.

"OUTPUT" (Long Stanton).—"What is the total capacity of a 1-mfd. condenser connected in series with a 2-mfd. condenser?"

Approximately ·66mfd.

THE LONG-WAVE STATIONS.

G. N. (Stockton).—"Having recently been placed on the retired list I have taken a great fancy to wireless, especially the foreign station side of it. (To tune in these different countries is about the nearest I shall ever get to foreign travel, I suppose, for at the age of 60 getting about is not the simple affair it used to be!)

"And so I want you to tell me about the long-wave stations for which I have recently been trying. Could you give me a list of all those on the long waves?

"Or failing that a list showing *the order* of those I might receive—for instance, is Moscow above Daventry on the dial or below it? And which Paris station is which?

"I should be very glad if you could throw some light on these (to me) mysteries; and

(*Continued on page* 1100.)

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 1098.)

if you could say at the same time *which* stations I might be able to receive and which not, it might save many heart-burnings and vain hopes!"

The accompanying list shows all the broadcasting stations working on the long waves.

It is impossible to say which you are likely to be able to pick up and which not, as conditions vary greatly with different sets, aerials, positions and so on. But we have emphasised the stations which are most commonly received among our readers, and this will give you some indication as to which are possibilities and which are not in the "possible" class.

You will note that the list is arranged in order of wavelength, so if you get any two, and make a note of the dial readings, you will know that the intervening stations will all have intermediate dial readings.

Metres.	Station.	Power. Kw.
1000 ..	Leningrad, Russia	100
1053 ..	Tiflis, Russia	10
1083 ..	OSLO, NORWAY	75
1116 ..	Moscow Popoff, Russia	40
1153 ..	KALUNDBORG, DENMARK.	7·5
1200 ..	Reykjavik, Iceland	21
1200 ..	Istamboul, Turkey	—
1229·5 ..	Boden, Sweden	·75
1237 ..	Vienna (Experimental), Austria	—
1260 ..	Novosibirsk, Russia	—
1304 ..	Moscow Trades Union, Russia..	100
1348 ..	MOTALA, SWEDEN	40
1350 ..	Kasbah, Tunis	—
1411 ..	WARSAW No. 1, POLAND ..	158
1445·7 ..	EIFFEL TOWER, PARIS ..	15
1481 ..	Moscow, Old Komintern	100
1538 ..	Ankara, Turkey..	—
1554·4 ..	DAVENTRY NATIONAL, GT. BRITAIN	35
1635 ..	KOENIGSWUSTERHAUSEN, GERMANY	75
1725 ..	RADIO PARIS, FRANCE ..	—
1796 ..	Lahti, Finland	54
1875 ..	HUIZEN, HOLLAND	8·5
1935 ..	Kaunas, Lithuania	—

AN INEXPENSIVE LOUDSPEAKER.

C. W. (Bolton).—"We were in the country at the house of a friend for a bit of a 'do' on New Year's night, and he had a new loudspeaker going which he told me was an expensive one.

"Knowing he was about as hard-up as I am I was surprised at this, but I quite believed it on account of the fine quality he was getting. However, towards the end of the evening he explained that it was really an inexpensive loudspeaker, built from POPULAR WIRELESS, and that he was pulling my leg

"So I got the back number (October 17th) from him, and have since been busy making up one of my own. Unfortunately, I have got a bit stuck about the dimensions which do not seem to pan out quite right.

"It seems to me that the dimensions given from the bottom up to the main big piece for fixing strip should not be 2¼ in. but 2 in.—which makes all the other dimensions right. Is that so?

"Also, would a baffleboard of thicker than ¼ in. be better than that thickness?"

Two inches up from the bottom is O.K. for the dimensions you refer to. The 2¼ in the original description was a mistake.

As regards the baffleboard you will probably improve results with a thicker baffleboard, for as a rule, within limits, the thicker it is the better.

FITTING AN EARPIECE AS A "MICROPHONE."

W. C. (Dublin).—"(1) I want to connect up an earpiece to use as a microphone. Can you tell me the connections, using This Year's 'Magic' Three? (2) What do the markings, I P, O P, I S, O S on a transformer mean?"

All you have to do is to join the two wires from the earpiece to the primary terminals on the first low-frequency transformer, in place of the leads going there at present.

The primary terminals are those which carry that winding of the transformer which is joined between H.T.+ and the plate of the valve.

In most modern transformers these terminals are respectively marked "H.T.+" and "P," though sometimes "H.T.+" is marked "B+" instead; and the "P" terminal may be "A" (for anode) instead of "P" (for plate).

In older transformers the two primary terminals were marked "I.P." and "O.P." (actually this indicated the disposition of the wire on the former, I being inside and O outside). The secondary terminals on these older transformers were marked I.S. and O.S.

On the later models of transformers the secondary terminals are marked "G" and "G.B." But here, again, "G.B." sometimes appears as "L.T." or as "C" or as "C—."

Care must be taken when connecting up not to let the H.T. wires come near the filament wiring, or you may "blow" something. In fact, the H.T. battery should be completely disconnected until the alterations to wiring have been carried out.

"P.W." PANEL No. 54. THE PENTODE.

The Pentode is a special type of output valve having five electrodes.

* * *

Unlike most output valves it is generally used directly after the detector, without intervening L.F. amplification.

* * *

It is also unlike other output valves in its high impedance, which often necessitates a special output transformer for coupling the loudspeaker.

* * *

In internal construction the pentode is something like an S.G. valve with an extra grid (next to plate), which is connected inside the valve to filament or cathode.

(Continued from page 1090.)

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OP... THE 7-M...

Tuning-in to ne...

FULL details were given in the ... issues of "P.W." for the con... of an inexpensive and easy... adaptor unit which enables al... big existing set to be used without ... for the forthcoming B.B.C. exper... 7 metres.

As may well be imagined, the re... a station on a wave-length of 7 ... a frequency of nearly 43,000,000 ... second—is something very differ... ordinary broadcast or even s... reception.

But for all that, it isn't. su... difficult matter!

You just have to remember tha... from minimum to maximum of th... in. tuning condenser, you are, in effect, men... a band of frequencies equivalen... than four times the band betwee... than 2,000 metres, and that in co... the tuning control *must* be ... or the *proportionately slowly*. And if you ... riginal closely in mind (and *act* on it!) ... bably shouldn't have very much diffi... or as finding the station.

That brings us to another point.

When Tuning In.

To simplify matters when you ... to find a station, you will find it best to operate the adaptor in an oscillating condition. In other words, use both controls when tuning-in, the left-hand one for finding the station, and the right-hand one for maintaining the adaptor just (but only just!) in an oscillating condition.

In this connection, it is desirable to mention that the setting of the reaction condenser to obtain this only-just-oscillating condition will not remain constant over the whole of the tuning range.

The procedure when once you have found a station (denoted by a carrier-wave in the headphones which, by the way, are attached to the normal output terminals of your set) is exactly the same as with an ordinary broadcast station. You carefully decrease the reaction condenser capacity until the set just stops oscillating, at the same time, possibly, slightly re-adjusting the main tuning control, and you should then hear signals.

About the Aerial.

Those of you who have already studied the previous articles on this adaptor may have wondered why the normal aerial terminal has been omitted, especially since an aerial connection was shown in the theoretical circuit.

Definite aerial coupling arrangements have purposely been omitted because the question of the best type of coupling for this "new" wave will largely depend upon the type of aerial in use.

If, for instance, your aerial is very long, you may find it sufficient just to trail the ... and use ... lowest tapping that gives the desired effect.

One choke should be connected in series with each filament lead between the adaptor and the adaptor plug.

Just as a matter of interest, it may be mentioned that there are already two stations working on the band between 7 and 8 metres, although, on account of their distance, it is very doubtful whether they will be heard in this country under anything but freakish conditions. However, you may feel inclined to give the 7-metre dials a "once-over" just to see if there *is* anything doing, and so here are the details.

Two "Possibles."

One of the Berlin stations is radiating an experimental programme on a wave-length of 7·05 metres every Tuesday and Thursday from 16.00 to 18.30 G.M.T. The other transmission, which comes from Amsterdam, Holland, is under the call-sign of P F I P H, and the wave-length is given as 7·85 metres. Unfortunately, no definite schedule is available in connection with this second station.

In order that some valuable data may be gathered by "P.W." regarding this "new" wave-band about which so little, comparatively, is known, every reader who receives signals successfully is asked to send in a report of his results. Letters should be addressed to the Research Department, and the top left-hand corner of the envelope should be marked "7-metre experiments." As far as is possible, every letter received will be answered.

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THE LISTENER'S NOTEBOOK

(*Continued from page* 1090.)

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Probably few people are aware that Korsakov began his career as a naval officer, and that he turned a professional musician comparatively late in life. Born in 1844, Rimsky-Korsakov died in 1908.

* * *

I hope (for her sake) that Miss Sackville West's lament over the dearth of new books during the bleak weeks following December 25th did not fall on deaf ears, and that some enterprising publisher will hasten to remedy this state of affairs next year. As such is the result, this benefactor will have the satisfaction of knowing that not only will he be keeping the wolf from the door of our poor book-reviewers, but also Miss Sackville West will be able to give us more than a re-hashed "list with no comment" in her corresponding talk next December.

Tip for Talkers.

Would it be out of place, I wonder, to remind our scholars and experts appearing before the microphone that teaching by diagrable or illustration is a time-honoured device, never known to fail? I *do* wish they would introduce a little more of it into their talks.

Mr. H. G. Wood's very apt illustration in his Retrospect in "The Changing World" series that "if a man takes only a scientific interest in his fiancée, the engagement is likely to be broken off," must have explained instantly to many listeners (if they had not already switched off) what I had been saying about unemotional intelligence and unintelligent emotion!

NORTHERN NEWS

Some Items of Interest from A Special Correspondent.

DESPITE financial stringency, the sum distributed to charitable objects from the contributions of members of the North Regional Radio Circle was more than double in 1931 that available the previous year.

Most listeners know that each member of the Radio Circle is asked to send an annual fee of ninepence, from which the cost of badges, cards, etc., is met, after which the balance is usually given to hospitals.

For the Hospitals.

In 1931 the Northern Region distributed over £360 to nine local hospitals, most of which are for children only, and in other cases, such as the Chester Royal Infirmary and the Royal Southern Hospital, at Liverpool, donations were given to children's cots. In addition, £260 was distributed in the summer in the smaller industrial towns to organisations which provide holidays for poor children.

The work of the Radio Circle does not end there, because no fewer than 800 toys were sent to the North Regional offices at Manchester during several weeks before Christmas, most of them being sent also to hospitals.

A tribute to the memory of "Lewis Carroll" will be paid in the North Regional programmes on Wednesday, January 27th, when listeners will renew acquaintance with "Alice in Wonderland," and other books written by this famous author, Charles Dodgson, who was born a hundred years ago at Daresbury, in Cheshire.

Mr. Dodgson, the mathematician, refused to recognise any relationship to "Lewis Carroll," but the world knows that they are one and the same, and will look forward to the programme on January 27th, about which I hope to give further details when they are arranged.

Cinderella Coming.

On the same day the Northern programmes contain a talk by Mr. F. E. Doran upon that well-known delicacy, the Wensleydale cheese.

An hour's excerpt from "Cinderella," relayed from the Empire Theatre, Newcastle-upon-Tyne, will provide the third of this season's pantomime broadcasts for North Regional listeners on Friday, January 29th. Arthur Kay's String Orchestra, a combination new to broadcasting, will be heard in a concert which is to be relayed from the Town Hall, Huddersfield, on the following evening.

Mr. Kay takes a prominent interest in the musical life of Huddersfield and his orchestra, which numbers a hundred, consists largely of young artists, many of them in their 'teens.

Legends of the North.

Szigeti, the Hungarian violinist is the soloist in the Liverpool Philharmonic Society's concert which will be relayed on Tuesday, January 26th, during the interval of which Mr. Kenneth Adams is to continue the series of readings entitled "Legends of the North" with an account of the story of the battle of Brunanburh.

TECHNICAL NOTES

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

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

Those S.G's.

I AM often asked why it is that the screen-grid type of valve, as now used so extensively for high-frequency amplification, cannot be applied in its ordinary form for low-frequency amplification, and why it is that a five-electrode valve—the pentode—should be necessary for this purpose. In fact, readers have more than once suggested that, logically, there should be no limit to the number of electrodes which could be introduced into the valve.

I know it seems rather strange that, having started with two electrodes, we should go to three, then four, then five, and no further. One is naturally tempted to wonder why the arbitrary figure of just *five* should be arrived at.

Control-Grid.

I need not go into the reasons why the third electrode or control-grid was introduced into what is now the ordinary three-electrode valve; I think everyone understands this, and, anyhow, it is a matter of ancient history.

Nor do I need to say very much about the introduction of the fourth electrode or screen-grid into the screen-grid valve. It would take quite a long time to discuss in detail the actions which take place in a high-frequency amplifying valve, and the way in which these actions, or some of them, are prevented by the introduction of the screen-grid.

However, you know that with the screen-grid valve we can obtain a degree of amplification which was altogether out of the question with the ordinary three-electrode high-frequency amplifying valve. An ordinary valve may give an amplification of perhaps 15 or 20, whereas a similar valve of the screen-grid type would give us an amplification up to a theoretical maximum of perhaps 200.

Indeed, some special types of screen-grid valve would give an amplification of several times the latter amount. It goes without saying that in the vast majority of cases a single-stage of screen-grid high-frequency amplification is all that is needed before the detector, although it is true that in certain special cases two stages of screen-grid amplification are used.

Altogether apart from the very greatly improved amplification, there is the question of selectivity to be considered, and with the screening effect inside the valve and the corresponding screening which is invariably introduced in the screen-grid receiver itself, very high selectivity can be obtained. This, in fact, is mainly what has rendered possible the very compact portable sets so much in use to-day.

The Collector-Grid.

But I am getting away from the matter which I wanted to discuss, and that is the

(*Continued on next page.*)

TECHNICAL NOTES

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pentode valve. The best way to understand why the fifth electrode (that is, the *third* grid) is introduced is to consider the characteristic curve of the screen-grid valve when fairly high anode voltages are applied.

If you get hold of such a curve showing the relation between the anode current and the anode volts, with a fixed voltage on the grid, you will see that the current at first rises rapidly, but then begins to fall (even with increasing anode volts) in a remarkable way, until a certain voltage is reached; the voltage at which the fall ceases depends, of course, upon the other voltages employed, but may occur at an anode voltage of, say, 60 or 70 volts. After this, with further increase in anode volts the anode current rises sharply again.

In other words, the curve has what is sometimes called a "kink" in it, and the presence of this irregularity in the curve would altogether upset the performance of the valve if it were used for heavy currents, as it would be in the case of a low-frequency amplifier.

Incidentally, in the case of the screen-grid valve for high-frequency amplification, the currents which are used are exceedingly small, and the difficulty referred to may for practical purposes be ignored.

The Pentode Characteristic.

Now we come to the reason for the third grid. This "kink" in the characteristic curve of the screen-grid valve is believed to be due to what is called "secondary emission" from the anode (and probably from other electrodes in the valves) due to the impact of electron streams.

The interposition of the third or "collector-grid" between the screen-grid and the anode has the effect of "mopping" up the secondary emissions, and so keeping the valve clear of the complications mentioned above.

The third grid or collector-grid is connected to earth, and as there is already an earthed "terminal" in the valve in the shape of the filament, the simplest thing to do is to connect the collector-grid internally to the filament, which is the standard practice in the construction of the pentode valve.

Amplification.

Like the screen-grid valve, the pentode gives very much greater amplification than the corresponding three-electrode valve, although the difference is nothing like so great as in the case of the screen-grid.

Whereas the ordinary low-frequency valve may give an amplification of 20, the pentode will give perhaps five or six times that amount.

With such a large amplification it is obvious that in a great many cases the pentode is the only low-frequency amplification necessary in the receiver. A very important point to bear in mind, however, is that the output of the pentode, although large, is limited, and in view of the large amplification, it follows that the input must be made correspondingly small.

If you feed into the pentode an unduly large input you throw upon the valve the task of delivering an enormously magnified

(Continued on next page.)

TECHNICAL NOTES

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output, and this may be entirely beyond its capabilities, with the result that bad distortion will set in.

Mounting a Grid-Leak.

The proper way to mount a grid leak is in spring clips, and if you have any doubt about the contact between the metal end-caps of the leak and the clips, you should turn the leak round a few times so as to create a rubbing contact between the clips and the ends.

If the springs press very lightly on the leak, take the leak out and bend the springs slightly inward so as to get good firm contact. Sometimes for convenience, or the saving of space, amateurs solder stout wires to the ends of the grid leak, but this is a dangerous operation and is not to be encouraged.

The grid leak is not intended to be heated and there is quite a real danger of the leak being damaged. It may be that its resistance value will be completely upset (which is serious enough) or that some bad or broken contact will be created inside it.

Grid-Leak Troubles.

I have known cases where grid leaks, after being soldered, give endless trouble owing to the resistance continually varying. If, however, you *just* make a soldered connection to the cap of the grid leak, you want to do it very quickly.

Have the end of the wire thoroughly tinned first and then, using a very hot iron, apply the iron only momentarily to the grid-leak cap. If you do not succeed in making a joint in the space of about one second, leave the whole thing for a few minutes until the heat which you put into the leak has "evaporated" before trying again.

Aerial Inspection.

At this time of the year it is a good plan to examine the earthing-switch of the aerial, if you use one, and also the lead-in. These inevitably get contaminated with dirt and moisture, with the result that you may get a considerable loss in signal strength as well as all sorts of irregularities and noises in the set.

Sometimes the dirt on the earthing switch (more particularly when this is outside the house) will be sufficient to produce a low-resistance path to earth which, of course, may mean robbing the set of a large percentage of the energy which otherwise would go in from the aerial.

It is a good plan to remove the switch occasionally and take it indoors and give it a thorough overhaul and clean-up, so as to make sure that there is no serious leakage, before you put it back in position again.

Earthing-Switch.

With an outdoor aerial this periodical inspection and cleaning-up of the various parts, particularly the insulators, lead-in tube and earthing-switch, are really essential, and naturally needs to be done much more frequently during the winter months than during the summer.

One of the many advantages of an indoor aerial is that it is not affected by the weather, and most of the troubles which

(Continued on next page.)

TECHNICAL NOTES

(Continued from previous page.)

ave been mentioned above do not arise at ll. At the same time, even with an indoor erial, it is not a bad plan, say two or three imes a year, to give it a thorough overhaul.

Mind Your Cabinet.

I have often noticed that set-builders, fter having made up a nice receiver, will fit into a cabinet which is not at all suitable r "in keeping" with it.

There are various reasons why the abinet may not be suitable, but the par- icular sort of case I am thinking of is here the cabinet is too light or flimsy in onstruction for properly housing the set, nd more especially for the proper operation f the loudspeaker when this is incorporated ith the set.

Bear in mind that the movement of the rmature of the speaker, whatever it may , reacts upon the stator, and if the motion at all powerful this may set the whole of he supporting part of the cabinet into ppreciable vibration.

In order to avoid this, the cabinet should e of robust construction, and it is certainly uite a mistake to incorporate a powerful udspeaker in a flimsy cabinet.

Apart from actual vibrations set up irectly in the cabinet itself, you have the ibrations communicated from the loud- peaker to the air inside the cabinet and you ay be bothered with "resonances."

oudspeaker Reaction.

In order to overcome these effects, it is ot a bad plan to line the inside of the binet with felt or some similar material at l available parts so as to deaden the reflec- ons of the sound-waves.

Sometimes the vibrations are com- unicated to the valves; under modern nditions any such effect is likely to be due the direct action of the sound-waves upon e bulb of the valve rather than to the assage of the vibrations through the valve older.

A final point, as I have mentioned cently, is to pierce a number of fairly rge holes in the cabinet at suitable places, putting the air inside the cabinet into mmunication with that outside the binet; this often has a distinct effect in ing away with undesirable resonant fects.

cho Effects.

A very interesting article appeared in Modern Wireless" a little time back on roducing echo effects by using two sound- xes or two pick-ups to play a gramophone cord, and readers have from time to time ised a number of points with regard to is experiment.

I remember trying the experiment a good ny years ago, long before electrical production was invented; it is quite easy, d the effects are often remarkably realistic.

The essence of an echo is that you get e *same* sound echoed back at a short terval of time after the occurrence of the iginal sound. Now when you use two producers with their needles lying in the me track of the record but at a distance art of, say, an inch or two, the sound m a certain point of the record will be roduced by the soundbox which is

(Continued on next page.)

TECHNICAL NOTES

(Continued from previous page.)

passed first and then, at a fraction of a second later, the *same* sound will be reproduced by the *second* soundbox, so that you get a sound and its echo, the time-interval between the two being the time taken for a point on the record to travel the distance between the needle of one reproducer and that of the other reproducer.

Time Interval.

If the two reproducers are in the outer track of a 12-in. record, rotating at 80 revolutions per minute, the linear speed will be about 50 in. per second, so that if the distance of separation is 2 in. the echo interval will be about 1–25th of a second.

Since the velocity of sound in air is roughly 1,100 ft. per second, the distance travelled by sound in air in 1–25th of a second is roughly 45 ft., so that if a sound is produced at a certain point and reflected from a wall about 22 ft. away, since the total distance travelled there and back is about 45 ft. the echo will reach the original place 1–25th of a second after the original sound.

From this you see that a distance of separation of the two reproducers (on the outer part of a 12-in. record) of about 2 in. gives an echo-interval about the same as that due to the reflection of sound from a wall about 22 ft. away.

Producing "Atmosphere."

You will observe that as the two soundboxes or pick-ups gradually progress towards the centre of the record, the echo-interval will become longer (if the separation distance of the two reproducers remains the same) because the time-interval represented by one inch of the record track increases as you go towards the centre.

If matters are properly arranged, you can, as I say, get a very realistic effect which sometimes gives a surprising sense of "atmosphere" or "space." But if you overdo it, and make the time-interval too long, the effect is unreal and displeasing.

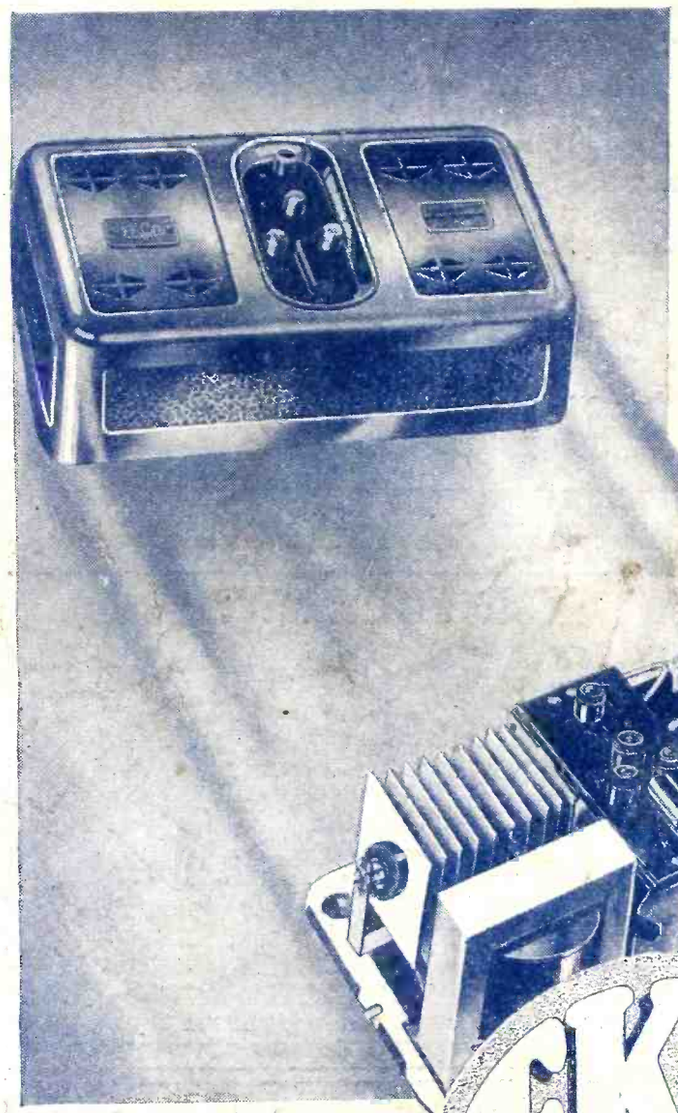
H.T. with Pentode.

When using a pentode valve remember that the high-tension current passed by it is apt to be rather heavy for the average loudspeaker winding, and it is, therefore, a good plan to incorporate some form of output circuit, such as an output transformer.

Owing to the relatively high impedance of the pentode valve, it is generally necessary to use a stepdown transformer in order to get the best results out of the valve so far as quality is concerned.

Another important point to bear in mind, reverting to the question of high-tension current, is that if you use a dry battery as your H.T. source (with a pentode), this should be of the heavy-duty type; small low-capacity H.T. dry batteries will be very soon used up owing to the extra heavy current load thrown upon them.

Constant Power for a penny a month



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POPULAR WIRELESS, January 23rd, 1932.

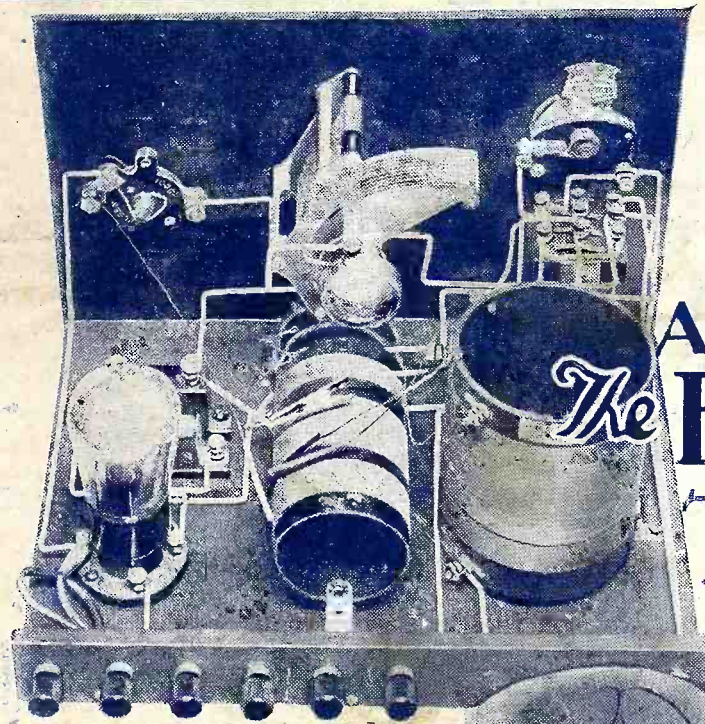
REGISTERED AT THE G.P.O. AS A NEWSPAPER.

SHOULD THE B.B.C. BAN CONTROVERSY? (See Page 1113)

Popular Wireless

Every Thursday PRICE 3d.

No. 503. Vol. XX. INCORPORATING "WIRELESS" January 23rd, 1932.



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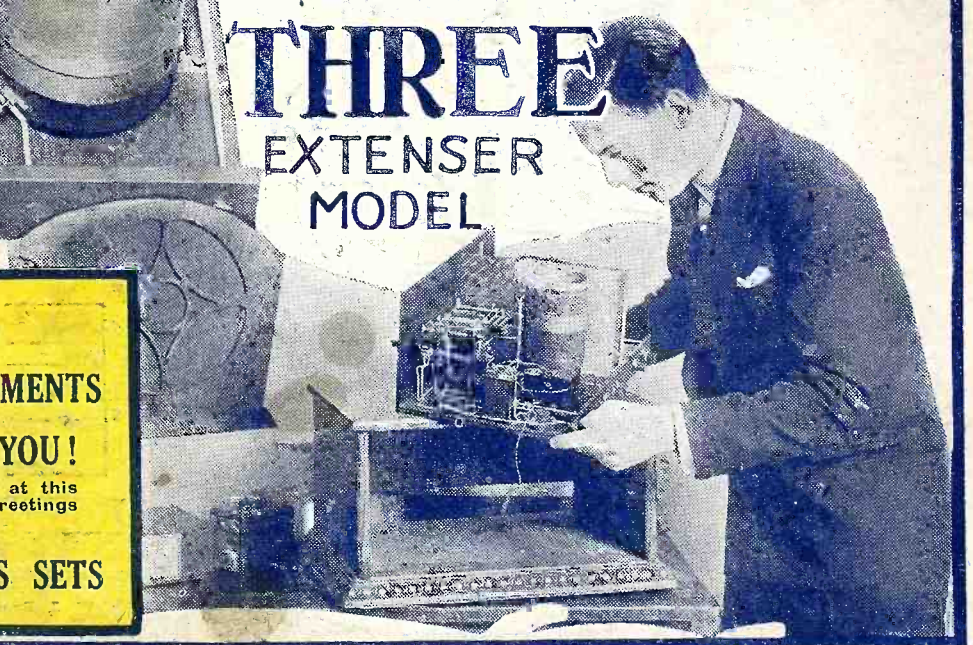

ALSO THIS WEEK:

MARCONI'S LATEST EXPERIMENTS

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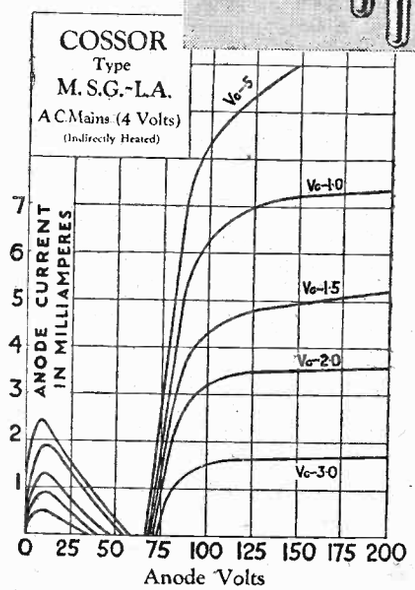

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A NEW ATTACK
TESTING INSULATION
LICENCE ITEMS
WITH OR WITHOUT

OUR PUBLICISTS
"FIZZ AND OP."
NEW POWER RATING
PUZZLING RADIO

RADIO NOTES & NEWS

New Attack on "Pirates."

THE Post Office is expected to ask radio dealers to divulge to them the names of the buyers of sets, so I learn from a London evening paper. This is an attempt to tackle the "pirate" problem from another angle, and is, I understand, not unfavourably viewed by "the trade" generally. Certainly "the trade" has no reason, legitimate or otherwise, to protect in any way those people who evade or seek to evade the very reasonable fee levied by the Post Office on receiver owners.

Simple Home Construction.

PROBABLY a great part of the leakage is due to "forgetfulness" by those who make sets at home, and apparently, therefore, component buyers should also be reported under the proposed new scheme. Professor A. M. Low told the aforementioned London evening paper that a check on home-constructed sets would be difficult because. "You have only got to get a knife and fork, a potato, a piece of wire and earphones, and you can make a set."

A condenser and some form of inductance wouldn't do the set much harm, but, finnicking details of that nature are apparently beneath professorial notice.

Testing Insulation.

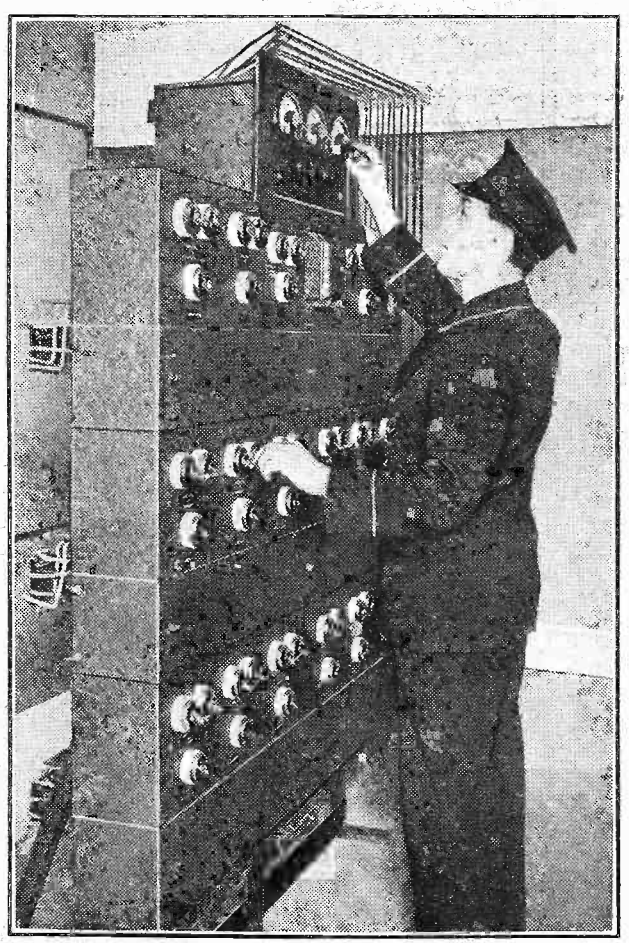
ANOTHER London paper, this time a "daily," published a little paragraph which caught my roving eye. "How would you test the insulation of the aerial?" The writer of the par appeared to recommend inserting a spark-gap in series with the aerial and energising the aerial circuit from the "secondary of an A.C. transformer." If the insulators are leaky the energy won't jump the gap. Bee-yutiful! But not conclusive.

Myself would borrow a "megger" from the nearest electrician. If the resistance of the aerial, measured by the "megger" is less than infinity, the insulators (or the aerial itself) are leaking.

New Development in Sight.

I AM informed by the Technical Staff that I shall shortly be placed by them in a position to make an announcement of the greatest interest and importance concerning results which they have succeeded in getting from their recent researches.

TUNING-IN A 50-VALVER!



This is the central control panel of a 50-valve set installed at Chiltern Court, Baker Street, London, W. It serves a large block of flats, in each of which a socket is provided for loudspeaker reception, and the P.M.G. recently prosecuted one of the tenants for failure to take out a licence!

This announcement I hope to make next week, or certainly not later than February 6th, though in any case I shall refer more fully to the matter next week, when our plans will have taken definite form. I understand that something outstanding has been achieved, but more than that I can't say at the moment.

A New Thing in Radio Societies.

I HAVE much pleasure in drawing the attention of our readers to a new Short-Wave society which is being organised by Mr. John E. Rendle, of 28, Sandford Road, Bromley, Kent. It is to be called "The Short-Wave Listening Station." The enterprise is represented at present by a headquarters at that address, and one or two sub-stations. Reports are sent in by the sub-stations and are examined scientifically. A Technical Investigation Committee is to be formed and a small laboratory equipped. More sub-stations are required, here and overseas, and in Great Britain three are needed, one in the North of Scotland, one in the Midlands, and one in the West Country, preferably in Cornwall. Mr. Rendle, I *keant* do no more at the moment. Good luck to your efforts!

Licence Items.

DESPITE the successful "Sleuth Van" tour, the licences in issue in Great Britain dropped from 4,100,000 at the end of October last to 3,411,910 on Jan. 1st. In August last Latvia had 22 licensees per 1,000 population. New Zealand has just on 65,000 licence-holders. Belgium has about 200,000, and recently, after some heavy fines, new licences appeared at the rate of some 1,000 a day!

In August last Estonia had issued about 14,000 licences, or 1·2 per cent. of population.

"Ariel" on the Situation.

I GET some queer letters, as I have demonstrated many a time, but not often do I receive an invitation to utter words of wisdom on the "State of Denmark" in general. Hence the letter from "Twenty Lancashire Lads," asking me to say what

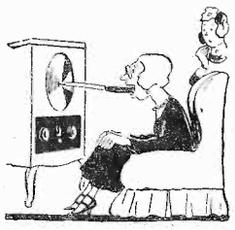
(*Continued on next page.*)

"ARIEL'S" RUNNING COMMENTARY ON RADIO *(Continued)*

I think of the state of the nation, leaves me scared. But here goes! I believe that no nation is bust till it loses its fighting spirit. I believe that in these islands there is an untamable pack of fighters, sane and brainy, and that the high spirit of the nation, the will to battle out through bad times, is worth all the gold in the Paris and New York banks and treasuries—and then some! It's the "then some" which turns the scale. Be British—and proud of it!

With or Without Ivories.

THE "Daily Mail" tells of a deaf lady who can listen to radio by holding in her teeth the handle of a knife whose blade rests on the "central pivot" of a loudspeaker.



That is fine, though one would need strong jaws to hear "The Messiah" through; you would just have to sit tight and think of bulldogs! The same lady has a friend who has no teeth, and finds that the "lack of teeth makes no difference." I should prefer teeth. They are really more effective for holding the handles of knives. Still, it's a great discovery, and we shall yet live to see a fund started—"Dinner Knives for the Deaf." "With rubber handles for the victims of dentists!"

Our Versatile Publicists.

WHETHER Mr. A. E. Moody, the gifted organiser of the National Radio Exhibition, was showing his nephew what ostriches do, or whether he was using a nail instead of a knife (see preceding paragraph!), I do not know, but the fact is that on December 14th he swallowed a large nail which lodged in the base of a lung. A serious operation was averted, happily, by Mr. Moody's last-minute act in coughing it up. We congratulate him upon his escape, and ask him to be more careful in future, because "P.W.," ever alert, is already thinking about the 1932 "Show." (Lucky it wasn't a fish bone!)

"Listening Group Leaders."

SPEAKING at a meeting of "Listening Group Leaders" on January 2nd, the Chairman of the Board of Governors of the B.B.C. said: ". . . but I am quite sure that you who come here do represent in a great sense the great body of the people . . ." The idea that a handful of these "uplift" people represents the listening public is comic, and it just shows you how obsessed the B.B.C. is, thanks to its Chief Obsessor, with the notion that it is a missionary body entrusted with the task of trying to squeeze a little culture into coarse, unlettered oafs like you, and the next man, and me!

The "Fizz and Op" Show.

AS usual the Annual Exhibition of the Physical and Optical Society, which took place on January 5th, 6th and 7th, was most attractive. "Amongst those (exhibits) present" was a display illustrative of the well-known Westinghouse metal rectifier, a G.E.C. photo-electric smoke recorder, a G.E.C. photographic sound recorder, and a fine show off "Osram" Valves, including a new development called the "thyratron," a valve which is filled with mercury vapour.

Some Good Exhibits.

FROM the radio man's standpoint, probably the most interesting exhibit was that of Electric and Musical Industries Ltd., who showed 7" and 8" diameter photo-electric cells with cathodes of caesium on silver. A direct reading Modulation Meter was the centre of an immense display of enthusiasm, as also was an ingenious Harmonic Content Analyser for use in the design of L.F. amplifiers. A portable radio frequency Oscillator made one's mouth water, so to speak, and every time I passed it I came over all smash-and-grabby.

SHORT WAVES.

The Pronunciation Committee of the B.B.C. cannot agree whether the "e" in pianoforte should be silent, or not.

Our view is that, if it is the pianoforte next door, the whole of it should be silent.—"Punch."

* * *

Many prisons are now fitted with wireless equipment, we read.

This is great news for radio fans who are contemplating crime.

* * *

A correspondent has written to an evening paper to say that while listening-in the other night he distinctly heard somebody crying. Perhaps it was Dean Inge laughing.—"Punch."

* * *

Brown: "Ah, I see you've got a new wireless set! Which station do you listen to most?"

Jones: "The local power station!"

* * *

"Broadly" speaking, of course, the best wireless announcers are the Americans.

* * *

"An amateur picked up the P.O. trans-atlantic telephony by mistake recently," we read.

The poor fellow thought it was a trunk call that he had put through the day before, and died of shock.

* * *

Lady (interviewing maid): "Do you belong to the Church of England?"

Maid: "Well, m'm, father goes to chapel—but, personally, I'm wireless!"—"Punch."

New Power Rating.

THE new method of rating the power of "broadcasting" transmitters which was evolved at the Copenhagen International Technical Consultative Committee for radio-electric communication has been adopted by the Union Internationale de Radiodiffusion. The power supplied to the B.B.C.'s antennae will not be altered, but the new ratings will be; London and Northern National and Regional stations (four), 50 kw. each; Daventry (5 X X), 30 kw.; Midland Regional (5 G B), 25 kw.; Aberdeen, Belfast, Bournemouth, Cardiff, Glasgow and Newcastle, 1 kw. each; Edinburgh, 0·3 kw.; Dundee, Plymouth, Sheffield and Swansea, 0·12 kw. each. The maximum peak modulation is 80 per cent in each instance.

Anti-Tar Campaign.

STRANGE what a lot of ripples a small stone can cause when it is dropped into a big pond. There was that tar, for instance. Someone said that we ought to dip our aerials into tar, whereupon I asked how tar could be removed from the human hand, and suggested alcohol. (It came natural to do that!)

Apparently the earth is full of amateur chemists; the interest evinced in this point is remarkable, and if I were to publish all the letters about it my columns would look like "Household Hints." The reply to my inquiry is, however, "Benzol," and I thank those who supplied it.

Puzzling Radio.

THANKS, B. M., of East Ham! Here's a good one for you, my ancient legumes! One of the newspapers, in referring to the story of a lady who put a holly wreath on a grave and "heard the strains of stringed instruments playing carols," asks: "Did the wire frame pick up radio waves which were reflected from the grave-stone, thus setting up vibrations of sound?"

The expert who asks the question surprises me. I wonder why he thinks that a gravestone can alter the frequency of electro-magnetic waves, or how he can imagine or suggest that ether waves can be turned into air waves by a gravestone. So do you!

Looks as though another journal is going to take the place of my dear old friend, which has been non-"expert" for some months.

Personal Note.

IF I might be so bold just this once! I have been asked by an eminent firm of photographers to oblige them by sitting for my portrait, an attempt to play on human vanity for sundry guineas. But I am not human where my photograph is concerned. I am adamant.

Instead, please, friend artist, draw me as a gentleman with piercing black eyes, clad as to the upper and nobler parts in a black cloak and pinched-up "Trilby" hat. And don't forget the pipe stuck in a "three-quarter" view face. I should be positively Victorian as a publicist without an ensemble of this kind.

ARIEL.

SHOULD THE B.B.C. BAN CONTROVERSY?

by

Lt.-Commander the Hon. J. M. Kenworthy R.N.

The first of a short series of important articles by an eminent politician who is noted for his championship of the "ordinary listener."

THE logical result of the present policy of the Governors of the B.B.C., if it continues, will be the banning of all controversial subjects in talks, lectures and debates, and an end to everything of living interest.

This policy itself has aroused controversy, and has become a topic of interest and discussion amongst many thousands of listeners. I propose to deal with the problem in its broad aspects in this article, and in my next article to make some practical suggestions for an escape from the present position.

To begin with, let us consider the functions of the B.B.C. These fall under two main headings. The first is entertainment, pure and simple.

People want to be amused. They desire relaxation and enjoyment. What pleases some doesn't please others: so there must, in any case, be variety.

The subject of entertainment by wireless is outside the scope of the present controversy, and I will content myself here by stating the opinion that a really able entertainer should be engaged to supervise all this part of the programme.

The second function, or purpose, is, and should be, to provide education *in its widest sense*. If the general public thinks that any attempt is being made to "uplift" them they will be irritated and either switch off or tune-in to foreign stations.

But listeners do want real information, news, to know what is going on in the world, to hear of new ideas, or new ways of looking at life, about the latest books and plays and scientific discoveries, if these last are explained in non-technical language. Our modern, educated democracy is like the Athenians of old, eager to listen to some new thing.

The Eternal Struggle.

This is as it should be, for that is how human knowledge spreads, and we are living in a rapidly changing world. But as soon as we get beyond the mere recital of actual facts we enter the region of controversy.

Nearly everything nowadays that is interesting is controversial.

In the arts, literature, the drama, science and philosophy, religion, politics, there is an eternal struggle in progress between the old ideas and the new. That is how the world progresses.

But the new ideas always shock the orthodox, always have and always will. As far as we can delve back into the history of the human race the older generation has always been scandalised by the behaviour or way of thinking, or the proposals of the younger generation. In their turn the younger generation, having grown older and become "set" in their ideas, are shocked by a new school of thought.

A Clear Choice.

There are some men and women who never grow old in spirit and in mind. But there are many others who become orthodox and conservative—in the non-political sense—in early middle-age, and most of us, as a matter of course, in the closing years of our lives, live in the past and are unreceptive of new ideas.

If in arranging the talks, criticisms, explanations and debates the attempt is made to avoid offending susceptibilities the result will be stagnation and the loss of much that is valuable and needed at the present time.

For there is no progress without change. And, as Hazlitt says, "prejudice is the child of ignorance." To dispel ignorance the stimulus of an occasional mental shock is required.

But this very stimulus is sure to annoy *some* of the old-fashioned, and the choice, therefore, is between colourless programmes not really reflecting the age we live in, drab and uninteresting to most of the younger generation, and to the open-minded of the older, on the one hand, and on the other hand, life, truth, discussions of the things people are really talking about and thinking about, and, therefore, Progress.

If we, as we must, recognise that the B.B.C. should be a great forum for the exchange of ideas, we will have to fight against the dead monopolistic hand of autocracy being allowed to lie heavily on its programmes.

Let us compare broadcasting, on its informative and educational side, with the older means of propaganda and instruction and the dissemination of ideas. The teaching profession claims considerable latitude. The professors in our universities in particular have fought for, and won, the right to considerable liberty in their teaching.

So have the Ministers of Religion, especially in the Free Churches; indeed, anyone to-day is free to found a religious sect, build a church and expound any doctrines within the law. And the law is generous.

For all practical purposes the stage and the cinema screen have complete freedom. The only acknowledged checks here by authority are against attacks on the Throne or indecency.

Why This Timidity?

The freedom of the press is part of our British birthright. The authors of books have a very wide latitude only circumscribed by the laws of libel and those defining propriety.

Some of our greatest poets, indeed, have been frankly revolutionary, as, for example, Shelley and Byron. They wrote in a revolutionary period and they expressed the thought of the young men and women of their time.

(Continued on next page.)

OUR CONTRIBUTOR

A recent photo of Lieut.-Commander Kenworthy.

SHOULD THE B.B.C. BAN CONTROVERSY?

(Continued from previous page.)

Why, then, this timidity on the part of the Governors of the B.B.C., or whoever it is that influences their policy?

And there is another danger here. It is of the deliberate use of wireless for conscious propaganda in support of what constitutes the government of the day, or the powerful vested interests that may have influence upon that government. We see an extreme example of this in present-day Russia, where wireless is used deliberately for propaganda purposes, the pill only being sugared with the thinnest coating of entertainment.

Churchill on India.

Indeed, there are complaints of political repression in England at the present time. Mr. Winston Churchill, for example, who is after all a Privy Councillor and has held high office in the State, is aggrieved because he was not allowed to broadcast his views on India. That was wrong, for he speaks for an organised school of thought on a very grave present-day problem.

In Japan there is a crime known as "dangerous thinking," and the police have orders to arrest anyone whom they have reason to believe indulges in dangerous thoughts on religion, or the monarchy or social problems or any other matter about which the authorities in Japan are sensitive.

This is the use of authority to suppress individual thought carried to a ridiculous length. But it is only a question of degree here if the free expression of what does not suit the views of the orthodox, whether represented by elderly maiden ladies, old-fashioned country parsons or those who claim to censor the programmes in the interests of the over-sensitive, is suppressed.

To take an actual case in point at the present time—great differences of opinion exist on questions of currency and finance. There is a highly orthodox view here that is openly challenged by the heterodox.

Even the bankers themselves are at loggerheads about present-day financial problems. Yet these matters affect the interests, and even the livelihoods, of all of us.

A PROTEST

Mr. Harold Nicolson who protested vigorously against the censorship which was imposed on certain of his broadcast talks.

The learned economists who have been good enough to favour us with their views over the wireless so far, since the subject became "hot," in the journalistic sense, have all expressed the strictly orthodox point of view, and where they have ventured to prophesy they have been proved wrong every time. Is it only an accident that the heterodox view has not been expressed?

There is, of course, the other side to this very controversy about the B.B.C. programmes. We do not want an overdose of cranks, and we do want both sides of the topical questions of the day presented. But it is just as bad only to allow the orthodox at the microphone as to deluge us with the views of the rebels.

And again some, though not all, of the cranks of to-day will be recognised in years to come as the pioneers and missionaries of this present day and generation. Galileo was looked upon as a crank when he suggested that the world was round.

I believe there are still citizens of some of the inland States of the Union in North America who believe to this day that Galileo was wrong and that the world *is* flat!

If we are to close down real controversy for fear of offending the fundamentalists we may as well stop all attempts at interpreting the thought of the day and confine the B.B.C. to bare announcements.

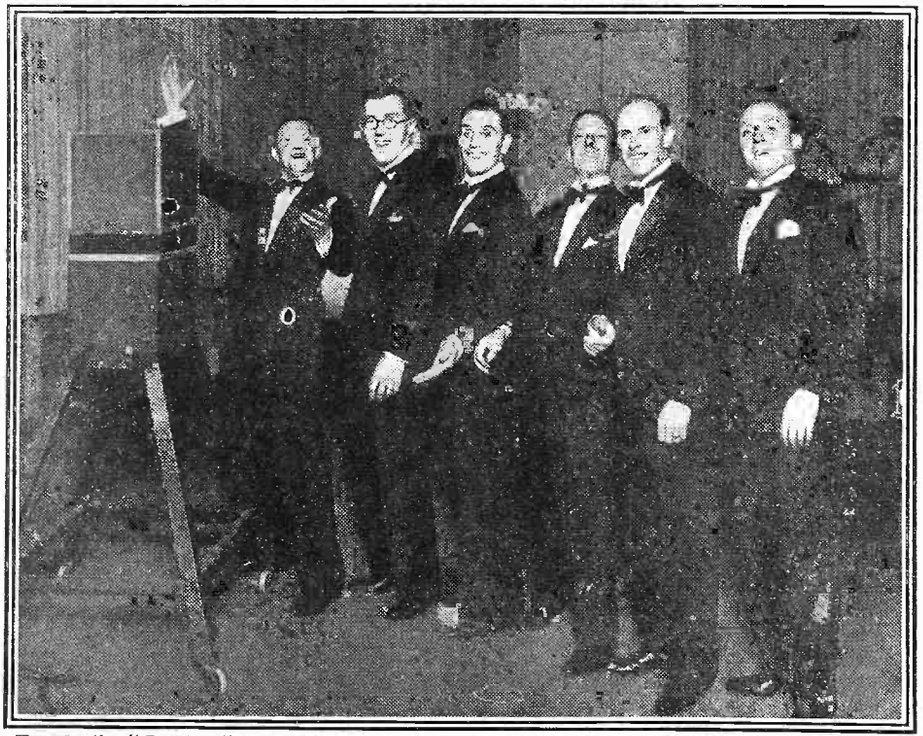
Hear Both Sides.

And neither is the present policy altogether consistent. There is nervousness lest the minds of certain people should be upset—yet we end up the programmes nearly every night by broadcasting jazz music, the very appeal of which, to many people, is that it excites their bodies.

I suggest that what is needed is the spirit of the best of the world's universities, where both sides of even the most controversial subjects are allowed expression so long as the protagonists are sincere, informed and interesting.

How this can be achieved without offence to public morality or the infliction of unnecessary pain to ordinary decent people, I shall endeavour to show in the next article.

POPULAR PROVIDERS OF PLEASING PROGRAMMES



Here are the "Roosters," a concert party originally formed from Army personnel for the entertainment of the Army. With one or two original members and a few new "stars" the "Roosters" constitute one of the most popular of all broadcast turns.

WHAT READERS THINK ABOUT—

The Eckersley Three — Those Dance Bands.

THE ECKERSLEY THREE.

The Editor, POPULAR WIRELESS.

Dear Sir,—I have just completed the Eckersley Three for a friend of mine. We have as yet not recovered from our shock. The set was finished, eliminator connected up, Amplion M.C. 6 moving coil also wired up. The tuning condenser is turned slowly. Hallo! Sh! A faint noise as of music. Yes, a little adjustment on reaction, and here she comes—pure, and with a wonderful volume for a three-valver. But most wonderful of all, one little turn of tuning condenser, and all is still—not a sound. One more little turn and, behold! another station, with not the faintest suspicion of overlap. Shock after shock as stations came and went, none of them together, but each on his own. "Hats off to Captain Eckersley."

The only snag with the set was that it had to leave for my friend's house, leaving mine own, a . . . . A wonderful set for giving you half a dozen stations at once!

On testing the Eckersley Three with a pick-up, we received most gratifying results, the tone and volume being excellent.

Langley Park, Durham. E. DAVIS.

THOSE DANCE BANDS.

The Editor, POPULAR WIRELESS.

Dear Sir,—I have read with great interest your article in the current week's issue of POPULAR WIRELESS, under the heading "After Five Years." Whilst in agreement with most of the points raised, I am afraid that I must disagree with you in one case.

This concerns outside dance broadcasts. You deal with several dance combinations, including Henry Hall's Gleneagles Band, Roy Fox, and so on, but don't you think you have omitted one combination which, in my opinion, overshadows those named?

I refer to Ambrose's Mayfair Hotel Orchestra, which, as regards playing skill, technique, and originality, has no superior in this country.

I mean to say, good as Henry Hall and the others may be, I give credit where credit is due, and I honestly think Ambrose's ranks as the best orchestra, at least in this country. Whether this band is British or foreign I do not know, but if the latter I can quite understand the reason why they receive such little recognition from critics in general. If they are British, I think it's a feather in our caps to be able to boast of such an orchestra.

Maidenhead, Berks. "FAIR PLAY."

ED. NOTE.—"Bert" Ambrose and his "boys" *are* a British combination.

"P.V.J." ONE

A headphone receiver for distant reception which embodies several special features. It is remarkably inexpensive, and is a particularly efficient instrument.

Described by A. JOHNSON-RANDALL.

ALTHOUGH most listening these days is carried out on a loudspeaker, there are still very many people who have a preference for headphones.

There is much to be said for a simple single-valve set. In the first instance it is inexpensive to build and extraordinarily economical to run. It really takes the place formerly occupied by the crystal set.

Ether conditions are pretty severe at the present time. Selectivity is a vital factor, otherwise it becomes impossible to listen to a transmission without a second or even a third station butting in. The crystal set has certain advantages, the chief one being that the running costs are almost nil.

Better Than a Crystal.

This is offset by the fact that a crystal receiver cannot be made to give high selectivity without a marked loss of volume, and in addition a crystal does not amplify; it can only rectify, which, in plain language, means that its useful range is limited at the most to three powerful stations—National (medium wave), Regional and 5 X X.

Now, the average listener wants something more than this. The bulk of his listening may be carried out on the local, but he likes also to be in a position to get other stations when he wishes.

A single-valver solves the problem, because one can employ reaction and so amplify as well as detect the minute currents received on the aerial.

Neither is the problem of selectivity so serious. Reaction solves the difficulty, since it wipes out coil losses and vastly increases the sharpness of tuning.

It may be said, without any exaggeration that a single-valve set with reaction will bring in at good headphone strength all the stations that can be received on the loudspeaker with a powerful detector and two transformer-coupled L.F. three-valver.

A one-valve receiver is an ideal set for the beginner. He can make up such a set at small cost and, after getting accustomed to the controls, he can then proceed to build a two-valve amplifier, thus providing himself with a first-class three-valve design by easy stages.

There is, as a matter of fact, a 6d. blue-print of a two-valve amplifier which is eminently suitable for use with the "P.V.J." One, and the number of this blue print is M.W.5 (the Full-tone Amplifier).

The "P.V.J." One is a particularly efficient design. The secret lies mainly in the coils, which, as the title implies, are the famous P.V. and P.J. units.

These coil units have been used in a number of "P.W." "Star" designs, and are highly effective on both the medium and long wave-bands. It would be extremely difficult to improve on these coils for volume and selectivity.

Novel Switching Scheme.

The method of switching in the "P.V.J." One is interesting. If you glance at the back of panel you will notice a three-way change-over switch.

When the switch knob is in the centre or neutral position the set is switched off, i.e., no current flows through the valve filament.

When the knob is turned to the left (anti-clockwise), the receiver is ready for working on the medium broadcast wave-band, the L.T. current being automatically

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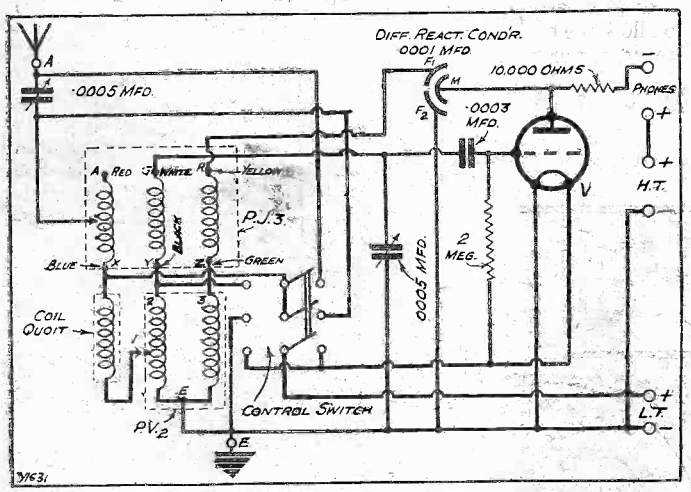
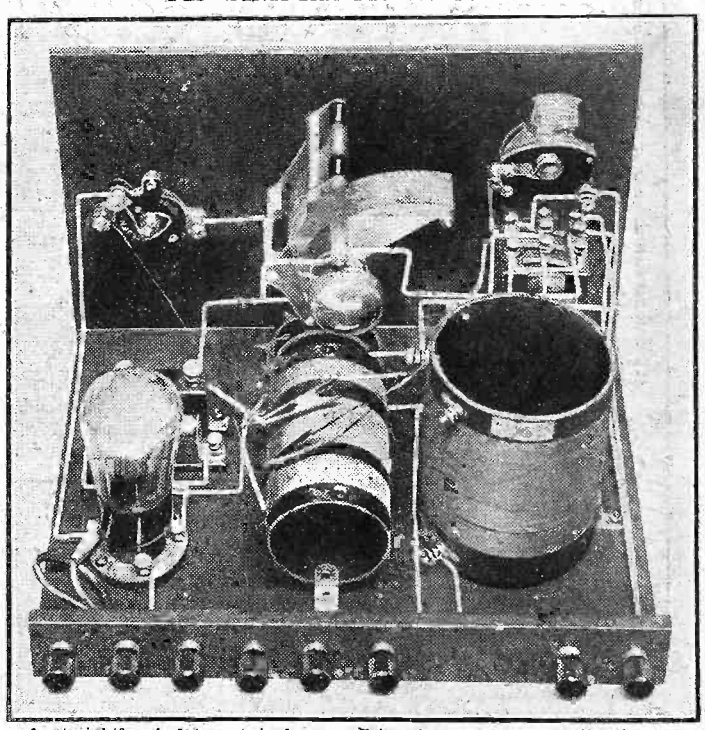
AN EFFECTIVE CHANGE OVER



The control switch performs a number of useful tasks, including wave-changing and turning the set on and off. When put over to long waves it automatically shorts the series-aerial condenser.

AS SIMPLE AS CAN BE



A straightforward layout and easy wiring keep the constructional work completely free from even the slightest of difficulties.

"P.V.J." ONE

(*Continued from previous page.*)

switched on, and the selectivity control (directly above the switch) is brought into circuit.

Then if the knob is rotated to the right (clockwise) the set is switched over to the long waves, the selectivity control being cut out of circuit (it isn't required on this wave-band), and a Contradyne coil is included in the aerial circuit.

What is this Contradyne coil, and what does it do? Well it is a simple hank winding consisting of 60 turns of No. 24 gauge D.S.C. wire, wound on a standard "P.W." coil quoit, 2 in. in diameter.

A hank winding, incidentally, is merely a number of turns of wire wound on "any old how," with no attempt to place them in carefully arranged layers.

This winding is effective on wave-lengths up to about 400 metres. Above this wave-length it is sometimes (not always) found that an increase in the number of turns is desirable.

So those listeners who come within the service area of the Northern Regional transmitter may find it necessary to try 100 turns of No. 30 D.S.C. instead of 60 turns.

A Useful Tip.

By the way, those who are in doubt can first of all use the standard 60-turn coil, employing No. 30 gauge wire instead of No. 24. Then it is quite easy to add another 40 turns, if necessary.

The 60-turn coil is perfectly satisfactory on the London and Midland Regional and the Northern and London National wave-lengths.

You will say "What does the Contradyne coil do?" The answer is "It eliminates a common trouble, viz., that of the nearby medium-wave station breaking through on the long waves and interfering with the reception of the various long-wave transmissions.

Complete Cure.

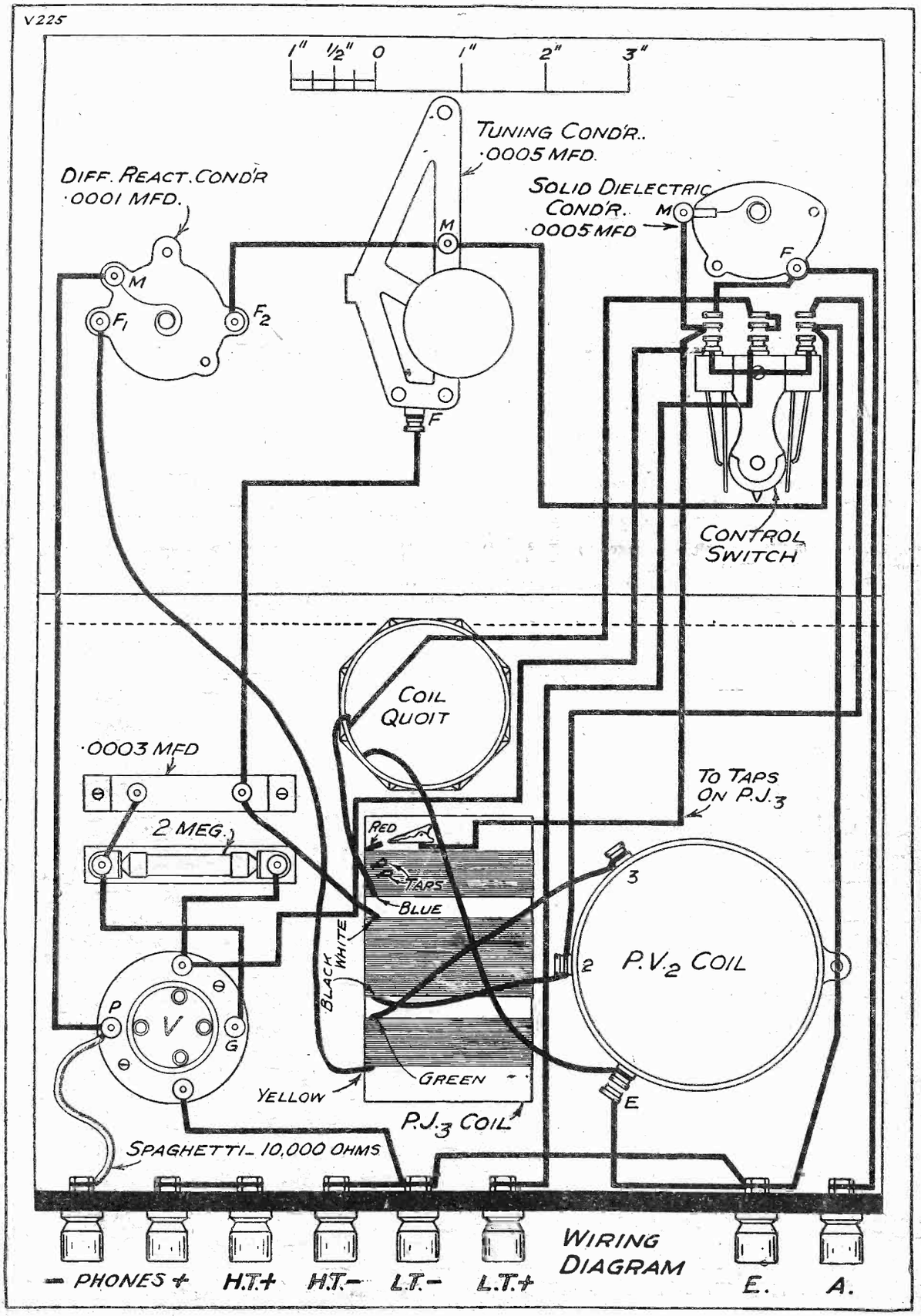
It has been found that in certain areas, directly a set is switched over on to the long wave-band, the local Regional or National transmission breaks through and makes itself a nuisance over a portion of the tuning dial.

This interference is liable to ruin long-wave reception, and the "Contradyne" scheme is an effective method of cutting it out.

Now about the construction of the set.

(*Continued on next page.*)

YOU DON'T HAVE TO SOLDER A SINGLE WIRE!



Every connection is taken from a terminal or screw or nut, so that a pair of pliers is the only tool needed when wiring up the "P.V.J." One.

"P.V.J." ONE

(Continued from previous page.)

First of all there is the panel to be marked out and drilled.

The panel layout gives all the dimensions necessary, and all you have to do is to mark off the four drilling points with the aid of a straight-edge and a scriber, or a sharp-pointed nail, and then to run a drill through the drilling centres so obtained.

In most cases a ⅜-in. drill will suffice for all the holes. In addition, there are three smaller holes along the bottom edge of the panel for securing it to the baseboard.

When you have drilled the holes for mounting, you can then proceed to screw the panel to the baseboard, and to place the tuning and reaction condensers, and also the selectivity control and switch, in their respective positions.

After this the components can be laid out on the board, and the terminal strip screwed into position.

Perhaps it will be as well to leave the P.V. and P.J. coils for the moment, until the Contradyne coil is wired to the switch. This also applies to one or two other wires from the switch.

Simplified Wiring.

If you look at the photographs, you will see that some of the wiring comes between the panel and the two coils, and the task is simplified if the coils are left until this part of the job is completed.

Now about the wiring. The original set was wired up with stiff wire of the Glazite variety. If some of you feel that you cannot tackle this type of wiring, you might try flexible leads

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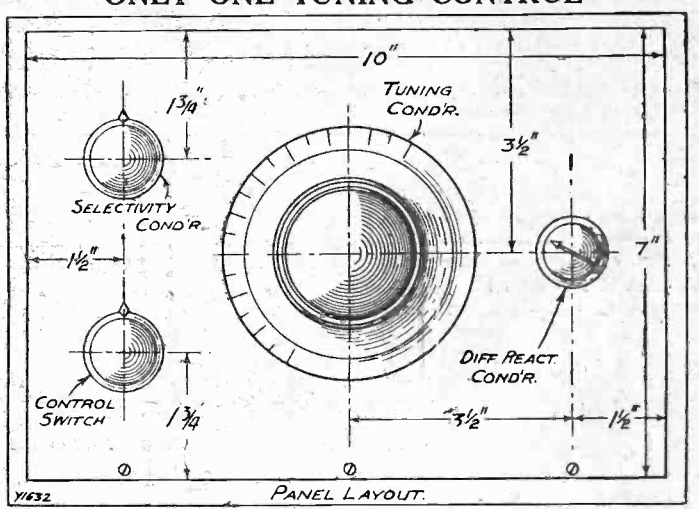
THE PARTS YOU REQUIRE.

1 Panel, 10 × 7 in. (Permcol, Peto-Scott, Ready Radio, Wearite, Becol, Goltone).
1 Cabinet to fit, baseboard 7 in. (Gilbert, Camco, Peto-Scott, Ready Radio, Pickett).
1 ·0005-mfd. tuning condenser (J.B., Cyldon, Lotus, Telsen, Igranic, Dubilier, Polar, Lissen, Formo, Wavemaster, Graham Farish).
1 ·0005-mfd. solid dielectric condenser (Ready Radio, Telsen, Ferranti, Lotus, Graham Farish, Polar).
1 ·0001-·00015-mfd. differential reaction condenser (Telsen, Lotus, Polar, Ready Radio, Ferranti, Polar, Graham Farish, Cyldon).
1 3-pole rotary change-over switch with terminals (Wearite).
1 P.V.2 coil (Wearite, Lewcos, Peto-Scott, Ready Radio, Formo, Parex, Goltone, Melbourne).
1 P.J.3 coil (Lewcos, etc.).
1 ·0003 fixed condenser (Dubilier, Ferranti, Telsen, Graham Farish, Ediswan, Mullard, T.C.C., Ready Radio, Lissen, Igranic, Formo, Goltone).
1 Coil quoit (Sovereign, A.E.D., Peto-Scott, Ready Radio, Melbourne, Wearite).
2 oz. 24 D.S.C. wire for Quoit.
1 2-meg. grid leak and holder (Telsen, Ferranti, Graham Farish, Lissen, Igranic, Mullard, Ediswan, Varley, Dubilier).
1 10,000-ohm "spaghetti" resistance (Varley, Lewcos, Telsen, Ready Radio, Peto-Scott, Graham Farish, Sovereign, Igranic, Bulgin, Goltone, Lissen).
1 Valve holder (Telsen, Graham Farish, Wearite, Clix, W.B., Lotus, Lissen).
1 Terminal strip, 10 × 1½ in.
8 Indicating terminals (Belling & Lee, Igranic, Eelex, Clix, Bulgin, Goltone).
1 Crocodile clip (Bulgin, Goltone).
Glazite, Lacoline, Jiffilinx, Quickwire, flex, screws, etc.

ACCESSORIES.

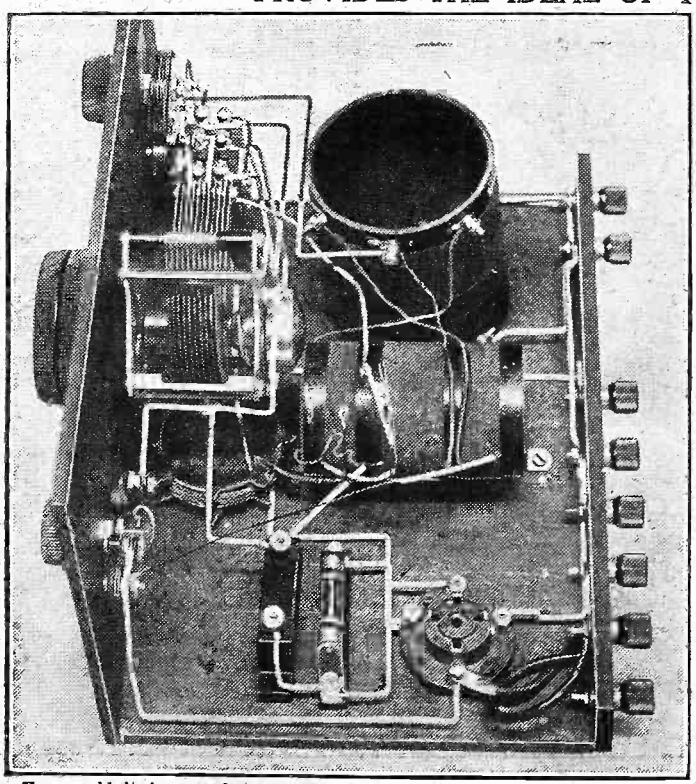
VALVE.—1 Det. Mullard P.M., 2 D.X., or H.L. type Mazda, Osram, Marconi, Cossor, Six-Sixty, Tungsram, Dario, Fotos, Lissen.
BATTERY.—H.T. 60–90-volt (Pertrix, Ever Ready, Lissen, Magnet, Ediswan, Columbia, Drydex.)
ACCUMULATOR.—Voltage to suit valve (Exide, Lissen, Ediswan, Pertrix, G.E.C.).
TELEPHONES.—1 pair, any good make.

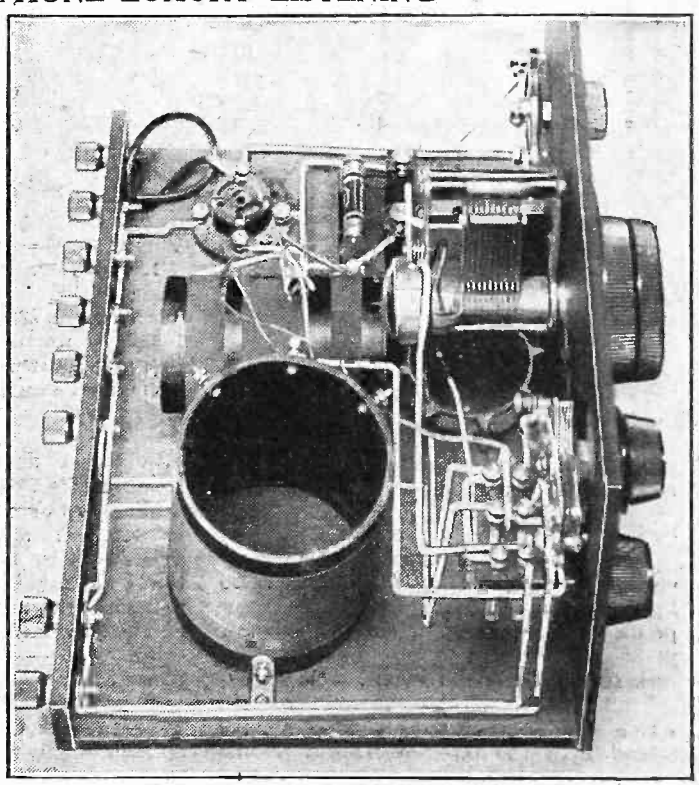
ONLY ONE TUNING CONTROL



All the panel components, of which there are only four, are of the one-hole fixing type, so only two sizes of drills will be required.

PROVIDES THE IDEAL OF TELEPHONE LUXURY LISTENING





You couldn't have a finer set for headphone reception, for with its quality, ease of control, and reaching-out properties it gives all you can want. What is more, it is just the set to make into a first-class loudspeaker receiver by the addition of a separate amplifier.

The MARCONIPHONE TYPE 42 A.C.

You will enjoy reading about this set and the account of a home test that brought in five American programmes the first night it was put on the aerial.

By A "P.W." Technician.

'YOU are listening to station W G Y, Schenectady. This programme is coming to you through the courtesy of——"—I felt almost like adding, "through the courtesy of the Marconiphone Type 42 A.C. Receiver!"

But let me tell you the whole story.

The Marconiphone people recently sent along to "P.W." one of their new type 42 A.C. all-electric receivers for test and report, and after a very promising preliminary test in "P.W.'s" research laboratory, the Editor invited me to take it home to see what I could do with it under suburban conditions.

Almost Unlimited Range.

In the light of my subsequent tests, I am rather inclined to think the Editor would have been nearer the mark had he invited me to take it home to see if there was anything I could *not* do with it!

But before I invite you to join me, spiritually, on the evening on which the tests were made, let me tell you something about the actual set itself.

The Marconiphone "42 A.C." is a highly efficient combination of an S.G., Detector and Pentode for use on A.C. mains. At the front—which, as you will see from the photographs, is particularly pleasing in appearance—there are three small knobs and a neat little "window" through which the condenser setting can be read straight off in terms of wave-length.

The small knob on the left is the main tuning control, the one in the centre is a trimmer, or, in more "homely" language, a vernier tuning control, while the knob on the right controls a four-way switch which adjusts the set from the off position to medium waves, long waves, or gramophone.

A combined reaction and volume control is provided on the right-hand side of the instrument in a position which makes for easy accessibility when operating the set.

Moving-Coil Speaker.

The "42 A.C." incorporates a moving-coil loudspeaker, and inside the set the valve holders are clearly marked with the appropriate valve markings. I mention this last point, for although it may appear to be rather a trivial one, I regard it as an excellent example of the thorough way in which the Marconiphone Company have attended to the often-overlooked details which are so necessary for the uninitiated user.

But I think I have said enough about the attractiveness of the actual set itself, so now come with me to a suburb west of London, and let us see what we can do with it "on the air."

Let us try the medium broadcast band first. How do we know it *is* the medium broadcast band? Yes, I had thought of that, too, but then so had the Marconiphone people!

Have a look under the tuning condenser "window." Do you see the illuminated marking which tells us the wave-band over which the set is tuning, and which also indicates when the instrument is switched over to gramophone pick-up? Smart idea that, isn't it?

Ah, here's a powerful station down at the bottom of the scale! What is the dial reading—241 metres—that must surely be Wilno (Poland). S-sh! He's just going to announce! Yes, it *is* Wilno!

Let us go on up the scale, and stop only when we hear what I call a worth-while transmission—one that is not heterodyned or distorted, and is at adequate strength for all normal domestic requirements.

What is this one at 247 metres? Must be Trieste. Yes, it certainly is Trieste, for you could not mistake that announcement, could you? Next, please!

Great Scott! There's a whole gamut of stations simply rolling in just here, and this one at 261 metres must be the London National. Back with the volume control. There, now, how is that for superb quality? Remarkable, isn't it?

And so half an hour slips by.

How many stations is that we have heard intelligently and at more than sufficient volume in our quick run over the medium wave-band? Thirty-one, eh? And that is with the 68-kilowatt locals working only fourteen miles away!

Stations Galore!

Now let us see what we can do on the long waves before we switch over to the gramophone. Ah, here we are, this is Huizen, and here is Radio Paris, and Königswusterhausen, and 5 X X, and Eiffel Tower, and Warsaw, and Motala, and Reykjavik (Iceland), and Kalundborg, and—here, wait a moment, let us change over to the pick-up, for they all sound so much to the standard of 5 X X that I cannot decide which programme to settle on!

Yes, let us have the Arthur Meale version of the "Storm" played on the organ of the Central Hall, Westminster. Quick, back with the volume control. Ever heard organ music from a gramophone record reproduced so realistically?

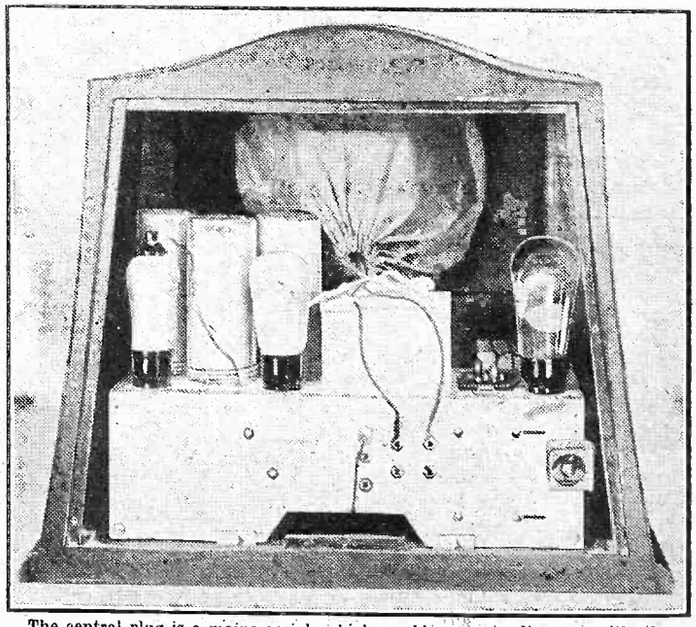
Five "Yanks"!

What do I think of the Marconiphone, Type 42 A.C.? Well, after all that, what could I think? What with the sensitivity, superb quality and, perhaps equally as important, the ease with which it can be handled, I can only sum it up as a very creditable instrument—in fact, I have been so impressed with its "reaching-out" capabilities that I am going to set the alarm for 3 a.m. to-morrow and try for the Yanks!

Did I succeed? As a matter of fact, in a little more than half an hour of lost slumbers I heard five American stations in all.

Altogether, the Marconiphone "42 A.C." is a fine instrument, and I have no hesitation in saying that it is one of the best commercial three-valvers I have tested. The price is 20 guineas.

AN INSIDE VIEW OF THE "42 A.C."



The central plug is a mains aerial, which enables you to dispense with the usual "outdoor" one if desired—very handy! Note, too, the safety-socket on the right, which takes the mains connector.

CAPT. ECKERSLEY'S QUERY CORNER

Under the above title, week by week, our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers.

Don't address your letters direct to Capt. Eckersley; a selection of those received by the Query Department in the ordinary way will be answered by him.

Replacing A.C. Valves.

L. D. A. (Richmond).—"I am at present using a directly-heated output valve in my four-valve A.C. receiver, which employs two low-frequency stages. The valve in the first L.F. stage has developed a fault, and I should be glad if you would kindly inform me as to whether it is possible for me to use a directly-heated valve in this position in place of the present indirectly-heated valve, or is a directly-heated valve only applicable to the output stage?"

It doesn't matter *in principle*, whether you use directly or indirectly-heated valves; they all act *in principle* just the same. *But* an indirectly-heated valve may have a characteristic very different from the directly-heated type. So just slamming in

any old indirectly-heated or directly-heated valve won't do. We must *design* the circuits round the valve.

However, if the makers say that your directly-heated valve proposed to be added has, more or less, the same sort of performance as the indirectly-heated (which has gone phut), by all means fit it.

P.S.—Indirectly-heated valves give less hum.

* * *

Single-Wire Aerials.

A. N. C. (Rochester).—"Will you tell me why it is that the average broadcasting aerial is usually of the single-wire type?

"I notice that on ships more than one wire is used. In fact, on a naval vessel I saw an aerial comprising two parallel sausages each containing six wires."

You've got to take a lot more care with a transmitting aerial than with a receiving aerial. Every wasteful ohm in a transmitting aerial may lose you kilowatts.

You can destroy lots of ohms in a receiving aerial by using reaction. Thus, suppose you had a transmitting aerial with a 50 per cent radiatic efficiency and you had 100-kilowatt input, 50 would be useful, 50 wasteful.

Increase the radiatic efficiency to 75 per cent, and 75 are useful, 25 wasteful. Any receiver will get a much stronger field strength because of the increased efficiency and this is a gain in level of wanted over unwanted signals.

But in a receiving aerial, doing the same thing would merely make the receiver get a *little* stronger signal, whereas the signal *could* be increased tenfold by putting on another valve in the amplifier.

The efficiency of the transmitting aerial is thus all-important, and the receiving aerial doesn't matter if you can have a valve set. But with a crystal receiver it's well worth while looking to the aerial.

* * *

The Time-Lag

N. K. (Manor Park).—"I have an all-mains receiver with indirectly-heated valves, and it takes a few seconds before I receive any signals after I switch on. Is this quite in order, because I didn't get this with my last receiver, which had 2-volt valves?"

This is very common. The indirectly-heated valve has a temperative lag; it takes a little time for the heater to bring its surrounds to the required temperature.

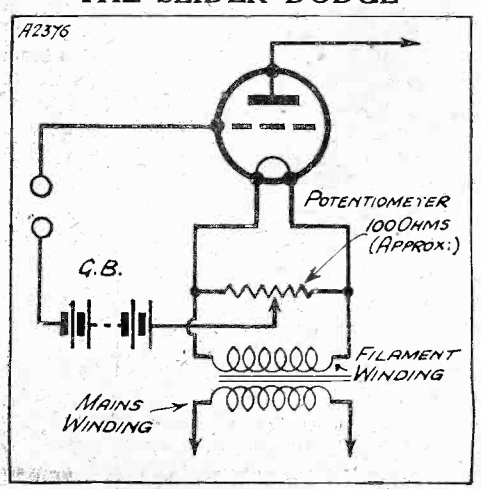
The directly-heated *filament* has little temperative lag, and gets hot at once.

* * *

Power-Valve Hum.

B. D. (Weybridge).—"My present A.C. receiver with H.T. unit have been perfectly satisfactory for the past year, until recently I replaced the power valve with a new pattern super-power type. Instead of the improved results I expected, a loud hum now completely spoils the programmes, but the receiver is quite O.K. if I replace the original valve."

THE SLIDER DODGE



Illustrating the method of "grid return" to the slider of a potentiometer instead of to one side or to the centre of the heater circuit.

Frankly, I don't know without more information. I should have expected just the reverse, because I should have expected the super-power valve to have a *lower* magnification value and a stouter filament.

The following are suggestions:

1. The new valve may have a higher magnification.

2. The new valve may have a smaller filament current.

BUT these are things to try. Light the filament with an accumulator. Does the hum cease? Yes! Then try the A.C. arrangement shown in my sketch. By moving the potentiometer slider you should

A CLIP TIP!

Temporary joints with flex and a clip are often poor because the short thread of the screw does not permit the flex to be gripped. A "packing" of 2 or 3 turns of stout wire gets over the difficulty.

find a minimum hum. If it isn't filament, increase the H.T. smoothing.

* * *

That New Loudspeaker.

T. F. H. (Cardiff).—"It was suggested by a friend that to increase the quality from my set I need only purchase one of the many moving-coil loudspeakers at present on the market. I obtained a new loudspeaker and was disappointed with the results.

"Should I have ordered some special type of moving-coil to suit my set, or do moving-coil loudspeakers require special sets?"

No! Yes! No! Yes! Oh!

A good loudspeaker—and all good loudspeakers are not moving-coil speakers, and all moving-coil speakers are not good speakers—requires a good set, and the better a loudspeaker the more critical it is of the set which feeds it.

A loudspeaker which reproduces *all* the frequencies fed into it reproduces *all* the distortions fed into it. A loudspeaker which gives a rough impression isn't very particular about the original being rough. So first get a good quality set. Secondly, the "low-impedance" loudspeakers require a step-down transformer.

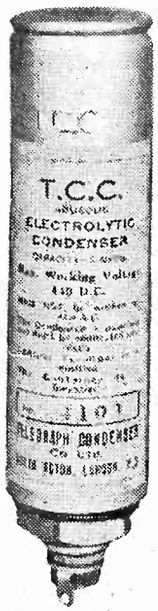
FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?

ACHIEVING HIGH CAPACITIES.

FOR a long time the electrolytic condenser suffered from a serious limitation; it would not withstand any but low voltages of the order of 6 or so volts.

The principle under which it operates is, of course, an electrolytic one, and it depends for its functioning upon the formation of a skin of gas between its "electrolyte" and a metal construction.



The new T.C.C. electrolytic condenser

This gas skin is very thin and so high capacities are achieved with comparatively small electrode areas because, you will remember, the capacity of a condenser is directly decided by the thickness of its "dielectric"—the thinner it is the higher the capacity.

It is now possible to produce electrolytic condensers capable of standing up to high electrical pressures. And the new Inverted Type T.C.C. Aqueous Electrolytic condenser is an example of the new technique.

It is compact, indeed small, yet its capacity is 8 mfd., and it can stand anything up to some 440 volts D.C.

But it should be noted that this T.C.C. product is not to be placed on the retail market, but is only being supplied to set manufacturers.

Nevertheless, as it is said to be the first British condenser of its type, it certainly must be recorded in our columns that on test it gave completely satisfactory results.

MAGNUM SPAGHETTI RESISTANCES.

There is no doubt about it at all: constructors have had trouble with Spaghetti resistances. However, most of the leading manufacturers have now got to grips with the problem of the production of "Spags" and are now making dependable varieties.

Our old friends Burnes Jones, for instance, have entered this field and are making Magnum "Spags" which certainly do seem to be reliable in every way.

I have very closely examined the couple they have sent me, and I cannot discover any weaknesses in them. They appear to be perfectly sound.

LOEWE PUBLICATIONS.

The wideness of the modern range of radio components now made by The Loewe Radio Co., Ltd., is very well illustrated by their new components catalogue.

Another Loewe publication radio enthusiasts should make a point of acquiring is the leaflet describing the latest Loewe all-electric set, the E.B.100 (Model 1932).

NEW R.I. COMPONENT.

The new R.I. "Quad-Astatic" H.F. choke is a particularly attractive little component both on account of its appearance and its efficiency.

Compactness is a desirable quality, but one at which the constructor is apt to look askance if it is obtained at a sacrifice of efficiency.

A GOOD CHOKE

The R.I. "Quad-Astatic" H.F. choke.

But when it is present in a component of first-class efficiency it can but increase that component's popularity to a considerable extent.

The R.I. "Quad-Astatic" is effective over both broadcasting bands, and we have no hesitation in recommending its use in our set designs.

H.F. ON THE MAINS.

It is probably not yet fully realised by constructors in general that a great deal of the noise heard on some mains sets is due to H.F. irregularities. This is also apparently unknown to many manufacturers, too!

I have heard a number of mains sets the owners of which suffer from much more in the way of interfering noises than they need do were steps taken to deal with this form of interference. But I believe that not a few are under the impression that a certain amount of noise is inevitable!

However, there is now available a neat little device for dealing with these H.F. irregularities in the mains.

It is the Blue Spot Mains Disturbance Eliminator, and it can be used in conjunction with any existing set.

You merely plug it into the supply mains socket and plug your set into the socket on the device.

The Eliminator is successful in what it sets out to do, for the simple reason that it comprises a very sound and thorough H.F. filter system in which two H.F. chokes and two fixed condensers figure.

So you see you are getting really good intrinsic value for the 10s. 6d. that is asked for it.

NEW "RED DIAMOND" SWITCH.

The Jewel Pen Co., Ltd., inform us that in order to meet a demand for a 4-point switch with an insulated spindle, they are now producing their type R.D.35 with a "dead" spindle.

The price is 2s., and we must say that at this figure we considered it very good value for money.

But, then, most constructors will be acquainted with one or other of the "R.D." types of switches, and will know them as sound, well-made components.

They will also no doubt, regard "R.D." with affection for the sensible disposition of terminals, by which the wiring is so much facilitated, which is a feature of all "R.D." switches.

FOR METAL CHASSIS.

Lectro Linx, Ltd., are now making new Insulated Resilient Sockets primarily for use on metal chassis. These sockets will accommodate any of the following: Clix Parallel Plug, Solid Plug, and "Vicegrip" Wander Plug.

The new sockets supersede the original Clix Insulated Resilient Socket and also the Rigid Socket with engraved shoulder.

I have examined samples of these latest Lectro Linx lines and in my opinion they are very attractive devices.

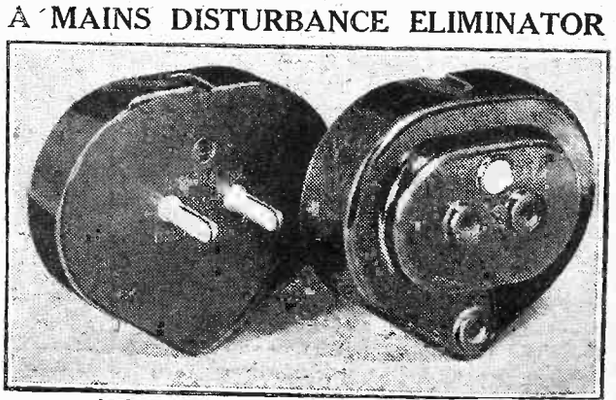
And they only cost 2d. each in red or black, engraved or plain.

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 undertake to return them, 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.

A MAINS DISTURBANCE ELIMINATOR



A Blue Spot device designed to reduce mains noises.

MARCONI'S LATEST EXPERIMENTS

A "P.W." representative tells you all about a special interview he recently had with the Marchese Marconi, during which the latest short-wave developments were discussed.

"NOW," said the Marchese Marconi. "What can I tell you?"

The great inventor had just returned from a long Mediterranean cruise in his famous yacht, the "Elettra," and as I faced him across his desk in his office in Marconi House, overlooking the Strand, I was struck by his bronzed and sunburned appearance. He balanced a cigarette case on the tips of his fingers while I explained to him how eager "P.W." readers were to hear about the secret experiments he had been conducting on the "Elettra."

As he started telling me about his work, thoughts flashed through my mind. . . . Thirty years ago, almost to a day, this man—Mr. Marconi as he then was—startled the world by bridging the Atlantic by wireless for the first time. Now, here he is, His Excellency the Marchese, talking to me of things which even *he* never dreamed of at that time—of death rays, power by radio, echoes from space, television, and so on!

"My experiments were mainly concerned with ultra-short waves," he said; "that is, with wave-lengths between 20 and 50 centimetres; and I must say that I am quite pleased with the results, although the research is, as yet, by no means complete.

"The first thing we noticed about ultra-short waves was that they behaved almost exactly like light.

Like Light.

"We used a 30-centimetre transmitter just as one would employ a searchlight, throwing the beams of waves in any desired direction. We could not, of course, see the waves, but it is obvious that they travel in a beam, just like the rays from a searchlight.

"In fact, the waves might be called 'invisible light,' and a useful point is that neither fog, darkness, smoke, nor anything like that, has any effect on them. The snag, however, is obvious—we can only send the beam just over the horizon, and since it goes in a direct line, there must not be any obstacles, otherwise the waves will be stopped."

Feeling the Waves!

The marchese explained to me that he was of the opinion that the beam curved round the earth, as it were, and got a little beyond the horizon, owing to refraction—another property of light. So far as he knew, though, ultra-short waves possessed no chemical properties, like light, nor could they be photographed, as X-rays can.

He then told me of one of his most significant discoveries:

"Engineers tell me that such short waves can kill mice and birds and other small animals. Well, I've not experimented with them as a death ray, but I do know this—if you get in their path, your whole body begins to warm up. The ray feels hot if you put your hand in it, and although you cannot see the beam of 'invisible light,' you can, close up to the transmitter, feel it there.

"There may be big possibilities behind these phenomena, and I intend to study the question carefully as soon as I am able to get back to my experiments."

The marchese gave me the impression, however, that he was not attempting to develop his discoveries into anything like a death ray, nor did he see any great opening there for the transmission of power by radio.

"Of course," he said, "we use absurdly low power. A few watts, that's all. It really doesn't matter what power we use, so far as I can see. I don't think I have made use of anything like a kilowatt yet; it doesn't seem to make any difference, so if we gain no advantage, why waste power?

"In any case, there is no jamming on such a short wave-length. The ether there is perfectly free from interference and, more important still, there is a heap of room for thousands of stations.

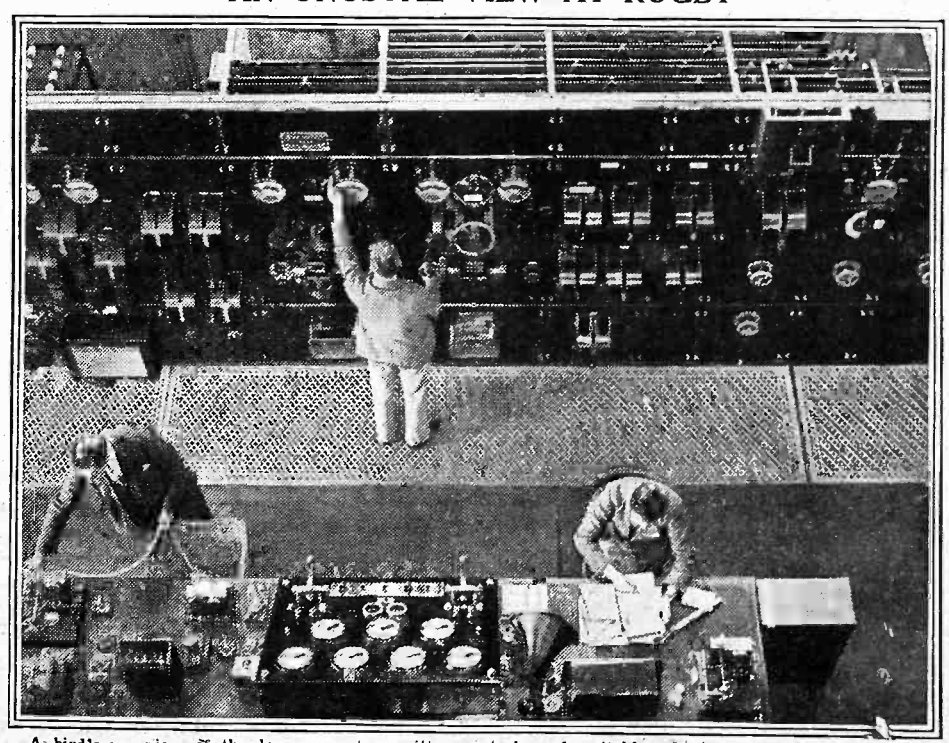
"Probably quite a lot of transmitters could work close together and on the same wave-length, provided they were making use of the directional properties. Moreover, only low power is ever likely to be required for sending over the short distance to the horizon—fifteen or twenty miles or so.

Below 50 Cm.

"The question of wave-length, too, is important. Fifty centimetres seem to be about the ideal, and there is no necessity for and nothing gained in going lower. Using valves, we transmitted on 30 centimetres, and with

(*Continued on next page.*)

AN UNUSUAL VIEW AT RUGBY



A bird's-eye view of the long-wave transmitter controls and switchboard at Rugby, where the trans-atlantic telephony service is centred.

MARCONI'S LATEST EXPERIMENTS

(Continued from previous page.)

spark oscillators we did some work on 20 centimetres.

"Another important thing about ultra-short waves is that they are not reflected by the Heaviside Layer. Thus, there is no fear of them being reflected to great distances and picked up miles away. I have shot the waves directly up into the sky, but failed to detect any reflection whatever. The waves must have penetrated the Heaviside Layer, I think, but where they go to—goodness only knows!"

This brought us to the absorbingly interesting question of echoes.

"If the waves travel into space," I asked, "might they not be reflected from the moon, or the stars?"

Amazing Echo Effects.

"Possibly," he said; "but I hold no views on that question. I have heard echoes of all sorts, but not on the ultra-short waves. On 20 or 30 metres we get long-delay echoes up to fifteen seconds. These must have come from thousands of miles in space. Then there was an occasion on the Rome-Sardinia 9½-metre radio-telephone circuit, when I was puzzled by multiple echoes. If I spoke the short Italian word 'Si,' it came back four or five times very quickly and sounded like this: *Si, si, si, si, si!*

"This is what had happened—each word went right round the world in one-seventh of a second. The message went round like this, time after time, and on each occasion, as it passed our receiving station, I heard again what I had said. This effect got to be such a nuisance that I was compelled to work upon something to prevent it. Otherwise, a whole sentence would jumble up with multiple repetition."

On Seven Metres.

"What are the practical applications of your ultra-short wave discoveries?" I asked.

"To begin with," he replied, "think how useful it would be for battleships in a fleet to talk to each other over short distances without the enemy eavesdropping. Then, too, aeroplanes in squadron formation could communicate secretly, and without difficulty. We can link up small islands which otherwise would not be on the telephone, and by use of relay stations, just over the horizon from each other, use the ultra-short waves for long-distance telephone circuits."

I took the opportunity of asking the marchese what he thought of the B.B.C.'s scheme for experimenting with a 7-metre transmitter on the roof of Broadcasting House. (The Marconi Company are building the equipment for this station.)

"For my own part," said the marchese, "I have never experimented with 7-metre broadcasting stations, although I have naturally some experience on that wavelength. I should imagine that, in a big town like London, where there are millions of listeners within easy range, a 7-metre relay station would prove exceedingly useful, provided there were not too much absorption from steel buildings. Even here, however, we might have aerials up above.

"I imagine, too, that there might be some crackling noises from motor-car ignition sources, but perhaps this will not be serious. The great point is, 7-metre transmissions are not reflected by the Heaviside Layer over great distances, so that there can be no unexpected jamming from a station working away on the other side of Europe. For this very reason, though, the range of a 7-metre transmitter will be limited. But within a radius of, say, ten miles, there should be good reception, free from the jamming which prevails on ordinary broadcasting wave-lengths."

Next Time!

His Excellency smiled good-humouredly when I was about to depart, and would not hear of my apologising for taking up so much of his time.

"Not a bit of it," he said. "I am delighted to have explained anything that may have been interesting to you. Perhaps the next time we meet I shall be able to tell you of some really special developments."

"Have you anything in mind, then?"

"Ah!" he answered. "Much in mind, but nothing to say—at the moment!"

PRESERVING YOUR PLANE

Useful advice for amateur woodworkers.

By REGINALD TEECE.

SINCE it is quite impossible to do good work with your tools not correctly sharpened, I propose to outline the correct method of sharpening the plane. The plane is nearly always a source of trouble to the amateur craftsman, and there is nothing more likely to cause exasperation to the woodworker than a poor plane. It ruins your chance of getting a really good finish on your cabinet.

Planes vary in structure; some are constructed of metal throughout, others are of the more familiar hardwood.

It is not necessary to go into detail regarding the various types and purposes of planes here, but the chief ones in use in the ordinary way are:

The Plane Iron.

The Smoothing Plane.—Used really for finishing, as its name indicates, and about 8 in. long.

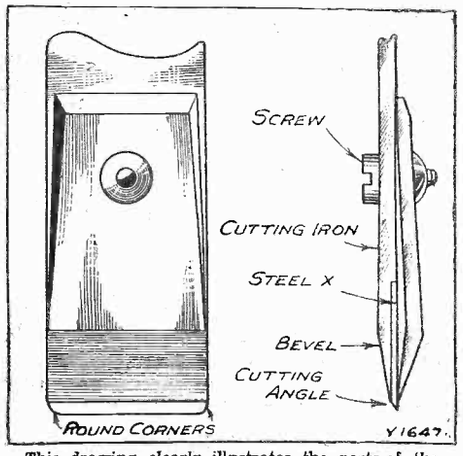
The Block Plane.—This is for small work, and is made of metal.

The Jack Plane.—This plane is about 17 in. long, and is used for trueing up surfaces before applying the other planes. In other words, this plane precedes the others, unless the wood has been purchased in a prepared state, when it will only require careful treatment with the scraper, and finally glass-paper. There is another larger bench plane, the *trying plane*, but the amateur will not require this.

In the sketch of the plane iron, it will be seen to consist of two separate parts. The longer iron is the blade proper, or *cutting iron*, and screwed to this is the *back iron*. The former is made of iron, except for a small portion marked "X" in the sketch; this is steel. This method of construction facilitates grinding, as the larger portion, being iron, is soon ground to the required angle on the emery stone. Sometimes it is more convenient to cut the large bevel with a milling file, afterwards finishing on the emery stone.

If you use this method, don't use a coarse file, and do not try to file the steel portion of the blade. It must be remembered that the idea of cutting the bevel with the file is only to save time in grinding, and that the blade has to be finished off afterwards on the grindstone, or whatever means the amateur has at hand.

SETTING THE EDGE



This drawing clearly illustrates the parts of the plane referred to in the accompanying article.

When the long bevel has been carried right down to a *point*, one can attend to the cutting edge, which must be done entirely on the oilstone. The angle for this edge is 35 degrees, and the angle for the larger bevel is 25 degrees. The cutting iron needs to be slightly rounded on each corner, as shown in the sketch; this is to prevent the blade scoring the wood when in use.

Finishing Off.

It will be noticed that the back iron is adjustable, and it is necessary to set this iron back from the cutting edge of the blade to about $\frac{1}{16}$ in., and a little more than this for the jack plane. The back iron should always fit close.

When setting the cutting edge on the oilstone, try to keep the angle the same throughout the process. A round edge *must* be guarded against, or the blade will give trouble. Don't forget to remove the wire edge afterwards, and in so doing keep the blade quite flat on the oilstone. Only a few circular strokes or movements are necessary. Always apply the thumb-nail test, so as to make sure that you have removed the entire wire edge; and, remember, the real edge lies underneath this waste, so be careful how you remove it, in case you damage the new edge.

Before placing the blade in the plane, hold the iron towards the light, when you will be able to see at a glance if the cutting angle has received sufficient attention. If it has *not*, you will see a white line along the extreme point of the blade. It is of the utmost importance that you pay particular attention to the grinding and setting of this blade, because the presence of flat spots or wire edge will stop the plane doing good work.

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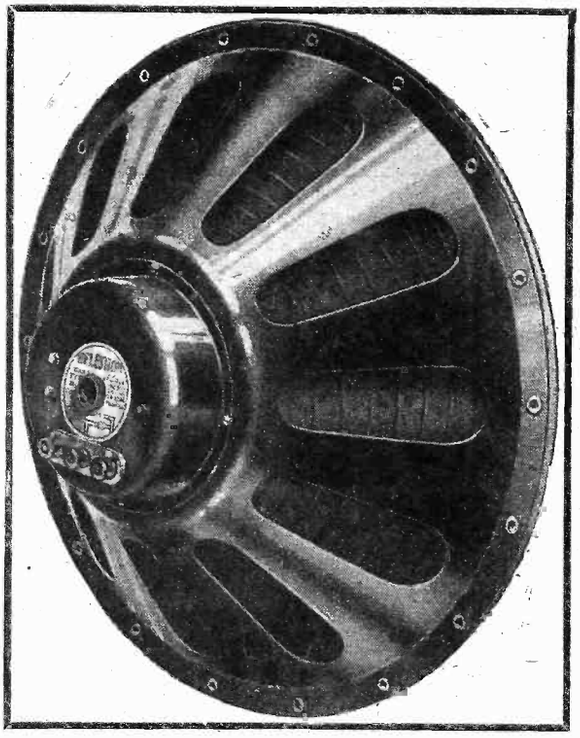

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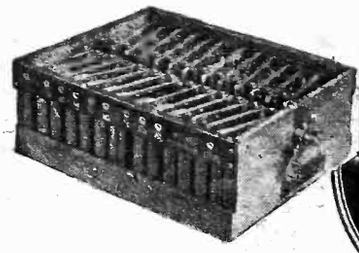

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N.C.C.86.

REDUCING HUM IN MAINS SETS

Is a certain amount of hum inevitable in a mains set or when an H.T. unit is used ? Or should there be a complete freedom from it even during programme intervals ? These are the questions dealt with in this article.

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

ONE of the hoariest of all radio fallacies is that a certain amount of hum is inevitable in any mains set or, for that matter, even when only H.T. is taken from the mains.

This is quite wrong ; hum is not inevitable, and a perfectly silent background can nearly always be obtained providing the apparatus is properly designed.

I have several times made that statement in the past, but its repetition is commanded by the present growing popularity of radio mains gear.

It is to be feared that the fiction of inevitable hum is circulated largely by over-enthusiastic or ignorant shop-assistants who find themselves in the invidious position of having to sell badly-designed mains receivers and units, for it is a fact that shops all over the country hold alarmingly large stocks of these.

Those "Dirty" Mains.

You will note that I have written "badly designed." Now by that I do not necessarily mean *wrongly* designed—inadequately would, perhaps, be a better word.

In every mains unit or set a proportion of the components used, and a certain amount of the general "framework," have the definite task of "smoothing"—removing irregularities in the current.

Using standard parts and materials it can be said that, in general, the effectiveness of the "smoothing" will be proportional to the cost of the components and materials used.

With that borne in mind, it should next be noted that the "hum content" will greatly vary with different mains. Some mains are exceptionally "clean," and with these, cheap and almost elementary smoothing will prove capable of suppressing hum.

On the other hand, there are mains which are exceptionally "dirty," and elaborate smoothing arrangements will be needed with these if the last hum residue is to be removed.

The Designer's Dilemma.

Correlating these two sets of facts, it will be appreciated that manufacturers of mains units and sets are in the unhappy position of having to face up to a situation which can only be met by a rather unhappy compromise, if they are to be able to compete in a somewhat "cut-throat" market.

If they were to go all out to cope with the wickedest mains supply in the country, a majority of their customers would be paying for quite unnecessary smoothing.

But, again, if they designed their apparatus with only the smoothest mains in mind, they would have to meet the violent criticisms of the users of all the rougher mains supplies.

A few of the better class of manufacturers do go "all the way" in their smoothing, others appear to strike a medium which, if not quite a happy one, is at least praiseworthily superior to that adopted by those remaining concerns which seem to operate on the principle of "so long as we please some of the people some of the time, we'll have plenty of appreciative letters to show the grumblers."

But I must not forget to add that a handsome proportion of those better-class manufacturers who do not quite "go all the way," run efficient service departments to deal with "hard cases," and it may be that economically this is the best method of dealing with an admittedly difficult problem.

Of course, the toleration level of hum varies with individual listeners. For myself I cannot tolerate any hum at all. I am served at home by rather bad D.C. mains, and it took some time and the use of some rather expensive gear to remove the last vestige of mains noise.

H.F. Often to Blame.

It was comparatively easy to reduce the hum to the extent that it was faintly audible only during programme intervals when reaction was applied, and most of the time and money was spent in getting rid of the residue, a residue which would probably be tolerated by nine out of ten listeners.

It should be appreciated that I have been using the word "hum" in its most elastic sense to cover all mains-current irregularities. Unfortunately, these are not all due directly to low-frequency variations. The mains also provide an efficient channel for the conveyance of high-frequency disturbances—their effectiveness in this regard can be gauged by the fact that currents set up by broadcasting can be drawn from them.

So you find that many mains are "alive" with disturbances of an H.F. origin due to all sorts of things in the neighbourhood, from medical apparatus to lifts, trains and trams.

Where Constructors Score.

And before hum can be dropped to even a moderately low level, it is often necessary to provide H.F. filters in the mains input.

Those of you who are troubled seriously by hum should note whether or not the hum is loudest when the set is tuned to the lower wave-lengths (the lower readings of the tuning dials). If it is, then you can be pretty sure that it is caused to a greater or lesser degree by "H.F. on the mains."

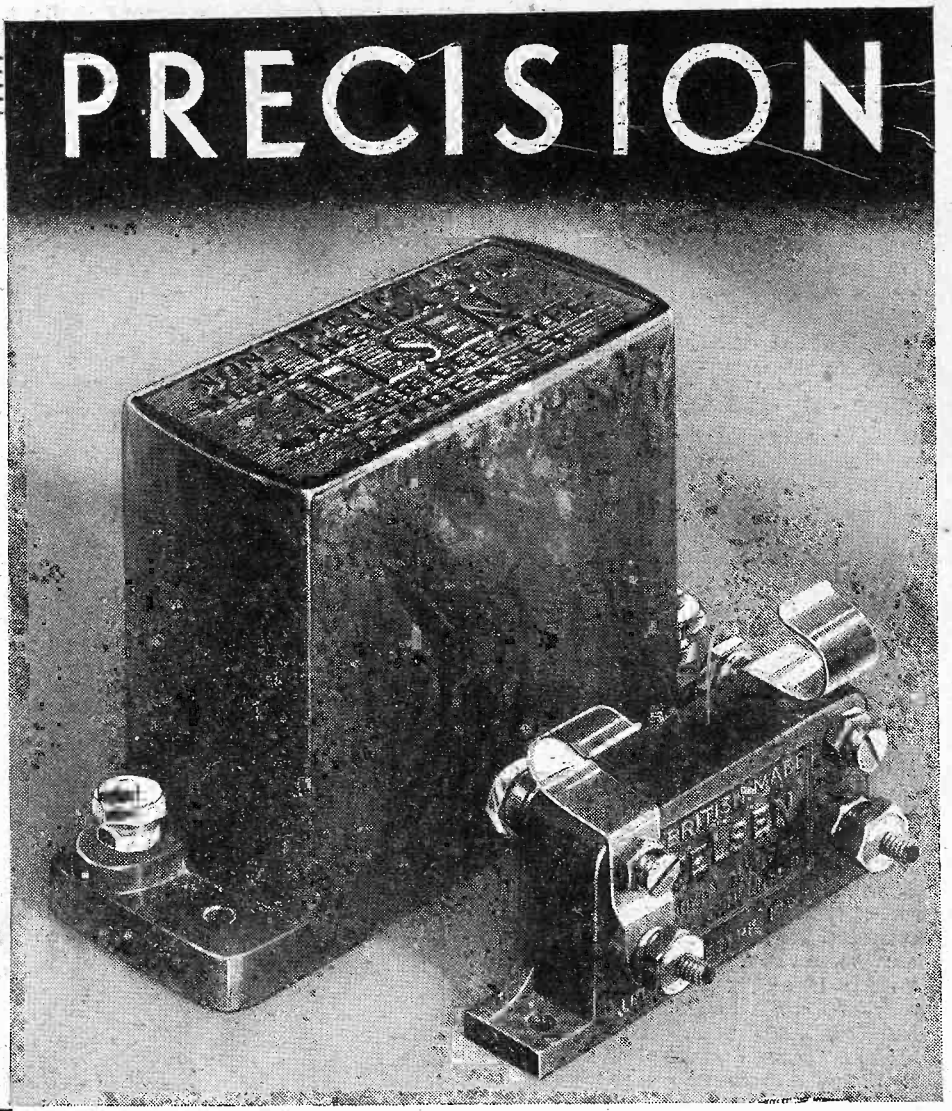
To deal with this kind of interference it is necessary to place H.F. chokes in series with the L.F. smoothing chokes. But they must be special H.F. chokes designed to carry the currents used—few of the ordinary H.F. chokes will serve the purpose.

Finally, I am impelled to point out that, in regard to hum, the constructor scores heavily over the purchaser of a commercial set in that he can modify his receiver in accordance with the "hum content" of his mains ; constructor designs of mains sets and units invariably provide for that.

A RADIO DETECTIVE

A German Post Office official touring the rooftops of Berlin with a portable radio receiver in an attempt to track different kinds of radio interference, including oscillating receivers.

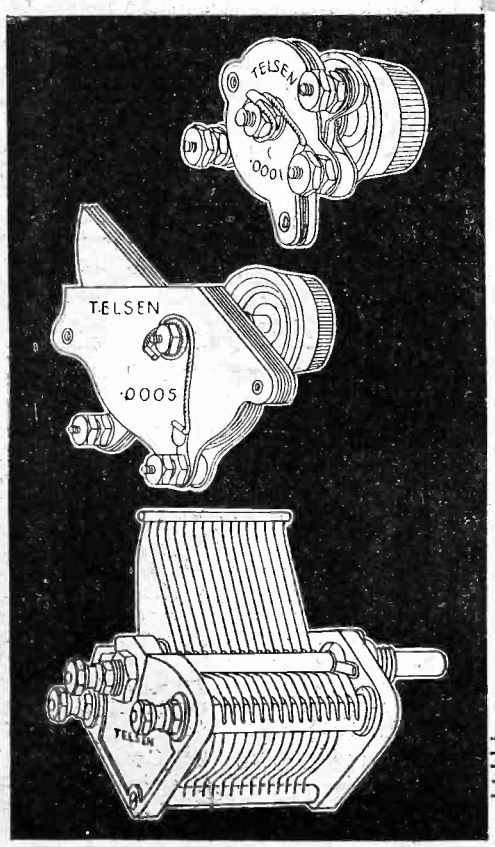
PRECISION



TELSEN MANS-BRIDGE TYPE CONDENSERS from 1/6

FIXED CONDENSERS (Prov. Pat. No. 20287/30) Price 6d.

PRE-SET CONDENSERS, Price 1/6



LOGARITHMIC VARIABLE CONDENSER in capacities ·0005, ·00035, ·00025, Price 4/6

DIFFERENTIAL, REACTION AND TUNING CONDENSERS in all capacities, Priced from 2/-

TELSEN

100% BRITISH RADIO COMPONENTS

Advt. of The Telsen Electric Co., Ltd., Aston, Birmingham.

CVS—122

THE MIRROR OF THE B.B.C. By O.H.M.

B.B.C. AND REVIVAL OF THE MONDAY "POPS"

NOTTINGHAM HARMONIC SOCIETY—"RANK" IN THE B.B.C.—PROGRAMME POINTERS—HOBSON'S CHOICE.

I UNDERSTAND that the B.B.C. is seriously considering the revival of the Chamber Music Concerts which were at one time as popular as the Queen's Hall Proms. The idea is to put on a new series in the Hall at Broadcasting House on Monday evenings.

Nottingham Harmonic Society.

It is likely that the B.B.C. will relay the special Easter performance by the Nottingham Sacred Harmonic Society of "Gerontius." As the conductor will be Sir Hamilton Harty, this may mark the beginning of the end of the feud which has gone on for so long between the famous conductor and the B.B.C.

"Rank" in the B.B.C.

Recent changes in staff arrangements have caused a good deal of heartburning about the rank, status, and so on, of a number of B.B.C. officials. There is a good deal of unrest and, unless something is done to meet the grievances, I expect quite a crop of resignations.

The position of Regional Directors is specially involved. The root cause of the difficulties is the combination between the youth of the B.B.C. and the strange, almost parodoxical stability of its organisation in the past five years.

So far there has been singularly little promotion, and certainly no criterion of promotion, hence when, as now, there is a kind of "general post," conflict is inevitable between those who give priority to seniority of service and those who follow the Navy tradition of promotion by selection.

Programme Pointers.

Speeches by the Prince of Wales and by Captain E. A. FitzRoy, M.P., Speaker of the House of Commons, at a meeting organised by the National Council of Social Services, will be relayed from the Royal Albert Hall on Wednesday, January 27th. The object of the meeting is to bring to the notice of the youth of Great Britain the voluntary assistance it can give to social services in a thousand and one ways.

Hobson's Choice.

That famous comedy of Lancashire life in the 1880's, Harold Brighouse's play, "Hobson's Choice," is to be broadcast during the North Regional programme on Thursday, January 21st.

It is an ideal story for the microphone, this tale of Mr. Hobson and his boot and shoe shop at Salford, where his three daughters think he does not always treat them as kindly as he might, which causes the eldest, Maria, to marry her father's best shop-hand, Will Mossop.

Most listeners know what happened when Mr. Hobson's luck deserted him and how he was faced with the inevitable and gave the world a phrase which is more expressive than a hundred sentences.

Two other plays, which are in the Northern programmes for Friday, February 5th, have as their chief interest a contrast in the dialects of the North and East Ridings of Yorkshire with that of the West Riding.

The plays, which will be given by the Driffield Players and Yorkshire Comedy Players, will be preceded by a short talk by Mr. F. Austin Hyde, the secretary of the Yorkshire Dialect Society, who will explain the essential points of the dialect to be used.

The first of a series of six talks dealing at some length with the Bronte novels will be given during the North Regional programme on Wednesday, February 3rd, by Miss Phyllis Bentley.

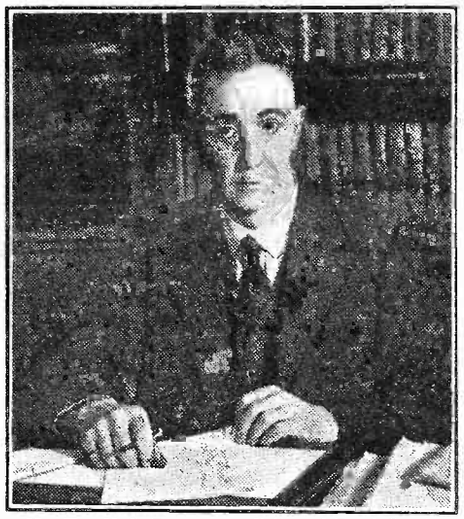
Many people will also look forward to the forthcoming talk by Mr. J. V. Allen, who will describe the Life of a Lakeland Sheep Farmer, an insight into which listeners have already had by the running commentaries on the Annual Lakeland Sheep-dog Trials for some years past.

Nine-thirty Novelties.

The next of Mr. Charles Brewer's Nine-Thirty Novelties has been given a place in the Midland Regional programme on Saturday, February 6th, the first occasion on which one of these shows has been presented on a Saturday. Light music, one or two sketches and burlesques will make up the show, the cast of which includes: Dorothy Summers, Evelyn Over, Myles Clifton, Alfred Butler, the McGowran Male Voice Quartet, Jack Venables, the Revue Chorus, and Ernest Parsons' Orchestra.

Arthur Bliss, famous as the composer of the Choral Symphony of War, "Morning Heroes," which has already received several broadcast performances, is to visit the Belfast studio on Friday, February 5th, to conduct the Wireless Chorus and Orchestra in a programme of his own music, which will include "Pastoral," a composition for chorus, mezzo-soprano solo, solo flute, drums, and string orchestra, and which is based upon poems selected from the works of several authors. The concert will be followed by a Shakespearean programme given by Fred C. Hughes (tenor), May Turtle (soprano), and the Radio Septet.

NEW B.B.C. GOVERNOR



Mr. Harold C. Brown, a solicitor of Bond Court, Walbrook, London, E.C., who has been appointed a Governor of the B.B.C. in succession to Sir Gordon Nairne.

THE LISTENER'S NOTEBOOK

A rapid review of some of the recent radio programmes.

THE success of that romantic operetta "Good Night Vienna" should encourage other authors to proceed on similar lines when considering the technique of wireless production. The introduction of spoken captions was, I think, the most outstanding feature of the show—more outstanding, perhaps, than the omission of music of the fox-trot order.

I am convinced that the spoken caption, or title—a device borrowed from the silent film—could be used with effect both in broadcast drama and opera. But if it is used, it *must* be spoken, and not acted. Mr. Dennis Arundell did not speak his titles, he acted them as dramatically as he would have acted lines from Shakespeare. The result was that I frequently mistook him for one of the cast.

Many people will disagree with me on the plea that "if these titles were said in a cold and business-like voice, the continuity of the play would be broken and the atmosphere shattered." In fact I have already heard this opinion expressed.

Buy British Programmes.

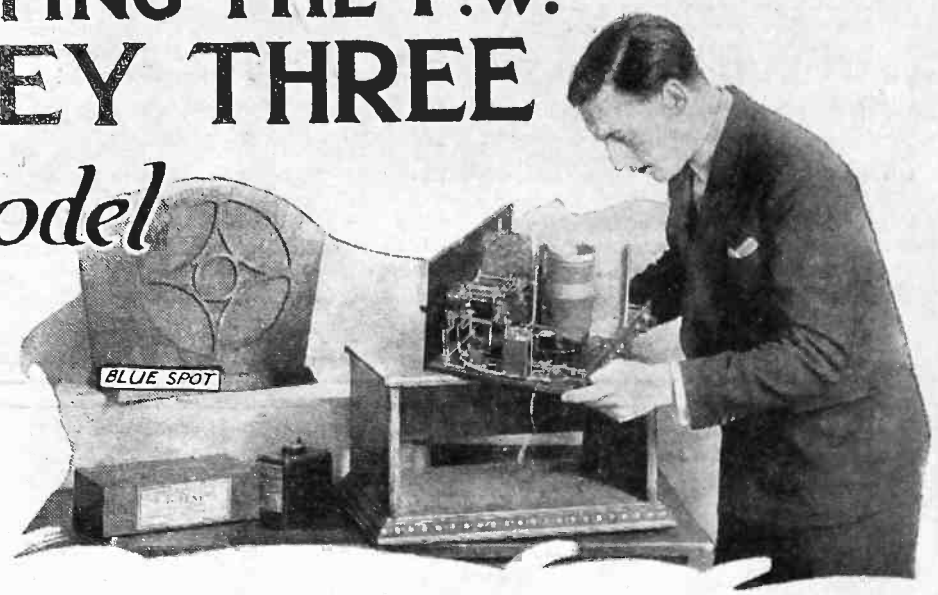
But I would answer these people by asking them whether, in the days of the silent film, the continuity of the picture was broken, etc., either by their own reading of the caption or by that of the chattering person who invariably sat behind them. I don't think so!

The "Buy British" Campaign has apparently extended its activities to France, for I noticed, the other Sunday, at least

(*Continued on page* 1145.)

CONSTRUCTING THE "P.W." ECKERSLEY THREE

Extenser Model



In this issue of "P.W." Capt. Eckersley describes the construction of his astounding set, especially arranged for Extenser tuning. This up-to-the-minute component, in conjunction with the highly efficient Eckersley Tuner, produces a combination which it is impossible to beat.

NOW we can start to build the set.

If you have purchased a kit, most of the work will have been done for you.

Simple Panel Dimensions.

Others who have bought the additional parts to complete the list will probably have to drill the panel and terminal strip. There are no difficulties here—the panel is laid face downwards on a flat surface and a centre line is scribed horizontally, 3½ in. down from the top or 3½ in. from the bottom edge (it's the same thing).

Next, vertical lines are marked off to the dimensions given in the "panel layout," the points where the vertical lines intersect the horizontal centre line being the drilling centres for the holes.

The scribing part of the business can be carried out with any sharp-pointed metal object such as a nail, the tang of a file or a darning needle.

Similarly the straight edge can be either a steel or wooden rule—it's quite unimportant so long as it *is* straight and indicates inches and fractions of an inch.

Having found your drilling centres, it's not a bad plan to mark them clearly by a nail, sharply tapped with a hammer—any sort of hammer and ditto nail. This serves a useful purpose in providing a start for the drill.

Some Practical Tips.

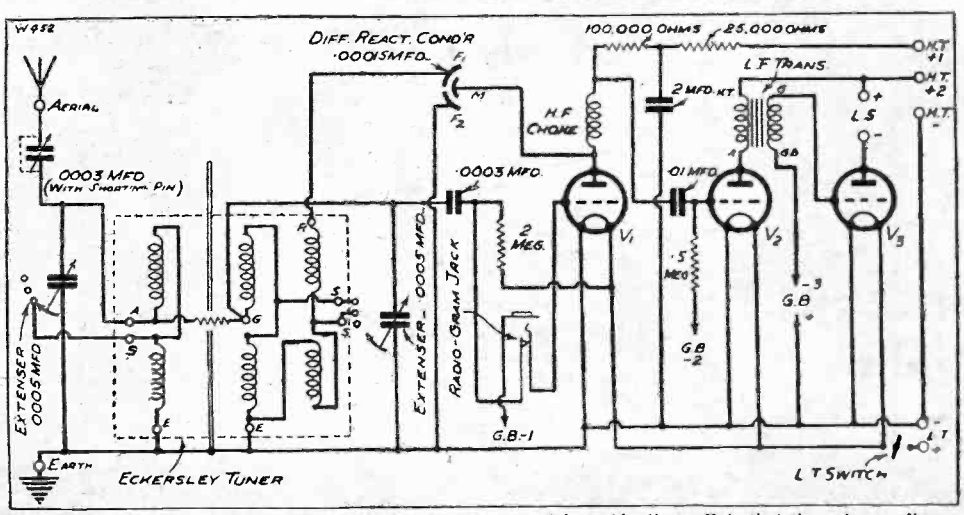
Whatever you do don't mark off the dimensions with a pencil because graphite is a conductor and will result in a leaky panel.

(Continued on next page.)

CHOOSE YOUR MAKES FROM THIS COMPREHENSIVE LIST

1 Panel, 18 in. × 7 in. (Permcol, Goltone, Lissen, Parex, Wearite).
1 Cabinet, with 10-in. baseboard to fit (Cameo, Ready Radio, Peto-Scott, Pickett, Osborn, Gilbert).
2 ·0005-mfd. Extensers, with cam connected to moving vanes (Cyldon, Formo, Wavemaster).
1 Filament snap switch (Ready Radio, Bulgin, B.A.T. or push-pull, Telsen, Wearite, Goltone, Peto-Scott).
1 ·0003-mfd. solid dielectric condenser, with shorting position (Ready Radio, Ferranti).
1 ·0001-·00015-mfd. differential condenser (Polar, Lotus, Ready Radio, Igranic, Ormond, J.B., Dubilier, Lissen, Burton, Formo, Wavemaster, Telsen, Cyldon, Graham Farish).
3 Valve holders (Telsen, Igranic, Lotus, Wearite, Lissen, Graham Farish, Clix, Bulgin, Formo, Dario).
1 2-mfd. fixed condenser (Telsen, Dubilier, T.C.C., Lissen, Ferranti, Igranic, Sovereign, Hydra, Formo, Helsby).
1 ·01-mfd. fixed condenser (Dubilier, Telsen, T.C.C., Lissen, Ediswan, Igranic, Ferranti, Watmel, Formo, Graham-Farish, Sovereign, Goltone).
1 ·0003-mfd. fixed condenser (Ferranti, Telsen, Sovereign, Goltone, Formo).
1 25,000-ohm Spaghetti resistance (Telsen, Ready Radio, Lewcos, Bulgin, Peto-Scott, Sovereign, Graham Farish, Lissen, Varley, Goltone, Igranic).
1 100,000-ohm Spaghetti resistance (Varley, etc.).
1 2-meg. grid leak and holder (Telsen, Dubilier, Lissen, Ferranti, Ediswan, Igranic, Loewe, Graham Farish, Watmel, Varley).
1 H.F. choke (R.I., Lewcos, Peto-Scott, Telsen, Ready Radio, Tunewell, Parex, Varley, Climax, Dubilier, Lissen, Lotus, Wearite, Watmel, Sovereign, Atlas, Graham Farish).
1 ·5-meg. grid leak and holder (Telsen, Dubilier, Lissen, Ferranti, Ediswan, Igranic, Loewe, Graham-Farish, Watmel, Varley).
1 L.F. transformer (Climax, Telsen, Igranic, Lissen, Varley, Ferranti, R.I., Lotus, Lewcos, Goltone, Atlas, Formo).
1 Eckersley tuner (Goltone, Lewcos, R.I., Formo, Sovereign, Melbourne, Wearite).
1 Radio-gram jack (Igranic P.62).
1 Terminal strip, 18 in. × 1½ in.
9 Indicating terminals (Igranic, Bulgin, Belling & Lee, Eelex, Clix, Goltone).
1 Screen, 4 in. × 6 in. (Parex, Peto-Scott, Ready Radio, Wearite).
G.B., H.T., and L.T. plugs, etc. (Belling & Lee, Clix, Igranic, Eelex).
Flex, screws, etc. Glazite, Lacoline, Quickwire, Jiffilinx.

A CIRCUIT OF OUTSTANDING POSSIBILITIES



The Eckersley Tuner and the Extenser comprise a very powerful combination. Note that the only coupling between the aerial circuit and the tuned grid coil is through a high resistance. This arrangement provides remarkable selectivity.

CONSTRUCTING THE "P.W." ECKERSLEY THREE

(Continued from previous page.)

Oh, and don't forget to drill three holes along the bottom edge of the panel, the distance from the edge being equal to one half the thickness of the baseboard.

These holes are for the wood screws which secure the panel to the baseboard.

Now the terminal strip. There are nine terminals and the jack. The battery and loudspeaker terminals are spaced 1 in. apart, and those for the aerial and earth are 2 in.

The strip runs the whole length of the baseboard, and requires three screw holes for fixing purposes as in the case of the panel.

The procedure now is to screw the panel and terminal strip into position and then to mount the components.

I don't think you will come up against any "snags" in this, so I am going to pass straight on to the question of layout.

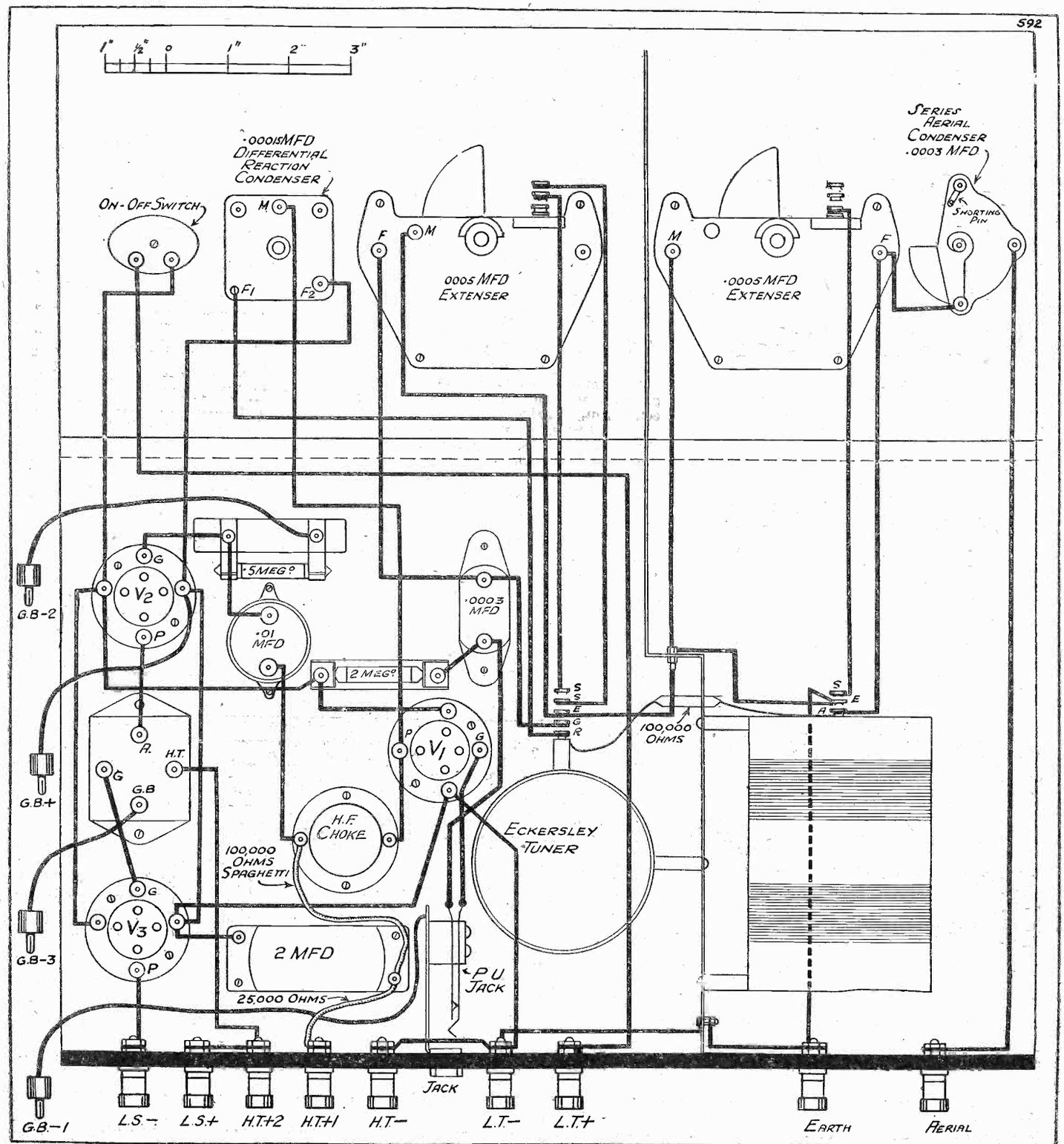
The tuner is supplied complete with screen, but I have extended this screen by attaching to it a piece of copper sheet, 6 in. high and 4 in. wide.

Inter-Condenser Screening.

This extra shield is arranged so as to come between the two "Extensers," and it is bent at right angles for ½ in. of its width, this portion being screwed to the

(*Continued on page* 1132.)

THIS DIAGRAM WILL ASSIST YOU WITH YOUR WIRING



After all the components have been fixed to the baseboard and panel this diagram should be used as a guide for the wiring. Keep all leads as short as possible and make a final check before trying out the set.

. . Matched Kits . . Tested Kits . .

READY RADIO KITS

for the

"P.W." ECKERSLEY THREE

. . . Original Model . . .

MATCHED KITS

Kit "A" (Less Valves and Cabinet) **£4:13:6**

OR BY EASY PAYMENTS

8/9 DOWN and 11 monthly payments of 8/9

Kit "B" (With Valves less Cabinet) **£6:1:0**

OR BY EASY PAYMENTS

11/3 DOWN and 11 monthly payments of 11/3

Kit "C" (With Valves and Cabinet) **£7:1:0**

OR BY EASY PAYMENTS

13/- DOWN and 11 monthly payments of 13/-

Any Component can be supplied separately.

RECOMMENDED ACCESSORIES

1 Pertrix 120 v. H.T. Battery	15 6
1 Pertrix 9 v. G.B. Battery -	1 6
1 Pertrix Accumulator Type P.A.C.3 - - - -	11 0
1 Blue Spot 44R. Loudspeaker	£2 12 6

The Ready Radio H.T. Eliminator (with trickle-charger combined) type B.S. (A.C. Mains) is especially suitable for this set.

Price £5:17:6

JIFFILINX

FOR SIMPLER WIRING

Always use Jiffilinx for wiring. They eliminate soldering, give perfect contact and are the most convenient, rapid and neat method of wiring a set.

Forty Jiffilinx in various lengths, fitted with shake-proof connectors—price 2/6.

Send for a packet to-day.

"How to get real quality, How to increase selectivity, How to change to Mains Operation." These are but three of the many matters described in Mr. Kendall's Book entitled, "Ten Hows for Modern Radio Constructors." Send four 1½d. stamps now for your copy. (If you wish you can use order forms below.)

The "P.W." Eckersley Three Extenser Model

This is the list of parts you need.

	£ s. d.
1 Polished Oak Cabinet, 16 ins. x 7 ins. x 10 ins. with baseboard	17 6
1 Ebonite Panel, 16 ins. x 7 ins.	5 0
2 Cyldon ·0005-mfd. Extensers with dials	1 8 0
1 ReadiRad Filament Switch, Snap Type	2 9
1 ReadiRad ·0003-mfd. solid dielectric condenser with shorting position	3 6
1 Readi Rad. 00015-differential condenser	2 6
3 Valve holders	1 6
1 T.C.C. 2-mfd. fixed condenser, Type 50	3 10
1 T.C.C. ·01 fixed condenser, Type S	2 6
1 T.C.C. ·0003 fixed condenser, Type 34	1 6
1 ReadiRad Standard H.F. Choke	4 6
1 Lewcos 25,000-ohm Spaghetti Resistance	1 6
1 Lewcos 100,000-ohm Spaghetti Resistance	1 6
1 ReadiRad 2-meg. leak & holder	1 4
1 ReadiRad 1-meg. leak & holder	1 4
1 R.I. Dux L.F. Transformer	6 9
1 R.I. Eckersley Tuner	15 6
1 Lotus Jack, J.K.1	2 0
1 Aluminium Screen, 3½ ins. x 6½ ins.	1 6
1 Terminal strip, 16 ins. x 1½ ins.	1 6
9 Belling-Lee Terminals, Type R.	2 3
3 Valves as specified	1 7 6
1 Packet of Jiffilinx for wiring	2 6
Belling-Lee Wander Plugs	8
Flex, Screws, etc.	7
	£6 19 6

Any Component can be supplied separately.

TO INLAND CUSTOMERS.—Your goods are dispatched post free or carriage paid.

TO OVERSEAS CUSTOMERS. 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 charge forward.

Ready Radio

HEAD OFFICES:
Eastnor House, Blackheath, S.E.3
'Phone: Lee Green, 5678.
'Grams: Readirad, Blackvil.
SHOWROOMS:
159, Borough High Street, London Bridge, S.E.1.
'Phone: Hop 3000.

CASH or C.O.D ORDER FORM

To: READY RADIO, LTD., Eastnor House, Blackheath, S.E.3.

Please dispatch to me at once the following goods.....

.....

or which { (a) I enclose / (b) I will pay on delivery } (cross out line not applicable) £.....

Name.....

Address.....

P.W. 23/1/32. .....

EASY PAYMENT ORDER FORM

To: READY RADIO, LTD., Eastnor House, Blackheath, S.E.3.

Please dispatch to me the following goods.....

.....

for which I enclose first deposit of £.....

Name.....

Address.....

..... P.W. 23/1/32.

CONSTRUCTING THE "P.W." ECKERSLEY THREE

(*Continued from page* 1130.)

right-angle bend on the tuner screen. (See photographs.)

Thus there is a vertical shield across the entire depth of the baseboard. The distance between the tuner screen and the right-hand edge of the baseboard (looking at the back of the set) is approximately $5\frac{3}{4}$ in.

SUGGESTED ACCESSORIES

LOUDSPEAKER.—Blue Spot, Amplion, H.M.V., Marconiphone, W.B., Graham Farish, Epoch, R. & A., Celestion, Undy, B.T.-H.).

VALVES.—1 Det. (Cossor H.L.210, or suitable Mullard, Mazda, Osram, Marconi, Six-Sixty, Tungsram, Lissen, Dario).
1 L.F. (Mullard P.M.1L.F., etc.).
1 Output (Marconi P.2, etc.).
(If other output valve used, adjust G.B. voltage accordingly. Milliamp. consumption of above at 120 volts H.T. = 16 m/a.).

BATTERIES.—H.T.: 120-volt super-capacity (Pertrix, Ever-Ready, Drydex, Lissen, Magnet, Ediswan, Columbia).
G.B.: 9 volts (Drydex, etc.).
(Note: If more than 120 volts H.T. used, G. Bias should be available up to 15 volts).

ACCUMULATOR.—Exide, Ediswan, Lissen, Pertrix, G.E.C.

MAINS UNITS.—Should supply up to 20 milliamps at 120 volts (Regentone, Ekco, Tannoy, Atlas, R.I., Heayberd, Lotus, Tunewell, Formo). (State voltage and type of mains, and give details of set when ordering).

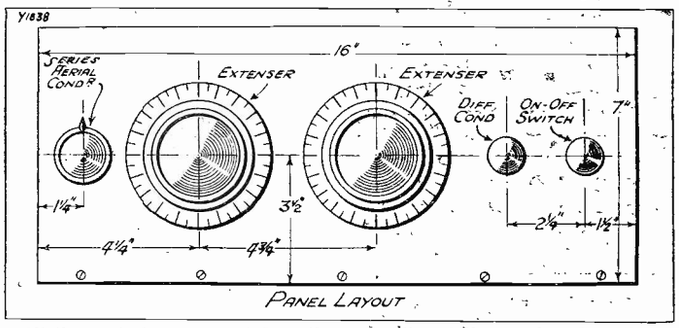
Because of its bulk the tuner takes up a large proportion of the available baseboard area. The coils are big—big coils make for efficiency—and efficiency means power and selectivity.

A Compact L.F. Side.

I am proud of my tuner, and I know of nothing better at the price.

But the size of the coils necessitates a compact L.F. side, otherwise the receiver tends to become somewhat cumbersome.

A "FIVE-IN-LINE" AFFAIR



All the controls are mounted on the centre line of the panel, and, as they are all one-hole fixing, the problem of panel drilling should not present any difficulties. In view of the super-station-separating qualities of this set the controls are really surprisingly few.

The particular layout I have adopted is the result of a great deal of experiment, and involved discarding other schemes which proved less effective.

I advise you to stick carefully to the lay-out shown in the photographs and wiring diagram.

Slight divergences may be rendered unavoidable by the use of alternative makes of components, but these are very small and have been allowed for.

I don't want you to run away with the idea that the wiring must be arranged throughout in a series of right-angle bends.

Straightforward, direct wiring will serve equally well, but I suggest that some bends (not necessarily right-angled) are essential owing to the compact layout.

Be neat; neatness implies method, and the methodical person is less likely to make mistakes.

There are four flexible leads for grid bias. G.B.—1 is the length of rubber-covered flex joined to the jack frame. G.B.—2 is connected to the 5-meg. grid resistance; this goes to the grid of the first L.F. valve. G.B.—3 is joined to G.B. on the L.F. transformer, and G.B.+ is connected to the *negative* filament terminal on the valve holder nearest the "on-off" switch.

Easy to Handle.

You may have formed the impression—and it is an erroneous impression—that the results given by the tuner are only obtained by difficult and "tricky" manipulation.

Let me tell you at once that the set is "dead easy" to handle.

There are two tuning dials—that much is true—but if you attempt to "gang" the two tuned circuits you lose considerably in volume. How much? It is impossible to say definitely. Perhaps 20 per cent.

You see, in order to "gang" two circuits successfully the two inductances must first of all be *very, very* accurately matched.

There must be no "unbalanced" capacities (or inductance) in the wiring which would tend to throw the circuits out of step.

Moreover, you have got to remember that the aerial load, or part of it, is across the first circuit.

Before you can "gang" tune two circuits you must render negligible the effect of the aerial load, and in practice this means that you cannot obtain the full benefits from the aerial-earth system over the whole wave-band.

Utilises All Aerial Energy.

With the two-control method used in conjunction with my tuner the aerial circuit is tuned independently, and the particular circuit arrangement chosen utilises the whole of the energy picked up by the aerial.

However, I fear that I am going a bit too fast, because it has just occurred to me that I have as yet said nothing about valves or high-tension voltages.

Well, the valves are the usual ones for a circuit of the det.-L.F. type.

The detector is not specially critical. Any old valve will work in this position, but some types are more suitable than others.

For instance, you want a valve which will give you good amplification, because a grid-leak detector both rectifies and amplifies.

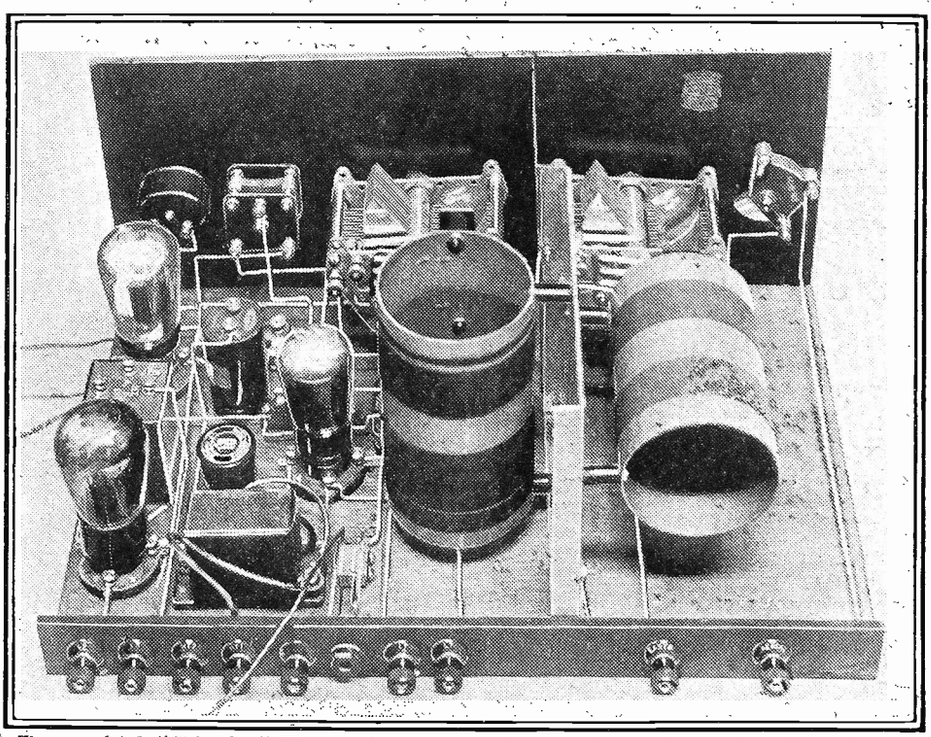
The electrodes should be pretty rigid, otherwise there is a tendency for the valve to give rise to microphonic noises, sometimes building up to a howl.

And there is also the question of reaction.

So I suggest you go for one of the special detector types listed by the valve manufacturers, or alternatively an "H." or "H.L." type.

(*Continued on page* 1146.)

ALL READY TO PROVIDE YOU WITH PROGRAMMES



The completed "Eckersley" Three makes an extremely attractive receiver which will enable you to enjoy programmes from all over Europe. Provision is also made for using a pick-up, and the jack can be seen between terminals on the strip at the back of the set.

STATIONS WORTH HEARING

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.

THE present year, so far as it has gone, has been marked by remarkable fluctuations in the barometer reading. And the queer point is this: Usually if the barometer is wobbling, now rising rapidly, now falling with equal celerity, one can nearly always say with something like certainty, "Atmospherics will be a nuisance to-night."

Another prophecy which is nearly always realised in such circumstances is that the strength of distant stations will be below normal and rather patchy. Young 1932 has distinguished himself by showing us that the barometer can be as jumpy as you like without any consequent outbreak of atmospherics or any falling off in signal strength.

Less Fading.

The only effect that the barometer's unsteady state has had upon long-distance reception is that there has been a little more fading than was the case at the end of last year. Fading, though, has never assumed really serious proportions; you don't find stations working up to a roar at one minute and completely disappearing the next.

Daylight reception continues to be extraordinarily good; in fact, I cannot remember switching on at any time of the day recently and failing to find something worth listening to coming through from abroad on the medium wave-band.

On the long waves conditions for both day and night reception continue to be superb. Even with a small portable, using its own little built-in frame, I find the number of alternative programmes on the long waves considerable at any time.

Is 5XX Falling Off?

Have readers, by the way, noticed a falling off in the strength of 5 X X, or the Midland National, to give him his modern name? It seems to me that he has come down in the world considerably in the last month or two. Certainly his strength at forty-five miles is not what it was, and I am wondering how those who live at great distances are faring. With me, Warsaw is actually a somewhat stronger transmission than 5 X X.

If it wasn't for spark signals the lower end of the medium wave-band would be a very happy hunting-ground just now. These spark transmissions are concerned with the direction-finding service for trawlers, and the interference is naturally at its worst in snowy, stormy, or foggy weather.

Clear, calm nights are therefore the best for exploring the region below about 250 metres. Trieste, whom you will find in these parts, is one of the most powerfully received of European stations. I have not the least difficulty in obtaining full loud-speaker strength from him with a two-valve set operated from a tiny indoor aerial. Cork is coming through extremely well, and you should not miss giving Cologne, Fécamp, and Nuremberg a trial.

Higher up the band extraordinarily good conditions continue to prevail. The majority of the important stations are so reliable that you can safely say without first touching wood, "I will now let you hear Heilsberg, or Turin, or Bratislava," or one of a score or more other stations.

Some Selected Stations.

The only hostile influence that you need be afraid of at all is heterodyne interference, and this has not affected any station of note for more than just a brief period for some time past.

Bordeaux seems to be now quite back to his old form, and Barcelona is good once more. Here are a dozen first-rate stations from which you can be sure of obtaining entertainment: Hilversum, Strasbourg, Hamburg, Lwow, Toulouse, Frankfurt, Katowice, Stockholm, Rome, Beromenster, Langenberg, and Prague.

SHORT-WAVE NOTES

News and views regarding an exciting and fascinating wave-band.

By W. L. S.

AS this is the last opportunity I shall have of "meeting" my readers before the Reception Competition, I had better make a few remarks on that subject.

First, for the benefit of those who have not read previous issues, I want to make it clear that all you have to do is to listen between midnight on Saturday, January 23rd., and midnight on Sunday, January 24th, anywhere below 100 metres, and log all that you hear. This is simple enough—with no restrictions as to time, wave-length, receiver or anything else!

A New Competition.

Then send in your logs to me, with the following particulars: in the case of amateur stations, the wave-band on which they were heard (80, 40 or 20 metres) and their strength, as well as the exact time. In the case of broadcast stations, I want the wave-length, call-sign, announcement (if heard) and brief details of the programme at the time of picking them up.

The results will be classified in two classes—broadcast and amateur. The "Broadcast" class will be judged on the basis of the number of different stations logged, and the "Amateur" on the number of different *countries* logged. In the latter, marks for countries will be given on a sliding scale, in proportion to the difficulty in receiving them.

The only other remark I need make is that your logs should be sent in to "P.W." and marked "Short-Wave Reception Competition."

Among the correspondence is a note from Mr. J. Skidmore, 2 A U L, stating that his address is now "Holly House Lane, Blackbrook, Belper, Derby." There is also a request from G 5 X H for reports on his 10-watt transmissions on 20 and 40 metres. His address is 10a, North End, Croydon.

Nairobi's Come-Back.

I have far too much correspondence to answer here on the subject of short-wave conditions generally, but not a soul has mentioned the triumphant return of Nairobi (V Q 7 L O) to his perch on 49 metres. I have heard him for several nights, just below Moscow, and out of the way of the "spread" of the latter station. With one valve Nairobi varies between R3 and R5, and the announcements can always be understood perfectly.

"F. N. B." writes an interesting letter and propounds a knotty problem. He says, quite rightly, that "DX follows the sun round the world." Thus we hear Asia in the afternoons, and as the further stations fade out the nearer ones come in.

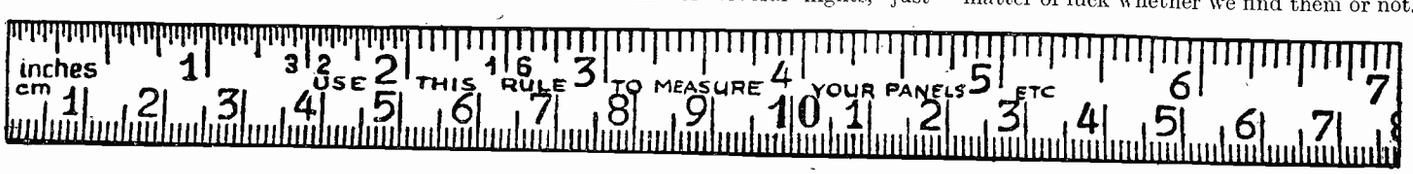
Wrong Way Round?

What worries "F. N. B." is that some Americans and Canadians come in weakly at mid-day. Can they, he says, be coming round the *wrong* way, and covering 21,000 miles odd?

Personally, "F. N. B.," I think not. They don't *sound* as if they were as distant as that, and the Canadian that you found me in touch with at mid-day was not receiving me weakly by any means. As a matter of fact he asked me to put telephony over!

I think we must regard the East Coast American stations as sufficiently near to come over at any time of day, providing that conditions are not really *bad*.

On 40 metres, of course, the Australians seem to come over at almost any time between 7 a.m and 10 p.m., but since there are often only two or three of them on, it is a matter of luck whether we find them or not.



RADIO-ROMA CALLING YOU!

The charming young ladies who make the Rome announcements not only welcomed our Special Correspondent and answered his questions, but they also sent their special "saluto" to all "P.W." readers who know them "over the air"! After you have read the article, tune to 441 metres, or to one of the Rome relays, and then send a friendly little note to the lady you hear. But if you do not get a reply, don't be disappointed, as their correspondence is very heavy!

ROME'S three popular announcers send their very special wishes to readers of POPULAR WIRELESS. And "Miss Radio Roma," the chief announcer, who is really Madame Marilou Boncompagni, told me: "I am not able to thank all British listeners for their kind letters in person, so I am pleased to use POPULAR WIRELESS to convey to them all my best 'saluto.'"

Readers will also remember the interview published some time ago in "P.W." and telling all about Mme. Boncompagni. Personally I was pleased to hear that to intimates she went by the pleasant name of "Marilu" (Mary Lou), and surely listeners may call her that, too.

"MARY LOU"

She was Rome's first lady announcer, and her voice is probably known to more people than any other woman's in the world.

Her colleague, Maria Corsini, is the youngest of Italy's bevy of beautiful "announceresses." She is just twenty-four.

She comes from a town which we usually associate with Vermouth and so seldom with beautiful ladies—Turin. She acted as announcer there for some time and then came to Rome to somewhat alleviate the strenuous duties hitherto carried out by Mme. Boncompagni alone.

"A Full-Fledged B.A."

Miss Corsini is a university graduate, a full-fledged B.A. She writes and understands French, also a little English, but Italian comes first of all. It is on Fridays that she takes over all the Roman announcing, and "'twegn-times" on other days, too.

Miss Corsini has already been to London, but only to return to her native Italy with the positive conviction that London was very nice certainly, but she preferred her own native sunshine to our rather moist climate!

By the way, I ought to tell you this! At the recent Rome meeting of the Union the Italian Broadcasting Company had arranged a concert in honour of the delegates; as this concert was broadcast it was necessary to have an announcer at hand. Miss Corsini was on the job.

"Good Taste!"

Before things began a certain prominent British broadcasting official is said to have gone up to Admiral Senegallia of the EIAR and asked him "Who is that beautiful girl?" I mention no names, but that particular official certainly has jolly good taste!

When listening-in readers will be able to recognise Miss Corsini from her rather full contralto voice. It is also rather softer than Mme. Boncompagni's.

Rome's third and youngest announcer (as announcing goes) is Mr. Gastone Ciuffo. He has quite a history!

Formerly attached to a Swiss banking establishment, he was for over nine years in London. During the war he served as a lieutenant in the Infantry, and continued banking in Italy. Later he got into contact with radio through a short story of his which was broadcast.

A BEAUTIFUL ANNOUNCERESS!

Miss Corsini has a full contralto voice, and has penned her good wishes to you on the photograph.

Then when in June of this year the Italian Broadcasting Company opened a competition for a male announcer he was first of 1,875 applicants. That competition, by the way, was the origin of that rumour which ran through the European press that the EIAR were doing away with lady announcers to substitute male voices, as the ladies were getting too many love-letters!

The facts are that the EIAR, on the

(*Continued on next page.*)

RADIO-ROMA CALLING YOU!

(Continued from previous page.)

contrary, intend sticking to the ladies, as all listeners prefer them, but that for such dry-as-dust broadcasts as stock exchange prices, labour market reviews and the latest press news, also sports news, the EIAR consider a male voice better suited. Hence the competition and the subsequent appointment of Gastone Ciuffo.

He wears glasses, but they seem to make him even handsomer than he is. He speaks excellent English and equally good French, German and Spanish.

I won't say that Mr. Ciuffo is young, but you can't call him middle-aged, and he certainly is not old—most emphatically not! In Germany one would term his as "im besten Alter," meaning in the best of man's ages. He, too, has a most sympathetic voice, and it was that, together with his knowledge of languages, which brought him out first of 1,875 competitors.

ON 80 METRES!

Don't forget that Rome can be heard on 80 metres as well as from Naples (319 metres). This is another charming portrait of Maria Rosa Corsin.

RADIO-TELEGRAPHY AND TELEPHONY

A Complete Textbook for Students of Wireless Communication.

THESE are, respectively, the title and sub-title of an ambitious work compiled by Rudolph L. Duncan and Charles E. Drew, the second edition of which has recently been published in London by Messrs. Chapman and Hall at 45s.

It is a big price to pay for a book, but this is a big book and comprises over one thousand well-illustrated pages. The barest minimum of formula is used and the text makes easy reading, even for the beginner.

But at times the authors are unnecessarily verbose, and many of the pages could be greatly improved by good sub-editing. And there are passages which, while not always definitely wrong, should have been treated in a different manner. For instance, the pages dealing with grid-circuit rectification are misleading in that it is apparent that a not-too-successful attempt has been made to render old and discarded theories compatible with modern knowledge.

Further, I suggest the British publishers ought to have cut out most of the pages that deal with purely American apparatus. An elimination of unwanted words and of this purely American material would still leave a useful work, and the pages would, in the process, be reduced to three or four hundred!

AN "EXPRESS" WIRE CONNECTOR

For Quick Hook-up.

I CALL this handy little gadget an "Express" wire connector because, by means of it, one is enabled to set up electrical connections in less than the proverbial "jiffy."

All it consists of (as you will see in the photograph) is a two-inch length of brass tubing of about quarter or three-sixteenths inch internal diameter. Provided, also, are two wooden pegs or wedges to fit in opposite ends of the tube.

Suppose you have two thick wires to connect up temporarily. All you do is to push them in opposite ends of the tube and then insert the wooden wedges as tightly as you can. The interior of the tube is clean, of course, and so, by these means you at once effect your temporary electrical connection.

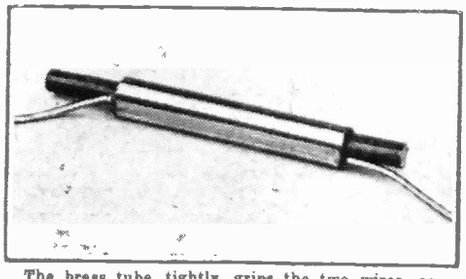
With a little careful fashioning of the wooden wedges, the connector will take thick wires or thin wires. It will even take flex. But it is for the connecting up of thick wires that this little connector of mine has served its most useful purpose, for, unless you happen to have special clips handy, it is nearly always more difficult to effect a good connection by twisting thick wires together than it is to obtain a thin wire connection by similar means.

FLATTENING FOIL

A Tip for Condenser Construction.

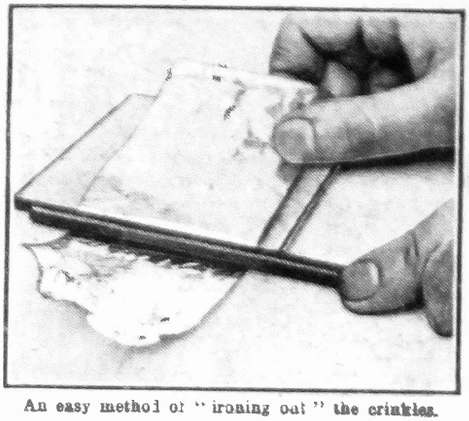
IF you happen to be making up one or two small fixed condensers from pieces of silver paper or tin foil, you should take great care to see that the foil is quite free from wrinkles and creases.

IN A JIFFY



The brass tube tightly grips the two wires, as explained on this page

ROLL YOUR OWN!



An easy method of "ironing out" the crinkles.

A good method of ensuring this necessary flatness of the foil consists in placing the tinfoil against the edge of a sheet of glass, and then pressing a lead pencil against the edge of the latter.

The foil is now drawn slowly and steadily between the glass edge and the lead pencil, as depicted in the illustration, and it will be found that most of the creases in the foil will readily be smoothed out.

Now reverse the foil and repeat the process. After a few repetitions of this procedure the foil will be perfectly smooth and free from creases. What is more, the foil, if the operations have been carried out with reasonable care, will not be torn or cut in any way.

"P.V.J." ONE

(Continued from page 1117.)

To operate the set, connect up the batteries, a pair of headphones, and the aerial and earth leads. Move the switch knob to the medium-wave position, and then rotate the tuning control until you hear your local station.

If you require maximum volume, you can achieve that by joining the crocodile clip to the red tap on the P J 3 coil. If, on the other hand, you need high selectivity, connect the clip to one of the other tappings on the coil.

Maximum volume will also be obtained when the selectivity control knob is rotated until the moving vanes are fully engaged with the fixed. Rotating this knob in the opposite direction will increase the selectivity.

No Interference on Local

With these facts in mind, you will now be in a position to tune-in your local free from interference, but a few words about the reaction condenser will not be out of place.

First, too much reaction will cause distortion, and if the set is worked in an oscillating condition it will interfere with neighbouring receivers. So generally try to operate the receiver with the reaction control well away from the oscillation point.

You will find that after a little practice you will be able to keep the reaction just off the oscillation point while you are searching, and this, of course, is the adjustment which gives the highest sensitivity.

'THE SECRET OF LIFE' IN AN H.T. BATTERY

LABORATORY CONDITIONS NOW REPRODUCED COMMERCIALLY FOR THE FIRST TIME IN THE CELLS OF THE NEW

Improved LISSEN H.T. BATTERY

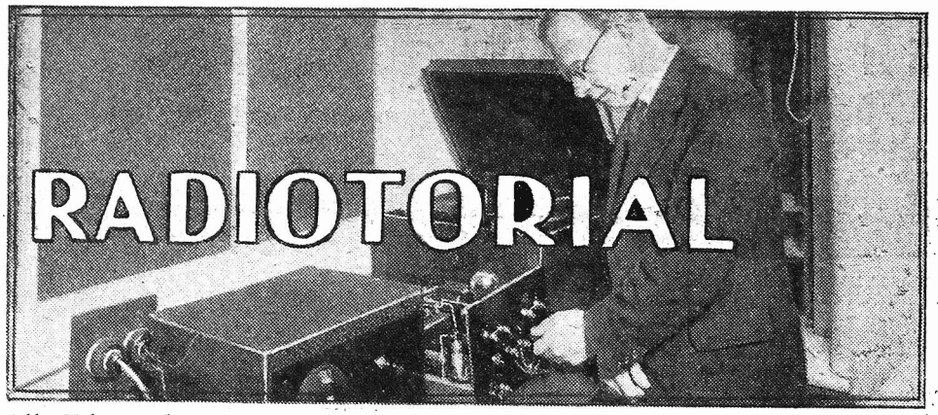
Longer Life Guaranteed

An IMPROVED Lissen Battery! Bigger cells made in a better way—finest battery-making chemicals with their reactive properties scientifically increased—the Lissen Secret Process giving an even more amazing flow of current because of IMPROVED manufacturing methods which exactly reproduce laboratory conditions in the cells.

A longer-lasting battery! A GUARANTEE with it! And big price reductions—50 volt from 7/11 to 5/6, 100 volt from 12/11 to 9/3, 120 volt from 15/10 to 11/-. Examine the guarantee when you buy—it means weeks of extra life, more power for less money.

In any set you build, this IMPROVED LISSEN BATTERY will last longer than any other battery you can buy.

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX



All Editorial communications should be addressed to the Editor, POPULAR WIRELESS, Tallis House, Tallis Street, London, E.C.4.

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

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

QUESTIONS AND ANSWERS

WORKING FROM A.C., BUT WILL NOT WORK FROM D.C.

PUZZLED (Birmingham). — "Could you please solve for me the following riddle? I recently made the 'Comet' Three (foundation model) for a friend and when completed it performed admirably, the H.T. being supplied by an A.C. mains unit. When connected up at friend's house the set remained silent when H.T. was being supplied through D.C. mains unit, but on changing over to dry H.T. battery the set performed well again. Now it seemed to indicate plainly that the D.C. mains unit was at fault, but it had previously worked well on other sets, so, to make sure I obtained another D.C. unit which was working well, but this also would not work the set, the only response being a click in loudspeaker when H.T.+2 plug was connected. Of course I tried connecting the unit's adaptor the opposite way round and tested unit with voltmeter and found it to be delivering almost correct voltage. Is it possible that I have parts in the set that will function when H.T. is supplied through A.C. mains unit and dry battery, but not when through D.C. mains unit? My transformers are Telsen 'Radiogrand' 3–1 and Telsen 'Ace' 5–1.

"P.S.—If I cannot get D.C. mains unit to operate set it means that my friend will have to continue to buy H.T. dry batteries."

A Very Queer Effect.

You are certainly up against a very queer effect. In fact, we don't remember ever hearing of a more puzzling case of its kind.

We can assure you, however, that it is *not* a case of having parts in the set which will function when H.T. is supplied through an A.C. mains unit or dry battery, but not through a D.C. mains unit.

All these three supply current of the same nature, and although each method certainly has its own peculiarities these are very slight indeed compared

(*Continued on page* 1142.)

IS YOUR SET GOING WELL?

Perhaps the switching doesn't work properly? Or some mysterious noise has appeared and is spoiling your radio reception? Or one of the batteries seems to run down much faster than formerly?

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

Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

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

LONDON READERS, PLEASE NOTE: Inquiries should **NOT** be made by 'phone or in person at Fleetway House, or Tallis House.

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 1140.)

with the general effects, which is to provide sufficient direct current at the correct voltage to work the set. All three methods are capable of this, and therefore the set should work well with all three.

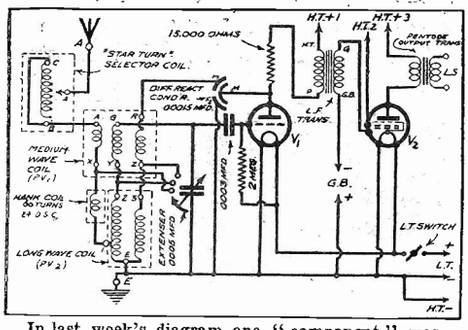
We can only suggest that your tests were misleading in some important particular. If, for instance, you were using a home-made H.T. unit, and the D.C. mains had the positive earthed, you might get such an effect, though in that case all you would need to do to put the set right would be to insert a large fixed condenser in its earth lead.

Your best plan would be to do this, and then re-test, taking the voltages at the D.C. unit tappings and also at the plate terminals of the various valves. This should show up the fault.

Don't forget the possibility of a test being fogged by the use of different flex connections which are faulty, or something of that kind!

MISSING LINKS, No. 26

A DETECTOR AND PENTODE CIRCUIT



In last week's diagram one "component" was purposely omitted. Here is the complete diagram showing that the circuit needed an Extenser, connected as shown above.

DID YOU GET IT RIGHT?

FEEDING THE LAST VALVE FROM A.C. MAINS.

W. G. (Ilford).—"I am perfectly satisfied with the set and do not wish to change it in any way except as regards the following:

"I notice that my super-power valve can be heated from the A.C. mains if desired, and although I do not wish to use the mains for the whole of the set I should certainly like to fit a mains unit to supply the L.T. for the last valve, if this can be done without extra smoothing, or much trouble. Could you tell me what would be the necessary alterations to make?

"Also, do you consider this worth while, assuming that the valve, as the makers say, will not cause hum or anything of the kind, but can be run just like a battery as regards its filament. My accumulator is nearly new, but too small. I can get a suitable low-tension transformer 'buckshee,' and so am very tempted to adopt the method to save the accumulator drain, but I definitely do not want to go to A.C. valves or to any other modification in the set, which is now perfectly satisfactory."

Little Alteration To Be Made.

It is quite satisfactory to run the last valve of a battery set from an A.C. L.T. unit in this manner, provided the valve makers recommend the practice. And there is very little alteration indeed to make.

If the L.T. unit delivers exactly the required voltage to the valve you will not need a rheostat in series with its secondary, but otherwise you must insert some form of current control in the form of a rheostat able to carry the filament current which the valve will require.

You will need flex leads of stout quality (complying with the I.E.E. regulations as regards insulation, etc.) from the primary of the L.T. transformer to a plug which will make connection with the mains. The secondary of this transformer should be connected straight across the filament terminals on the last valve holder, all the other wiring to this being disconnected.

It will, of course, be necessary to connect this "filament" to earth, or to the screen, or whatever other point the filament was previously connected to place it at earth potential. And this is best done by means of a slider on a potentiometer.

All you have to do is to carry the connection which previously went to the filament to the slider and connect the ends of the potentiometer across the filament terminals of this valve (they will thus be across the secondary of the transformer, too).

You can then try out the arrangement and if there is a slight tendency to hum, adjust the slider of the

(*Continued on page* 1144.)

TECHNICAL TWISTERS

No. 97. H.F. GRID BIAS.

CAN YOU FILL IN THE MISSING LETTERS?

At one time it was found necessary to give a . . . . . bias to H.F. amplifying valves in order to "stabilise" the valve. The more efficient S.G. valve is stable without this.

* * *

Usually 1½ or 3 volts . . . . . grid bias should be applied to the S.G. valve.

* * *

Among the advantages of such . . . . . grid bias is that of reducing the H.T. current consumption—an important point with battery-run receivers.

* * *

It is generally better to use a separate G.B. battery for the H.F. valve to avoid the risk of . . . . . due to unnecessarily long leads.

Last week's missing words (in order) were High-frequency. Tuning, Windings. Core, Core.

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 1142.)

potentiometer, which otherwise can be kept in the centre or half-way position. Normally, it would be better to convert the whole set than to alter just one filament, but in view of the "buckshee" transformer and your small battery it should be worth while.

ILLUMINATING THE DIALS.

B. W. G. (London, S.W.).—"I have only tried to improve the set in one way, and that 'improvement' has been a distinct failure, for the following reason.

"All I did was to put in a pilot light and illuminated dial, and although these work very satisfactory indeed I am always burning out the lamps, which becomes a nuisance!

"Could you suggest any reason why it is unsatisfactory to light such a lamp from the secondary of a low-tension transformer of the correct rating?"

The arrangement is quite a satisfactory one, but in such circumstances it is usual to run the lamps so as to get *less* than their rated voltage. A small variable resistance in series with the lamps will reduce the brilliance and be satisfactory, or alternatively you can, if a potentiometer is being used across the filament-heating secondary, run the lamp circuit across slider and one end of the potentiometer so as to derive about half the voltage instead of the full load. Generally this is quite satisfactory.

A DUAL-PURPOSE SWITCH.

W. N. (Bradford).—"Could you give me the connections of a three-point switch to break a potentiometer from which screened-grid volts are supplied, as well as putting the L.T. on and off?"

Two contacts on the switch will work as normal, *i.e.* one direct to L.T.+ and the other to filaments. The third contact will take the place of the usual direct connection of the potentiometer to filament circuit.

Thus, when the switch is "open" and all three points are separated, the potentiometer is disconnected from the L.T. battery itself, and also from the filaments of the valves at the same time that the L.T. is cut off.

When the switch is closed all three contacts come together, the battery is joined to the filaments and the potentiometer to both.

THE "MAGIC" THREE.

F. C. C. (Westminster, S.W.1).—"Could you please advise me regarding alteration of my 'Magic' Three? (1) I wish to use a Telsen Dual Coil instead of plug-in coils. Can I do so? (2) Could I change my potentiometer for a volume control? If so, state what ohms would be required."

Yes. The connections are not difficult, but you will need as well a 3-point wave-change switch of the type in which in the one position all three contacts are joined together, and in the other position all three are separated.

You will not need the original small aerial condenser, so this should be taken out when you are removing the coil holders. Also undo the connections to the differential reaction condenser.

The connections must now be re-wired, as follows: 2 on the coil unit to A2 terminal. 1 on the coil unit to A1 terminal.

One contact on the three-point wave-change switch to 4 on the coil. Another to 6, which is joined to 7 on the unit, and to earth, etc.

The third contact on the wave-change switch to No. 3 on the unit.

The remaining coil unit connections are terminal 8 to fixed plates of ·0005 condenser and grid condenser; and finally terminal 5 to one of the sets of fixed vanes (F1) on the differential reaction condenser.

The remaining set of fixed vanes on the differential reaction condenser (F2) goes to earth. And finally the moving vanes of the differential reaction condenser go to the plate terminal of the valve holder V1 and to the vacant end of the H.F. choke (that which is marked "bottom," and formerly went to reaction coil and one set of fixed plates of the reaction condenser).

We note that you say CHANGE the potentiometer for a volume control.

It would be no good taking out the potentiometer and wiring a volume control in its place, with the idea of controlling the output from the set. But you can easily put in a volume control for this purpose *quite independent of the present potentiometer wiring.*

All you have to do to fit the volume control is to join its *ends* across the secondary of the first L.F. transformer. Leave this transformer's grid bias lead (G.B.—1) as it is, but take off the wire from the other end of the secondary (to grid terminal of valve holder) and connect the grid terminal to the slider of the volume control instead.

This arrangement will then control volume. It has nothing whatever to do with the wiring or working of the original potentiometer, which should be left alone.

The new "volume control" could be placed on the panel to the right of the tuning condenser, where its leads (named above) will be short and direct.

Actually a volume control is made like a potentiometer, but it *must* be of high resistance—the usual value is 250,000 ohms.

"P.W." PANEL, No. 55, EXTENSER SIMPLIFIED WAVE-CHANGING

The Extenser can be used in place of any ordinary tuning condenser, and possesses many advantages which the latter lacks.

* * *

By means of its self-changer contacts the Extenser can make wave-changing entirely automatic, thus rendering a wave-change switch quite unnecessary.

* * *

Extenser dial-readings tell at once whether the set is tuned to long or medium waves (e.g., all 3-figure dial readings are long-wave stations, all 2-figure dial-readings medium waves).

TWO LETTERS WORTH READING.

HARMONICS FROM DAVENTRY.

Dear Sir,—I noticed in a recent issue of "P.W." that Captain Eckersley commented on the question of harmonics of B.B.C. transmitters. It may interest him to know that one Sunday I received the second, third, fourth and fifth harmonics of Daventry National on 1554·4 m., when it was transmitting the usual Welsh service.

The second was as strong as Brussels No. 1, the third I at first mistook for Frankfurt, as it was only just audible, the fourth was considerably stronger, but it was probably strengthened by Cardiff, which was transmitting the same programme. The fifth was also of considerable strength, and London National was not transmitting.

Casually turning the dials to-day, I found the first harmonic of the National, right at the bottom of the long-wave scale, which I had not before investigated thoroughly; this was comfortably loud (S.G. and Pent., A.C. set).

The only other station, of which I receive harmonics is the Hillmorton long-wave station, G B A 1 believe is its call-sign. This is a great nuisance as one harmonic severely disturbs London Regional, when both are transmitting together. It is particularly objectionable because of the distortion produced in an ordinary receiver by the single side-band system of transmission. I suppose we must put up with this type of interference, but it is excessively annoying at times.

Yours faithfully,
Rugby. QUINTUS.

"RADIO MEMORIES."

The Editor, POPULAR WIRELESS.

Dear Sir,—May I, as a reader of your most interesting journal, express my earnest appreciation of the articles which appear in it regularly, and more especially for the series contributed by Sir Oliver Lodge?

To anyone who is interested in the hypothetical side of wireless more than the practical, as I am, these lucidly written articles make special and intense appeal, and I heartily hope that "P.W." will keep up to standard regarding these in the future.

I should very much like to see an article by Sir Oliver Lodge on "Inductance and Capacity." I wonder whether such an article may, sometime, make its appearance in your paper?

Thanking you for a very fine paper, and with best wishes to "P.W." and its creators.

Yours very sincerely,
Prestatyn, Flints. ARTHUR C. ELLISON.

THE LISTENER'S NOTEBOOK

(*Continued from page* 1128.)

seven hours of British Broadcast Programmes, supplied to British listeners by British advertisers. As the majority of these hours coincided with the B.B.C.'s hours of sabbatical inactivity, enthusiastic listeners had no alternative but to "lend their ears" to the broadcasts from the Continent; that is, of course, if their sets let them.

If they didn't, and if the B.B.C.'s policy of Sunday silence continues, then the radio industry should benefit.

* * *

The fact that Chicago school-children are to be entirely dependent on radio transmissions for their instruction, owing to the financial crisis in their city, marks another step in the development and application of wireless. "Wireless for schools" is nothing new, of course, in this country, but up till now it has occupied only a comparatively small place in school curricula.

Commercial Gossip.

I heard two amazing stories this week, and I give you them for what they are worth.

A certain cycle dealer, in a small way, in a provincial town, runs a wireless business as a side line. His turnover during the last three months (in the wireless department alone) has been over £8,000.

The second story also concerns a wireless dealer in the provinces and a young schoolboy on holiday in the same town. Like a great many schoolboys, this particular boy had a penchant for the mechanical side of wireless, and after introducing himself to the dealer, he soon found himself doing repairs, gratis, in the latter's workshop.

Although some of these repairs meant only a general tightening-up of a set, the bills amounted to anything from ten shillings to a pound.

Both these stories may be exaggerated, but if the second one is true, it makes it easier to believe the first. I need say no more!

Talking Points.

What a mental tonic Mr. S. P. B. Mais is! What a bright, breezy, invigorating style his is, and what marvellous powers of description! I always thought it was "Sussex über Alles" with him, but, apparently, I was wrong!

His first talk on the Yorkshire Moors—the Brontë country—has persuaded me to do two things—to read Jane Eyre and Wuthering Heights again, and to spend my next holiday at Leeds. (Yorkshire readers, please note!)

Mr. Mais' talk came as a toning corrective to me, following, as it did, the monotones of Mr. Desmond MacCarthy.

While on this subject of talks, let me say this: Mrs. Sidney Webb's discourses are doubtless masterpieces in scholarship, but what a pity it is they cannot be given in language everyone can understand. Is a simple vocabulary really inadequate?

I could mention many literary masterpieces remarkable for their simplicity of language. The subject-matter of her talks is of such interest that they ought to be followed universally. As it is, I am sure many listeners "try another station" during Mrs. Webb's discourses.

CONSTRUCTING THE "P.W." ECKERSLEY THREE

(*Continued from page 1132.*)

The first L.F. can be an "L." The grid bias will be about 1½–3 volts (G.B.—2).

When we come to the output stage I hesitate; you see, I don't know anything about your loudspeaker. But I will say this: that the amount of distortionless power—or, if you will, volume—you get out of a valve is proportional to the amount of power you can put *into* it from your H.T. battery or mains unit.

Perhaps I can make it clearer. A small power valve requires only five or six milliamps, and will handle sufficient energy to work a *sensitive* speaker unit moderately well.

So if you are in the position of being able to supply at the most, say six or seven milliamps to the last valve, than I would suggest that you choose a power valve of the smaller type.

Type of Speaker to Use.

It will need approximately 7½–9 volts (G.B.—3) negative grid bias at 120 volts H.T.

A valve of this class will operate a loudspeaker of the cone type quite well, and the volume—without noticeable distortion—should be sufficient for an ordinary drawing-room.

Those who intend using moving-coil or inductor-type speakers will need a super-power valve in the output stage, because any slight overloading of the valve is shown up very quickly by this class of loudspeaker.

A super-power valve takes a higher anode current—that is, the amount of power put into it is greater than in the case of a small-power valve.

Hence a super-power requires a triple-capacity H.T. battery or a decent mains unit capable of supplying 12 milliamps or more to the last stage.

The H.T. voltages I suggest are as follow: H.T.+1, 60–80 volts. H.T.+2, 120–150 volts.

The grid bias in all cases should be adjusted to the value specified by the valve makers for the particular H.T. voltage used.

Tuning the Receiver.

I can now revert to the operation of the set. The two main controls are the Extensers, and of these the tuning on the second Extenser is definitely sharp.

The aerial Extenser is comparatively flat, so in searching I suggest that you adjust the second dial a division or two at a time while swinging the first Extenser dial through a fairly wide arc.

The aerial-series condenser can be "set" at a low value—moving vanes about ¾ out—but, in general, this adjustment should be employed only for stations on wavelengths below the Midland Regional. For example, the North Regional comes in at much greater volume with most of the series capacity "in" (moving vanes nearly fully engaged with fixed). On the other hand, this condenser requires the moving vanes about two-thirds "out" to tune down to London National.

With the aerial Extenser adjusted to a given station, the final tuning for this circuit can frequently be carried out on the aerial-series condenser.

The aerial Extenser has no effect on the adjustment of the second Extenser. With this tuner the two controls are quite independent, and the dial settings are not intended to match up or to remain in step.

The reaction control will not be required for the reception of the local transmissions unless the local conditions are definitely bad, but the smooth differential effect will be found invaluable for picking up distant stations.

I would point out that to increase the reaction effect the reaction knob is rotated clockwise and that the position for maximum sensitivity is just below the oscillation point.

On the Long Waves.

Oscillation is denoted by a rushing sound which develops into a squeal, varying in pitch when the tuning control is rotated.

The receiver should not be permitted to oscillate, and the use of too much reaction will produce distortion.

The tuning on the long wave-band is precisely the same as for the medium waves.

The two Extenser dials are rotated until the self-changing contacts no longer make connection with the cam. This condition holds good through an arc of 180 degrees, hence you have the medium-wave range over one arc of 180 degrees on each dial (self-changer contacts making connection with cam) and the long waves over the remaining 180 degrees of the 360-degree dial movement.

For the long waves the aerial-series condenser should be placed in the "shorted" position—that is, moving vanes "all in."

The pick-up jack is inoperative until the jack plug is inserted.

When you want to use the pick-up you just insert the plug in the jack, and the grid condenser, grid leak, and tuner are automatically cut out of circuit.

When Using a Pick-Up.

The two pick-up leads are, of course, simply joined to the two plug terminals.

There is a separate grid-bias flexible lead which is connected to the frame of the jack. The grid-bias wander plug (G.B.—1) is inserted in the 1½-volt tapping on the G.B. battery, thus applying a small negative potential to the grid of the first valve when it is called upon to act as an L.F. amplifier for "gramo." work.

So we end this model. I do hope you will try it or the other variation. I feel that the fundamental trouble about wireless is this lack of wavelengths. But we are faced with a frozen plan—the Union Internationale is moribund and we have got to make the best of a bad job. My tuner is offered to you as a solution. I think it's a good solution, and hope, when you have used it, you will feel the same.

TECHNICAL NOTES

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

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

Converting the Portable.

IF you have a portable set, there are a number of points which are worthy of attention if you want to use the set indoors to the best advantage.

(*Continued on next page.*)

TECHNICAL NOTES

(Continued from previous page.)

By a portable set, by the way, I include the type of set which is self-contained and therefore easily removable or "transportable," although it may not be strictly "portable" in the ordinary sense.

The points to keep in mind are the range of the set, that is, the sensitivity and selectivity, the quality and the volume of the output, and last, but by no means least, the question of economical running.

I should like to say something about the question of economy first, because it is a very important point with regard to a portable.

Usually in a compact portable or transportable set the high-tension supply is apt to be expensive owing to the fact that space is limited and therefore a low-capacity high-tension battery is generally used. For similar reasons, a rather low-capacity 2-volt low-tension accumulator is the general practice.

Changing the Supply.

Now, if you are going to use the set indoors it is a simple matter either to provide a separate and heavier capacity H.T. battery, used externally but with suitable leads, or better still a small H.T. mains unit.

In the latter case it should generally be possible to find a compact unit which would actually fit into the set in place of the original H.T. dry battery.

It will also, as a rule, be possible to find a mains unit which incorporates a trickle-charger and in this way the 2-volt L.T. accumulator can be kept up to scratch.

The amount of current required for the trickle-charger, by the way, varies very considerably; generally when we speak of trickle-charging we think of current not exceeding half an ampere, but in many cases the current may be as low as a quarter of this amount.

With regard to the range of the receiver, if this is not all that might be desired it is a good plan to look over the high-frequency amplifiers and if you happen to have a spare H.F. valve suitable for the purpose you might try substituting it to see whether it makes any difference.

Assuming that the H.F. stages are in order, if the range is insufficient a small indoor aerial or, if you particularly fancy it, an outdoor aerial may be added. In the majority of cases this is quite easy to arrange. An earth connection is often a great improvement with a portable set. If a mains unit is employed you will have a convenient earth through one of the mains connections, whilst with a battery set an earth connection may be made to the negative low-tension side.

It is surprising in many cases what a great improvement is made both in the range and in the general operation of the set by connecting an earth in this way, even without the use of an additional aerial at all.

Volume and Quality.

As regards the output volume and quality, a good deal depends in the case of a portable set, as with any other set, upon having a sufficient voltage for the output

(Continued on next page.)

TECHNICAL NOTES

(*Continued from previous page.*)

stage, but not, on the other hand, too high a voltage.

A particular point with a portable set—it arises owing to the fact that the components are necessarily placed very close together—is the question of motor-boating; if you increase the high-tension too much in order to get increased volume, you may find yourself involved in motor-boating troubles and the best thing to do is to provide a filter circuit, if one is not already provided.

A wire-wound resistance in series with the primary of the transformer (or with the coupling resistance in the case of a resistance-coupled unit) will tend to overcome the liability to motor-boating, and a fixed condenser should be joined between the additional resistance and the negative low tension.

For the condenser a value of 2 mfd. is generally suitable, whilst the value of the wire-wound resistance may be, say, 50,000 ohms in the case of R.C. coupling or about half that value with transformer coupling.

Lumping the Voltages.

There is just a word of warning I would like to give you with regard to substituting a mains unit for a high-tension battery. It may be that with the H.T. battery the anodes of the various valves are joined together and receive the same H.T. voltage.

Now, when it comes to the mains unit it will probably be much better to provide for different voltages for the different stages

"COSMIC"?

and the highest voltage available for the last or output stage. At any rate, so long as you provide the high voltage for the output stage you can quite possibly lump the others together at a lower voltage common to them all.

In passing, I personally do not believe at all in a haphazard lumping-together business; I always think that giving each valve its precise correct voltage makes all the difference in the world to what you can get out of the receiver and to the ease with which it can be handled.

The Output Circuit.

Another point is this: You will generally find that a battery-driven set lacks an output transformer or choke-filter between the output and the loudspeaker.

With the anode current supplied by the H.T. batteries this may not be necessary, but when you change over to a mains unit it is very desirable to introduce an output circuit of the kind mentioned, which is safer as well as giving better results. By the way, make sure that the negative high-tension lead goes to negative low-tension lead, not to positive low-tension.

A final point which you will notice when using an H.T. mains unit is that the voltage varies with the load. This is true to some extent with an H.T. dry battery (it will become more noticeable as the battery gets older and its internal resistance increases), and to a *very* slight extent with a battery of H.T. accumulators.

With a mains unit the effect may be quite pronounced, so it is a good plan to test the H.T. voltages applied to the different valves whilst the set is actually *working*, using, by the way, a *high*-resistance voltmeter, the higher the better.

Using A Stopper.

I wonder how many of you have tried using a grid-stopper with a low-frequency amplifier and found the results not at all what you expected? The grid-stopper, like many other components, *can* be very useful, but its effectiveness depends very much upon arranging it to suit the conditions properly.

For the benefit of those who may not be familiar with the grid-stopper, perhaps I should explain that it consists of a resistance, generally placed in the lead to the grid of a low-frequency valve, and its purpose is to keep out high-frequency currents from the low-frequency stages, and in particular to prevent H.F. oscillation being set up in the L.F. part of the receiver.

Isolating the L.F.

Before dealing with the grid-stopper it may help if we consider briefly the usual methods of keeping high-frequency and low-frequency separate. The commonest method is to place a high-frequency choke in the anode circuit.

This choke must have an inductance which will be sufficiently high to act as a serious impedance to the H.F.—which we want to keep out—and yet its value must not be so high that it noticeably affects the *higher audio*-frequencies.

It is obvious that the longer the wavelength and the higher the acoustic frequencies with which we are dealing, the more nearly the H.F. and L.F. frequencies approach one another and the more the value of this component becomes in the nature of a compromise.

In addition to this, it is important that we should have an alternative path for the H.F. currents, and this can be arranged by means of a bypass condenser between the anode and low-tension circuits, a value commonly used being ·0001 microfarads.

The Pass Percentage.

If matters are properly arranged a very large percentage of the H.F. current will pass through the bypass condenser and only an inappreciable percentage will get into the low-frequency stages.

So far the arrangement seems perfectly satisfactory, but the question really turns not upon what arbitrary percentage of the H.F. current gets into the L.F. stages, but upon how much H.F. the L.F. stages will stand without the risk of H.F. oscillations being set up; this is a matter which depends upon a variety of circumstances, amongst them being the actual efficiency of the L.F. amplifier.

There are a number of reasons why oscillations in the low-frequency part of the circuit should be avoided, and not the least of them is the fact that such oscillations may cause a peculiarly tricky form of distortion which it is difficult to define and very troublesome to cure unless one has a hint of its nature and source.

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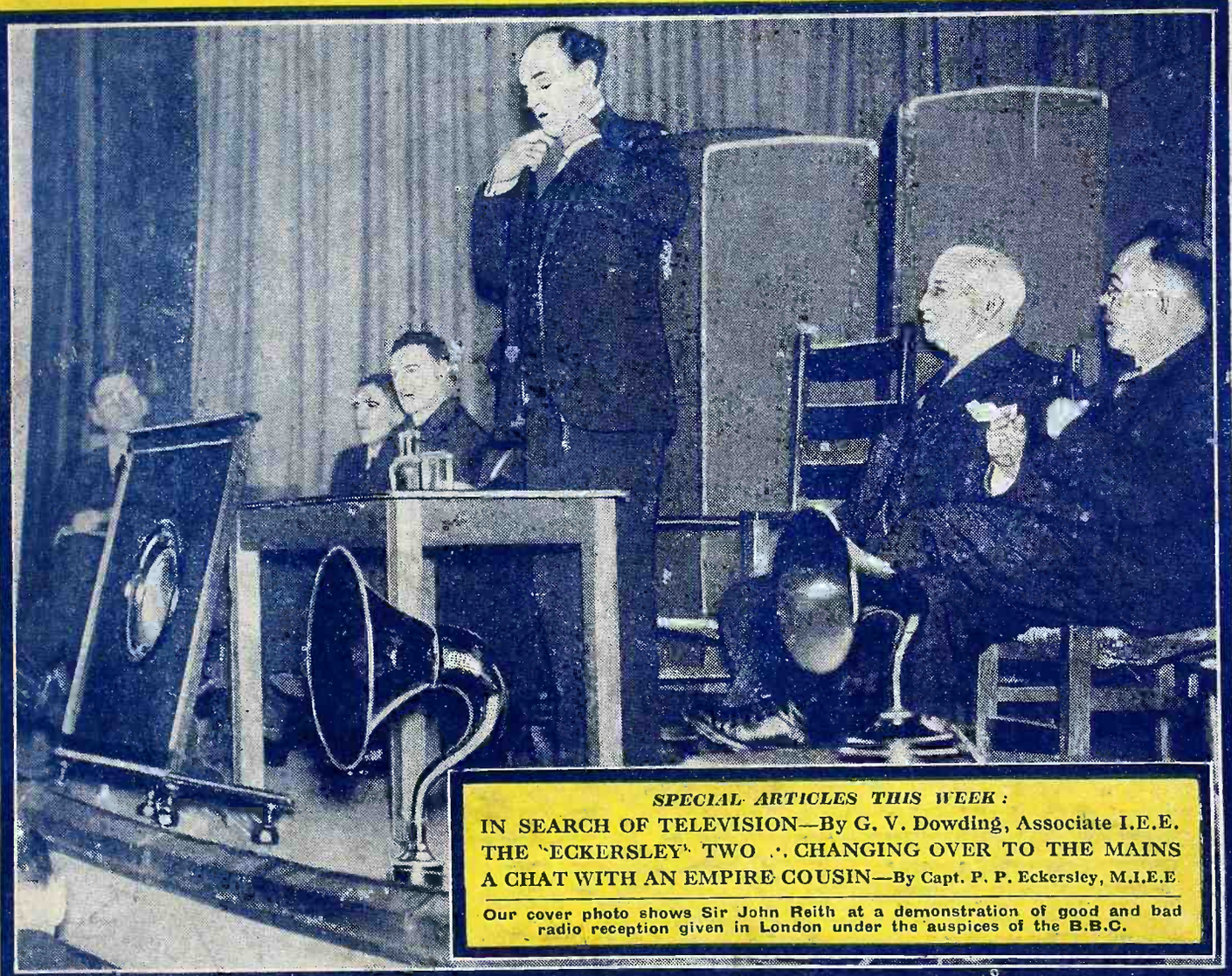

SPECIAL ARTICLES THIS WEEK:

IN SEARCH OF TELEVISION—By G. V. Dowding, Associate I.E.E.

THE "ECKERSLEY" TWO

CHANGING OVER TO THE MAINS

A CHAT WITH AN EMPIRE COUSIN—By Capt. P. P. Eckersley, M.I.E.E.

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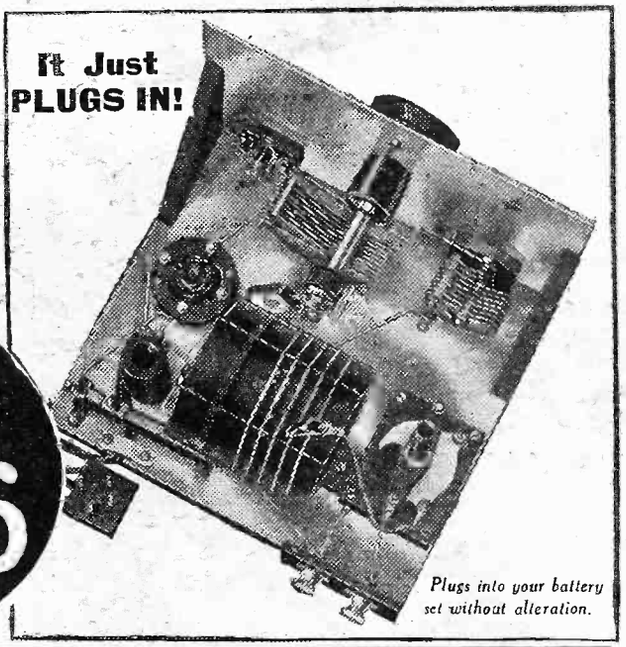

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RADIO NOTES & NEWS

Non-Radio Paris.

JUST back from a couple of days in Paris. (Yes, Mr. McFee—str-rictly business!) Wireless certainly appears to be a "flop" there. All the way from Calais I saw not one aerial; I saw none in Paris.

I don't say that there were none there, but they did not "jump to the eye" as aerials do here, where they grow in rows. I noticed one shop selling sets. Where are the Parisian counterparts of the jolly little shops to be seen all over England—full of components and all the delightful junk dear to tinkerers?

A New Story.

THIS may be apochryphal, but I see nothing improbable in it. I was told that just before Marconi left for Newfoundland for the classic experiment with Poldhu and the Kite and the three dots, one of the members of his party received a letter from Italy, hinting that Marconi and his assistants ought to see the doctor.

The inventor smiled on hearing that and, pointing to the signboard of a cable company, said, "The time will come when that will read 'Cables *and* Wireless.'" And now the prophecy has come true, the Marconi-Cable merger being named Cables and Wireless, Ltd.

Society Gossip.

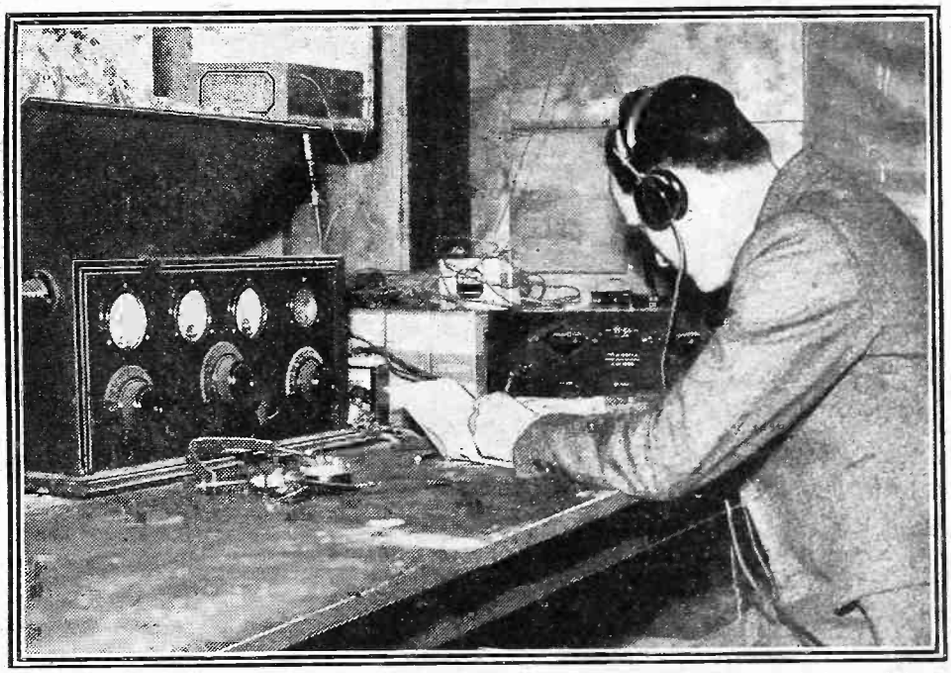
BEST wishes to the Medway Experimental Transmitting Society, Gillingham, Kent (the largest town in the county, I believe), who held an exhibition of apparatus on January 13th. The headquarters of the Society are at 33, Seaview Road, Gillingham, Kent; Hon. Sec.; Mr. J. Nixon (G6 X O). "P.W." is a journal devoted to the interests of radio reception, but has a very warm spot in its policy for amateur transmitters all over the world.

Bright—but Dull Preferred!

A FEW weeks ago someone was asking me to write about the junk used in the early days. I have not yet got the data together, but in the meantime I may mention that Mullards' had a fine demonstration at the Physical and Optical Societies' Exhibition, which showed quite plainly the difference between the degree of amplification given by a 1921 "bright emitter" and that given by a Mullard P.M.12 2-volt screened-grid valve.

The difference was some two to three hundred per cent in favour of the modern valve. And another difference was that the modern valve filament consumed 0·3 watt compared with 5·2 watts eaten up by the 1921 type!

THIS IS A RUM BUSINESS!



For two years the U.S. Federal authorities were looking for this short-wave station, which was being used by rum-runners to control the movements of liquor-ships. It was eventually run to earth in San Francisco and has now been seized by the Government.

Jack, How Could You?

THE separation of Jack Payne from the B.B.C. is a minor tragedy, for he must have been almost the most popular musical "turn" in the programmes. The B.B.C. is singularly unfortunate. It seems to have the habit of losing its most charming and useful employees with monotonous regularity. The list of loved and lost ones is by now too lengthy to be repeated. Can it be that He Who Must Be Obeyed thinks it's bad for the listener to have too much of what they like?

Why Do They Leave?

IF an employer makes a man happy in his job and pays him fairly, that man will not leave him, especially in these hard times; the B.B.C.'s money is as good as another's. What then can the matter be? (Old Song!). I could make a pretty shrewd guess at what's wrong, but who am I to put the Cabinet wise? But surely it is plain to all that there must be some reason for the frequent changes in the senior staff. Perhaps Mr. Harold G. Brown would investigate the matter.

Patent Pool Promises Peace.

THAT'S a good U.S.A. headline! It refers to a pooling of radio-gramophone patents by six of the leading electrical companies, including Marconis, the Gramophone Co. and the Columbia people. This agreement will put "paid" to a difficult patent situation and should

(*Continued on next page.*)

"ARIEL'S" RUNNING COMMENTARY ON RADIO *(Continued)*

greatly advance the radio-grammy interests, technical and otherwise. The pool will issue licences to approved manufacturers who desire to engage in the making of radio-grammies, and will keep out foreign stuff. From which it would appear that compromise is a great idea!

Think Again, Chun!

I HAVE been reading a report of a meeting of engineers in Newark, New Jersey, U.S.A., whereat a wily Chink named H. H. Chun propounded some theories which apparently stumped the Americans. Mr. Chun is reported to have said that, in his opinion, energy "continues to have some force, however small, down through the ages even until eternity." Oh, no! not *his* opinion; the theory of the Conservation of Energy is probably much older than Mr. Chun.

Mr. Chun also "visioned a receiver that would recreate and reproduce speech uttered years before, even to the days of the Pharaohs." In suggesting that fellows in past centuries spoke through the ether instead of through air, as we do nowadays, H. H. Chun was assuredly either leg-pulling or showing his ignorance.

"Atmospheric Tides."

A MUCH better theory (though it won't wash) comes from K. I. S. (London, S.E.18), who tries nobly to explain "fading" by a theory of "atmospheric tides." If his premise were correct his reasoning might be worth investigation, but unfortunately he says, "Wireless signals, as vibrations, must surely have a suitable vehicle in or against which to vibrate, and it seems feasible to regard the atmosphere as that vehicle." This shows that he ought to "rub up" his elementary physics.

How does he account for the fact that electro-magnetic waves can be propagated across a vacuum? No, friend, not atmosphere but ether is the vehicle, and ether does not seem to be subject to gravitation. However, you know how to think for yourself, and I would encourage you to study the theory of radio.

Coming Important Development.

AS I foreshadowed last week, I am now able to say a little more about the big surprises we have in store for "P.W." readers; no less than some entirely new technical ideas. Once again "P.W." will prove that it is not a machine for re-hashing old notions and re-christening old circuits. And we shall prove it beyond doubt.

These ideas are wholly original, and I think I can safely predict they will create a big impression not only on you, but also the "trade" in general.

Results of Hard Labour.

I HAVE had a serious *séance* with the technical staff (who are exceedingly happy about this matter), and I am earnestly assured that the application of the new ideas upon which they have been working gives results which repay them generously for the intensive research and patient testing they have carried out. In a few words, we have a new contribution to the art of radio-reception. Next week I hope to be able to give you more news about it.

SHORT WAVES.

MISS SMITH IN FORM.

"A running commentary is a very swift animal of the camel type." "Punch."

* * *

Four hundred American "femmes," we read, are to broadcast for a commercial company, and their broadcasts will be called "The Bath Club."

But we doubt very much whether they will be of the "wishy-washy" type.

* * *

There'll certainly be some new "talking through your hat" jokes about if Bradford policemen get their miniature wireless sets!

* * *

There was once a young man who said
"Hark!"
They're transmitting this row for a lark."
But his neighbour "highbrow"
Shouted gladly: "I vow
'Tis that wonderful prelude by Bach!"

* * *

THIS WEEK'S LIBEL.

There was once a Scotsman who bought a valve, used it for three years, and then took it back to the shop and said he had just learned that it contained a vacuum—and he would like either a gas-filled valve in exchange, or his money back.

* * *

"It is the whole rhythm of English life that has to be changed," says M. Andre Siegfried.

Perhaps the B.B.C. will give a lead by putting more verve and abandon into the fat-stock prices. "Punch."

Anglo-American Radio Society.

MR. E. HOBDEN, Enrolment Council member of this society, tells me that, on account of the hard times which the world is passing through, they have abolished membership fees, and now anyone wishing to belong to a radio society whose aims are to aid radio enthusiasts and promote good fellowship between nations may join free of charge. Apply to the society's headquarters, 11, Hawthorn Drive, Willowbank, Uxbridge, England, for details; but as the society has now no income, please enclose a stamped and addressed envelope. The subscription of money is, however, not positively forbidden!

Marconi and Mars.

DURING the few days on and about Dec. 12th, which was the 30th anniversary of Marconi's feat in first transmitting across the Atlantic by radio, the inventor gave interviews to some of "the Press," which interviews were duly dished up garnished with the requisite amount of gush. But, oh, how sick he must be of being asked whether he thinks that we shall ever be able to communicate with Mars! It really is rather an out-of-date question for an up-to-date man to ask, and, anyhow, it has been thrashed out innumerable times, the answer being always the square root of minus one!

Perpetual Motion.

THIS is another old timer which ought to be buried at the crossroads with a stake through it. Men still go on trying to devise machines which will never stop; some of them won't even start! It was lately reported that a Signor G. Costa of Italy claims to have invented a non-stop dynamo. It runs on its own juice, as bears and frogs live on their own fat. So there is still hope for the man who is trying to lift himself up by his own braces!

New Year's "Howlers."

FROM Mr. Cecil Hunt's collection I take the following for you. "A positive is an molecule which has electrons distracted from it." "The farad is the unit of cowpacity." "Wireless waves travel at such a high frequency that it is impossible for the naked ear to detect them." "A dull-emitter valve filament is coated with thorax." "When the circuit oscillates it is in residence." "Wireless valves are worked by eccentricity." "Wireless is of great use to ships at sea, it helps vestals in distress. . . ."

Television by Correspondence.

POSSIBLY some of you foreseeing lads may be grateful to me for pointing out that the Technological Institute of Great Britain, Temple Bar House, London, E.C.4, is preparing a correspondence course of instruction in television. Courses in radio engineering and sound recording and reproduction (covering gramophone records and "talkies") are also available.

Gandhi and Radiotelephony.

SAYS the "Telegraph and Telephone Age," "Gandhi talked across the Atlantic Ocean over a telephone for the first time on November 20th and called it a 'miracle.'"

An American clergyman (who would have been better employed in doing his proper job) rang the Hindu up from St. Paul, Minn., and when the demagogue was told that the call had cost $120, he commented, "Well, a bishop should have had more sense than to drop so much good money into the Atlantic Ocean." Sure!

ARIEL.

A CHAT WITH AN EMPIRE COUSIN

by CAPT. P. P. ECKERSLEY M.I.E.E

Here is a straight talk on a vital subject—and although it is addressed to overseas readers, it is packed tight with interest for we stay-at-homes as well.

IT looks as if the British method of running a broadcasting service is going to be adopted in Canada, Australia and New Zealand.

You can say that there are two absolutely contrasted ways of running a broadcasting service: private enterprise or public utility. In France and America they still cling to the private enterprise method. France talks about a public utility company.

"A Splendid Compliment."

But nearly the whole world is actually copying England. It's really a splendid compliment to Sir John Reith and his staff that our method has proved such a success. We must not forget, either, that it was a Conservative Government that confirmed the public utility method of conducting broadcasting.

Of course the public utility company method of running public services is sensible socialism. It isn't pure because it isn't blind *laissez faire*. It tends to conserve the good qualities of each method and reject the bad.

The danger of handing a monopoly of service to a body of men is that they think in terms of keeping their jobs instead of serving the community. I sometimes criticise the B.B.C. for its failure to interpret its duties to the listener as many of us feel they should be interpreted.

Is It Wise?

There is always a danger in removing competition because complacency supervenes. All the benefits that come from monopoly may be squandered if the people in charge feel that to make a mistake would be fatal to *their* interests. People who never make mistakes never make anything. The B.B.C. fails too often through excess of caution.

On the other hand, private enterprise has no check upon its vulgarities. Everyone in Britain agrees that it would be dangerous to adopt the American method without safeguards. Now it appears to Australia that broadcasting might be as easy as A B C—we must see that it avoids the difficulties of being B.B.C.

So I take my Australian (or Canadian or New Zealand) friend aside and I am given half an hour or so to explain some of the difficulties he will be up against. Perhaps you would like to hear what I should say to him? To save inverted commas, I give notice that from now on this is me speaking to an Empire cousin.

Well, I should say, you have come to the conclusion that on balance it's better to run broadcasting under national control. I agree with you—on balance. But be very careful how you frame this constitution. In the early days of broadcasting in Britain the B.B.C. was a company.

How It Started.

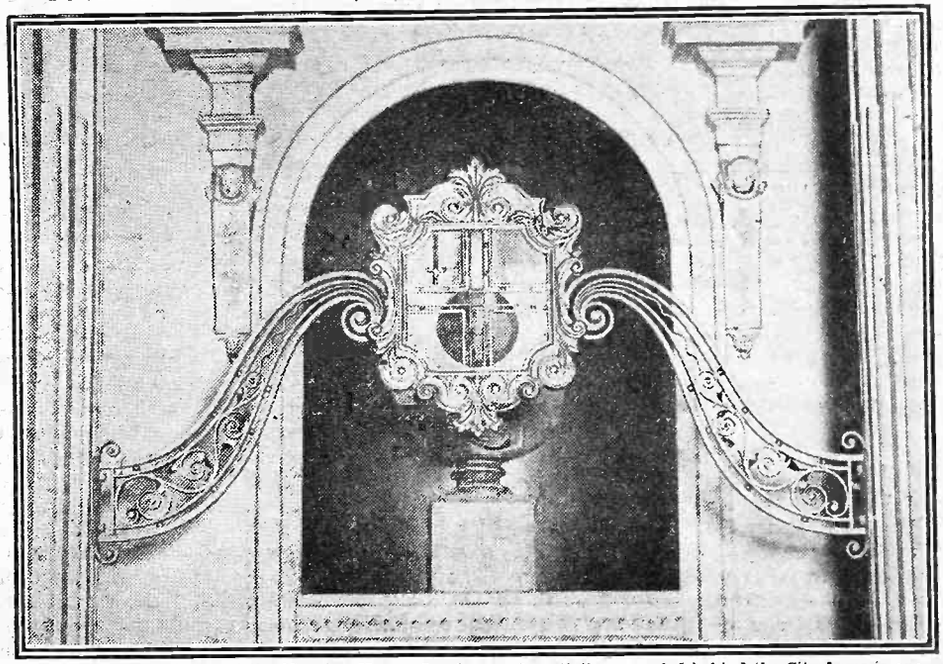
This company was allowed, on probation, to run the broadcasting service. Its money and its directorate were supplied by the manufacturers of wireless receiving apparatus. The directorate were wise enough to realise that they could only hope to continue to be allowed to serve the public provided they took all their decisions in terms of public utility ideals.

Parliament, therefore, appointed committee after committee to examine into the activities of this very responsible company. My word! how we worked in those days to see that our work welcomed examination. I tell you, it was a wonderful stimulus. If it hadn't been for one committee I doubt if we should have got on with the new relay stations half so quickly as we did.

"One" from Sheffield walked into my office one day and asked certain very pointed questions about conditions of

(*Continued on next page.*)

"YOUR ROYAL HIGHNESS, MY LORDS, LADIES AND GENTLEMEN——"



This picture was taken at the Mansion House, London, and partially concealed behind the City Arms is one of the moving-coil loudspeakers with which the historic building is equipped for use during banquets, etc. Broadcasts from the Mansion House are amongst the most popular items received overseas via the Empire Station at Chelmsford.

A CHAT WITH AN EMPIRE COUSIN

(Continued from previous page.)

listening in Sheffield. I defended myself as best I could. Time, technique, money, etc. —all the excuses, but I assure you a desire to meet "one's" criticisms. Well, all this was taken up by the Parliamentary Committee.

It seemed almost as if we were in danger of losing our monopoly because it was suggested that municipalities might run their own service. So I got out the whole relay station scheme in principle in a few days—an afternoon to be more precise. And, thanks to the almost superhuman work of my staff, we built eleven stations in eleven months. I only drag in this illustration to show you how that constant watchful eye from Parliament kept us on the *qui vive*.

In fact, though we lacked facilities in those earlier days the spirit of the place was first-class—we were going to show anybody (the more the merrier) that we deserved well of the public because we were out to do anything and try anything for the public benefit.

The First Step.

We were so successful that the final Parliamentary Committee decided to make the B.B.C. a permanent institution. One of their first steps was to suggest removing the old Board of Directors, who were ultimately responsible for the success of broadcasting, and appoint instead Governors.

The qualification of a Governor was that he or she should have no interest in any phase of broadcasting or entertainment. This ensured complete neutrality.

Now, in my opinion, certain fundamental mistakes had been made in taking these decisions. I don't want you to think that I consider the Governors appointed were anything but painstaking and conscientious people, aware of their responsibility and the importance of earning the comparatively large emoluments that were suggested. I believe it was an excellent thing to keep on the existing staff, particularly the so successful leader.

A Grave Mistake.

The mistake was twofold. First, to appoint Governors who had no knowledge of the art they served; secondly, to give the monopoly to the B.B.C. for ten solid years without there being any effective machinery for checking and controlling those who, however conscientious, are nevertheless fallible.

Broadcasting hasn't begun yet, you know! It's young and it ought to grow. It seems extraordinary, does it not, that the youngest and most modern development should be governed by four men each of whom is over 70 years of age? Again, do not misunderstand me, I am not sneering at age, I am not trying to belittle men who have all done admirable work.

Younger Men Wanted.

I do feel, and I am sure you will agree with me, that if there must be Governors (personally I can't see why there should be) they might at least be younger, more in touch with life as we post-war people see it, and they might also have some expert knowledge if they are to govern.

I do not know if you read the articles I write in the "Daily Mail," but I harp on one thing—the rigidity, the formula seeking, the standardisation that is creeping over our service. It's almost too facile to suggest that a lack of flexibility of outlook in the personnel of the governing body is the sole cause. I know it is not, but younger Governors might stir up the young old men. The Governors are supposed to resign at the end of this year—I bet you a bob they'll be re-elected.

Now from all this let me come to my suggestion for your new broadcasting company in (Australia, Canada, New Zealand).

First of all be sure that the constitution is such that Parliament can have machinery to examine into the affairs if it seems to Parliament advisable to do so. Let all the staff realise that it's up to them, and if they fail they must go—that the job is no sinecure, as it were. If they're worth anything that will be a fine safeguard and, better still, a fine stimulus.

An Executive Board.

Secondly, I don't think Governors are necessary if you take my first suggestion. You see if Parliament, acting as trustees for the public, know that they can at any time recommend different people to run the show, why have a non-executive Board? A Chairman, yes—possibly the P.M.G.—possibly not, because of course he's apt to get changed so often.

Make the Board executive, I suggest. Make the Director-General, the Assistant Director-General, the Chief Accountant, the Secretary, the Head of the Programmes, the Head of Publicity and the Chief Engineer constitute the Board. An executive Board, always knowing that they will only keep their well-paid jobs by being efficient and that Parliament will act P.D.Q. if they are sloppy or conceited or just mediocre.

I'm sure I'm right about this; I'm sure our show would be ever so much better if at the back of everyone's mind there wasn't this ten-year feeling. I believe our people are jolly good, I don't think Parliament would need to act very drastically, it would only be the stimulus of a two-year audit, which would be so beneficial.

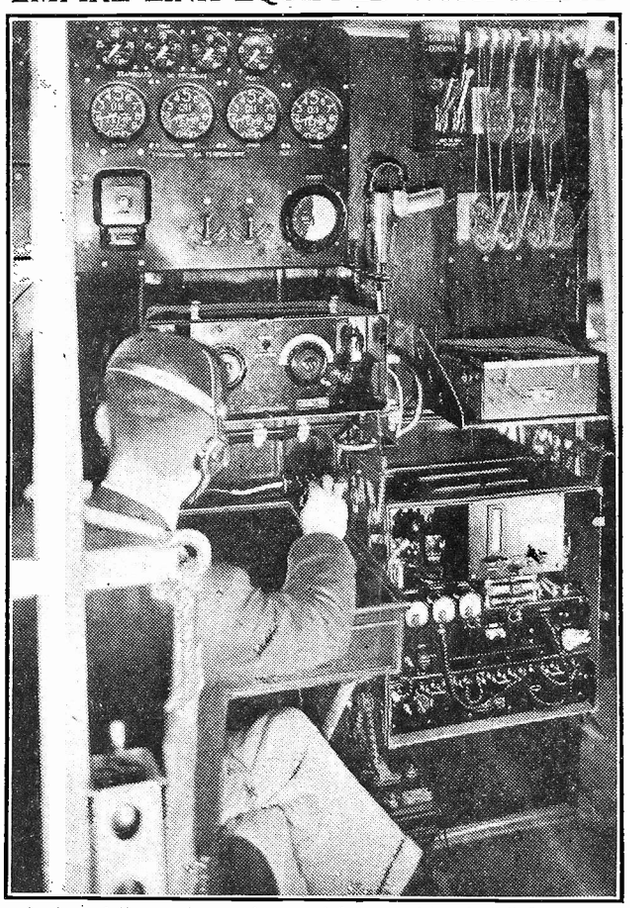
I hope you don't think I'm getting at anyone particularly—I'm getting at one of the difficulties of the system itself. It almost makes bureaucrats out of enthusiasts. It's very hard to expect men to be eager and flexible minded and tolerant in outlook when you give them complete monopoly.

"Think It Over."

You see here in England, even if everyone felt as I do about this lack of change and evolution in our service, it would be difficult to bring about the desirable changes unless everyone stopped paying licences. And that would be silly, because it would destroy so much that is good and worth while—particularly on the technical side. Think over what I've said, I assure you it's pretty sound.

Thus, reader, I would address my Empire cousin. Thus would I advise him. What do you think?—just a small change of system and a big change of spirit. Men are not often venal or stupid, it's so often system drives them into a wrong attitude of mind about things. Competition is a fine thing, but to be made to compete to serve your fellow-men seems to me the one way in which we may approximate to a Christian point of view.

EMPIRE LINK EQUIPPED WITH RADIO



A view of the receiver and powerful transmitter installed on an Imperial Airways "Kent" type of flying boat, for trans-Mediterranean service. The range is estimated to be about 500 miles, and the installation can be operated when the aircraft is on the surface of the water as well as when in the air.

AN ITEM OF INTEREST

About Radio-Paris.

MANY listeners have been complaining recently that Radio-Paris appears to have lost that little extra punch he acquired after the installation of the new transmitter.

Well, I have heard on quite good authority that for the past few weeks the engineers have had cause to resort to the old transmitter again. What the difficulty is I don't quite know, but they hope to resume with increased power again in the near future, possibly before this appears in print.

At any rate, readers can now rest assured that there was nothing wrong with their sets!

F.B.

SHOULD THE B.B.C. BAN CONTROVERSY?

by

Lt.-Commander the Hon. J. M. Kenworthy R.N.

How can frankness before the microphone on certain subjects be reconciled with a desire not to hurt individual susceptibilities? How can blunt truths be presented so as not to cause unnecessary pain? These are some of the intensely interesting subjects dealt with by our distinguished contributor this week.

IN a previous article discussing controversy "on the wireless" I examined the official attitude of the B.B.C. towards controversial matters and reached the conclusion that "what is needed is the spirit of the best of the world's universities, where both sides of even the most controversial subjects are allowed expression, so long as the protagonists are sincere, informed and interesting."

What to Avoid.

How can this desirable object be achieved without causing unnecessary pain or offence?

For there is this difference between the B.B.C. programmes and the curricula of the universities: the B.B.C. programmes are listened to by the maiden aunt and the child, the two sections of listeners picked out for special treatment in the official apologia for Savoy Hill; the universities are attended only by grown and educated and, especially nowadays, sophisticated undergraduates. Therefore certain things must be avoided in the B.B.C. programmes.

The feelings of the relatives of the recently dead must be spared. "De mortuis nil nisi bonum"—let nothing but good be said about the dead—would be a wise guide, if for "dead" we substituted recently dead. There are still living some of the first generation of descendants of the late Mr. W. E. Gladstone; but that statesman has passed into history and the same might be said of the late Mr. Joseph Chamberlain.

"Drawing the Line."

The utmost frankness should be tolerated in such cases. But the late Earl of Oxford and Asquith passed out of the political arena into the Unknown too recently for criticisms of his policy and, still more, personal character, to be in good taste.

Again the discussion of problems of marriage, of relations between the sexes, must be handled with delicacy. The treatment of this highly controversial topic has been made the basis for an attack on the B.B.C. arising out of the literary criticisms.

A living literature must deal with the problems that are agitating the minds of the public; and there is a good deal of frank discussion of this particular range of subjects at the present time. But much here depends on the way such subjects are handled.

It is curious how a scientific treatise on the subject of marriage often arouses fury, while extremely vulgar plays and music-hall sketches dealing with the same subjects in a far more objectionable manner, and, indeed, appealing to a larger and less sophisticated public, are allowed to pass without challenge. The test here surely is whether such subjects are handled scientifically or not.

Then there is the difficult case of religion. In the meetings of the two largest secret societies in this country, the Freemasons and the Buffaloes, their combined membership running into hundreds of thousands—and I am giving away none of their secrets in reminding readers of the well-known fact that follows—all discussion of religion is definitely barred.

That is for the sake of internal harmony in societies whose basis is largely fraternal. But the B.B.C. is neither a secret nor a fraternal body. Religion plays a larger part in the lives of people than is always realised even by professional ecclesiastics.

My own view is that a great religious controversy at the present time between the modernists and the fundamentalists would have a thoroughly healthy effect on all the churches. But the partisans would have to be very carefully chosen, and they, in their turn, would need to choose their arguments and words with great care.

"Tread with Care."

If there is no certainty of this being done, religion had better be barred altogether. It would be a pity; for the moment a great subject is banned from public discussion harm is done; and this probably applies to the organised religions more than to anything else.

In the case of the last two great topics that I have mentioned the objection may be made that children listen, and what may be fit subjects for discussion by adults and to be listened to by adults are unsuited for the young.

But there is a children's hour already, though from what I can gather from my young friends it is not over popular, not because of the excellent entertainment given, but because it is *called* the children's hour and they don't like being segregated from the rest of the population. In any case most children are in bed early and these highly controversial subjects might well be discussed after ten o'clock at night.

Unequal Treatment.

The greatest argument has raged over the handling of literary criticism. Recent instructions to critics and reviewers serving the B.B.C. are to the effect that the names of contemporary books are not to be mentioned. Yet when descriptions are given of contemporary art and music the names of the artists and composers can be referred to.

Apparently some person or persons in authority thought that by allowing the mention of particular books of the day by the B.B.C. critics, with the immense power and influence of the Corporation, an unfair

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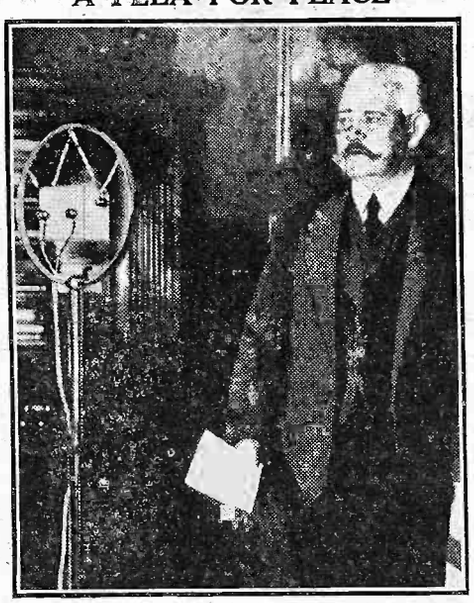
A PLEA FOR PEACE



President von Hindenburg, one of the great figures of the World War, broadcasting his recent appeal to the world to bury hatred and show mutual co-operation for the common good.

SHOULD THE B.B.C. BAN CONTROVERSY?

(*Continued from previous page.*)

advantage was given to certain authors. There are two answers to this: the first is the protest against the ban on names sent to the press signed by a very large number of leading publishers and prominent authors.

If these do not object, it is difficult to understand why anyone else should; and certainly not the listeners who want to know what books they should read. Most of these are busy people. It is a real boon to them to get an authoritative account of the merits, or otherwise, of contemporary publications.

More Reading Done.

In recent years there has been a tremendous increase in the reading of books. In a time of trade depression and strained finances the publishing trade and circulating libraries are doing fine business.

Not only do novels sell as never before, but biography, historical studies and some scientific works have an immense sale and circulation. Surely this tendency should be encouraged by such a public body as the B.B.C. And yet any effective criticism is impossible without mentioning the actual works and the names of the writers.

The other answer to the fear of favouritism is to refer to the practice of the newspapers. The influence of the press on the sale of a book is, of course, enormous. Limited space means that only the most noteworthy novels or other books can be referred to at all; and yet during the hundred years or so in which book reviewing in the newspapers has been practised there have never been any charges of favouritism. Why should the B.B.C. be any more suspect than the literary editors of the British Press?

The outcry over book reviewing in certain quarters has come from those who have felt that a certain type of book, a rather objectionable kind to some minds, has received more share of attention than it deserved.

Keep Out the Cranks.

But the remedy here is one of practice and administration, of choosing the book reviewers with more care. There are plenty of competent reviewers who cannot be classed as cranks; but why go to the other extreme and ban the mention of any contemporary literature? The B.B.C., I fear, has only made itself ridiculous by this change of policy, and the matter should be put right.

Politics, and the allied subject of economics, are both highly provocative and controversial.

There will always be a danger of the government of the day endeavouring to obtain an unfair advantage by monopolising as much of the time given to political talks as it can. And as this infringes the whole principle of free speech and the liberty of the subject, the tendency must be resisted to the utmost.

When we come to economics, the case for impartiality is even stronger; for here most of the old ideas are in the melting-pot and a whole new school of economics is coming to the fore. The people undoubtedly want to know about this subject, which so affects their lives.

The orthodox are entrenched in the most powerful institutions in the country and will, I fear, go to some lengths to prevent any but their own particular views on economics finding expression. They might just as well try to prevent a change in the weather when a blizzard is approaching; but that is another matter.

Free Hand Essential.

Politics and economics are becoming so intertwined that we can, and indeed must, discuss the principles involved as one. The only possible policy which the general public should tolerate is that all recognised points of view should be heard. Political opinions have changed rapidly during the last ten years, and will change again just as rapidly.

The majority in Parliament may represent a minority in the country in a few months after an Election. Every Government in turn, no matter what its political complexion, since broadcasting was established, has tried to take an unfair advantage over the Opposition or Oppositions. And the test of head-counting is fallacious.

The only safe and, indeed, the only just policy is to allow equality for expression through the ether. Take as a test the question of India, of first-rate importance now, and likely to become even more important in the future. This I referred to briefly in the former article.

"Three Points of View."

Broadly speaking, there are three points of view which I may describe as being right, middle and left. The middle point of view is that of the present Cabinet. But there are those on the right, by no means negligible in numbers or influence, who think that we are going too fast with Constitutional Reform in India; and there are those of the Left who think we are not going fast enough.

I am not referring here to distinguished Indian politicians; but to Englishmen, Scotsmen and Welshmen. So far the only expression allowed since the Round-Table Conference commenced its sittings in London, through the B.B.C., have been from those holding the middle position. Whatever one's own point of view might be, this is a gross misuse of the Cabinet's undoubted ability to influence the Governors of the B.B.C.

A Useful Weapon.

Nor can the excuse be made that any other expression of opinion might do mischief in India; because both the other schools of thought have their means of expression, which they have used and will use, and which as they affect India are more important than broadcasting.

For Mr. Churchill and his friends on the Right and the Socialists and Radical critics on the Left have Parliament, the platform, and the public press—and use them. Through these media their views reach Indian eyes and ears far more easily than any talk allowed by the B.B.C. in England.

I have purposely chosen this Indian example because it has been the most flagrant and the clearest, and because of the importance of the subject.

The public have the right to hear all widely held points of view on great questions of the day. The rough test of whether there is a distinct point of view should be its representation in Parliament.

On financial and fiscal questions, economic and industrial problems there are always two, and sometimes three, distinct points of view. And here the B.B.C. should be an open forum, just as are the Universities and the Press.

LETTERS FROM LISTENERS

These are not complaints and controversial criticisms, but are practical expressions of goodwill in the form of subscriptions. They are some of the replies to Viscount Snowden's appeal for the blind.

AN ECKERSLEY THREE APPRECIATION

The Editor POPULAR WIRELESS.

Dear Sir,—In response to Captain P. P. Eckersley's request for reports on the "P.W." Eckersley Three, I have pleasure in offering my observations on the performance of this set.

In my opinion, it is the best detector and 2 L.F. type of set yet published by the "P.W.," and I have made a large number of such sets.

And once one gets the hang of the tuning of the set, which, by the way, is entirely different to the usual tuning of "straight" sets, results are truly remarkable, and are a revelation in selectivity combined with sensitiveness.

On the medium wave-band sufficient stations can be received at good loudspeaker strength to satisfy the most assiduous of station hunters, and, what is more, they come in one at a time, and not like the animals entering the ark.

Muhlacker can be received clear of the London National, and all the other difficult stations can be separated.

Results on the long wave-band are equally impressive. So far, I have been able to receive 11 stations at good loudspeaker strength; and Konigswusterhausen and Radio Paris can be received without interference from the Daventry National at 19 miles.

Also, the set is wonderfully free from background noises when receiving distant stations.

I have one criticism to make, that is, I think the height of the screen should be reduced half an inch to advantage without impairing the efficiency of the coil.

The present height is 6½ inches, which with a ¾-inch baseboard and a 7-inch panel leaves only ¼-inch for a fillet across the top of a normal type of cabinet with a hinged lid. This is insufficient, and a baseboard less than ¾-inch thick has a tendency to warp, and involves the use of too short a screw for the baseboard components.

Yours faithfully,

Bletchley. R. E. FARWELL.

CHANGING OVER TO THE MAINS

A few hints for altering your battery set to mains drive.

By KAY LINDEN.

THERE seems to be a strong reluctance on the part of some listeners, when going over to mains operation, to use trickle-charging. Their aim is to do away altogether with the accumulator (which they have come to regard as a nuisance), as well as to do without the H.T. battery.

The Useful Trickle-Charger.

Really, it is only a nuisance in that it has to be sent away for recharging every few weeks. With trickle-charging the accumulator can always be kept in tip-top condition and the only attention it needs is an occasional test of the "specific gravity" by means of a hydrometer, and an equally occasional "topping up" with distilled water to make up for evaporation. There is no need whatsoever to disconnect the accumulator from the set during these operations.

If you have fairly recently bought a fresh set of valves for your set, it would be a pity to buy a fresh lot of mains valves unless you know some deserving friend to whom to pass on the battery ones.

But if your valves are two years old or more you can be sure that they have already lost most of their efficiency, and had they scarcely been used would bear no comparison to modern valves, either in the amplification they give or in the power they will handle.

In this case you would be well-advised to scrap them and invest in an entirely new set of modern mains valves.

Directly Heated Output Valves.

There is, however, one exception. It is possible to run some ordinary output valves from an A.C. current such as one would get from the secondary terminals of the mains unit transformer. This must be the same voltage as the accumulator used before. The more current the filament takes, the more likely is the valve to put up with this treatment and the less likely are you to be troubled from mains hum.

Many mains output valves are designed to work with directly-heated filaments and, on the whole, it would be better to invest in one of these, as the increased output from the preceding valves would be very likely to overload your old power valve.

That paragraph rather suggests that directly-heated output valves are best. This is not true, because indirectly-heated output valves are equally suitable and it is only a question of what power output you want.

And now for a few words of warning. If you are using two low-frequency stages, or one or two neutralised H.F. valves with coils not completely screened, the great increase in amplification due to modern valves may cause trouble. If you change to new valves you must be prepared for this.

The remedy for H.F. oscillation is to provide better screening.

The cure for L.F. oscillation, motor-boating, for instance, is to remove one of the L F. stages. If you do not want to lose too much amplification, fit a pentode valve in the output stage.

The question of H.T. voltage depends more on the valves that are used than on the cost, since voltages up to 250 can be obtained at quite reasonable cost. The majority of battery valves take up to 120 or 150, while mains valves work up to 200. In either case there are valves for extra power, working with higher voltages, though such valves are quite unnecessary for home use, very excellent quality being obtainable from ordinary modern power or pentode valves.

On the other hand, it is wise to have some surplus voltage in reserve to allow for a drop in anode components.

In general, the best policy is to get an output valve that requires roughly 20 per cent more anode voltage than the other valves in the set. You can then give this one the full voltage from a mains unit giving that value, and have a nice little reserve to drop in decoupling the earlier valves.

High-Tension Voltages.

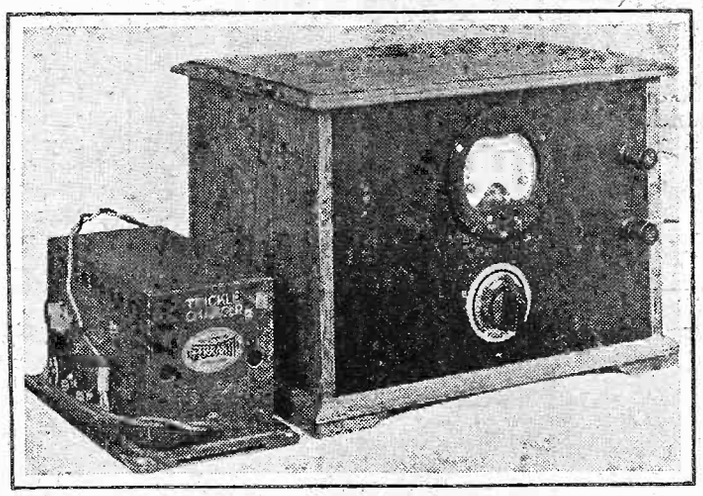
Thus for battery valves a voltage of 150 would be suitable. You could give H.F. and L.F. valves 120, an anode-bend detector would take the same amount, while a grid detector could be dropped to 60 to 90 volts. The low-tension current would be obtained from the accumulator charged from a trickle-charger.

For mains valves, I should choose a voltage of 200 or 250. The higher voltage would be the better if one wished to try power grid detection. The L.T. for mains valves is obtained from a secondary tapping on the eliminator transformer which supplies 4 volts of "raw" A.C. Sometimes there is a 6-volt winding also; this is for 6-volt output valves. There may also be another tapping to heat the filament of a rectifier valve if used.

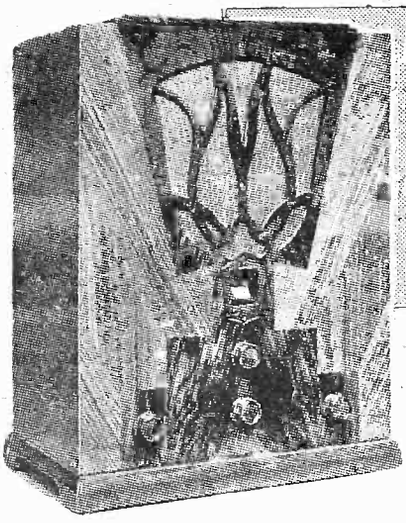
There remains grid bias to consider.

The values required depend very much on the valves used, especially the last one. These figures are readily obtainable from the makers' published figures, and if you buy an eliminator with grid bias incorporated the values supplied will be found to suit the high-tension voltages.

MEETING THE MAINS HALF WAY



By the use of an H.T. mains unit and a trickle-charger, for keeping the L.T. up to scratch, a very good compromise can be made. After all, it *is* "all-mains."



THE LOTUS A.C. TABLE CONSOLE

An account of a recent test of a popular all-mains three-valver carried out by a P.W. technician in the neighbourhood of Brookmans Park.

THERE is little doubt but that good appearance and ability to provide high-quality reproduction of the local station's programmes are the first essentials required of a radio receiver nowadays. For many, reception of foreign stations is a secondary, but nevertheless important, consideration.

The handsome two-tone walnut cabinet of the Lotus A.C. Table Console contains a completely mains-operated receiver of the popular S.G. detector and L.F. type, together with a moving-coil loudspeaker, and one cannot fail to be impressed by the compactness of the complete instrument when it is appreciated that this has not been permitted to impair results in any way.

When tested with an aerial and earth of average efficiency, about eight miles from Brookmans Park, we found that the two locals were received with excellent volume and quality, it being necessary to reduce the setting of the volume control considerably.

Easy Separation.

The Midland and North Regional transmitters could be received with almost as much volume as the London stations, a satisfactory number of foreigners being also obtainable adequately for any normal requirements.

The selectivity was found to be good, in fact above the average for this type of receiver; it being possible, by slightly reducing the setting of volume control, which has the effect of considerably increasing the sharpness of tuning, to receive stations working on wave-lengths quite close to the London stations without interference. Foreign stations operating on adjacent wave-lengths, such as Rome and Stockholm, may be separated quite easily.

On long waves six or seven programmes were obtainable with excellent volume, the selectivity and quality being as good as on the medium wave-band.

Accessible Controls.

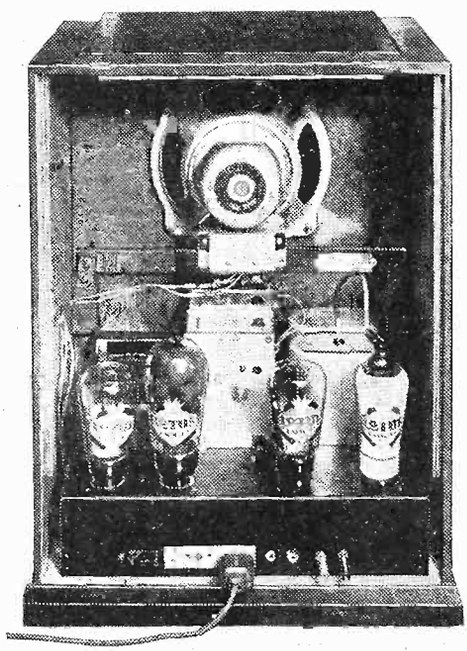
The controls required for normal operation are arranged on the front of the cabinet, the tuning knob is in the centre below the illuminated dial, which is conveniently calibrated in wave-lengths, so making the identification of stations simple.

Under the tuning knob is the volume control, which may also be used to vary the degree of selectivity when desired. On the right of the panel is the reaction adjustment, which operates with satisfactory smoothness, and at the left is the wave-change and pick-up switch.

Silk-covered slits are provided in the back of the cabinet (to prevent any trace of box resonance), and this is removable to enable the valves to be inserted and connection of the aerial, earth and pick-up leads to be made to the appropriate sockets. The mains voltage adjustment and on-off switch are also located at the back of the receiver.

Mazda indirectly-heated valves are normally supplied with this receiver, the types being a metallised A.C./S.G. in the H.F. stage, and A.C./H.L. working as a power grid detector, and an A.C./P.1 power valve providing a large undistorted output of volume. A U.U.60/250 rectifying valve provides the necessary H.T. supply and also field current for the Magnavox moving-coil loudspeaker.

A COMPACT ASSEMBLY



This view of the receiver, with the back removed, clearly illustrates the clear lines and straightforward construction of the set. Readers may wonder why there appear to be four valves in a three-valver—the explanation is that the additional valve is a rectifier for the H.T.!

Real Quality.

The reproduction given by this receiver on radio and gramophone can justifiably be termed "moving-coil quality" in the fullest sense of the phrase, bass being rich without any trace of boom, high notes crisp and the general tonal balance very excellent. On mains which usually give trouble if a set's smoothing is not good, not a trace of hum was noticeable when speech or music was being reproduced.

Considered from every point of view this receiver is designed and produced with the excellence usually associated with the name of Lotus Radio and is a product which the makers may offer with justifiable pride to the discriminating purchaser.

At the reasonable price of fifteen guineas this receiver is very good value, particularly as the instrument is complete, only requiring aerial, earth and mains connections.

PLATING AT HOME.

Two well-tried recipes for improving metal-work.

IF at the moment you are interested in the latest vogue in cabinet fittings, you will have noticed that clear silver predominates oxidised metal. The outrageous prices sometimes asked for such things as handles, catches, and hinges, are inclined to make most of us forget fashion and appearances.

A method of overcoming this drawback, however, is to purchase the necessary goods in brass, and then turn our minds to plating.

The recipes given abolish the use of batteries and special acid baths. And the results obtained, in comparison with a commercial treatment, can only be detected by a critical eye.

Mix 1 oz. of precipitated silver, ½ oz. of cyanate of potash, and ¼ oz. of hypersulphate of soda. Add to this 1 quart of water and a teaspoonful of whitening. Stir up well.

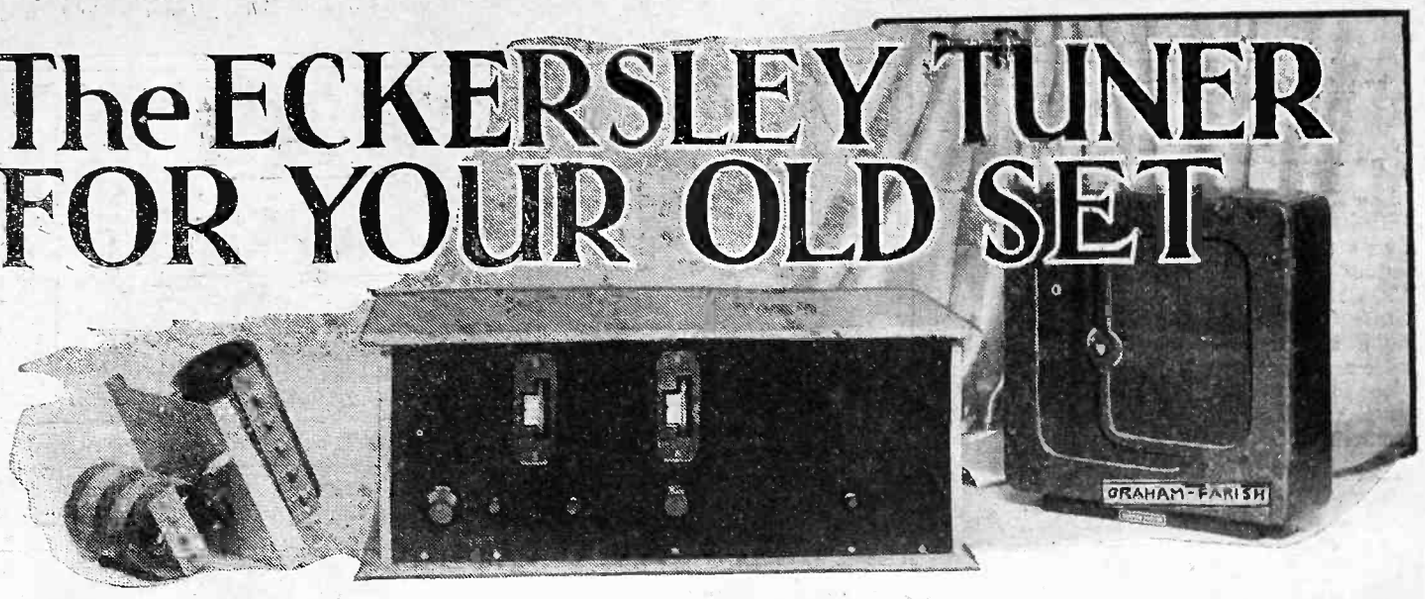
Before applying this mixture with a clean unfleecy cloth, clean the brass articles thoroughly. The quantities mentioned can be proportionately altered according to needs.

For oxidising brass an even simpler mixture is used.

Dissolve 1 part of photographic "hypo" and ¼ part sugar of lead in 14 parts of hot water. After cooling, immerse any brasswork requiring this treatment. Several hours of soaking is necessary, but by periodically making an examination the "tone" change can be gauged.

Should the effect be considered too dull, a frequent fault with many kinds of brass, the white of an egg or white spirit varnish can be used. Burnishing for either of the above transformations can be done with any superfine scouring powder.

The ECKERSLEY TUNER FOR YOUR OLD SET



RANGE without selectivity is useless. The medium broadcast wave-band is overcrowded and the result is chaos. There are scores of programmes, but what is the good if you get two of them together.

That is exactly what is happening in many cases at the present time.

Stations are increasing their power and by so doing creating a need for super-selectivity, thus rendering obsolete designs which have previously given no cause for complaint.

A Pressing Problem.

Selectivity with a simple receiver has always been a problem, because it is necessarily a compromise between volume and quality of reproduction.

Mr. JOHNSON RANDALL tells you how existing sets can be modified to take the wonderful new Eckersley Tuner, and gives the very famous "Comet" Three as an example.

It is possible to increase the degree of selectivity until the amount of side-band cutting makes speech unintelligible and music a ghastly travesty of the original.

On the other hand, it is comparatively easy to secure selectivity at the expense of a large percentage of the total volume available. This may be all very well for local station work but good-bye to the foreigners.

Fortunately *it is* also possible to obtain adequate selectivity, amazing volume, and excellent quality—the best permissible quality, bearing in mind the degree of selectivity imposed by the existing conditions.

Vastly Improved Efficiency.

And how is it achieved? The answer is with *the Eckersley Tuner!* Our Chief Radio Consultant has solved the difficulty and provided a means of vastly improving the efficiency of our sets, easily and inexpensively.

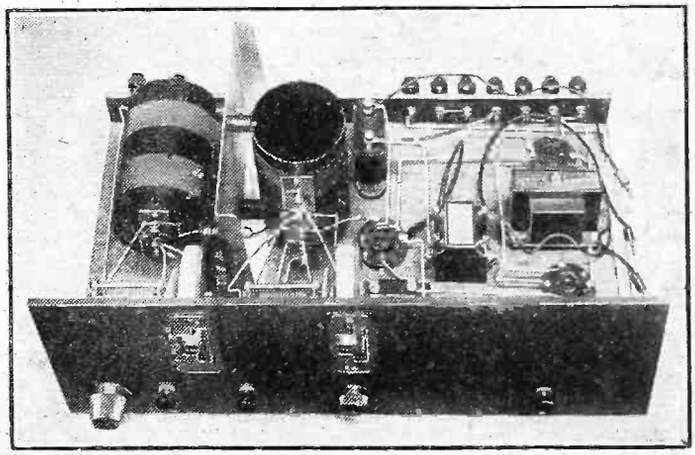
Can this tuner be fitted to any set? Well, yes, practically any set, provided there is no H.F. stage. You see, if a coil is to be highly effective it is necessary for fairly large formers to be employed.

(*Continued on next page.*)

THE COMPLETE COMPONENT LIST FOR NEW READERS

1 Panel, 18 in. × 7 in. (Peto-Scott, Permcol, Ready Radio, Becol, Goltone, Wearite).
1 Cabinet to fit, with baseboard, 10 in. deep (Camco, Peto-Scott, Gilbert, Pickett, Lock, Ready Radio, Osborn).
2 ·0005-mfd. "drum control" variable condensers (Cyldon Left-hand, Type C; J.B., No. 1 Plain; Polar, No. 3 DC.).
1 ·0001-mfd. to ·00015-mfd. max. differential reaction condenser (Lotus, Polar, Telsen Ready Radio, Cyldon, Igranic, J.B., Dubilier, Graham Farish, Wavemaster, Formo).
1 ·0003-mfd. solid dielectric condenser, with shorting position (Ready Radio, Ferranti).
2 On-off push-pull switches (Ready Radio, Telsen, Goltone, Wearite, Colvern, Igranic, Lotus, Peto-Scott, Graham Farish).
1 3-point push-pull wave-change switch (Ready Radio, Telsen, Bulgin, Wearite, Peto-Scott, Goltone).
1 Eckersley coil (Lewcos, Goltone, Sovereign, R.I., Melbourne, Wearite, Formo).
3 Valve holders (Telsen, Lotus, Lissen, Graham Farish, W.B., Wearite, Clix, Dario, Bulgin).
1 ·0003-mfd. fixed condenser (Dubilier Type 610, T.C.C., Telsen, Ready Radio, Sovereign, Graham Farish, Lissen, Goltone, Ferranti, Formo, Watmel).
1 2-meg. grid leak and holder (Dubilier, Telsen, Ready Radio, Ferranti, Graham Farish, Loewe, Watmel, Varley, Igranic).
2 L.F. transformers (Varley Niclet 1 : 3½, and R.I. General Purpose, Telsen, Graham Farish, Climax, Ferranti, Igranic, Formo, Goltone, Lotus, Lewcos).
1 2-mfd. condenser (Lissen, Telsen, T.C.C., Dubilier, Formo, Helsby, Sovereign).
1 10,000-ohm Spaghetti resistance (Telsen, Lewcos, Varley, Bulgin, Ready Radio, Sovereign, Peto-Scott, Graham Farish, Lissen, Igranic).
1 25,000-ohm Spaghetti resistance (Telsen, etc.).
1 Terminal strip 18 in. × 2 in.
9 Terminals (Belling & Lee Type R, Igranic, Clix, Eelex, Bulgin, Goltone).
1 Sheet of copper foil, 18 in. × 10 in., for covering underside of baseboard.
Glazite, Lacoline, Quickwyre, Jiffilinx.
G.B. plugs (Belling & Lee, or Clix, Eelex), screws, flex, etc.

PLENTY OF ROOM FOR THE TUNER



It so happens that the "Comet" is exceptionally easy to modify owing to the generous spacing provided for the components in the original design.

ACCESSORIES

LOUDSPEAKER.—Graham Farish, Blue Spot, Amplion, B.T.-H., Marconiphone, Celestion, H.M.V., Epoch, W.B., R. & A., Ormond.

VALVES.—1 Det. (H.L. type), 1 L.F., and 1 super-power type. Mazda, Cossor, Mullard, Osram, Marconi, Eta, Six-Sixty, Tungsram, Triotron, Lissen, Milliamp. consumption, 16-20 milliamps.

BATTERIES.—H.T. 120-volt super-capacity (Pertrix, Ever Ready, Magnet, Lissen, Drydex). G.B., up to 16½ volts to suit last valve (Pertrix, etc.).

ACCUMULATOR.—Voltage to suit valves (Exide, Ever Ready, Lissen, Pertrix, G.E.C.).

MAINS UNITS.—To supply 20 milliamps at 120 volts (Ekco, Tannoy, Formo, Regentone, R.I., Atlas, Heayberd, Lotus, Tunewell).

THE ECKERSLEY TUNER FOR YOUR OLD SET

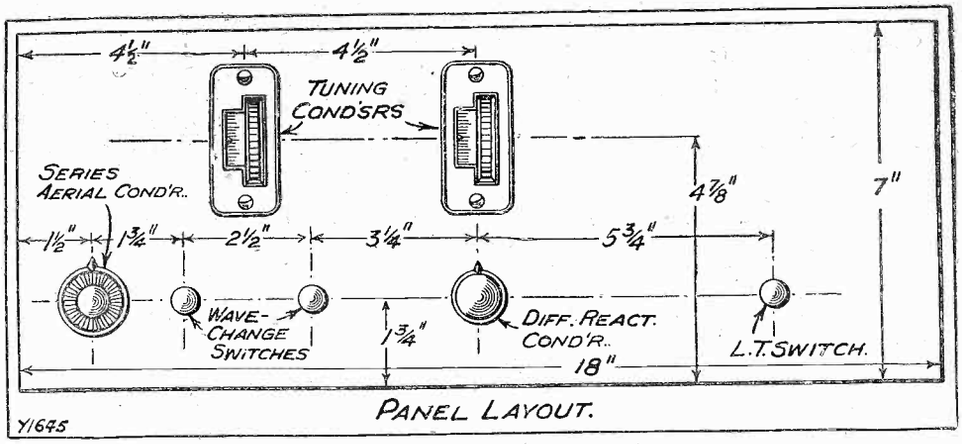
(Continued from previous page.)

Low H.F. resistance is vital, and certain difficulties arise through magnetic coupling if an attempt is made to use the tuner in conjunction with an S.G. stage.

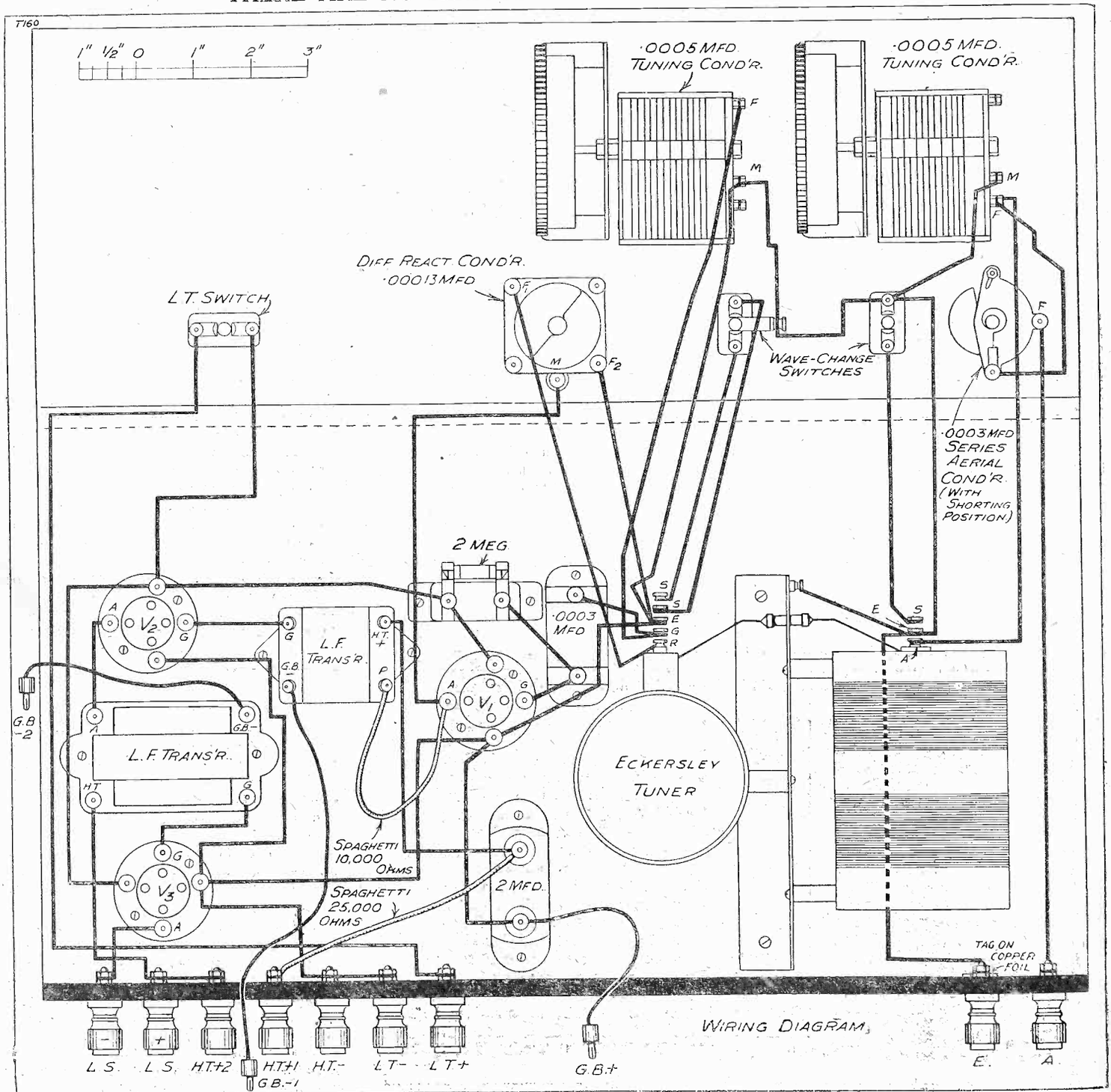
The Eckersley Tuner in its present form is intended for sets of the Det.-L.F. type, and it is, of course, these receivers which suffer most from inselectivity.

But it can be fitted to practically any straightforward detector design, space permitting.

(Continued on next page.)



THERE ARE NO SERIOUS LAYOUT ALTERATIONS



It won't take much longer, but it will certainly ensure success if you remove all the leads from your "Comet" and completely re-wire it to the revised model.

THE ECKERSLEY TUNER FOR YOUR OLD SET

(Continued from previous page.)

The question of space is a bit troublesome in some cases, because the tuner is about 8 in. in width, and two separate tuning controls are required on the panel. (No, you can't use a "gang" condenser.)

We recently decided to make an attempt at modifying a "P.W." design by fitting an Eckersley Tuner in place of the existing coil unit.

A "Comet" Three was available, and lent itself admirably to the task.

There must be thousands of "Comets" in this country, and so those of you who are "Comet" enthusiasts will be particularly interested in this article.

But don't run away with the idea that the conversion only applies to this receiver. The connections are just the same for any set of a similar type, i.e., a Det. and 2 L.F. stage. We had to take *one* design as a model, naturally, and the "Comet" happened to be convenient.

No Modifications to L.F. Side.

You all know what the "Comet" Three foundation model looked like.

It had a "P.W." Dual-Range Coil tuned by a ·0005-mfd. drum condenser. Space was left for a Selector coil to be fitted later, together with certain other refinements.

Well, the set we chose was the original foundation model without the refinements, and identical with the blue print given away with the February 14th, 1931, issue of POPULAR WIRELESS.

The "Comet" has two transformer-coupled L.F. stages, and these require no modification whatsoever. The Eckersley Tuner is quite independent of the low-frequency stages. The only portion of the circuit concerned with the alteration is that which precedes the grid of the detector valve, apart, of course, from the connection to the fixed vanes of the reaction condenser.

In the case of the "Comet" there are certain components which have to be removed. These are the Dual-Range Coil, the ·002-mfd. compression condenser, and the selectivity control.

This leaves a nice clear space on the aerial end of the baseboard, and so we can place our tuner into position without any trouble at all.

The panel requires one or two modifications. As previously mentioned the Eckersley Tuner needs two separate tuning condensers, each having a value of ·0005-mfd., hence another ·0005-mfd. variable should be mounted alongside the existing tuning control.

In addition the existing three-point wave-change switch is transferred to a new position under the *second* tuning condenser (the existing one), and a two point on-off switch is mounted in the position previously occupied by the old wave-change switch.

Also there is a ·0003-mfd. series condenser on the extreme left of the panel (looking at the front).

This condenser should be one of those having a "shorting" position when the vanes are rotated until they come up against the stop.

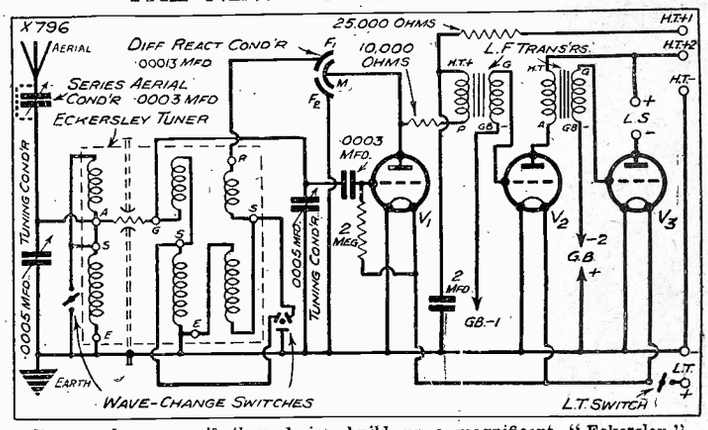
The connections are simple. You will, of course, have already removed all unwanted wiring, that is, the wiring to the old components.

You Can't Go Wrong.

The Eckersley Tuner is provided with terminals which are clearly marked, and there is no possibility of a mistake if the wiring diagram is followed carefully.

If you look at this diagram you will notice one very small departure from the original wiring in the "Comet" blue print.

THE NEW "COMET" CIRCUIT



New readers can, if they desire, build up a magnificent "Eckersley" Three set by using the diagrams and photos provided with this article.

The wire from the positive filament leg of V_2 passes to the filament leg of the valve holder V_1 via the grid-leak holder.

In the original blue print this lead goes first to the filament leg of V_1 and *then* to the grid-leak holder. Of course the wiring is exactly the same in each case as far as results are concerned, and it is immaterial which wiring scheme is employed.

No Connections are Soldered.

The point to remember is that the lead from the L.T. switch must go to the positive filaments of all the valve holders, and that the grid leak return must be joined to the positive filament terminal on V_1.

No soldering is necessary, terminals being provided on each component used in the modification.

Now some of you will probably wonder how you can fit the tuner to other sets.

There is no difficulty if you bear in mind the fact that the L.F. side always remains untouched, and that the alterations required precede the detector.

For instance, you may have a set on the lines of the "Magic" Three. Well, this is treated in a manner similar to the "Comet," those components before the detector, with the exception of the grid condenser, grid leak, and tuning condenser, being removed and in their place are inserted the Eckersley Tuner, together with its additional tuning control, wave-change switches, and series aerial condenser.

Space the Only Consideration.

As was previously stated, the *only* difficulty in fitting the tuner to *any* Det. and 2 L.F. or Det. and 1 L.F. receiver is *space*.

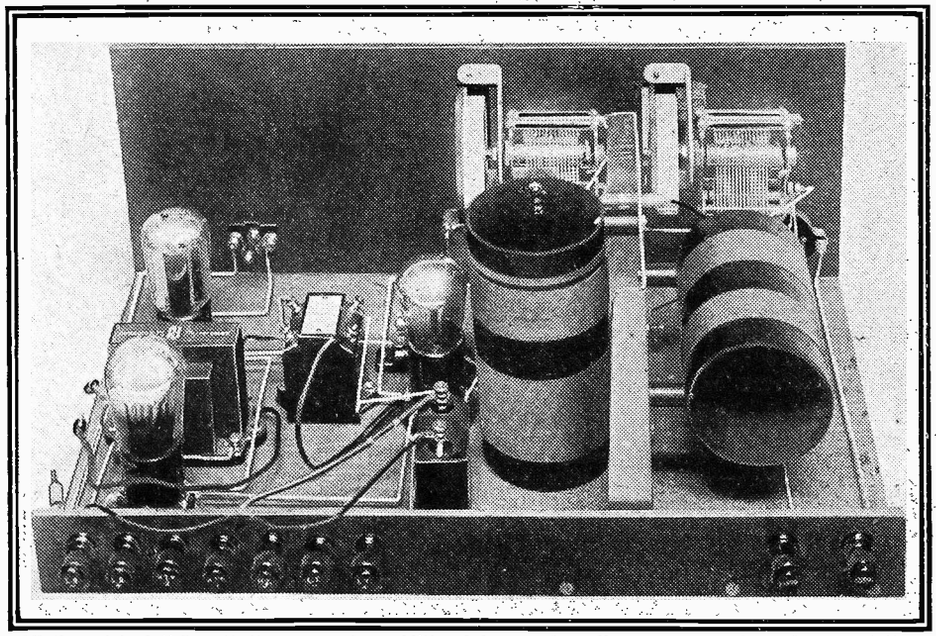
There must be room on the panel for another ·0005-mfd. condenser, and also sufficient space on the baseboard for the tuner itself.

You must not forget, when you are considering the possibility of modifying your set, that the plane of the metal screen between the two sections of the tuner should be arranged so as to come on a line midway between the two tuning condensers. That is to say, the lay-out scheme shown in the modified "Comet" should be adhered to.

Then you may also find that your own set employs R.C. and transformer-coupling instead of two transformers. Possibly there is an H.F. choke in the plate circuit of the detector valve, and not a 10,000-ohm resistance as in the "Comet."

(Continued on page 1196.)

THE L.F. END REMAINS UNCHANGED



All the original "Comet's" power, plus additional long and medium wave punch, and super-station separating qualities are found in this revised model.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?

THE A.D. CELL.

IT has often been a matter of wonder to me that the H.T. battery is always spoken of as though it were a greater nuisance than the L.T. battery.

Maybe one spends more money on dry H.T. batteries in the course of a year than on accumulators, but as far as I can see, from a maintenance point of view, the two are not comparable.

You buy a new H.T. battery, connect it to the set and then, being human, forget all about it until in three, four, five, or more months the thing is exhausted and has to be replaced!

On the other hand, although an accumulator has a longer life, it needs to be recharged at least at monthly intervals, and it also needs to be externally cleaned and, perhaps, greased if it is to give good service.

Trickle-charging, for those who are so fortunate as to have the power mains laid on, solves the charging problem, although that does not mean no periodic "servicing" is required.

In these circumstances, there must be many who will welcome the A.D. battery as an alternative to the accumulator.

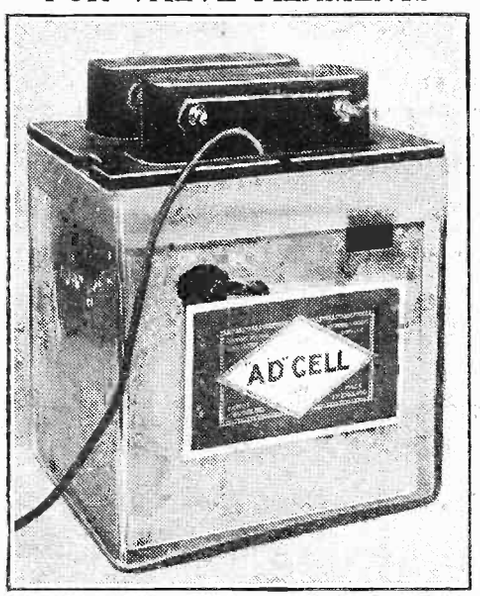
This battery is sold by the Standard Battery Co., and is a "Leclanché" type embodying a new depolarising principle. There is a large, porous carbon through which the gases disperse so that the internal resistance remains low and heavy currents can be drawn off at even voltages.

The voltage of each cell is maintained at 1·3 and the capacity is 500 ampere hours. You need two cells to run a radio set, using 2-volt valves and up to 2 years run is possible before it becomes necessary to change the zincs and electrolyte.

We have had an A.D. cell on test for some months and so far find it perfectly satisfactory. Its initial cost is £2 per cell, but over the year it compares favourably with the accumulator even in this matter of cost, and it can comfortably supply L.T. for an ordinary 3 or 4-valve set.

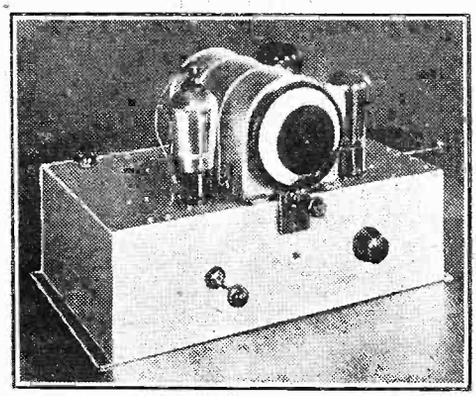
Country listeners particularly would be well advised to get full details concerning it from the Standard Battery Co.

FOR VALVE FILAMENTS



A primary battery which comprises an attractive alternative to the accumulator.

THE 1932 "MADRIGAL"



The chassis of Messrs. Radio Instruments' 1932 "Madrigal" Receiver. The complete set, with moving-coil speaker, is built into a handsome cabinet of distinctive design.

INVALUABLE FOR TRADERS.

How to service a set, so-and-so's 'phone number, the law on a certain point, the supply details of a town—these are some of the things traders can at once find by referring to "The Broadcaster Radio and Gramophone Trade Annual," the first edition of which has just been published.

It also contains the first "Who's Who" describing how prominent personalities entered the Trade, what they are doing and what their recreations are.

Public address, the charging of accumulators, and the testing of components are dealt with and retailers will find practical information on every aspect of their business from hire-purchase to advertising data, from the patent position to the factory, shop and business names acts and the legal cases of 1931.

SOME SOVEREIGN COMPONENTS.

I believe I have already dealt with three out of the four Sovereign components recently sent me for test and report—or, perhaps, I should say, with earlier samples of the same productions.

Anyway, I am again struck by the mouldings used—they are as clean and attractive in appearance as any I have seen. I think that the progress which has been made in moulding ebonite, bakelite and like materials, especially bakelite, during the past few years is little short of amazing. It would now seem as though perfection in the art has been reached, for some modern mouldings are of a most intricate character.

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 undertake to return them, 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.

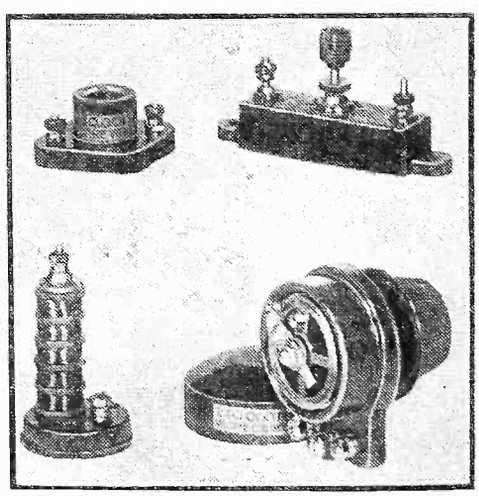
However, to return to these Sovereign components. Suffice it to say that the Sovereign Volume Control, Wire-wound Resistance and Compression Type Condenser have been favourably dealt with in this page.

But I do not think I have yet reported on the Sovereign Junior H.F. Choke. This, too, is a particularly neat, well-designed and constructed component and I find, on test, that it functions efficiently on both medium and long waves.

TWO NEW LISTS.

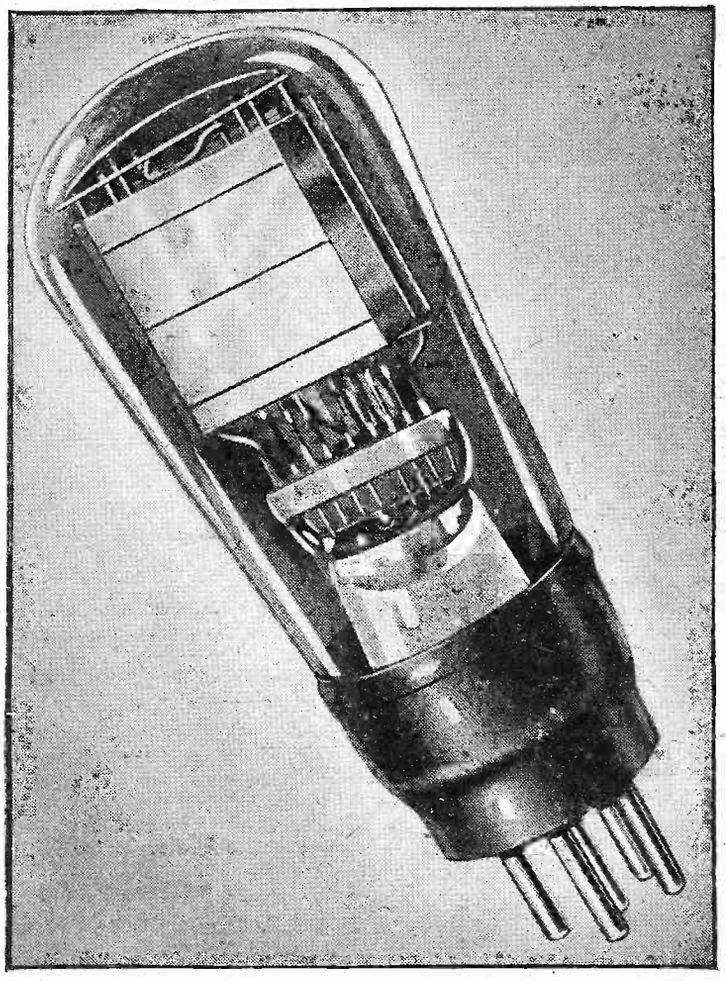
Two new lists to hand from Messrs. Igranic deal with Igranic Radio Components, and with the Igranic Permanent Magnet Moving-Coil Loudspeaker. Both publications should be secured by all constructors desirous of having the latest information concerning worth-while radio gear.

SOVEREIGN COMPONENTS



Here you see the Sovereign Wire-wound Resistance, Compression Type Condenser, Junior H.F. Choke and Volume Control.

THE NEW LOW CONSUMPTION HIGH EFFICIENCY PENTODES



★FOR THE MAN WHO USES BATTERIES

PEN 220

Here is the solution to the output stage problem in battery operated receivers. The Mazda Pen 220 gives an astonishingly high undistorted output for an anode current of only 5 m/a. It is the ideal output valve for portables.

PRICE 20/-

★FOR THE MAN WHO HAS AN ELIMINATOR

PEN 220A

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V.147

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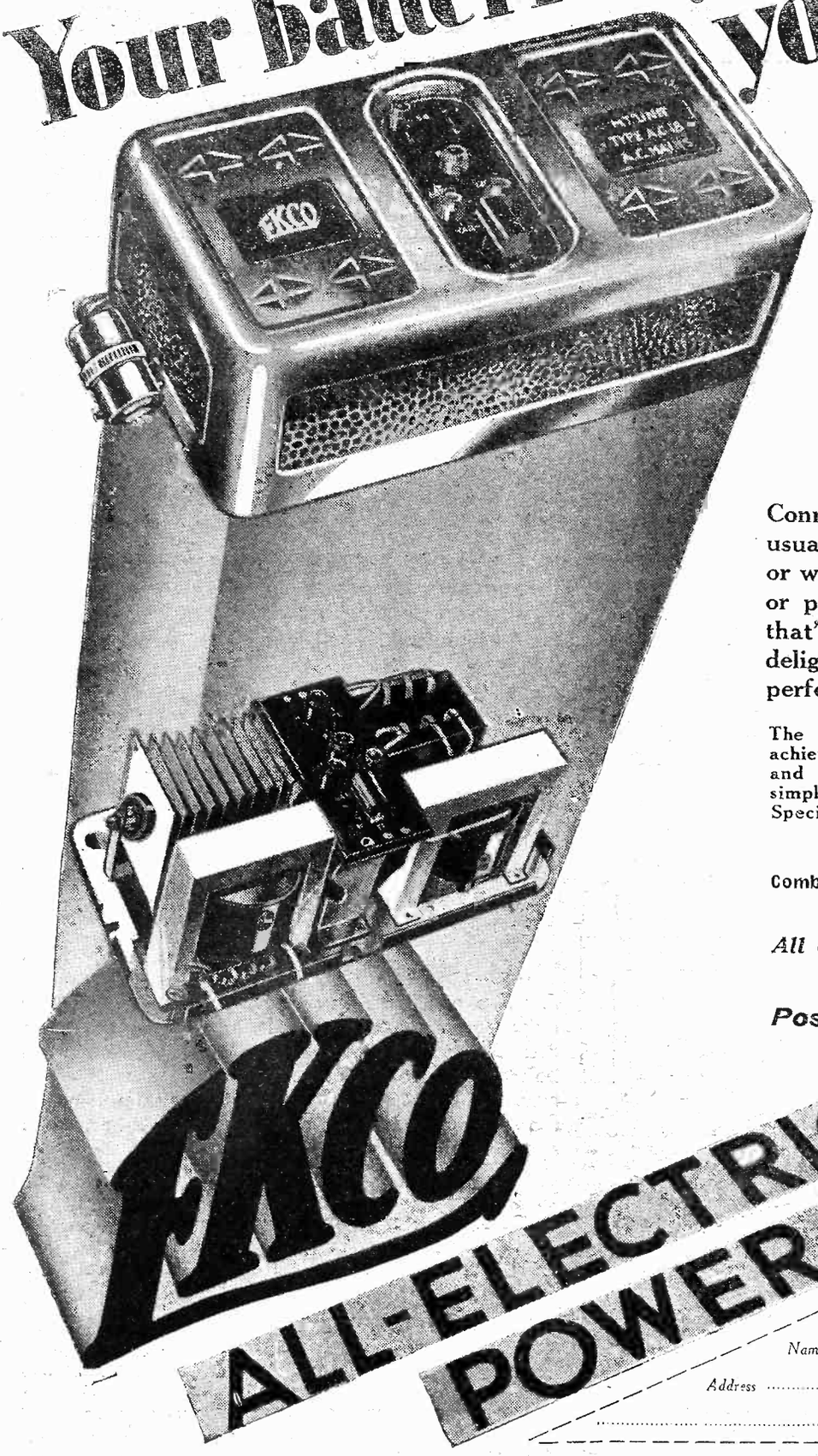

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IN SEARCH OF TELEVISION

By C. V. DOWDING ASSOCIATE I.E.E.

For nearly fifty years scientists and experimenters of all nations have been endeavouring to perfect television. How far along the road to success have we travelled? "Practically the whole way," say some enthusiasts. But "P.W.'s" Technical Editor shows that this is not, in fact, the case, and that there is nothing of which the world has public knowledge that gives us immediate grounds for hope. Television cannot yet successfully emerge from the laboratory, and it is very doubtful whether the general public has an inkling of even a fraction of the colossal difficulties which have yet to be overcome before television can become a worth-while entertainment unit.

HERMES, Caligula, Zosimus, Roger Bacon, Aquinus, Lullius, Valentine and Paracelsus. These are the names of some of the great men of all ages who for over two thousand years have striven to find the "Philosopher's Stone"—the secret of the transmutation of base metals into gold.

Men have devoted their whole lives to this cause; time and time again has success been prematurely announced, but the struggle still goes on. Even as I write my newspaper tells me of a Frenchman who claims to be able to change sand into gold by means of a high-frequency electrical process, and a scientific journal records "partial success" by an eminent American scientist.

Perpetual motion has fallen by the wayside; tireless transmutation workers continue with undying optimism. When two thousand more years have passed, to which of these two will television be likened?

Fifty Years Ago.

Don't make your reply too hastily; there is nothing more cruelly deceptive than the first shadowy promises of success. It was as far back as 1884 that Nipkow patented his "electric telescope," in which you find all the fundamentals of most modern television instruments. But it is inconceivable that, in his blackest fits of depression, he would have credited that television would still be in the laboratory stage nearly fifty years afterwards.

Nicholas Langer, Campbell Swinton, Fournier d'Albe, Belin, Mihaly, Jenkins, Korn, Bidwell, Langer and Baird are just a few of the individual research workers who have, and are still, tackling the problem, while the full resources of great laboratories in this country and in America have been brought to bear on it.

Nineteen twenty-three was a peak year for television enthusiasm on the part of inventors, and it was then that Jenkins of America exhibited the first of his "prismatic lens" instruments, and the first serious claim to a "television dawn" was made.

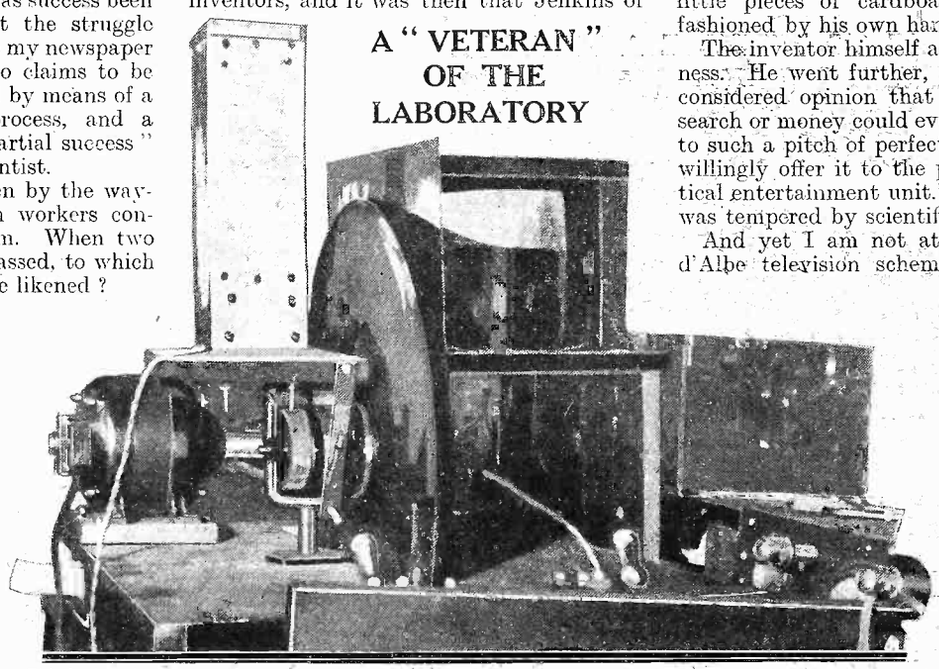
That year, too, I was one of a small committee appointed to adjudicate in a television competition run by one of the Amalgamated Press wireless journals. After preliminarily sifting the claims of numerous inventors we finally decided that there was only one man in the running—Dr. Fournier d'Albe—and a test demonstration was arranged.

As a laboratory experiment it was certainly quite successful, for Dr. Fournier d'Albe managed to transmit a moving shadow picture, and he was awarded a prize. But his pictures were most terribly crude; his apparatus also was extremely crude—little pieces of cardboard and tin, etc., fashioned by his own hands.

The inventor himself admitted the crudeness. He went further, and gave it as his considered opinion that no amount of research or money could ever bring his system to such a pitch of perfection that he would willingly offer it to the public as a "practical entertainment unit." His enthusiasm was tempered by scientific reason.

And yet I am not at all sure that the d'Albe television scheme could not have been made to give results equal to the best yet achieved, had nine years' expenditure of time and money been given to it.

A "VETERAN" OF THE LABORATORY



This is the television receiving apparatus built by Charles S. Hartman, of Philadelphia. Although he is only 30 years old he has been experimenting with television since 1922.

What of Today?

But stripped of the "ballyhoo" gratuitously contributed to it by self-appointed publicists, how exactly *does* television stand today? The fact that progress has been made must not be accepted as proof that progress will continue on the present lines of development.

For thousands of years sailing boats sailed the seven seas without the power to "tack" into the wind. And no doubt when the amazed world was introduced to sailing craft which were able to travel where they

(*Continued on next page.*)

IN SEARCH OF TELEVISION

(Continued from previous page.)

wanted, when they wanted, more or less irrespective of the fickle breezes, there were hundreds of prophets ready to predict further marvellous sailing-boat progress. "Nothing is more certain than that in a few years' time we will be able to sail round the world in a few days," is the sort of thing I can imagine them saying. And no doubt they really believed it.

Those "Parallels."

In a matter of a *comparatively* few years (in time as judged by history books) man *could* sail round the world in a few days, but with entirely new vehicles travelling in an entirely new medium. And the progress of the sailing boat came to a full stop.

But we must not pursue the analogy too far, or it might tend to make some of you think that present-day television is comparable with the sailing boat in practical effectiveness as a means of world-wide communication. But it isn't.

It is currently believed that television to-day stands where radio telephony did at the beginning of broadcasting. Nothing could be farther from the truth.

A more exact parallel would be to compare present-day television with the electrical speech transmission experiments carried out by Borseul in 1854.

Radio telephony was an entirely practical thing at the beginning of broadcasting, and by its means satisfactory communication could be carried out over long distances, using quite simple apparatus.

running costs were almost nil, and a child could install and operate it.

But the latest and most ferociously complicated television receiver cannot give you television reception even remotely resembling crystal-set telephony results of 1922—or 1915, for that matter.

And the public is entirely unacquainted with the multitudinous false trails and cul-de-sacs followed by innumerable scientists to make that 1922 broadcasting possible. They probably think of it as a logical development of a series of rules and regulations laid down by Marconi at the beginning of the century.

IN A NUTSHELL!

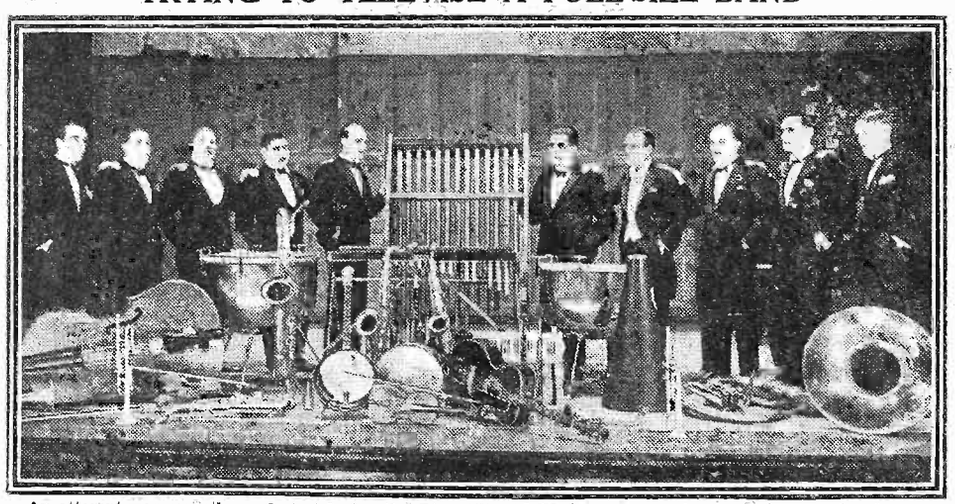
"They say Television is 'just round the corner.' But, oh, Boy! What a corner!"

(From a recent number of an American Radio Journal.)

Marconi—the crystal—the valve—modern broadcasting. They are only the highest of high lights. But where to-day are Preece's Hot-Wire receiver, Briguet's Capillary receiver, Edison's Electromotograph, Mercadier's Monotelephone, Adler's Magnetostrictophone, Fessenden's detectors, Saiki's Teppuri detectors, those whole hordes of magnetic, electrolytic and coherer detectors?—to mention only one branch of the art.

And yet they all gave results—of a kind. Anyway, I cannot honestly credit the best modern television system with having achieved the practical results given by any one of the above.

TRYING TO TELEVISE A FULL-SIZE BAND



An attempt was recently made to televise the Piccadilly Dance Band in action. While their music came over the "ether" in a form which enabled the original sounds to be reproduced with great power and remarkable fidelity, the corresponding "vision" could only be a very inadequate representation of the scene in the studio.

At the "beginning of broadcasting" you could have listened to anything from a single vocal turn to a full-size symphony orchestra, or the running commentary on the Derby, using nothing more than a crystal set.

Wayside Failures.

It is difficult to conceive of a simpler instrument than a coil of wire, a crystal detector and a pair of 'phones. Its initial cost was only about twenty shillings, its

But that does not mean that I think that television itself is doomed to run into a "dead-end." Let me repeat what Sir Oliver Lodge said in the opening days of 1924 (eight years ago).

"Attempts are still being made at what is called television, that is to say, seeing at a distance either by wireless or by wired means. If one is done, doubtless the other will follow. But at present neither can really be done. Pictures can be transmitted after a fashion . . . . For myself I am not sanguine of seeing anything that can be properly called television for a good many years yet, perhaps for a century."

I wonder how many people accused Sir Oliver of being reactionary when he made that statement? But time has proved the wisdom of his words; to-day, eight years after their first utterance, they remain unchallengeable, and no responsible scientist would question them if they were applied to the present situation.

Early Cinema Results.

With moderately complicated apparatus, the electric power mains and a modicum of patience, it is possible to glean cigarette-card-sized "blotchies" from the ether—pictures "after a fashion," to use Sir Oliver's expressive phrase. And in admitting the imperfection of these "pictures" the television publicist craves indulgence and points to the flickery nature of the first cinematograph shows.

But this parallel, too, is hopelessly inappropriate. The first cinema pictures *did* flicker, but nevertheless they gave more or less constant views on twelve-foot-square screens of big scenic effects. Many of you will remember the pride with which big landscapes, including railway trains, and big seascapes, embodying raging waters and storm-buffeted ships, were shown.

You did not have to strain your eyes in an endeavour to make out whether a "close-up" was the face of a man or woman or merely the outlines of a badly damaged vegetable. But there certainly was a constant "rain" effect, a flickering.

But television at its best can at present give you a picture of only extremely limited proportions, dozens of degrees worse than the worst of the earliest and most blodgy newspaper half-tone reproductions.

First you see a tiny frame of pale opalescence. It dances up and down, slips sideways, vanishes in a maelstrom of confused light-spots. You juggle with controls, and out of this miasmic confusion dance a couple of ragged, distorted shadows jerking insanely about which you are asked to accept as the pictures of broadcast artistes. These dither, slide, flicker, jump, dim, brighten, and then fly off in a whirling, dizzy medley of fiery sparks.

You feverishly adjust the apparatus, the while your eyes are pulled out on stalks and your head reels under the intense optical strain.

Holding the Picture.

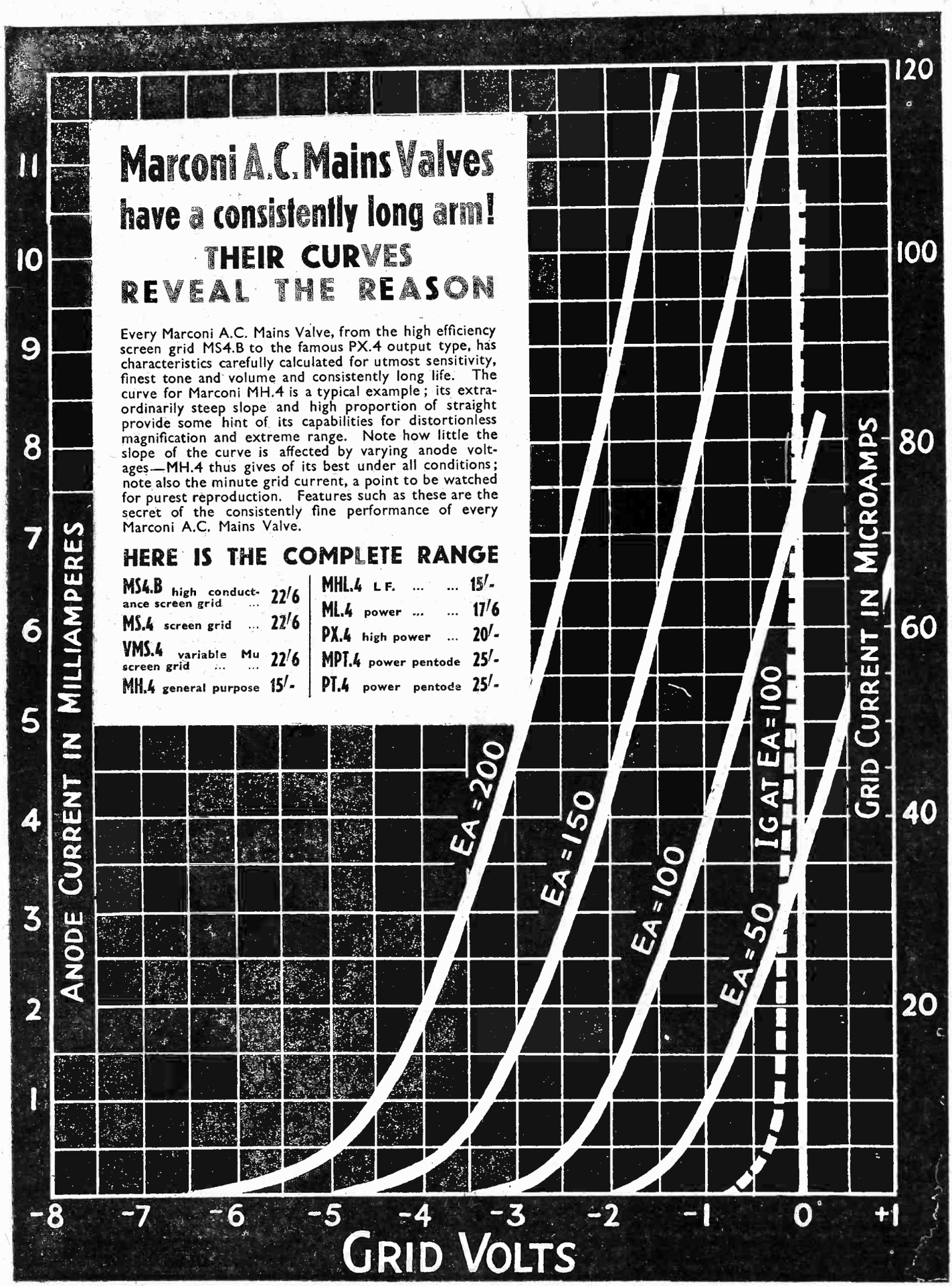
With luck on your side you might, under very favourable conditions, manage to stabilise the "picture" sufficiently to retain some semblance of "good" reception for a period of a minute or two.

But your aching eyes must never leave that quivering, speckled, swaying, jerking "blotchie" for one second or it will be gone, and the process of "re-framing" and synchronising has to be restarted.

They used to say those early cinematograph shows were bad for the eyes, but the audiences could at least take a rest now and then, and there was no need for constant, concentrated attention. And, anyway, the pictures did not violently dance and sway as well as flicker!

Personally, I value my eyes far too much to "look-in" at these television experiments for one second more than duty compels me. I admit the novelty of the most primitive television, but you

(Continued on page 1188.)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REVEAL THE REASON
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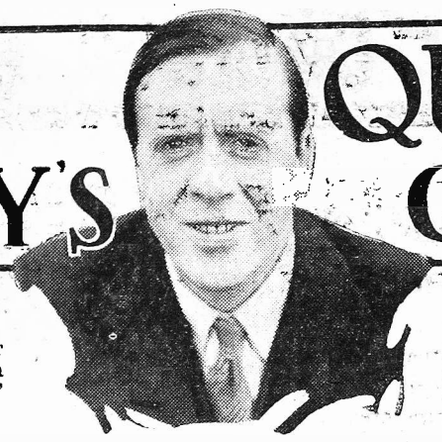
CAPT. ECKERSLEY'S QUERY CORNER



Under the above title, week by week, our Chief Radio Consultant comments upon radio queries submitted by "P.W." readers.

Don't address your letters direct to Capt. Eckersley; a selection of those received by the Query Department in the ordinary way will be answered by him.

Which End of an Aerial Should be Higher?

M. B. (Bournemouth).—"When the 'roof' of an aerial cannot be made very high, it is sometimes recommended that the end farthest from the lead-in be higher than the near end. It is never stated that the aerial should be arranged with the near end higher than the far end. Is there any reason for this?"

No; not that I can see. An aerial is the more efficient as its effective height is greater.

The effective height of an aerial is determined by its physical shape. In general, you want a large vertical part attached to a "roof" as you call it, which roof should have large capacity to earth.

It is, of course, essential to get both these qualities at once, a large capacity to earth alone is nothing, vertical height is not anything like effective height until the roof capacity is large. It's absurd to try and make these generalities answer your question exactly, but I cannot see that it makes much difference which end of the aerial is higher provided the lead-in end hasn't got an enormous (relative) capacity to earth.

Positive and Negative Again.

B. R. (Chelmsford).—"When a battery is connected to a load such as, for example, an L.T. accumulator connected to the ends of the filament of a valve, a current flows. I should be pleased to know in what direction the current flows—is it positive to negative or negative to positive?"

That all depends upon what we agree to call a current. People do not know how to answer the question "What is electricity," as it's difficult to know which way "it" flows!

But modern theory—and theories are only conveniences of expression—says that electricity is carried mostly by little particles called electrons. These electrons are negatively charged.

Thus, when you charge a battery all you do is to establish a "surplus to establishment" in the negative plate and a lack of normal numbers in the positive. When you connect a conducting unit between positive and negative accumulator plates the electrons surplus to establishment try and find more room in the plate which is apparently roomy and uncrowded, and they have to struggle through the wire to do this.

A procession of electrons (i.e a flow of current) goes out, therefore, from the negative plate round the wire and back to the positive plate. Of course, chemical action goes on and the deceived electrons are always being piled up on the negative plate, but always trying to establish equilibrium. When equilibrium is established we say the accumulator (or dry cell) is "run down"—the establishment of electrons in earth plate is the same.

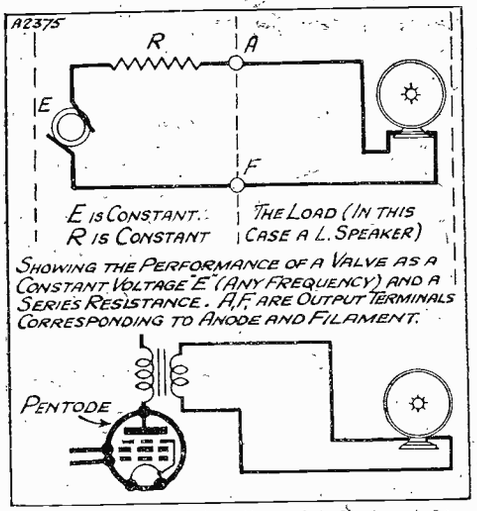
Pentode Performance.

W. G. (Eastbourne).—"Why is the quality of a receiver using a pentode usually harsh and shrill compared to the tone obtained when using an ordinary power valve in the same set?"

There is no necessity for the output of a pentode to be shrill, provided the circuits are correctly designed. The best way to look at the matter is to consider that a valve is an alternator of constant voltage over a range of frequencies having a resistance in series with the constant voltage alternator, the output terminals being from outside of resistance and one leg of alternator (see diagram), as the impedance of the load (a loudspeaker) is *small* at *low* frequencies and *high* at *high* frequencies. If you refer to the diagram, you will see that if the external load is low, then a lot of volts will be dropped in the resistance, *provided the resistance is large compared to the impedance of the loudspeaker.* Thus the volts at low frequencies, *provided the resistance is large compared to the load (loudspeaker) impedance*, across the load is small.

Thus, if a valve has a high internal resistance (usually known as a high impedance valve), its output is small if the load is relatively of low impedance. The pentode has a high impedance and the loudspeaker *at low frequencies* has a relatively low impedance, and so the pentode output at low frequencies is smaller than at high frequencies and reproduction sounds shrill. The solution is to use a transformer (see sketch) which has a ratio of 2 or 3 or 4 to 1 of anode circuit to loudspeaker circuit windings when the load impedance of the speaker to the valve is apparently increased.

WHY IS IT SHRILL?



This illustrates an interesting point about pentode performance—its tendency to make reproduction sound shriller than with an ordinary output valve.

The Super-Het. Which Howled on the Local Station.

H. K. (Luton).—"I have recently constructed a super-heterodyne receiver with a built-in speaker, and have struck a somewhat difficult snag.

"If I tune in a fairly powerful station at moderate strength, results are excellent; but if I increase the volume an extremely loud hum develops which quickly becomes unbearable. This is not due to hum from mains, as the receiver is operated from H.T. and L.T. accumulators, and there are no mains installed nearby.

"When the receiver is operated on a distant station with the volume control almost fully on, results are normal, and I am at a loss to account for the trouble experienced, as the receiver seems to be perfectly stable."

You are suffering because the *sound* output from the loudspeaker is impinging upon the valves. This makes the valves "pong," which makes the loudspeaker sound output give a pong, which pongs the valves more, which makes a bigger sound output, which—and so on and so on.

The process will not start unless the sound output is pretty loud, and this is obviously more likely when tuned to the local rather than the distant station. The cure is to mount the valves on very good spring holders, and/or to wrap them in cotton-wool, and to stop the speaker from making the box which contains the set vibrate.

In general, stop the *sound* output from the loudspeaker impinging on the valves, particularly the last detector in the super.

"CHANGING over to Telsen is like taking the wool out of your ears"—that is the verdict of an enthusiastic Telsen constructor which inspired the illustration on the opposite page. Telsen Components in your set give you a realism which is astonishing—they enable you to sit back and **hear,** without straining forward to listen—they bring every item on the programme "nearer, clearer, more lively than before."

L.F. Transformers	from 5/6
Output Transformers	... 12/6
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Telsen Screens	2/- and 2/6

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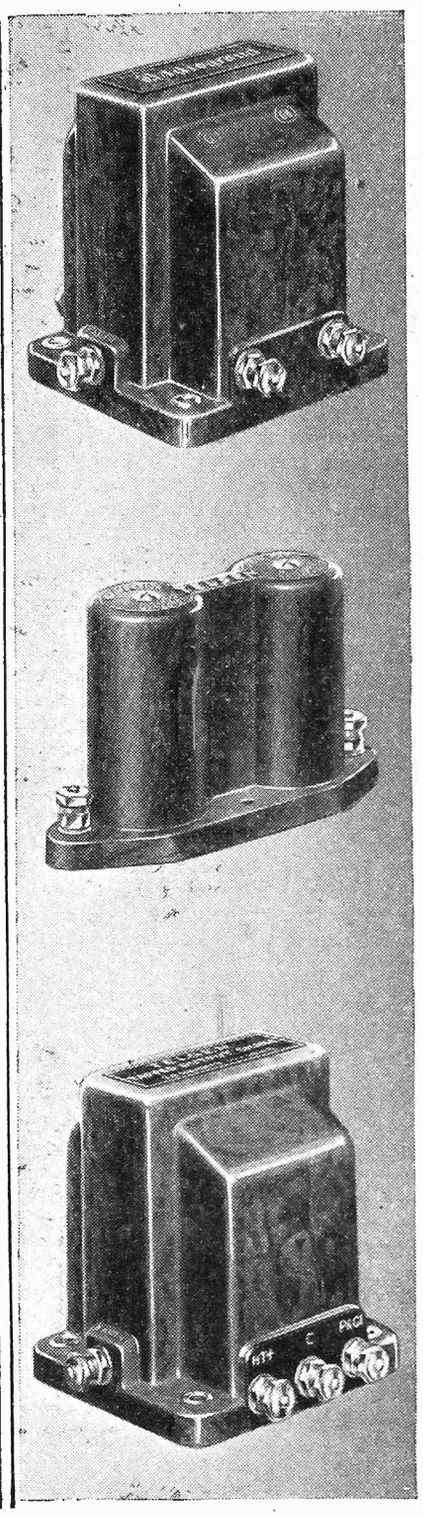
100% BRITISH RADIO COMPONENTS



THE MIRROR OF THE B.B.C. By O.H.M.

PUBLIC CONCERTS AND THE B.B.C.

JACK PAYNE—BETTER BROADCAST NEWS—SOME PROGRAMME POINTERS, etc.

THE late Lionel Powell had built up the greatest business of its kind in the world. He had a real instinct; he was in fact a genius as an impresario. His artistic success was proverbial, and, I believe, was also profitable, although presumably decreasingly so in the recent years of depression.

It is now being decided how and by whom this great business shall be carried on. There are rumours that the B.B.C. has been nibbling. Although I can get nothing out of Savoy Hill, I should not be surprised if the rumours were well founded.

It would be strange indeed if the B.B.C. did not attempt to get a finger in the new pie somewhere. Not that it would be altogether to the public interest if the B.B.C. took over the project lock, stock and barrel; that in effect would confer another monopoly on the B.B.C.—the monopoly of big concert production in Great Britain.

There are two objections, namely, big concert production should have some reasonable competition, and it is no part of the work of the B.B.C. to get involved in the large financial risks of a great impresario. Therefore, while I hope the B.B.C. works in close harmony with the new Lionel Powell concern, I hope equally that there is no merger.

Jack Payne and the Unsigned Contract.

Few people know that for the past year or so Jack Payne has been working for the B.B.C. on a purely verbal arrangement. True there was a contract, but it was still under discussion and, of course, unsigned.

The verbal arrangement covered another year, that is until March 1933, by which time it was hoped to enter into a formal contract for a further period. Although the break was made on Jack Payne's initiative to enable him to take advantage of an almost fabulous recording offer (I have heard the figures of £8,000 cash down and £8,000 a year, plus royalties, mentioned) things were not quite as smooth as they looked on the surface.

There is good ground for believing that neither side was sorry the contract was unsigned! By the way, Jack Payne contemplates retirement at the end of his new two-years' recording contract.

Better Broadcast News.

There is a prospect of an improved broadcast news service. Mr. Holt, the new head of the News Section at Savoy Hill, is a trained journalist, with imagination and insight into the possibilities of developing the rather tame bulletins that now go out. His plans are understood to involve a considerable brightening and broadening. He would like to see it more of a magazine of general interest than the present cold, unemotional budget.

The General Gordon Rumpus.

Mr. Harold Nicolson's broadcast quotation of the statement that "Chinese" Gordon was a dipsomaniac has caused a first-class row. General Sir Bindon Blood, Colonel Commandant of the Corps of Royal Engineers, called on Sir John Reith as a brother-sapper to put matters right.

Corrections and apologies were published, and the ban against Mr. Nicolson was tightened, so I shouldn't think he is likely to be asked to come to the microphone again during the present administration.

Programme Pointers.

An accident to a trans-Channel air-liner, the results of which it is said will do no harm to civil aviation, is the subject of a play entitled "Friday Morning," which is to have performances in the National and Regional programmes on Thursday and Saturday, February 4th and 6th, respectively. Its author, Julian Crane, is new to broadcasting, and his play is short and simple in construction.

John Watt, the brilliant young producer at Savoy Hill, who, as I recently mentioned, was responsible for putting on a special Christmas Day programme to take the place of the cancelled feature "Half the World Away," has prepared an extravaganza entitled "Africa Shrieks, or Where Men are Mental," for broadcasting on Monday and Wednesday, February 1st and 3rd.

Mr. Watt has introduced listeners to many strange characters, but this will be his first attempt to bring the inhabitants of the jungle—tigers, crocodiles, lions, pigmies—not to mention a beautiful White Queen, into the programmes.

Several of the artistes who took part in the Ridgeway Parade broadcasts, among them Dorothy Dampier, Bertha Wilmott, Anna Day, Fred Curtis and Jack Hodges, are going with the great Philip on a theatrical tour of his Parade, for which engagements have been secured all over the country.

Mr. Ridgeway will be in personal command, and his show, which will occupy the entire programme, will be divided into two parts. The first will consist of a revue with a reproduction of a B.B.C. studio for its setting, and the second, an old-time music-hall performance complete with chairman.

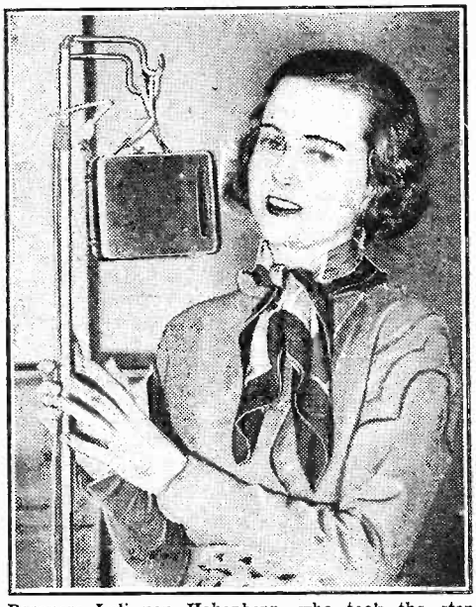
Scores of thousands of listeners will wish Mr. Ridgeway's troupe every success on their tour, which opens at Bournemouth on Monday, February 1st.

Three days after he celebrates his 80th birthday, on Tuesday, February 2nd, Sir Frederic Cowen, the distinguished British composer, is to conduct Section D of the B.B.C. Orchestra of 68 players in a programme of his own works.

For some years the B.B.C.'s programmes have contained talks by more or less distinguished people who have given their opinions on books, films and other topical subjects, but never have we heard what somebody thinks of the B.B.C. itself.

(*Continued on page* 1190.)

"GOOD-NIGHT, VIENNA"



Baroness Luli von Hohenberg, who took the star part in "Good-night, Vienna," at the microphone in London.

THE LISTENER'S NOTEBOOK

A rapid review of some of the recent radio programmes.

"I WOULD like to know what he is talking about." How often have you said this when you have found yourself listening to Radio-Paris? Well, I can probably tell you, because I recently came across an interesting booklet containing the talks programmes from Radio-Paris for January, February and March of this year.

It is an interesting document, for, besides satisfying the cravings of an inquisitive mind, it casts a good deal of light on what the Frenchman is thinking about, and wherein his interests lie. It offers entertaining reading, too, in that it invites comparison with our own programme of talks.

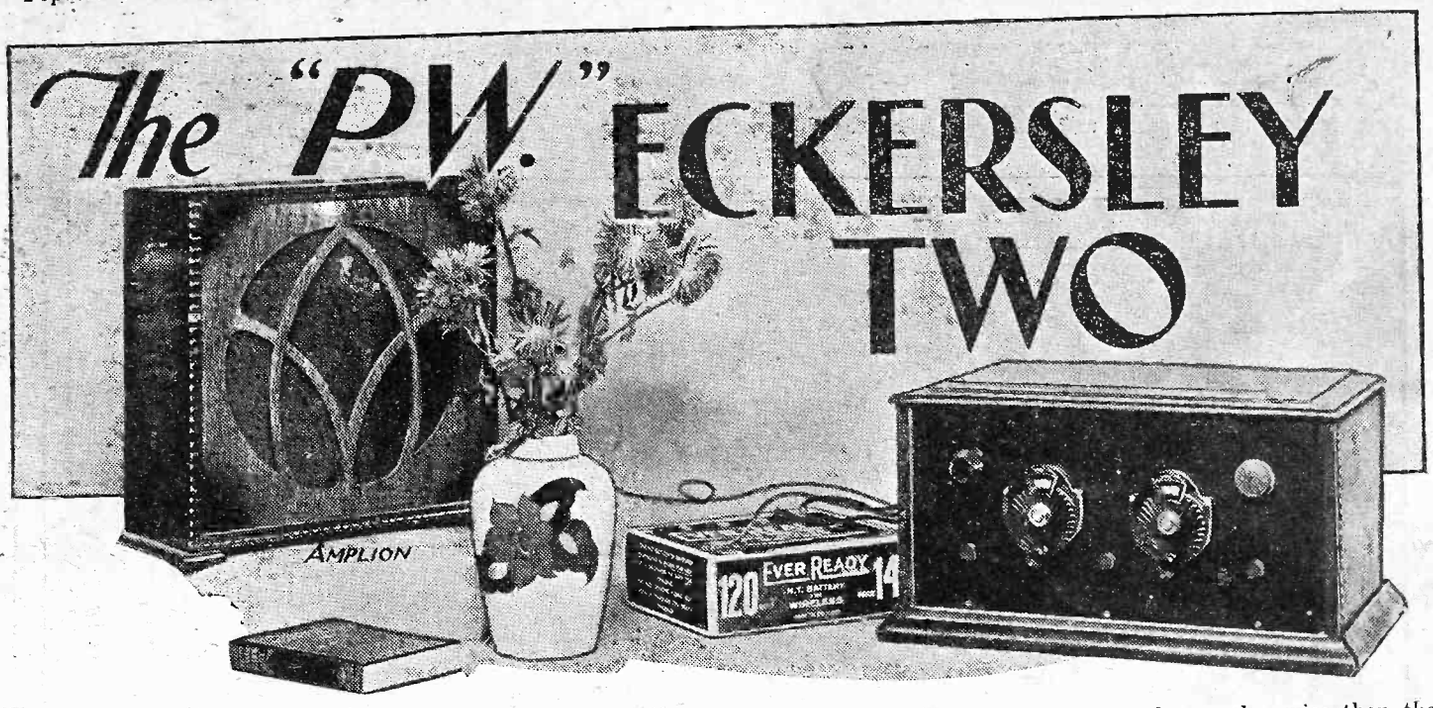
Here then is, briefly, the complete list for the three months, the figure in brackets indicating the number of talks on that particular subject:

The French Theatre (12); Books in General (12); Cinema (12, including its technical problems); Present-day Topics (12); Edward Rostand (3); French Novelists of the 19th Century (2, Balzac and Flaubert); Writers of To-day (3); Radio Dialogues (2); Ireland and Her Literature (2).

There are, too, Travels in China (2); Adventures in Contemporary Life (2); German Literature (8); Exhibitions (3, including the French Art Exhibition in London); Ancient Art (4); Great French Museums (4, Picardy, Rouen, Dijon and Lyons); the French Colonies (Native Arts (1), Equatorial French Africa (3), the Water

(*Continued on page* 1190.)

The "P.W." ECKERSLEY TWO



IF there is one thing that we must very carefully avoid in describing this set it is the too-frequent unqualified use of the term "two-valver," for in the minds of many that might conjure up invidious comparisons.

"A Place of Honour."

"P.W." is almost alone in ascribing to the two-valver a place of honour in contemporary receiver design. We never have regarded a "two-valver" as a "poor relation" of the lordly multi-valver—a cheap alternative designed for the impecunious unfortunate.

We hold the view that the fewer the valves, and the fewer the components that can be used to obtain satisfaction, the better it is. There is a tendency, particularly in commercial set quarters, towards the multiplying of parts and valves and the dropping of stage gain in order to facilitate manufacture and attain a higher service quality.

A loudspeaker receiver having qualities usually associated only with large and expensive multi-valve instruments.

The argument for the inefficient over-valved set is that because it possesses greater "margins of safety" it is cheaper in the long run to produce and service than the smaller high-efficiency design.

Very sound as far as it goes—at present. But it is a reactionary method, and offers nothing towards the advancement of the science of set design. Surely it is better to aim at getting more and more efficiency per valve stage? You needn't use all the efficiency all the time.

Aiming at Efficiency.

But working with this end in view, is there any reason why a two- or three-valve set should not eventually be as efficient as the four- or five-valver of to-day, and vastly easier to duplicate in mass production?

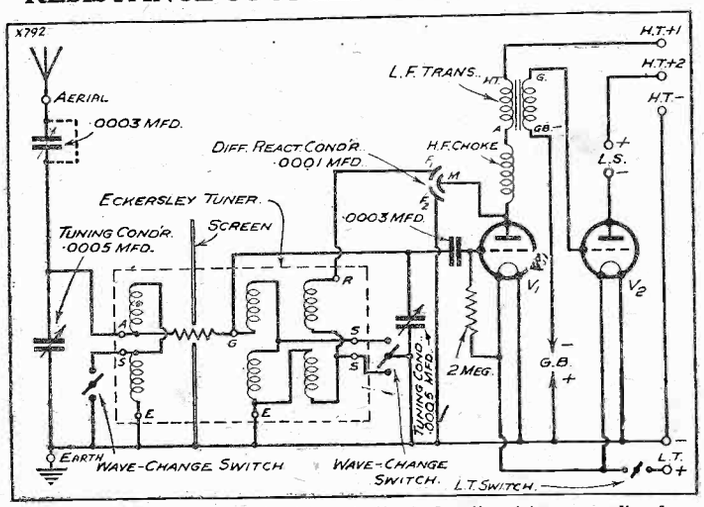
And there will be enormously fewer parts

(*Continued on next page.*)

THE PARTS REQUIRED FOR THIS FIRST-CLASS SET

1 Panel, 14 in. × 7 in. (Permcol, Goltone, Lissen, Peto-Scott, Parex, Wearite).
1 Cabinet to fit, baseboard 10 in. (Cameo, Pickett, Osborn, Gilbert, Ready Radio, Peto-Scott.
2 ·0005-mfd. condensers, (Telsen, J.B., Cyldon, Polar, Lotus, Lissen, Ormond, Igranic, Ready Radio, Dubilier, Formo, Burton, Wavemaster, Graham-Farish.
1 ·0003-mfd. solid dielectric variable condenser with shorting position (Ready Radio, Ferranti.)
2 Slow-motion dials (Telsen, Igranic, Ready Radio, Lissen, Lotus, Formo.)
1 3-point push-pull wave-change switch (Ready Radio, Telsen, Bulgin, Peto-Scott, Wearite, Goltone.
1 On-off push-pull switch (Ready Radio, Bulgin, Telsen, Peto-Scott, Wearite, Goltone.)
1 ·0001 to ·00015-mfd. differential reaction condenser (Telsen, Lotus, Ready Radio, Igranic, Ormond, Polar, J.B., Dubilier, Lissen, Parex, Formo, Wavemaster, Cyldon, Graham-Farish.)
1 Eckersley tuner (Goltone, Wearite, R.I., Lewcos, Sovereign, Formo.)
1 ·0003-mfd. fixed condenser (T.C.C., Telsen, Dubilier, Ediswan, Lissen, Ferranti, Igranic, Watmel, Formo, Mullard, Graham Farish, Goltone, Sovereign).
2 Valve holders (Lotus, Telsen, Igranic, Lissen, Clix, Graham-Farish, Bulgin, W.B., Formo, Wearite, Dario).
1 H.F. choke (Sovereign, Lewcos, Peto-Scott, Telsen, R.I., Ready Radio, Tunewell, Parex, Varley, Dubilier, Lissen, Lotus, Wearite, Watmel, Atlas, Graham Farish).
1 L.F. transformer (R.I., Telsen, Igranic, Lissen, Varley, Ferranti, Climax, Lotus, Lewcos, Goltone, Atlas, Formo).
1 Grid leak (Graham Farish, Dubilier, Lissen, Telsen, Ferranti, Igranic, Watmel, Varley, Loewe).
1 Screen, 6 in. × 2¾ in. (Parex, Peto-Scott, Ready Radio, Magnum, Wearite).
1 Terminal strip, 14 in. × 1½ in.
9 Indicating terminals (Belling & Lee, type B, Eelex, Igranic, Clix, Goltone, Bulgin).
1 Grid-bias clip, (Burton, Bulgin).
Jiffilinx, Quickwyre, Glazite, Lacoline.
Plugs, screws, etc.

RESISTANCE-COUPLED TUNING CIRCUITS



The principle of the Eckersley Tuner is "valveless" resistance coupling for high selectivity and big power.

THE "P.W." ECKERSLEY TWO

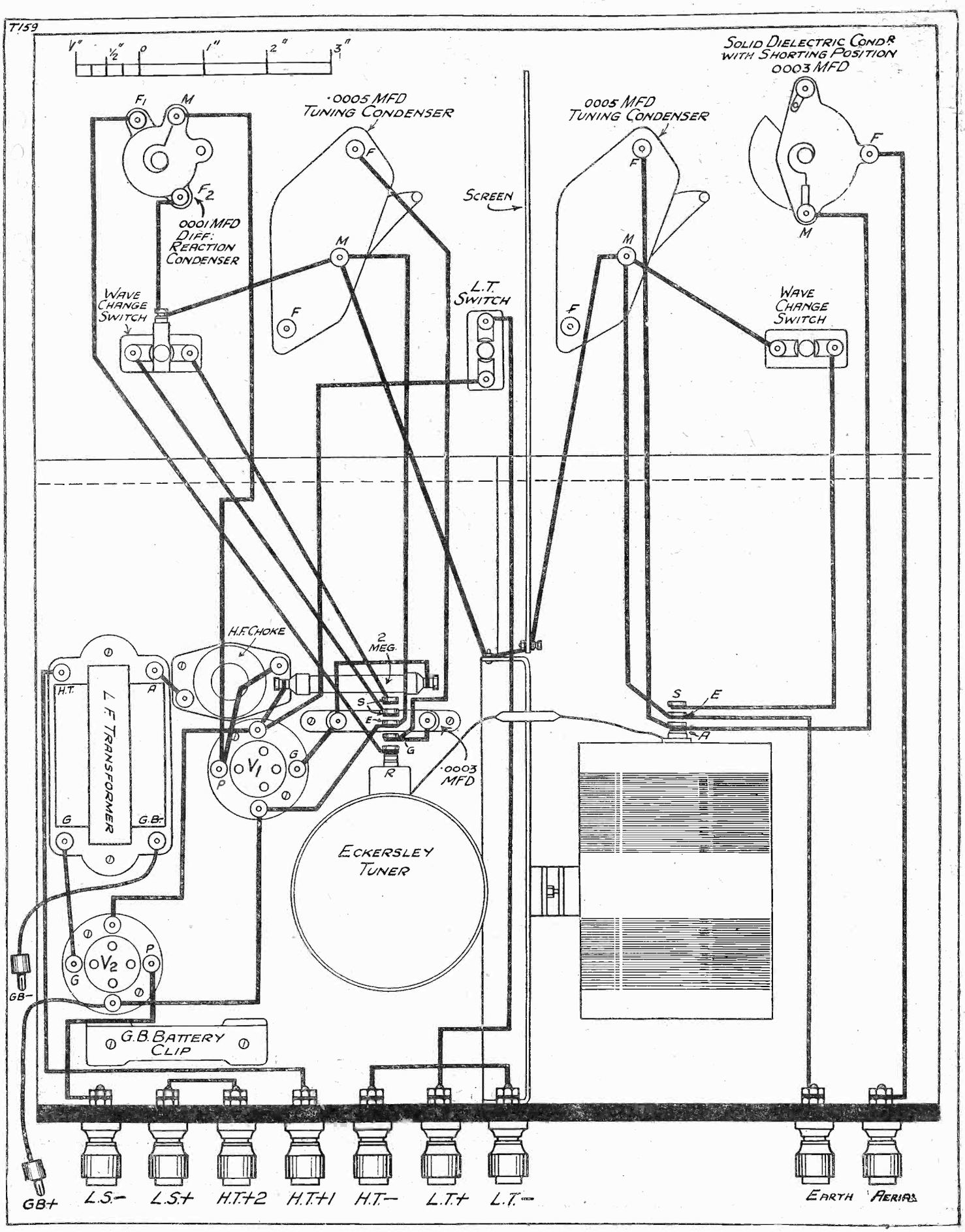
(Continued from previous page.)

and an enormously smaller cost of materials !

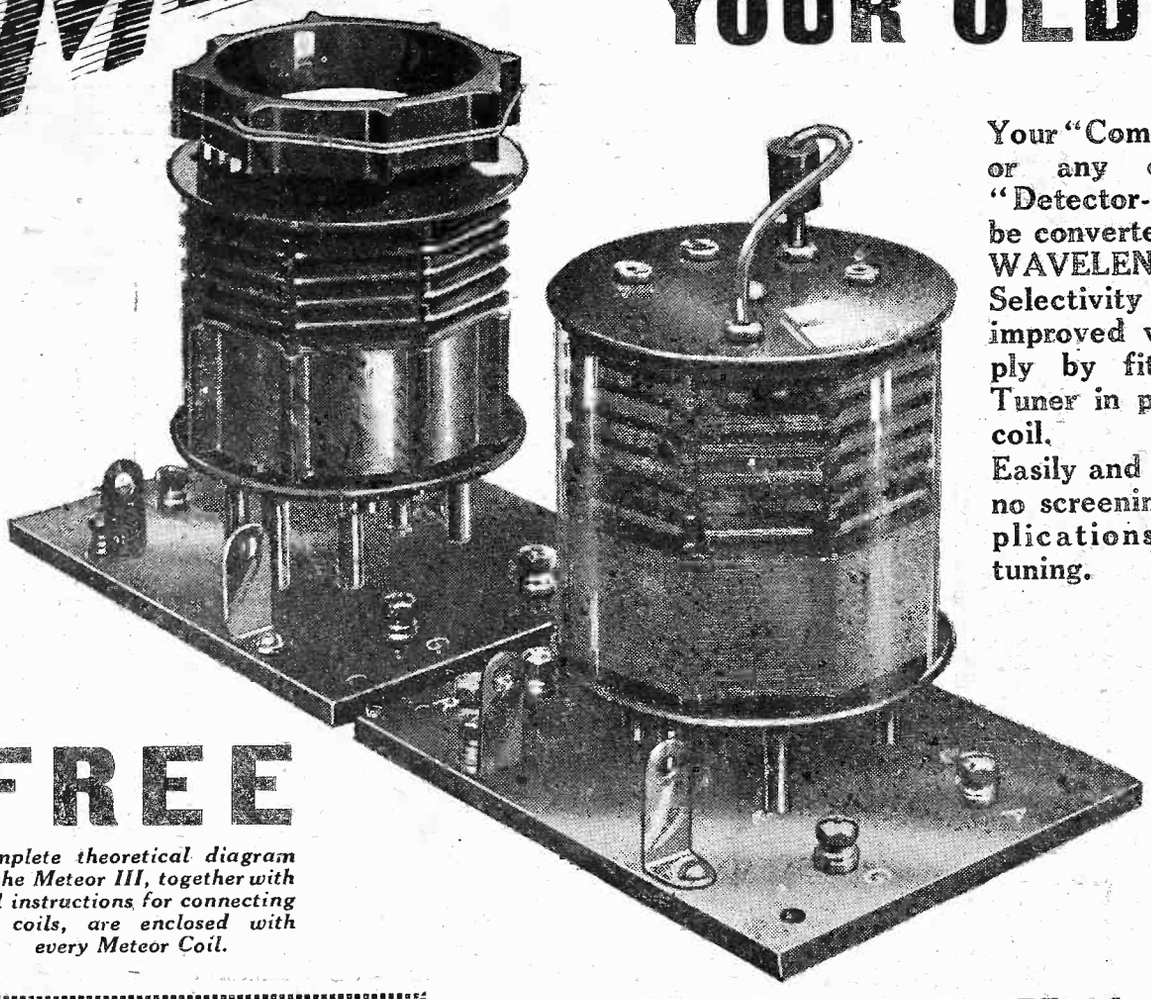
But while you work down to an efficiency, you cannot progress, except in the matter of such incidentals as pretty cabinets.

The Eckersley Two is positive proof that we work in the opposite direction. Here you have a receiver which definitely is an advance on any two-valver of a year or so of

(Continued on page 1176.)



METEORISE YOUR OLD SET



Your "Comet," or "Magic," or any other standard "Detector-L.F." Set, can be converted to cover ALL-WAVELENGTHS, and the Selectivity and Sensitivity improved wonderfully simply by fitting a Meteor Tuner in place of your old coil.

Easily and quickly fitted—no screening or other complications—single knob tuning.

FREE

Complete theoretical diagram of the Meteor III, together with full instructions for connecting the coils, are enclosed with every Meteor Coil.

METEOR III KIT

Complete Kit of Components **75/-**

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Complete Kit of Components and Cabinet to house set only - - - **89/6**

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Complete Kit of Components and Cabinet, to house set, speaker and batteries—equal in appearance to a 15-guinea model - - - - - - - **£5.0.0**

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Ask your radio dealer for Free Copy of the Full Size 1/- Meteor Plan and Wiring Diagram. If any difficulty post coupon below. If you also enclose four 1½d. stamps as well we will send you Mr. Kendall's latest book entitled "10 Hows for Modern Radio Constructors."

Meteorise to Modernise

The amazing success of the Meteor III is largely due to the remarkable efficiency of the Meteor ALL-WAVE Tuner. You can add this efficiency to your present set and enjoy the fascination of ALL-WAVE Reception.

Note particularly the tappings in the top of the Medium-Long Wave Coil by which you can adjust the Selectivity to suit your own particular conditions of reception. The short-wave coil is fitted with a variable loose-coupler by which you can be sure of obtaining oscillation over the whole tuning range.

Meteor Dual Range Coil, with special adjustable selectivity device (windings enclosed in dustproof covering) - **10/6**

Kendall Loose-Coupled Meteor Short-Wave Coil, 20 to 50 metres - - - **7/6**

Meteor Coil Base (incorporating grid leak holder, grid condenser and "range" condenser) **5/6**

Complete Kit as above **23/6**

Additional Meteor Short-Wave Coil covering 10 to 40 metres - 7/6

Full instructions with every Coil. Any Coil may be purchased separately.

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Phone: Lee Green 5678. *Grams: Readirad, Blackvil.*

THE "P.W." ECKERSLEY TWO

(*Continued from page* 1774.)

age. It is nearly equal to a "three" of such a vintage, and yet it has just as great a "margin of safety," indeed it is probably superior in this respect, for it embodies fewer electrical processes.

A "Hot Stuff" Set.

We can only hope an exceptionally large number of Eckersley Twos will be built, for then it will be known to an increasing number of people exactly what two valves used in an enterprising and scientific manner can be made to do!

ACCESSORIES RECOMMENDED.

LOUDSPEAKERS. — Amplion, Blue Spot, Celestion, Marconiphone, H.M.V., Undy, W.B., R. & A., B.T.-H., Graham Farish, Epoch.

VALVES.—1 Det., 1 L.F. (Cossor, Mazda, Mullard, Osram, Marconi, Six-Sixty, Eta, Tungsram, Dario, Lissen).

BATTERIES.—H.T., 120 volts (Pertrix, Drydex, Ever Ready, Lissen, Columbia, Ediswan, Magnet). G.B., 9 volts (Ever Ready, etc.).

ACCUMULATORS. — Voltage to suit valves (Exide, Ediswan, Pertrix, G.E.C., Lissen).

MAINS UNITS.—To supply 120 volts up to 12–15 milliamps. (Regentone, Tannoy, Ekco, Formo, Atlas, R.I., Heayberd, Lotus, Tunewell).

The Eckersley Two is capable of giving full loudspeaker results from a number of stations, and possesses a high degree of selectivity—it is superior in this regard to many threes using S.G. valves.

Supreme Selectivity.

You won't find the "local" swamping the dials, and you won't have difficulty in tuning in sharply separated programmes on the long waves. In fact, if you have held the preconceived idea that there are things S.G. sets can do which are totally beyond any two, you ought to build this set just to experience the startling eye-opener it is bound to give you.

It is an easy set to build, and the parts required are few in number and easily obtainable. The Eckersley Tuner is available in various dependable makes, and the same applies to all the other components with the exception of the ·0003-mfd. solid-dielectric variable condenser.

Your choice of makers for this is limited, for it is necessary that this should have a shorting position—that is to say, when its adjusting knob is turned right round in one direction it is automatically cut out of circuit. It is necessary that this should happen on the long waves if you want the utmost efficiency. However, it is an inexpensive component, and those firms which are supplying it are able to meet any demand, however large.

There is little that need be said about the remaining parts, and you can use any you may happen to have in hand providing they meet the technical requirements of the specifications.

You will notice that a small additional screen is needed to bridge the gap between the screen, which is an inherent part of the Eckersley Tuner and the panel.

If you *do* divert from this part of the specification you may lose little, but we advise you not to do so if you want to get the most out of the set.

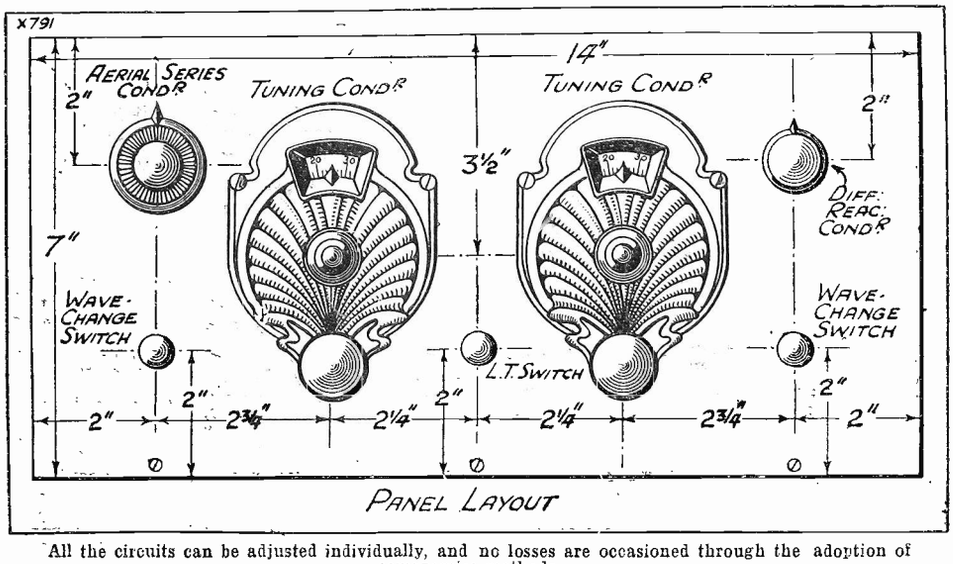
Extending the Screen.

The extension screen can be made of either aluminium or copper, and is best fixed by bolting it to the tuner screen. Alternatively, a piece of metal can be cut and bent at the bottom to enable it to be screwed to the baseboard. In such a case, though, you should make sure that it is efficiently connected to earth either via the other screen or via a separate short lead to the nearest point, such as a variable condenser terminal, which joins to earth.

Be careful with the differential reaction condenser connections and make sure that you keep all the tuner wiring short and neat.

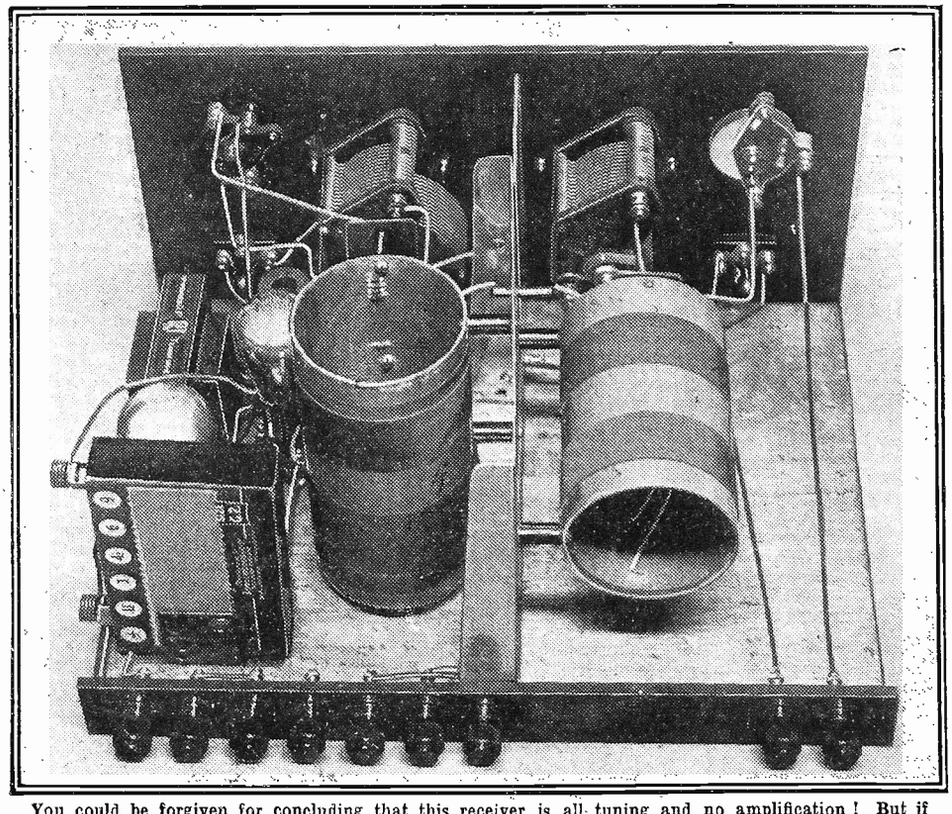
Further details regarding the assembly of this excellent receiver, together with full operating details, will be found in our Radiotorial columns (and, as you will note, we are killing two birds with one stone, for much of this information applies also to the three-valve version).

NO COMPROMISES IN CONTROLS



All the circuits can be adjusted individually, and no losses are occasioned through the adoption of compromise methods.

CLEAN BACK-OF-PANEL LINES

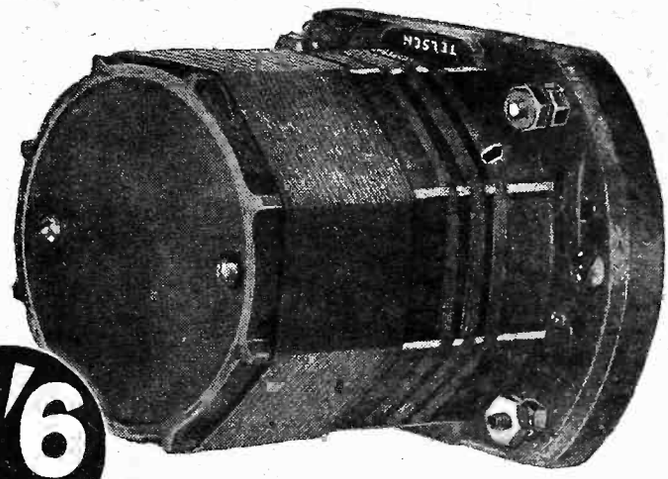


You could be forgiven for concluding that this receiver is all-tuning and no amplification! But if anyone can point to a better two-valver in the whole world we would be pleased—and surprised—to hear about it!

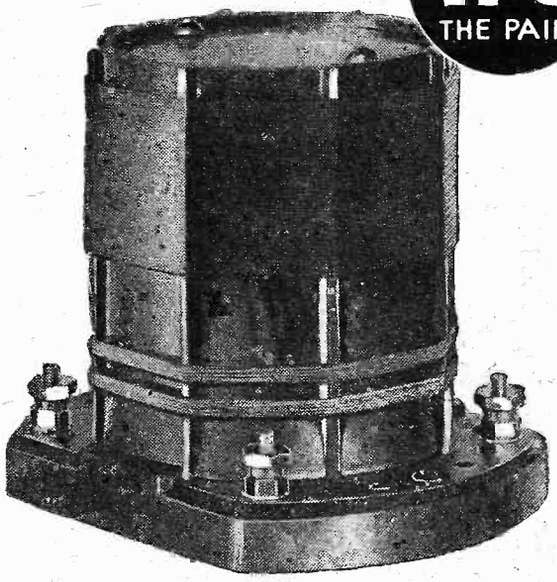
NOW TELSEN COILS

FOR THE S.T. 300

AS DESIGNED BY
Mr. JOHN SCOTT-TAGGART



11/6 THE PAIR



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2	Slow Motion Dials	W.141	5/-
1	Aerial Coupling Condenser ·00004 mfd.	W.196	2/-
1	·00015-mfd. Differential Reaction Condenser	W.139	2/-
1	Binocular H.F. Choke	W. 74	5/-
1	·0001-mfd. Differential Condenser	W.138	2/-
1	Set "S.T. 300" Coils	W.197	11/6
3	4-pin Valve Holders	W.105	1/6
1	Standard H.F. Choke	W. 75	2/-
2	3-pt. Switches	W.108	2/6
1	5-1 Radiogrand Transformer	W. 58	8/6
1	·0001-mfd. Mica Condenser	W. 91	6d.
1	1-meg. Grid Leak	W.100	9d.
2	1-mfd. Mansbridge Type Condensers	W. 78	4/6
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1	Plain Screen	W.166	2/-
			59/9

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CVS-139

STATIONS WORTH HEARING

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.

IT is, I think, fairly safe to prophesy that if only Dame Nature will be a little less prodigal of her atmospherics than she was in 1931, summer reception should be better this year than it has ever been in the past. The chief reason why I make this prediction is that the number of stations receivable at any time of the day just now upon the medium waves is so large.

This means that in this country we may regard ourselves now as being practically in the service areas of many of the big Continental stations, and that we can thus expect good reception from them irrespective of daylight and darkness, or of the season of the year.

A glance through my log shows an astonishing list of stations from which loudspeaker reception has been obtained during the past few weeks at times between 11 a.m. and 4 p.m.

All Received in Daylight!

Leaving out of account the long-wave stations, whose transmissions are much less affected by light conditions, the stations in question include Budapest, Brussels No 1 and No. 2, Vienna (once), Prague, Langenberg, Beromunster, Rome, Stockholm, Toulouse, Lwow, Stuttgart, Brno, Breslau, Goteburg, Hilversum, Heilsberg, Turin, Leipzig, Horby and Nurnberg.

This list includes, I see, twenty-one stations, a number which would not have been too bad a "bag" after dark a few years ago.

At night-time the receiving set seems positively alive nowadays. Provided that it is reasonably sensitive and selective, stations are to be found all round the dials, and it is gratifying to observe how many of these come through completely free from interference of any kind.

From Across "The Pond."

Nobody who makes a wireless trip round Europe just now can doubt for a moment that long-distance wireless is genuinely worth while.

In case you had not noticed it, the American medium-wave stations are coming through well on many nights at present. Amongst those best worth going for are WHAM, WTIC and that wonderful station WIOD.

I have also heard WJZ, WENR, KDKA, WGY and one or two others not definitely identified. From kind correspondents I have reports of reception of many other American stations including WAAB (Boston), WFAA (Dallas), WJSV (Mount Vernon), WEAF (New York), WBZ (Springfield), and WBBM (Chicago).

If you find European conditions good one evening you may profitably burn the midnight oil by sitting up until a little after midnight in search of Americans. On several nights I have heard the shorter-wave stations best in the smallest of the small hours, those on longer wave-lengths coming in a little later. I don't venture, though, to lay this down as anything like a rule—on certain nights conditions may be exactly reversed.

Worth Attention.

To return to Europe, there are one or two stations that are particularly worth attention just now, since they may not have made an appearance in most logs for some little time. Amongst these are Fécamp (220 m.), Cologne (227 m.), Nurnberg (239 m.), Toulouse PTT (255 m.), Rennes (272 m.), Bratislava (279 m.), Copenhagen (281 m.), Lyons (288 m.), Bordeaux (304 m.), Genoa (313 m.), Marseilles (315 m.), Grenoble (328 m.), Barcelona (349 m.), Katowice (408 m.), Belgrade (430 m.), Lyons Doua (466 m.), and Ljubljana (574 m.).

Many of the Italian stations have been coming over exceptionally well of late, and at times the entertainment value from some of them has been very nearly as good as that from the "local."

In fact on several evenings recently Rome and Trieste have delivered the goods with such clearness and punch that it made me wonder if our own B.B.C. transmitters were really doing their best!

It may interest readers to know that the Trieste station employs a transmitter of British design and manufacture.

SHORT-WAVE NOTES

News and views regarding an exciting and fascinating wave-band.

By W. L. S.

AS this is being written before the "Competition Week-end," I cannot say much about reception conditions except that, at the moment, they seem pretty poor. But perhaps they will change round in time for some of our hot receiving people to put up a really good show of stations and countries.

Have you noticed the way some of the popular "Dailies" are booming the "Eleven-Year Cycle" just recently? Their variety applies to the weather, and in view of the exceptional summers in 1899, 1910 and 1921 they are promising us something extra special this year. One paper I read mentioned, as a possibility, warm, fine weather from February to September!

That "Eleven-Year Cycle."

I was just thinking that from our experiences of our very own "Eleven-Year Cycle" the exceptions seem so numerous as to disprove the rule! Let us hope that the weather-cycle is more reliable.

I have received two copies of a unique little paper with the queer title of "Rag-Chewing," which emanates from Holland.

"Rag-Chewing," in case you do not know, is the American term for having a good long chat with a brother-amateur via radio, instead of dismissing him with "Good morning, old man, your signals R four here in London, nothing more to say, cheerio, see you again some time."

With the object in view of promoting good operating and longer contacts, the Rag-Chewers' Club (R.C.C.) has been formed in the United States for some time. The European branch is comparatively new. I like the conditions for membership. One has to be able to work at 15 words per minute or more, to possess a pure steady note (preferably using crystal control) and to be proposed by three members.

Written in English!

Then for an annual subscription of 2s. 6d. one acquires the benefits of membership, including the monthly journal, published in Holland but written in English!

The latter is worthy of note, as a great proportion of the members are in Holland, Germany, Austria, and Switzerland.

In the words of the Editorial note therein, "Well, o.m., be handy and let this sport of ours be one means for you to practise this language, being spoken in the greatest part of the world."

"J.B.M." (Glasgow), who is easily my most regular reporter, sends details of reception of a Portuguese station on about 46 metres. It doesn't sound like CTIAA. Can anyone give us full particulars?

Next come several more inquiries about "that single-valve short-waver." The set, gentlemen, is before me as I write, and when I am really satisfied that it is as good as it can be made, it will go to the sanctum of the Editor, there to make his closer acquaintance. More than that I cannot say!

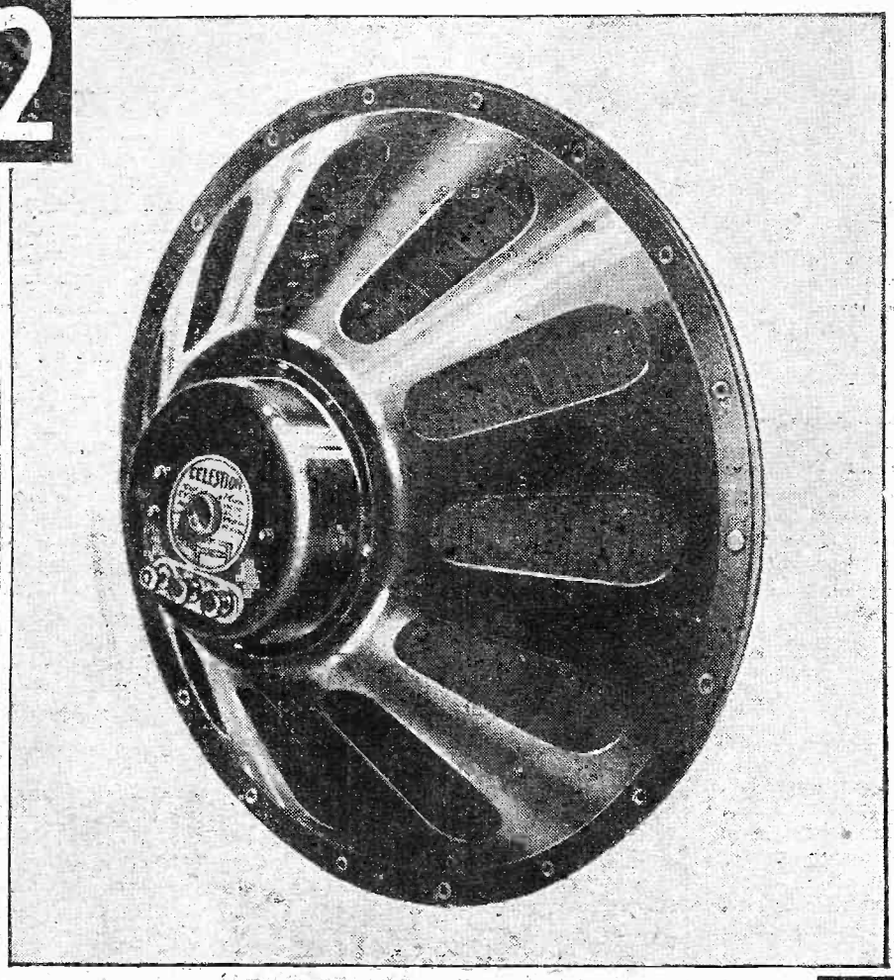
"Not Telling Stories"!

Let me add, though, for the benefit of the "sceptics' brigade," that I am not telling stories when I mention what I receive on my own single-valver. Further, I do not think there is anything exceptional about receiving Australia on a "one." It was done by several hundreds of amateurs in A.D. 1925, and there is no reason whatever why any properly made single-valve set should not do it to-day.

Frankly, I do not know how to answer the readers who say, "Here are you, reporting Australia on one-valve, while I, with a great big three (or four or five) can get nothing outside Europe." It puzzles me sorely, particularly as the strength of long-distance signals on one valve is often so great as to suggest that one could get them on a crystal!

Celestion
unparalleled quality

M12



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Outstanding in quality!—brilliant in performance! Unsurpassed for sensitivity. These are the three outstanding characteristics of this amazing achievement. The M.12 Chassis incorporates that exclusive renowned Celestion feature—the REINFORCED DIAPHRAGM. An absolute essential to faithful reproduction.

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MIDLAND REGION ACTIVITIES

By OUR OWN SPECIAL CORRESPONDENT

who gives many interesting news items about broadcasting progress in the Midlands.

EVEN in these days of centralisation some of the provincial stations continue to reflect the personalities of their Directors—especially Mr. E. R. Appleton (famous for his religious activities at Cardiff), Mr. E. G. D. Liveing at Manchester, who constantly seeks to emphasise the distinctiveness of the North of England, and Mr. Percy Edgar, the Midland Regional Director. Programmes from the Birmingham studios have always been marked by a cheerfulness which has made them widely popular.

Dawning of New Era.

The relaying of a considerable amount of London Regional material from the Midland Regional transmitter has given rise to disquiet in recent times, but information given me in an interview with Mr. Edgar will quieten such fears, for it reveals the dawning of a new era of increased activity in the Midlands.

Mr. Edgar was recently appointed Chairman of the meeting of Regional Directors which is held monthly in London, and also of the weekly conference of London, Midland, and North Regional Directors.

He tells me that as a result of these meetings listeners may expect a wider interchange of Regional programmes, including plays and revues as well as music, and the Midland Regional transmissions will in future contain more local material and less relayed from London.

Work has already commenced on a big extension of the Midland Regional studios and offices in Birmingham. It is intended to bring these in line with the Manchester and Edinburgh premises. The present B.B.C. building in Bond Street, Birmingham, is to be extended to the rear, over a garage.

The No. 1 studio, which was the largest broadcasting studio in Europe when opened in 1926, is to be divided up to provide larger control-room accommodation, and a new concert studio, 46 ft. by 36 ft. and 20 ft. high will be built.

Facilities for Better Programmes.

Three other studios are provided for in the extension scheme. There will be a modern dramatic control panel, additional office accommodation, and a canteen. At present there are only two studios.

Mr. Edgar told me that the new premises will facilitate better programmes from Birmingham. The present limited accommodation has hindered free development in certain directions.

It is also intended to extend B.B.C. activities throughout the Midland area. Theatres are to be tapped for outside broadcasts, not only in Birmingham, but also if practicable in such Midland towns as Nottingham and Leicester.

New choirs, such as the Gloucester Orpheus and the Ross-on-Wye Orpheus, are to be used, and concerts will be relayed from various towns. Midland amateur theatrical organisations are to be given the opportunity of showing their paces on the radio, and, of course, the Birmingham station will continue to keep a sharp watch for talent of all kinds.

Forty to fifty would-be broadcasters are given auditions weekly at Birmingham, but only two or three per cent are successful. I was interested to learn that the auditions are taken by Frank Cantell, Charles Brewer, and T. H. Morrison together. They listen to the auditions separately in different rooms and compare results afterwards.

Mr. Brewer is widely known as the dramatic producer at Birmingham. Mr. Cantell, who is reponsible for the region's orchestral music, is leader of the Studio Orchestra of nine players which was all that remained after the old Birmingham Wireless Orchestra was dismantled (Mr. Edgar says that he is still receiving complaints about this). Mr. Morrison acts in an advisory capacity to the Midland Region and is also Music Director to the North Region.

"How large is your staff?" I asked Mr. Edgar.

"There are thirty-one," he replied, "and in addition the Studio Orchestra, which consists of two first violins, one second violin, viola, 'cello, double bass, flute, clarionet, and piano. We also have a vocal chorus of nine, who come into all shows needing a chorus."

"Have you found," I asked, "that Midland listeners have any particular preferences in programmes?"

"Light music and light revues are the most popular features," Mr. Edgar replied. "I believe in giving the public what it understands in music. I also believe that a happy atmosphere within the B.B.C. makes for good programmes. I am fortunate to have a particularly happy staff, and I believe that this atmosphere gets across to the listener."

Mr. Edgar is, of course, a well-known broadcaster himself under the pseudonym of Edgar Lane, famous for the memories of Albert Chevalier, the great comedian, who was a personal friend of Mr. Edgar's.

Benefit to Dramatic Items.

In their search for broadcasting talent in the Midlands, the B.B.C.'s greatest difficulty, Mr. Edgar told me, was to obtain good dramatic talent. The dramatic side of the Midland Regional programmes should benefit enormously, however, by the recent installation at the Birmingham Repertory Theatre of a broadcasting studio. This is connected by land-line to the B.B.C. control-room in Broad Street, and it will place the vast resources of this famous theatre at the disposal of the B.B.C.

Not only does it enable members of the Repertory Company to broadcast without going round to the B.B.C. studios, but, says Mr. Edgar, "There is a totally different atmosphere when the actors can broadcast from the theatre, where they are amidst familiar surroundings and the smell of greasepaint.

"I hope to do a monthly relay from the Repertory Theatre studio at present, but more frequent relays may come in due course."

Mr. Edgar has been with the B.B.C. since its formation. In 1922 he was manager of the then Western Electric Co.'s station at Birmingham, and in 1923 became B.B.C. Station Director. He is the only person on the B.B.C. provincial staffs who still holds the same position as in 1923.

BIRMINGHAM'S PRIVATELY-OWNED BROADCASTING STUDIO

The Birmingham Repertory Theatre has built a special broadcasting studio of its own. It was the first theatre to conceive the idea, and the B.B.C. gave their full co-operation to the enterprise.

READY RADIO KITS for ECKERSLEY'S SETS

"P.W." ECKERSLEY THREE

ORIGINAL MODEL

Kit "A" (Less Valves and Cabinet) **£4:13:6**

OR BY EASY PAYMENTS

8/9 DOWN and 11 monthly payments of 8/9

Kit "B" (With Valves less Cabinet) **£6:1:0**

OR BY EASY PAYMENTS

11/3 DOWN and 11 monthly payments of 11/3

Kit "C" (With Valves and Cabinet) **£7:1:0**

OR BY EASY PAYMENTS

13/- DOWN and 11 monthly payments of 13/-

RECOMMENDED ACCESSORIES

1 Pertrix 120 v. H.T. Battery	15 6
1 Pertrix 9 v. G.B. Battery	1 6
1 Pertrix Accumulator Type P.A.C.3	11 0
1 Blue Spot 44R Loudspeaker	£2 12 6

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WONDERFUL RANGE & SELECTIVITY

ULTRA-SHORT, MEDIUM & LONG WAVES WITH NO COIL CHANGING

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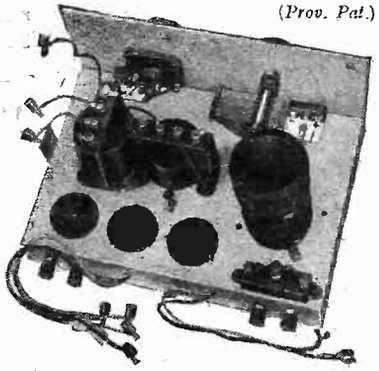
(*Prov. Pat.*)



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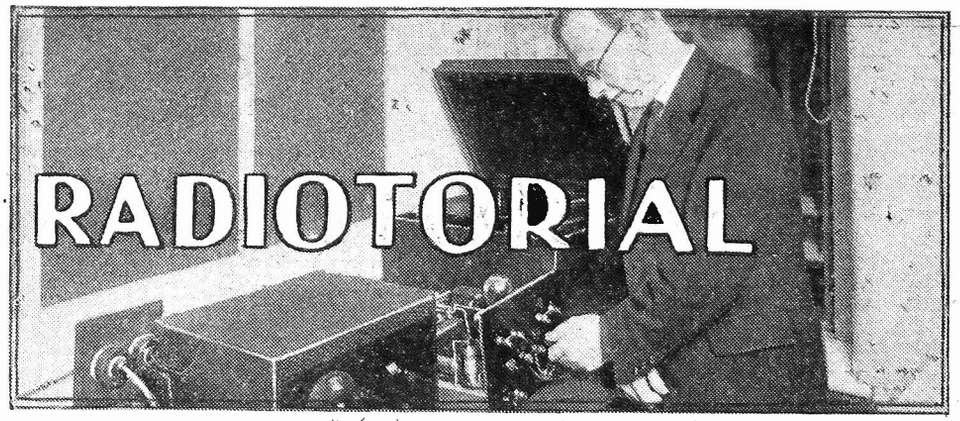

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The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS. not accepted for publication.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

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

QUESTIONS AND ANSWERS

WHEN STRENGTH FALLS OFF.

D. G. (Newbury).—"Does a crystal set need new 'phones after about eighteen months use?

"I ask this because my set was put in in August, 1930, and all that first winter we had wonderful reception. We did not expect this to continue after about March or April, for we had been warned that at this distance from a broadcasting station there was a considerable difference between summer and winter reception, but nevertheless right up 'till May or June it was good and quite satisfactory.

"At the beginning of this winter it certainly seemed to get a little better, but instead of this improvement continuing, it seems to have gone back to summer strength again. Some nights when a talk is on I can hardly hear if anyone rattles a paper, or speaks in the room, so I am deciding on getting new telephones.

"Before doing so, I should like your paper's opinion, as no doubt many people have had similar trouble when listening to the talks."

It certainly may be the telephones, as you suggest. But we should not buy a new pair until you have made quite certain that the rest of the installation is O.K. You do not say anything about your aerial and earth, for instance, and yet it is quite possible that one of these is causing the falling off in signal strength.

Perhaps your lead-in contact has become corroded or dirty, or a high resistance has developed in the joints of the aerial wire if you were unwise enough to use an aerial with a break in it, instead of putting it up in one piece. A poor aerial is a certain source of poor results. And if joints must be made somewhere in the aerial or earth leads, do not forget that only a soldered joint is likely to be satisfactory after a few months.

We advise you to examine not only the earth wire where it is joined to the earth plate, but also the latter's connection with the surrounding soil to make sure that it is placed in a damp situation and that a good sound lead connects the actual earth plate to the lead on the set.

Remember, also, that the crystal itself sometimes goes "tired," and an occasional brushing to remove the dirt is of good service, or in bad cases a fracture of

(*Continued on page* 1184.)

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 1182.)

the crystal to expose a new surface may work wonders. Nipping the point of the cat's-whisker with a pair of fine scissors is another good tip which you may have overlooked.

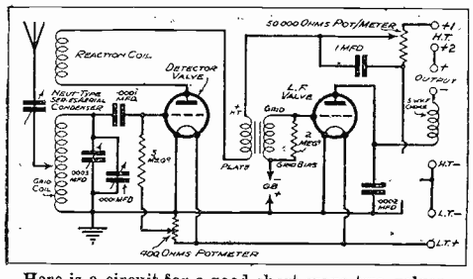
If none of the foregoing points have been neglected it is possible that the 'phones themselves may be the trouble, and there are two likely causes (in addition to faulty leads, which would not be likely to show up gradually, but would probably have caused a more or less sudden drop in reception).

These two causes are (1) if you have dropped the 'phones and injured the magnetism, or one of the diaphragms; or (2) if you have not been wiping the 'phones after use possibly they are rusty inside, which would naturally impair their sensitivity.

As it is better not to tackle them at home unless you know someone who has had experience with this kind of thing, it would be best to take the 'phones to a dealer if you have any doubts as to their condition.

MISSING LINKS, No. 27

A TWO-VALVER FOR SHORT WAVES.



Here is a circuit for a good short-wave two-valver, but one "component" has purposely been omitted. Can you fill it in correctly?

LOOK OUT FOR THE ANSWERING DIAGRAM NEXT WEEK.

CONDENSER CONNECTIONS.

P. G. (Atherton).—"My neighbour's boy is quite hot stuff at this wireless, although he has not left school yet; and when he came in the other day to borrow a screw or two he opened my eyes about condensers.

"I was saying I should have to get a 2-mfd. condenser as I had only 1 mfd. in stock, when he told me that if I connected them together they would serve just the same as a 2. Is this right?"

It is certainly possible to double the capacity of two equal condensers in this way, and you will find they work exactly like one condenser when correctly joined up. There are, however, two methods of joining the condensers together, and it is essential to do it the right way—as the opposite way will have an effect opposite to the one you want.

The two ways in question are joining them "in series" and "in parallel." If you join two condensers in parallel, you add their values together, so if you have two 1-mfd. condensers joined in parallel they are equivalent to a 2 mfd.

To join them in parallel, run one lead from the set to one terminal on one condenser and to another terminal on the other condenser. Then take the other lead from the set and run it to the two remaining terminals so that in effect the condensers are "across" one another. This is "in parallel," and it doubles the capacity.

If you had wanted to reduce the capacity from 1 mfd. to half a mfd. you could have done it by joining them "in series."

In this case one lead from the set goes to one terminal on one condenser and the other lead from the set goes to one terminal on the second condenser. This still leaves two vacant terminals, one on each condenser, and if you join a wire across these two the condensers are then said to be "in series."

Condensers in series have a capacity always less than the separate capacity of either condenser; and when two equal condensers are connected in this way the value is halved. Similarly, when joined in parallel the effective capacity is always *more* than that of one condenser alone, and if two condensers are of equal capacity the total capacity will be doubled.

A "COMET" QUERY.

M. L. (Leamington).—"I am making up the famous 'Comet' from the 'P.W.' blue print, but I am a little puzzled about the low-frequency transformer.

"I have one exactly like that shown on the blue print as regards its terminals, and it is marked 3½ to 1, but there are only four terminals in all, and the one which is marked 'earth' on the blue print is not on my transformer at all. What shall I do about that?"

The connection to the earth terminal on the L.F. transformer is actually of not much importance, but as some transformer makers provide this terminal and as some transformers work better when it is

(*Continued on page* 1186.)

TECHNICAL TWISTERS

No. 98. POWER DETECTION

CAN YOU FILL IN THE MISSING LETTERS?

The object of using Power Detection is to enable the detector to handle . . . . . power without distortion.

* * *

Such a detector permits the use of increased . . . . . amplification, with the result that one of the . . . . . amplifying stages can be omitted.

* * *

This has the advantage of reducing the likelihood of hum, and this decreases the need for . . . . . apparatus.

Last week's missing words (in order) were Positive. Negative. Negative. Interaction.

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 1184.)

connected up, the correct connections for it are shown on the blue print.

However, if you have no extra terminal on the transformer simply ignore the wire that goes from that point to the filament of the V2 valve holder and connect all the other points exactly as shown. In all probability you will find the set works perfectly without this connection.

If, however, you should be troubled with a little hum or instability try moving that transformer a little way farther from the other one, and secondly, reversing the G. and G.B. wires on it, so that the flex lead goes to the G. terminal and the lead on the grid of V2 goes to the G.B. terminal. This should do the trick.

THE ECKERSLEY TWO.

For this set, as for all straightforward constructions, the actual set-building processes fall into three main sections, namely, drilling, mounting and wiring.

The drilling of the panel and terminal strip is rendered easy by the diagrams given with the article. So far as the terminal strip is concerned there is no need for meticulous accuracy, and the disposition of the holes can be seen sufficiently well from the wiring diagram.

The terminals are all placed in line halfway up the space between the top of the baseboard and the upper edge of the strip.

As shown in the wiring diagram, the first is placed 1 in. from the end of the strip; and the remaining L.S. and all the battery terminals are at similar distances from each other, namely 1 1/5 in.

At the other end of the strip, similarly spaced, are the aerial and earth terminals, the former being about 1 in. from the edge of the strip.

The drilling of the panel is done from the dimensions given in the separate diagram. The fixing-screw holes at the bottom—three will be sufficient—are all arranged under other holes. And they are placed to come halfway through the thickness of the baseboard.

That completes the drilling. Next comes the mounting.

This operation really comprises the mounting of the terminals on the strip, the condensers, etc., on the panel, and the screwing down of the baseboard components; though "the mounting" is often understood to mean only the latter.

It is easily carried out correctly with the aid of the large wiring diagram, which shows the exact relative positions of the various components. (Remember that, like all "P.W." wiring diagrams, this is drawn to scale, but, of course, "flattened out" for reproduction.)

The wiring is done in accordance with the heavy lines—soldering is not essential, but there is no objection to it, if properly done, of course. Note that the L.T. — terminal goes through a small hole in the screen fold, with which it makes contact.

When the wiring is finished it should be checked carefully by the diagram, and then the batteries, etc., can be connected up and the set placed on test.

THE WAVE-CHANGE SWITCHES.

The two wave-change switches "pull out" for medium waves and "push in" for long waves. On both wave-bands the set's operation is identical and straightforward; but on long waves the small aerial condenser (top left) is placed in its shorting position, while on medium waves it is adjusted as desired for selectivity.

When this condenser is (nearly) "all in" the selectivity or sharpness of tuning will be at a minimum, and the strength of reception at its maximum. When this condenser is placed "all out" strength is reduced, but the "sharpness" or selectivity is at its maximum.

Tuning is quite easy though the two condenser readings will not be exactly the same, when the circuits are "in step."

The easiest way to search for unknown stations is to set the left-hand (first) tuning condenser, say, half-way round; and then bring its fellow (second condenser) to about mid-way with the left hand, while the right hand increases reaction so that the set is on the verge of oscillation.

As soon as a programme is heard the final touches on the tuning dials will enable reaction to be slackened off and good clear interference-free reception to be achieved.

IMPROVING AN OLD THREE-VALVER.

D. L. (Parkstone, Dorset).—"I was wondering if you could help me with my three-valve set, which has just gone back on me after three

(*Continued on page* 1188.)

"P.W." PANEL, No. 56, OVERLOADING.

The term "overloading" is often applied to transformers, valves, loudspeakers, etc.

* * *

It indicates the condition when the input is larger than the apparatus in question can handle satisfactorily, under the conditions obtaining.

* * *

In the case of an amplifying valve, for instance, the output wave-form is mutilated and does not correspond with the input during overloading, because the valve is being required to handle excessive input voltages.

* * *

In the case of a transformer, output does not correspond to input during overloading, because the core becomes magnetically saturated.

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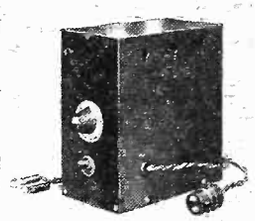

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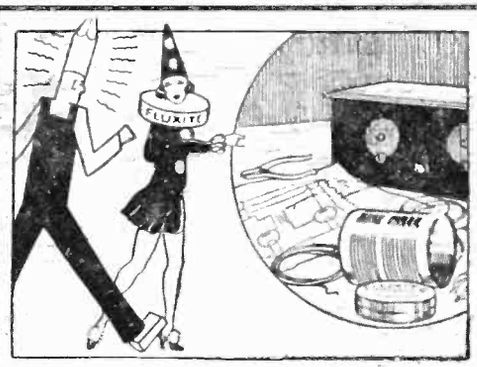

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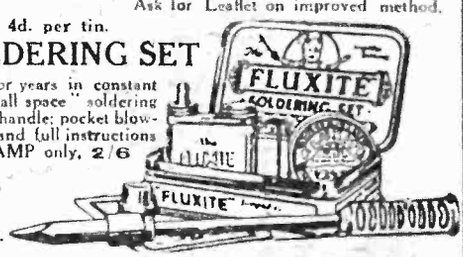

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CHAS. A. OSBORN, Dept. P.W., The Regent Works, Arlington St., London, N.1. *Telephone: Clerkenwell 5095. And at 21, Essex Road, Islington, N.1 (1 min. from the Agricultural Hall). Telephone: Clerkenwell 5634.*

RADIOTORIAL QUESTIONS AND ANSWERS

(*Continued from page* 1186.)

years' good service. It was originally a detector, two L.F. with plug-in tuning coils, but I got you to send me a diagram for adding a dual-range unit which worked very satisfactorily

"For some time, however, I have been bothered with crackling, which I put down to the R.C.C. unit, and finally in desperation I tried disconnecting the H.T. lead from the H.T. on the R.C.C. unit and running it instead to a spaghetti, the other end of which was joined to P. terminal on the unit. This went fine for some weeks, but then the effect got very distorted and weak, and in the end I had to take it to a dealer. He tells me that the coupling condenser was faulty and that I have ruined my second valve. As it happens I have another valve of this type, but I certainly do not want to spoil that too, so what I have been wondering is this:

"Could I put in an L.F. transformer in place of the R.C.C. unit without much trouble? Or should I have a new set altogether? I would much rather try the transformer, as I certainly do not want the resistance, nor any extra expense this side of the summer.

"I should be very glad of a candid opinion, as if it needs a new set I suppose I shall have to go to it; but I really did not want to."

It is very difficult for us to advise in the economics of the affair, but, honestly, if you can go to the new set we should certainly be tempted to do so in your place. The up-to-date sets and circuits are really such a great improvement on the older ones that we think you would be pleased with the change.

However, if you are bent on trying the transformer it is really quite a simple matter, and there is no reason why you should not do so. All you would have to do is to take out the R.C.C. unit and connect the transformer in its place as follows:

H.T.+ terminal on the transformer to the H.T.+ lead; A or P on the transformer to the H.F. choke which is in the plate circuit of the detector valve; G on the L.F. transformer to the grid terminal of the succeeding valve; and finally a flex lead from the G.B.— terminal on the transformer to the appropriate point in the grid bias battery, probably 1½ volts.

Be sure you have all the connections right before connecting up the batteries. Then switch on and try it with the new valve.

If you find that it causes humming, and you have been careful to place this transformer as far as possible from the other transformer in the set (and cores at right angles to one another), disconnect the batteries again and change over the G. and G.B. leads on the transformer.

You may find that this alone will cure the trouble, but if you still get humming or howling or instability, then you will have to try decoupling. Probably by this time you will be regretting not having tried the new set, but it is really quite a simple matter to fit a decoupler, so you may as well as have the connections!

Disconnect the H.T. + terminal on the new transformer from the H.T. + lead and insert there a 20,000-ohm spaghetti resistance. Join the H.T.+ terminal on that transformer (and, of course, that end of the spaghetti which is connected to it) to one side of a 1 or 2 mfd. fixed condenser. The other side of this fixed condenser must be taken by a short lead to L.T.—, H.T.— or earth, thus completing the decoupling.

Finally, remember that the transformers must be well apart from one another and with their cores at right angles, and that the mere reversal of one set of connections, as described above, is often sufficient to clear up instability.

NEXT WEEK

MAKING A SINGLE DIAL SUPER

A special article concerning a new development in multi-valve set design.

WHEN THE L.T. IS IDLE.

T.L.K. (Torquay).—"How often should the low-tension battery be charged when it is not in use?"

The "mass" type of L.T. battery can stand up to very long periods, since it was designed for light load conditions. But the ordinary type soon deteriorates without use.

If this latter type is in good condition it can be left for about two months, when it will require a good charge. But a battery of this type which is not in good condition cannot be left as long as this without some risk of deterioration.

IN SEARCH OF TELEVISION

(*Continued from page* 1166.)

can take it from me its entertainment value is mighty small, and will remain so until such a time that it achieves that stage of development usually demanded of a thing before it is allowed to leave the laboratory.

However, it is an undeniable fact that scientists and business men all over the world are convinced that the public wants television, and if they remain convinced the public is bound to receive television in time, even if it has to wait for a hundred or more years.

I am not going to prophesy, but I don't mind admitting that it would not surprise me one bit if there happened to be a 1932 schoolboy somewhere with television in his satchel, or a grown man practically on the verge of discovering the new line of thought needed to open up fruitful new lines of research which will lead to television, comparable with early broadcasting, receivable under conditions of optical "safety first." On the other hand, Sir Oliver's "hundred years" may still be a good bet for all that contemporary activity can show.

MIRROR OF THE B.B.C.

(*Continued from page* 1172.)

On Saturday, February 6th, a new feature will be introduced into the programmes—a vaudeville critic who will appear at the end of the Saturday night bill and say what he thinks of the vaudeville programmes of the week.

The first criticism will probably be given by Mr. Herbert Farjeon, the playwright and dramatic critic, and it is also hoped to secure the services of Ashley Sterne, P. G. Wodehouse and Harry Graham for future talks of a similar nature.

Nuts and Wine.

Alan Howland, who is in charge of the Children's Hour at Savoy Hill, is producing a light feature programme having the attractive title of "Cakes and Ale" for National listeners on Saturday, February 6th. It is, I understand, a sequel to his sing-song "Nuts and Wine," which was broadcast some weeks ago, and will, as did its predecessor, take the form of an imitation outside broadcast, with which department at the London headquarters Mr. Howland was associated before he was transferred to the Children's Hour department as assistant to Mr. C. E. Hodges.

In "Cakes and Ale," listeners will renew acquaintance with Mr. Willetts, the churchwarden who provided the comic relief to the village parish hall concert in "Nuts and Wine." Mr. Willetts will be one of the chief characters in "Cakes and Ale," which is another village concert to celebrate the wedding of his daughter. The artistes include Ernest Lush at the piano, the Wireless Male Voice Chorus, conducted by Cyril Dalmaine, and Frederick Grisewood (baritone), who is a member of the Announcing Staff at Savoy Hill.

THE LISTENER'S NOTEBOOK

(*Continued from page* 1172.)

Problem (3), Aspects of the Moroccan Mind (5).

Also, Science and Civilisation (9); Astronomy (6); Medicine (13); Pedagogy (13); Religion (3); French Literature (Classical (5), Political (3), Stories and Novels (7), Poets (1), "Disques" (3)); and Communiqués on Agriculture (91).

It is interesting to note the extraordinarily large number of talks devoted to agriculture; in fact, there is one every day, and even Sundays are not excluded. They cover a wide range of subjects, are intended for the professional farmer and amateur gardener alike, and are arranged on the "To-day in Your Garden" principle; that is, the subject matter of the talk is that particular branch of agriculture in which the farmer would be engaged at the time the talk is given. As is to be expected, the cultivation of the vine is dealt with very thoroughly.

The talks as a whole differ, I think, very materially from our own, but I would like to know whether they provoke as much criticism. What do you think?

Group Listening.

Evidently, the group-listening movement is growing fast. Indeed, Dr. C. Delisle Burns, in his talk "What Difference Have Motors Made?" seemed to regard it as already universally established by addressing his listeners as groups. This is a bit premature, perhaps.

It has been officially stated that there are, at present, more than 350 of these groups in existence, the majority of which have sprung up in the North and the Midlands, although the movement is not entirely confined to these parts.

A Significant Feature.

It has already intruded itself into southern and western counties as well, Kent heading the list with 13 groups. The Home Counties still seem to be holding themselves aloof, but they are sure to follow the fashion sooner or later.

One significant feature of the movement is that 116 of the 350 groups confine their interest and discussion to the economic series of talks, "Industry and Trade." It is by specializing that the groups, I think, show wisdom.

Dr. Burns mentioned "superficiality of mind" as being one of the bad effects of the new travel machines. I am sure that

a similar superficiality of mind *must* result from our unsystematic way of listening-in. There is no doubt that we have, in the past, listened-in to too much.

Selectivity is as essential to the listener as it is to the set. We obviously cannot study to any depth *all* the arts and sciences at once. If we attempt to, then the most we can hope to have is just a nodding acquaintance with the many subjects taught via the microphone.

Adopt the fashion set by these 116 groups, and concentrate on one series only. Follow up what you hear with reading and discussion. That is my advice.

If you do, wireless will henceforth cease to be "the not completely satisfactory thing" it is, but something absorbingly interesting, because it provides substantial food for thought.

THE DUBLIN STATION ORCHESTRA

The Augmentation Postponed.

IN an article on "Broadcasting in Ireland" in POPULAR WIRELESS of October 17th last our special correspondent who visited the Dublin station stated that the Dublin Station director hoped to increase the orchestra of six to sixteen. This plan has now received a set-back.

In reply to a question in the Dail, Mr. M. R. Heffernan, Parliamentary Secretary to the Irish Minister for Posts and Telegraphs (who is responsible for the broadcasting service), has stated that the question of augmentation of the Dublin Station Orchestra had been carefully considered, but in view of the present financial stringency the Minister for Finance was not prepared to sanction the extra expenditure that would be involved. The matter would be reconsidered, however, when the financial situation improved.

AN ECONOMY HINT

By W. L. S.

I SUPPOSE that, with the exception of the famous "Buy British" slogan, the word most in the thoughts of the public at the moment is "economy." Coupled with the gruesome thoughts of Income Tax forms, "economy" is not a mere slogan—it is a necessity.

It is only natural that many families who are thinking of treating themselves to a new receiver in the near future are now beginning to think harder still—this time about whether it will be done or not.

Although my few remarks apply more to "P.W.'s" short-wave followers, than to the average broadcast listener, they may be put to use, even by the latter class.

Separate Short-Waver.

It is being proved more and more often nowadays that it is an advantage, if one does much short-wave work, to have a separate receiver for the job. Many excellent "all-wave" receivers have been described, but it is generally necessary that they should be a compromise in some ways. Further, the really keen short-wave man likes to have a set that he can experiment with, without incurring the wrath of the family by leaving them in the lurch when they particularly want to hear a local broadcast programme.

If both the short-waver and the broadcast set are of the large variety, there is inevitably a certain waste of gear. The two are never in use together, yet, for instance, each of them has a nice L.F. amplifier. My suggestion is that "two-set" or "three-set" families should share the L.F. side, and that this should be made particularly well to compensate for the economy in components.

Personally, I have a broadcast receiver consisting of a screened-grid H.F. stage and a detector. My short-waver is a modest single-valver.

A Single Amplifier.

Standing in a convenient corner I have an all-electric gramophone which incorporates a two-valve amplifier that is—I hope—above reproach. When I want loudspeaker work, be it gramophone, broadcast, or short-wave long-distance signals, that amplifier has to do its stuff. It is most convenient (particularly for an all-A.C. job) to build an amplifier, power supply and loudspeaker all together. If one wants gramophone, the turntable and pick-up can probably be built into the same assembly.

Then, it seems to me, one's troubles are finished. An L.F. amplifier differs from most other radio apparatus in this respect—one *does* know when it is working well. There is no speculations about whether conditions are good, whether the transmission is up to scratch, and so on. One simply makes an amplifier that pleases one's ear and then leaves it severely alone.

This desirable state having been reached, we can push into our amplifier anything that is handy—be it London Regional from the broadcast set, Sydney from the short-waver, or Clapham and Dwyer from the record and pick-up!

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AN ECONOMY HINT

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I find, too, that an excellent way of arranging things is to incorporate an L.F. transformer in front of the first valve of the amplifier, and to "parallel-feed" it from whatever set it works on. The detector output of both my sets consists of a 30,000-ohm resistance where the 'phone terminals would normally be, and a 1-mfd. condenser going from the "live" side (i.e. the side remote from the H.T.) to the 'phone terminals themselves, the second one, of course, being earthed.

Simplifies the Switching.

An earth wire round the skirting makes its connection to the broadcast set, the short-waver, and the amplifier. Thus a single wire suffices to convey the signals from either set to the amplifier. To do this, one side of the first transformer primary is earthed, and the other goes to a jack on the front, into which my plugs (with only a single wire taken to each) are pushed as the need arises.

Thus, when the family (or even I myself) particularly want to listen to a broadcast item, there is no domestic trouble even if the Melbourne set is completely in bits! Likewise Melbourne, or Timbuctoo, or any of the usual distant stuff, is available, on headphones only, even if the family set is working on the local. In any case, I always use a separate indoor aerial on the short-waver, so that no trouble arises here.

This economy business *can* be carried still further, but not if one wishes to use both sets at once. By this I mean that everything in the two sets can be shared except the detector

Many Advantages.

That is not the same thing as using one complete receiver for both short and medium waves, with the same detector. It necessitates a larger cabinet, but one can arrange switching so that a short-wave detector, complete with its coils and condensers, is always ready to be put on the aerial instead of the broadcast detector. The same L.T. and H.T. can be used, but the detector valve itself remains separate, with the special purpose of receiving short waves only.

The advantage here is, of course, that it can be "hotted up" in the many ways known to short-wave experts without making it unsuitable for broadcast reception. It simply doesn't *have* to be used for broadcast reception, for which purpose the nice, tame, easy-to-handle detector circuit is still there.

All this may seem complicated and unnecessary to users of two separate sets, but where one's pocket will not run to the latter state it is surely better to use one of the foregoing expedients than to have a single set that has to be severely altered before it will serve either of its two purposes really well.

TECHNICAL NOTES

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

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

A Microphone Amplifier?

IT is rather interesting to notice the tendency to revive the use of the ordinary carbon type of microphone. It was not so very long ago that there were many attempts to use the button type of microphone so as to make a valveless amplifier and, as a matter of fact, with quite a measure of success.

The microphone has the great advantage that it requires only a small low-tension current—no high-tension current—but, on the other hand, the quality and reliability, especially the latter, are much below those usually associated with the valve amplifier.

In the old days it was quite a common thing for experimenters to work a loudspeaker from a crystal set by means of a microphone amplifier of this kind. Also many people used a type of microphone pick-up for the electrical reproduction of gramophone records. The microphone was sometimes attached to the stylus bar, or to the centre of the soundbox diaphragm, and was connected up in circuit with a battery and a loudspeaker.

Differential Microphone.

More recently a new type of "Brown" microphone has been introduced, particularly for amplifying from a gramophone pick-up, in which a diaphragm is surrounded on both sides by layers of carbon, the diaphragm being actuated by the needle of the pick-up; in this way there is a sort of "differential" effect, the pressure between the diaphragm and the carbon on one side increasing at the same time that it is decreasing at the other side.

Whether the microphone can be developed to such a degree of perfection as to be a serious rival to the valve remains to be seen, but it is remarkable what a great deal has actually been accomplished with different types of microphone during the past year or two, and there is no doubt that there is still a good deal more to be done. The simplicity of the microphone and the associated circuit is, of course, a great attraction of the system.

Modulation.

To the transmitting experimenter the question of modulation is a very important one, but to the operator of a receiving set, modulation is of secondary interest, inasmuch as it is a condition over which he has no control. The modulation of the transmission rests entirely with the broadcasting station, and although it has a direct effect upon the maximum quality of the reception, the listener has to take, in this particular matter, what is given to him and to do the best he possibly can with it in his receiver.

The question of modulation, so far as the B.B.C. are concerned, has been the subject of long-continued and exhaustive tests, and

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I think I am right in saying that the standard of modulation of the B.B.C. is not excelled, if indeed equalled, in the transmissions from any other stations in the world.

As you know, modulation of the carrier-wave is brought about by superimposing upon it the impulses from the microphone or speech circuit; this is commonly said to produce side-bands.

Effect on Quality.

The carrier-waves are in this way caused to increase and decrease in amplitude, and the ratio of the amplitude of the variations to the normal amplitude of the carrier-wave is a measure of the degree of modulation. If the modulation is a hundred per cent it means that the carrier-wave is caused to vary in amplitude between zero and twice its normal amplitude.

At first sight, you might think that it would be best in all cases to superimpose upon the carrier-wave a maximum or hundred-per-cent modulation, and that this would give stronger signals in receiving sets, which, after all, rely for their ultimate reproduction upon modulation and not upon the carrier.

This is true in a general way, but there are other factors which render it impracticable to use such a heavy degree of modulation as this, the principal reason being that the quality of the reproduction from receiving sets picking up the transmission would be impaired.

As a matter of fact there are transmitting stations which use a degree of modulation nearly up to the maximum in cases where they wish to reach as large an area of listeners as possible, and where the question of reaching out is more important than the actual quality of reception.

In the case of the B.B.C. the degree of modulation used is generally between about 60 and 70 per cent; this is found to give good, strong signals, whilst at the same time retaining as far as possible every scrap of quality.

Attenuation.

Perhaps I should mention that owing to what is called "attenuation"—which is simply another name for the gradual weakening of the waves as they travel greater and greater distances from the transmitter—the modulation becomes less and less effective.

At some distances the unmodulated or residual part of the carrier-wave can be picked up, but the modulation or side-bands have become so weak that it is practically impossible to receive speech or music, and all that can be heard is a kind of hissing note.

Frequency Wobble.

The B.B.C. is extremely careful not only in the matter of correct modulation, but also in keeping the transmitted wave-length as nearly as possible constant. Unfortunately, many Continental stations are not nearly so particular or their arrangements are not so effective, with the result that transmissions "wander" all around the stipulated wave-length.

This is very irritating to anyone receiving such transmissions, because clearly it means, especially if the receiving set is very selective and sharply tuned, that a type of "fading" will be experienced, the reception rising and falling in volume as the transmission approaches or wanders away from its proper wave-length. This wandering is sometimes called carrier-wave "wobble."

In order to avoid it some form of master-control should be used, of which I may mention the piezo-crystal as an example. Owing to the crowded condition of the ether in these days, the wandering of a broadcast wave-length from its allotted value is liable also to cause serious heterodyne interference with other stations.

Operating Skill.

With a set the circuit of which starts with a detector—for instance, a detector and two low-frequency amplifier set—it is surprising what different results can be got out of it in the hands of different operators.

I am thinking more particularly of the case where the aerial circuit is loose-coupled, so that you have two tuned circuits and two circuit adjustments to make afterwards.

At first sight you might think that there was really very little in the operation of such a circuit to call for any skill on the part of the operator, but if by any chance you possess such a set, and are not particularly skilled in manipulating it, get some more experienced friend to go over it for you and see whether *he* can get more out of it than you have been getting.

Plug-in coils are very convenient for the primary and secondary of the aerial coupling and for the reaction coil, but for the finest adjustment it is important that these coils should be of the low-"loss" variety.

Coupling and Selectivity.

So far as the tuning is concerned, this depends, of course, upon the tuning, first of all of the primary aerial circuit and of the secondary circuit, whilst the selectivity depends largely upon the precise adjustment of the coupling between the two. Remember that these effects react upon each other, and any adjustment of the one necessitates a further corresponding adjustment of the other.

This, in fact, is what calls for skill in the tuning and operation of a set, and is what renders the manipulation so interesting. For precise tuning adjustments of the primary and secondary circuits slow-motion or vernier condensers should be used, whilst a further aid in the final tuning up and operation of the receiver generally is a potentiometer for the grid leak.

Component Values.

If you do not use a variable grid leak it is a very good plan to try out different values of this component, and you may find that you get much better results with a somewhat higher value of grid-leak resistance than you have previously been using.

The operation and efficiency of the set, no matter what the nature of the set may be, are very largely a question of the choice of the right values of components, or alternatively, of course, of the adjustment of the value of components to the correct amount.

No amount of skill on the part of the operator will make up for serious errors in the values of vital components in the set, whilst, on the other hand, the more

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accurately the values of components are chosen for their respective purposes the easier the operation of the set becomes.

Needle Points.

Most people choose their gramophone needles in the Irish way, that is, they don't choose them at all; they just use anything that comes to hand. With a cheap portable gramophone, perhaps this method may be all right, but if you are using a pick-up or expensive radio-gram, and are out for quality, it is really worth while to pay careful attention to the type of needle used.

Incidentally, it has a very important influence on the life of your records. People often choose a thick needle for loud volume without recognising that this extra volume is obtained at the expense of the record. It is the poor old record that has to shift the needle about from side to side, and the bigger the load you throw on its back the sooner it is going to give up the ghost.

Personally, in using a pick-up, I always prefer to use fine, or so-called "soft," needles, and to make up the volume by amplification. I find that these needles are much more gentle on the records, and they seem to follow the track more faithfully.

A very good point is to give your records every now and again—particularly the expensive ones or those you are specially fond of—a thorough brush out so as to remove the dirt and particles of grit from the grooves.

This is not quite so easy as it sounds, and you have to use a very fine brush, preferably a soft one, and work this carefully and patiently into all the grooves round and round the record. Just rubbing the surface of the record over with a cloth, like wiping a plate, is no use at all, as the cloth does not get anywhere near to the inner parts of the sound grooves.

For Home Records.

Talking about needles, many people use the fibre type—including the various kinds of spines and thorns which are now prepared

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for gramophone use—in the belief that they are avoiding wear and tear on the records.

Inasmuch as the fibre needles are much softer than the material of the record itself, perhaps this is true in a way, and certainly the fact that the needle rapidly becomes worn away by the record seems to support the view, but, on the other hand, the fibre needle has a curious "sticking" action which seems to roughen the smooth surface of the record track, and for this reason I personally dislike fibre needles and never use them.

Fibre needles of one sort or another are almost invariably prescribed for the playing of *home-made* records. After you have cut a record, by means of any of the home-recording devices, upon an aluminium disc, it is rather delicate, and is not adapted for playing by means of an ordinary steel needle.

If you use a steel needle, it simply chews its way right through the tracing on the aluminium disc and destroys it at once—generally pulling up the gramophone as well, so that the record stops playing, anyhow. With a fibre or thorn needle you can often play these aluminium records a great many times without any apparent deterioration.

A Point to Watch.

I was examining a set the other day, and a little point cropped up which it struck me is not commonly recognised, and it may be worth mentioning. The battery voltage (a 6-volt accumulator) seemed to be too high, and the set had to be readjusted occasionally during about the first hour or so.

After making a series of tests, it turned out that the battery was too fully charged at the beginning of each evening's use. I should mention that it was used with a trickle-charger and the trickle-charging current was rather heavy. The result was that every evening when the battery was first put into service it was showing over seven volts, which fell in about an hour's time to something just over six volts. If you use a trickle-charger this is a little point you want to watch.

A Noisy S.G.

I wonder if you have ever had a screen-grid valve which turned out to be noisy or microphonic? I had one the other day which was very troublesome, and it was some time before I found out the cause, because "microphonics" are hardly what you would expect with a screen-grid valve.

I made inquiries about this, and it seems that, although it is not common, it is by no means unknown. Unfortunately, there is really very little that you can do to cure it beyond, of course, replacing with another valve. I think the trouble when it does arise is due to a bad metallic joint somewhere in the construction of the electrode system inside the valve.

THE ECKERSLEY TUNER FOR YOUR OLD SET

(Continued from page 1161.)

This doesn't matter in the least. If your set is reasonably up to date on its L.F. side you can neglect these points. They will not affect the working of the tuner.

Similarly, such refinements as volume controls, pick-up jacks or switches, etc., can be left in, but, of course, if the receiver incorporates a Selector coil or rejector these will have to be taken out.

Remember (a) that if the set has an R.C. stage, the value of the anode resistance should not exceed 100,000 ohms, otherwise you may not get adequate reaction.

(b) The reaction condenser must not be less than ·0001 mfd.

(c) A series aerial condenser of the type specified is essential because without it the tuner will not go down to the London National wavelength on a normal aerial. Moreover, the "shorting" position on the condenser is very necessary if the best results are to be obtained on the long waves.

Now a few words about the operation, H.T. values, etc.

The valves in use in the existing set will serve equally well in the modified receiver, and this applies also to the H.T. voltages.

In cases where a separate H.T. tapping is provided for the detector the usual rule for adjusting the voltage on this valve until smooth reaction control is obtained still applies. A value of between 60 and 80 volts is about right for an "H.L." or special detector type of valve.

Quite Simple Operation.

The operation of the tuner is simple. The *two* wave-change switch knobs are pulled for the medium waves and pushed for the long waves.

The two tuning controls are then rotated until the required transmission is heard. These dials or drums will not necessarily be in step, and the reading on the aerial tuning control will be dependent upon the adjustment of the aerial series condenser.

The series condenser plays an important part in the wave-range covered, and has an effect upon the volume and selectivity.

For the medium wave-band a good preliminary setting is to rotate the knob until the moving vanes are approximately half engaged, this setting being more or less correct for the lower portion of the wave-band. In the case of the Northern Regional the moving vanes may be almost fully engaged with the fixed, and this position will give the best volume above 450 metres.

On the long waves the moving vanes must be rotated until the "shorting" strip comes into operation, otherwise signal strength will suffer and the wave range will be decreased.

Generally speaking, the tuning on the aerial tuning control will be comparatively flat, whereas on the second tuning control it will be sharp.

So, although you must move the second condenser slowly when searching, you can swing the aerial condenser through a fairly large arc, provided the series condenser is not set at the low value (moving vanes nearly disengaged with fixed).

Revolutionise Your Old Set

With the IMPROVED & PERFECTED ECKERSLEY TUNER

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RESISTANCE COUPLING

The coil for aerial tuning is connected to the secondary coil for grid circuit tuning by means of a high resistance of suitable value

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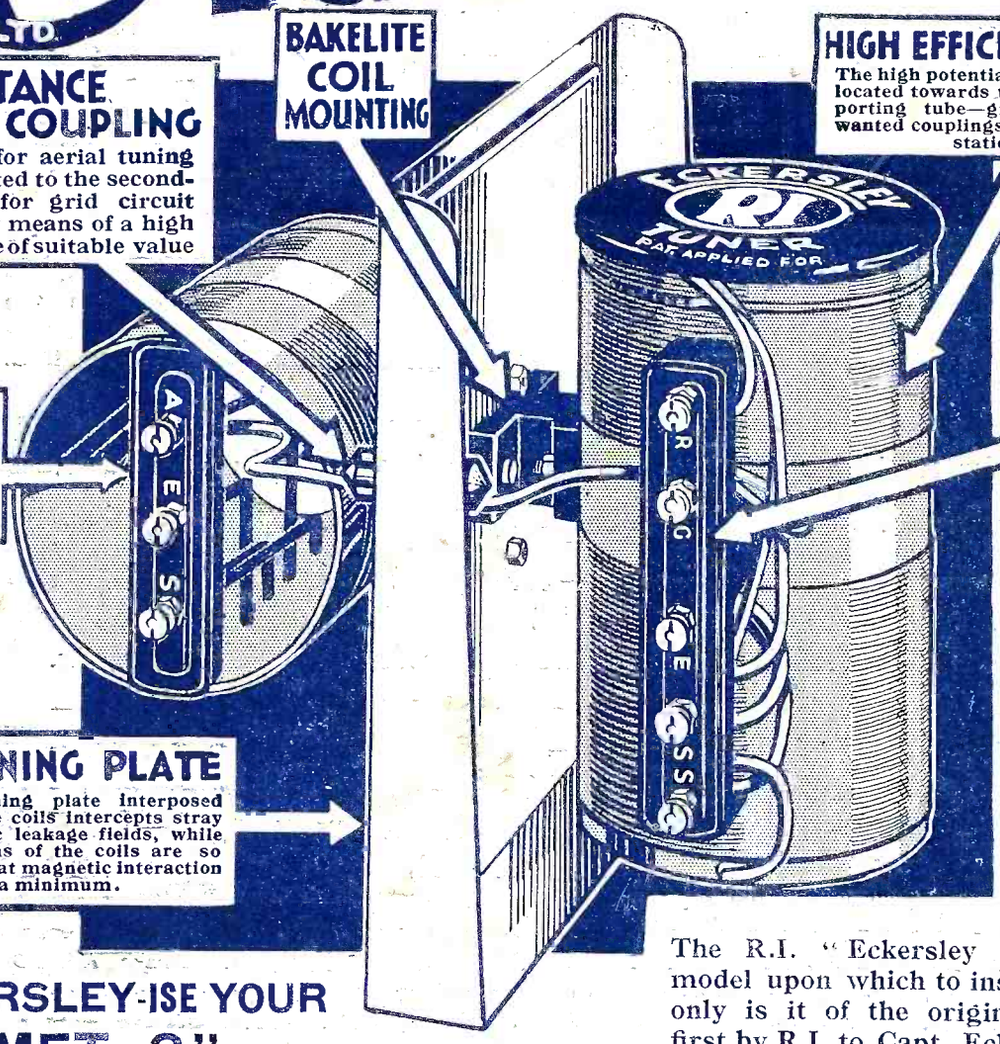
The high potential ends of the coils are located towards the centre of the supporting tube—greatly reducing unwanted couplings due to stray electrostatic fields.



BAKELITE MOULDED TERMINAL PANELS

BAKELITE MOULDED TERMINAL PANELS

These greatly enhance the appearance of the Tuner and give definite mechanical improvement and efficiency.

SCREENING PLATE

The screening plate interposed between the coils intercepts stray electrostatic leakage fields, while the positions of the coils are so arranged that magnetic interaction is at a minimum.

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The R.I. "Eckersley Tuner" is *the* model upon which to insist, because, not only is it of the original design built first by R.I. to Capt. Eckersley's specification, but it embodies improvements that make it definitely superior in constructional detail and finish.

With the special circuits the "Eckersley 3" and "Eckersley 2," the laboratory tested R.I. "Eckersley Tuner" will give you greatest satisfaction.

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