

CHOOSING AND USING YOUR PORTABLE

Popular Wireless

Every Thursday
PRICE
3d.

No. 418. Vol. XVII.

INCORPORATING "WIRELESS"

June 7th, 1930.

SPECIAL PORTABLE SET NUMBER



LOTUS



GECOPHONE



LISSEN



MARCONI



PHILIPS



IGRANIC

FAVOURITES WITH EXPERT AND AMATEUR ALIKE



"I find your Litz Wound Coils are by far the best."

"I have recently tested a 'five-valver,' using your Six-Pin Coils, and the results were simply marvellous."

"The Lewcos H.F. Choke is the most efficient Choke we have tested."

The above extracts are typical of the praise bestowed on Lewcos Products by expert experimenters and amateur enthusiasts.

The superiority of Lewcos Products is due to the high-class workmanship and fine materials used in their manufacture.

Fit a Lewcos component when building or improving your Set.

LEWCOS

Radio Products
for better
Reception

THE LONDON ELECTRIC WIRE COMPANY
AND SMITHS LIMITED,
Church Road, Leyton, London, E.10.

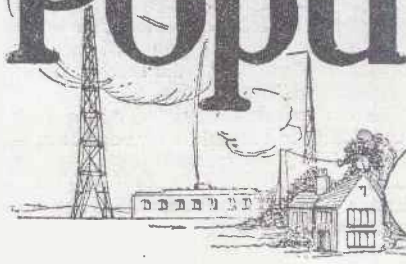


LEWCOS FRAME AERIAL WIRE

1. Lewcos Standard Frame Aerial Wire—100-ft. coils in cartons, 14/36 Art Silk braided. Price 2/6 per 100-ft. coil. Colours: red, blue, green, maroon, gold and brown.
2. 18/40 Double Silk covered—25-yd. reels in cartons. Price 1/9 per 25-yd. reel. Colours: red, blue and green.
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THIS FRAME AERIAL WIRE IS SUITABLE FOR THE PORTABLE SETS DESCRIBED IN THIS ISSUE.

Popular Wireless



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IN ARCADY.
 HOW IT'S DONE.
 THE TROGLODYTES.
 LEARNING MORSE.

RADIO NOTES & NEWS

"NO CHANGE."
 "EVERYBODY'S "THREE."
 RADIO RELICS.
 BROADCAST POLITICS.

A Scribe in Arcady.

DEEP in the Cotswold country, I lie snug in a ditch while a fluff of hail rattles down, one of winter's convulsive dying jerks. Presently the sun will blaze out and all the world will sparkle with diamond drops.

Then I shall continue my lunch, mainly chocolate, apples and water, light a pipe and from the high seat of contentment watch the face of Nature. If you keep a tame Ariel you must let him loose several times a year; then the pretty little creature will renew his plumage and amply repay you with his pretty ways and dog-like devotion. But while he is off the chain you must expect his thoughts to be of the earth, earthy.

A Few Secrets.

SO that this week's Notes will smack pretty strongly of Anywhere-but-London. Now, about that diet! The secret is Transport, my beloveds. Try packing three-quarters of a pound of steak, six potatoes, a hunk of bread and a bottle of Great Stuff in your rucksack; try to cook the food in the open, over two sticks, with a fork for a spit, and you will understand why a wandering scribe like me drops chocolate, apples and a canteen of H₂O into the bag and does all his real nourishing at the sunset, with the "mahogany" rammed into the midriff, the tale of miles behind him, and an appetite like the bottomless pit. I would not have you believe me a food faddist, that's all!

How It's Done.

HOW can I write Notes while I gallivant over the country? Ah! that is entirely due to my patent portable inkslinging outfit, consisting of non-porous paper, everlasting eraser, waterproof whiskers for shielding the pipe, and self-writing pen which carries on while the user sleeps, firts, worships the sun or talks to the Oldest Inhabitant about the Crimean War.

There is but one such outfit and it is mine—and I guess it'll earn me the sack one of these days, because try as I will, it won't turn out brisk, biting stuff about

grid leaks and vegetables of that ilk. Now, if a little discourse about *Fading* or slow-motion motor-boating is required—

The Troglodytes Rejoice.

THE response to our suggestion that our readers should hunt up their surplus components and pass them on to St. Jude's Vicarage, Old Bethnal Green Road, E.2, for the benefit of the cellaradio club has been gratifying and everyone who sent a parcel is hereby heartily thanked. If

to be done with the hand and wrist; (3) A light hold on the "key"; (4) "Key" in line with right shoulder and forearm; (5) A gap of about 1/4th inch.

N. P. S. (Hounslow) likes the "key" to be about 18 inches from the table edge; he also states that he would like to know what firm makes complete amateur radio transmitters. M. E. Chaplin, 11, Oxford Street, Ipswich, is good enough to promise free advice to "P.W." readers on the subject of telegraph operating, at a charge of one S.A.E. per person.

TEA-TIME MUSIC



Whatever the weather, a portable set adds to the joys of holiday-making, and these jolly Jersey girls got plenty of fun from theirs, although they were all "on the rocks!"

you place your ear to the ground in the vicinity of the vicarage you can positively hear the troglodytes at work below. Young policemen on that beat frequently fancy that they are on the track of tunnel thieves, and the club secretary has been twice arrested on emerging from the burrow, once as "Colonel" Barker and once as an absconding cocktail designer from "Ye Olde Tee-shoppe"!

On Learning Morse.

ALL letters from telegraphists were gratefully received; too many to be acknowledged individually. An analysis of the advice in these letters shows that the majority favour: (1) The "key" at the edge of the table; (2) The sending

"No Change."
 SPEAKING at the Savoy Hotel on May 14th, Dr. Adrian Boulton, the new music director of the B.B.C., said that so far as he was concerned there would be no change of policy on the part of the B.B.C. He is quite right. It's the staff that changes! I think there must be notices in Savoy Hill, reading "Any employee found tampering with this Policy will be allowed to resign in order to devote himself to literary or consultative or "Talkie," or other work." However, as Dr. Boulton appears to believe that the musical side cannot possibly be improved I shall buy some more gramophone shares!

Hungary's Big Idea.

THE dominant idea amongst the little countries seems to be that the smaller the territory the bigger the wireless whoop. Its like little Johnny; in order to be heard and noticed in the singing-class he has to stand on a chair! Well, Hungary is reported to be planning a 120 kw. station; Budapest has only 20 kw., and Daventry 25 kw., so that'll show you! And just in case there should be difficulty in receiving the new station they propose to sprinkle relay posts round the country.

Rural Reflections.

ONLY nine miles to-day—in nine hours! But crammed with experience! Get into the correct mood, and there is nothing more delightful than a slow saunter through the heart of Old England, seasoned with wind and rain and sunshine. I venture

(Continued on next page.)

NOTES AND NEWS.

(Continued from previous page.)

the aphorism that no man without a lively imagination was ever a true walker. Cars are turning us into a nation of "rubber-necks." This table wobbles so much that either it is a genuine Queen Anne piece or the floor is Elizabethan. The pot-boy of this "George and Crown" looks at me as though he thinks I am writing a long letter to a girl. Would you believe it—his name is Harry Godbehere! Aged twenty-four. Four children. Two pounds a week. Cocky as the deuce. Knows his county from the grass-roots upwards.

Why not "Boom" England?

AND Wales, Scotland, etc., of course. The American exodus is now well begun and I hope that our island will get its full share of tourists, because they go back with kind memories of a kindly people and a beautiful little country which still has a magic for them, or for such of them as do not derive from "the continent." They are model visitors, courteous despite a certain noisiness of speech and manner, and as enthusiastic as one could desire. They are mostly homely folk and sneer not. Now is the time for the B.B.C. to arrange to have its broadcasts relayed in the U.S.A. and to "boom" us without shame or reticence.

"Everybody's" Three.

SIX o'clock in the morning is early to begin broadcasting, yet as I write, a cuckoo over in the woods yonder is hard at work, cuckooing as he inspects his naughty interloping eggs. (Of all footling, monotonous remarks, the cuckoo's is the chiefest.) I was going to say that W. S. (Swansea) wants to know what is the matter with our "Everybody's" Three, apropos all this talk about the "Magic." On short waves it excels, he says, and he penetrates the ether with ease and certainty as far as Java and Australia. He has overheard numerous interesting talks, including Marconi's from the Elettra. Of course! That's the sort of thing we designed it to do.

Radio Relics.

IF you should happen to pass along the Strand near the Gaiety Theatre, don't fail to look at the exhibition of radio relics which is arranged in one of the windows of Marconi House. There you may see some of Marconi's experimental apparatus; his first coherers and transformers, for instance. It is strange to think of what may be hidden in the future whilst he potted with these simple little coils and tubes. Men who were not then born were to owe their lives to his apparatus, and the faint scratchings in his telephones were the heralds of a system which enables the King's voice to be heard all over the world!

'Ware Lightning!

WE are supposed, I suppose, to be entering the period when, it may be supposed, we shall be visited ever and anon by thunder and lightning. If this supposition proves to be justified, do not forget that it is prudent to "earth" your aerial at the approach of a storm. Of the hundreds of thousands of aerials

only a few are "struck," but it's like the Calcutta "sweep"—you may be one of the lucky ones! Don't merely disconnect the aerial and leave it trailing; give it a good connection to "earth." For myself, when I happen to think of it—for the doctor is slow to take his own remedies—I just transfer the aerial from its usual terminal to the "earth" terminal, and screw it and the "E" lead well together.

An Aerial Discharger.

THAT reminds me of an ingenious little device by Philips, I think, called an "aerial discharger." It takes the form of a glass tube filled with some rare gas which acts as an insulator until the applied voltage reaches about 180; it then becomes conductive. If this tube be connected between "earth" and aerial, it will by-pass electric charges of 180 volts, or more, safely to earth. It is made in a design handy for fitting on the

SHORT WAVES.

SUGGESTED CRICKET BROADCAST.
The M.C.C. on the B.B.C.?"—"Daily Mirror."

IN A WIRELESS AGE.

Mrs. Newlywed Robot: What was there about me that first attracted you?
Mr. Newlywed Robot: I thought you had the prettiest little aerial I'd ever seen.—"Wireless Weekly."

Notice in showcase outside wireless dealer's shop:
"If the gentleman who called for two portable sets from this case at three o'clock this morning will let us have his address, we shall be glad to give him our usual two years' guarantee for both sets."
This offer, we understand, has not yet been accepted.

Teacher: Bobby, will you find Madrid on the map?
Bobby: I don't believe I could, teacher, but it comes in at ninety-nine on the wireless.—"Answers."

A wireless-wag remarks that there is no place like ohm. A confirmed meat-eater might retort that there is no place like ham.

Landlady: You say you have no children, no motor-car, and no dogs?
Prospective Tenant: Well—yes, but perhaps I ought to tell you that I build wireless sets.

wall near the set, and once it is installed there is no need for earthing switches or other precautions. During this tube's operation the gas glows with an orange light.

Amateur "Brass Pounders."

THAT is to say, "key-punchers." You may be surprised to learn that in Britain alone there are some 1,800 amateur transmitting stations "on the air." Heaven knows what they all have to say to each other, but they certainly say it!

The Perfect Comment.

MUCH is written in praise and in criticism about our B.B.C. Many try to make epigrams and sum it all up in one short sentence. They all fail, and it has remained for the perfect comment to come from the real authority—the B.B.C. itself.

Time 8.50, and for the last half-hour the soothing sway and fall of the Hallé orchestra. The music fades into applause; the applause dies away into silence.

Entry of the Gods!

THEN a voice, precious, precise, thin and ultra critical: "Ai am sorry to brake into this concert, but I am afraid we have no time to give the last item, the entry of the Gods into Valhalla, so in precisely seven minutes you will hear the weather forecast and the second general news bulletin."

The omnipresent ether fades into silence—the B.B.C. has found its own epitome, the Corporation is triumphant.

The national news in precisely seven minutes told us that Brazenose II. bumped Christchurch II. and G. G. Voight beat someone at the nineteenth!

Broadcasting Politics.

THAT strange city, Canberra, the Federal capital of Australia, whose population goes up and down according to whether Parliament is in session and never has more than about 5,000 people, is without a broadcasting station. It is proposed to erect there a 5 kw. station for transmission on short waves, as well as the ordinary band. What is specially interesting is the proposal to broadcast the more important Parliamentary debates.

Appreciation From the Antipodes.

AUSTRALIA! Hem! That reminds me; I've a letter from—er—from—where are my spectacles? Ah! from R. H. C. (Victoria, Australia), which gave us all that rosy feeling, because he says such nice things about "P.W." and our noble selves. We thank him, and will let him into a secret which is known to two or three people only. And that is that we owe our little successes to the office-boy, who designs the names for our circuits, and to a certain imperious stenographeuse (how's that?) who inspires us to keep our beards and the bottoms of our trousers well clipped, so that we photograph nicely!

The Moon at Maribysnong.

R. H. C. lives at that place! Mari-something. It has lots of moon, besides rich veins of "atmospherics," and he has been conducting very careful experiments with these materials, with the result that he is convinced that on the medium waves DX reception is assisted by moonlight, and the reverse on the short waves. Mr. Corrigan is considering the matter—and the moon. Meantime, we welcome letters from our Australian friend, though we are sorry that his article about the moon is somewhat too affecting for summer use in "P.W."

Australia Advances.

HERE is an appeal which I print with complete confidence in the practical help and sympathy which will be forthcoming. Ron Armstrong, aged fourteen and still cooee-ing, who lives at 48, Sunbury Road, Victoria Park, Perth, Western Australia, is anxious to possess a "pen friend" in Canada or England. Applicants must be about advertiser's own age, interested in wireless, gold-mining and jack-rabbits. State colour of hair, views on Test Matches and last known address. Unhappy crystal users will find a soul-mate in Ron, because his 6 W F, 435 metres, is now intricately mixed with 6 M L, 297 metres, operated by a music firm for advertising!

ARIEL.

The P.W. "Safe-Power" Converter



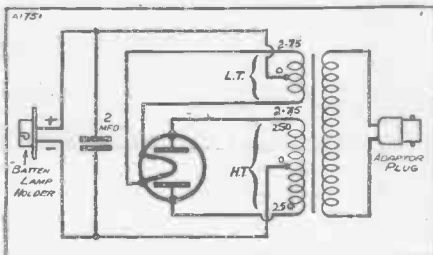
THE standardisation scheme for all public electricity supplies will no doubt be a very fine thing WHEN it reaches completion, but just at present it seems to be causing more annoyance than gratitude, at any rate, in some quarters.

There cannot be much doubt about which feeling must be experienced, for example, by anyone who has just built himself a really posh H.T. mains unit, and then hears

Going over to A.C. mains? If you are, this unit solves your conversion problems. You can fit it to any D.C. H.T. unit without the slightest complication occurring. And it is simple and safe.

Designed and Described by the "P.W." Research Department.

IMMEDIATELY ADAPTABLE



You plug the converter into the power or light socket and connect the existing H.T. unit to the output side of the converter.

that his mains are about to be changed over to alternating current!

What happens in cases like this appears to vary in different localities according to the ideas of the particular electricity supply company. The exact position is by no means clear, for while some companies appear to recognise an obligation to replace all apparatus with its A.C. equivalent, there are others which refuse to do so in the case of home-constructed gear.

Solving the Problem.

So long as there is a risk of being left with a unit which has become useless in consequence of a change in the supply, it is only natural that readers with D.C. mains should hesitate to build H.T. units at the present time.

Indeed, we have heard of quite a number of such cases, some of them even in districts where there is no real prospect of a change in less than four or five years.

The problem is evidently a serious one, for it means that readers are being compelled to go on putting up with the battery nuisance for a longer time than they really

need, on the strength of what may prove to be only a rumour after all. Accordingly we have decided to incorporate in the "Safepower" series a special unit which takes the sting right out of the difficulty and completely removes the risk of having to scrap an existing unit when the mains are changed from D.C. to A.C.

Simple Solution.

This means that those readers who have D.C. can go ahead and make one of the D.C. "Safepower" units and run his set with it until the change-over comes along.

Then, all he needs to do is to build the "Safepower" Converter, connect it up between the H.T. unit and the mains, and carry on just as before, all his controls and voltage adjustments being practically unaffected.

The essential idea of the Converter is very simple, and it is based upon the fact that an H.T. unit for A.C. mains is just the same as one for D.C. mains, except that it has a few additional parts. The Converter, then, contains just those additional parts required to make a D.C. unit into an

A.C. one, so that all you have to do is to connect it up between your unit and the mains when the change-over has taken place, and there you are.

Just what the additional parts are you will see when you look at the photos; a power transformer, a rectifying valve (full wave) and its socket, and a 2 mfd. condenser are the essentials, all the rest being a matter of assembly details and connectors.

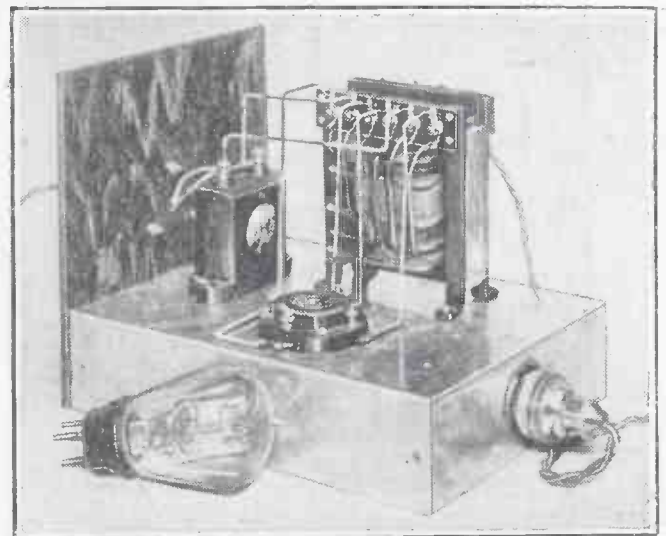
What It Does.

In effect you will see that you have here a conversion unit which takes in alternating current, rectifies it, and hands out rather "rough" direct current, which then goes into your old D.C. unit and is there smoothed and distributed to the various valves just as usual.

Such a unit can obviously be very simple, and not unduly expensive, but there are just one or two points to which attention should be paid. For example, it is obviously desirable to arrange matters so that the output from our converter should be of about the same voltage as the old D.C. mains if our adjustments are to be

(Continued on next page.)

NOTE THE SAFETY LOCK



One of the special features to be found in all "P.W." safe-power units is a safety-locking device in the form of a simple fixing of the adapter plug. It ensures that the juice is off when the unit is opened.

THE P.W. "SAFE-POWER" CONVERTER.

(Continued from previous page.)

unaltered, but this is a point chiefly affecting other types of units than "Safepowers."

The Converter, by the way, can be used with any reasonably well-smoothed D.C. unit, and of course with any of the "Safepower" series. In conjunction with one of these it doesn't very much matter within limits what voltage the Converter gives, because of the special "Safepower" voltage controlling scheme, but with others it is desirable that it should replace fairly exactly the old D.C. supply.

An Average Output.

As an average figure we have taken 220 volts, and that is what the Converter gives on loads up to about 30 milliamps (It will

give up to 60 m/a. if desired, but the voltage then falls to below 200.)

So much for the general idea. Now let us spend a few moments on practical matters. The power transformer is a vital item, and you must be careful to specify the right type in ordering it. Here is the correct description: "A transformer for mains of your particular voltage and your particular frequency, with L.T. secondary (centre tapped) for U.5 valve, i.e.—giving 5 to 6 volts, and H.T. secondary giving 200—0—200 volts."

Suitable Transformers.

Suitable transformers can be obtained in a variety of makes, e.g., Wearite, Heayberd, R.I., Croix, Varley, etc.

By the way, a transformer with H.T. secondary giving 250—0—250 volts can be used if you are using a "Safepower" D.C. Unit, since you can always get the right voltage on this unit by adjustment of the main control. Note, too, that some transformers have a number of alternative input terminals and you should be careful to connect up to these, in accordance with your mains voltage.

These connections, of course, are the mains flex leads from the input adapter in the base of the "Safepower" chassis. The constructional work is exceedingly

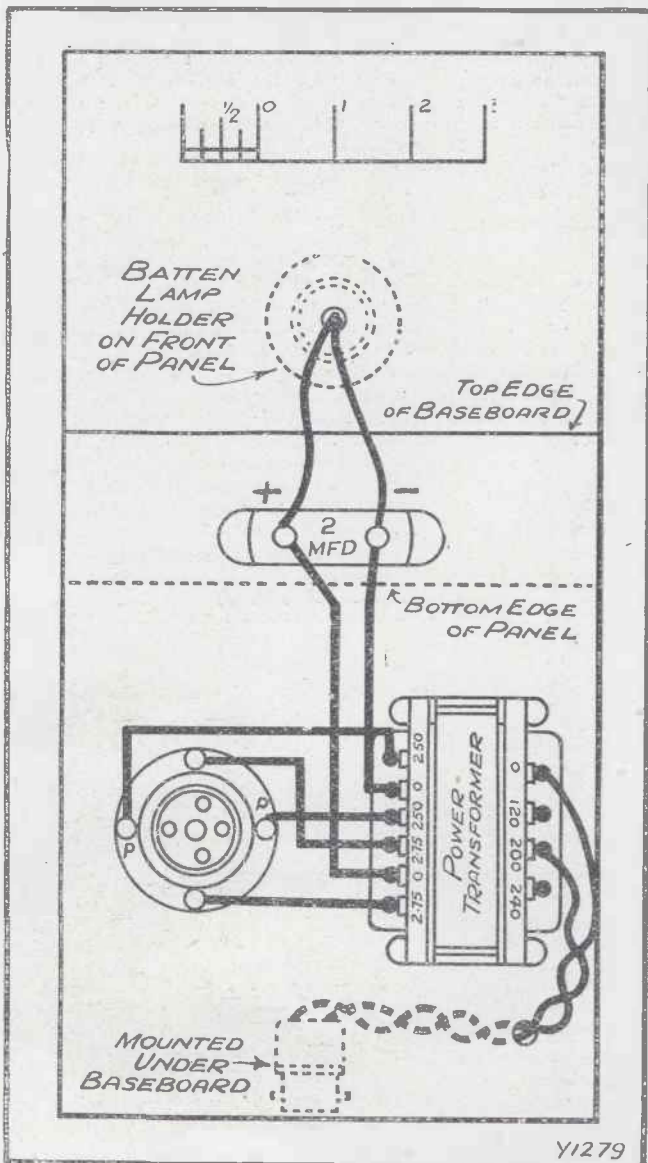
of the mains lead from your H.T. unit. That is all, provided that you have placed a rectifying valve of the U.5 type in the

THE PARTS YOU NEED.

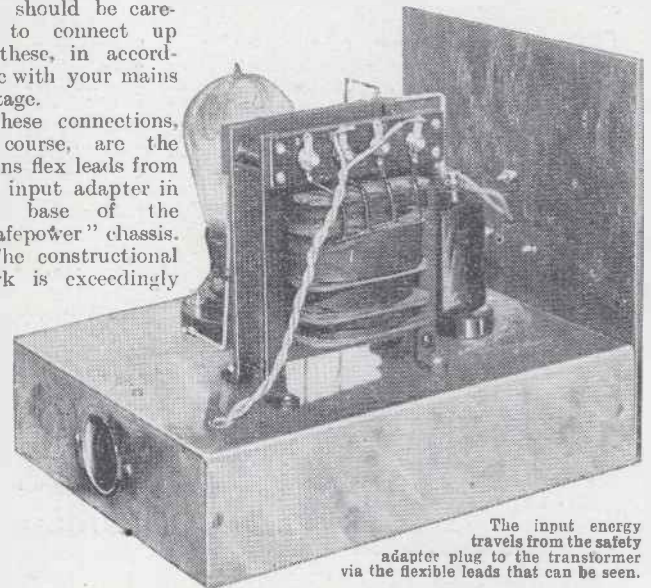
- 1 Safe-power "Junior" case (Ready Radio or Wearite, Paroussi, Magnum, etc.).
- 1 Panel, 7 in. x 7 in. (usually supplied with case).
- 1 Power transformer (see text). (Wearite or Heayberd, Wholesale Wireless, Goltone, Igranic, R.I., Croix, Varley, etc.)
- 1 Valve holder (Lotus or Igranic, W.B., Benjamin, Wearite, Formo, Lissen, etc.)
- 1 2-mfd. condenser (250-volt working rating or over. (Lissen or T.C.C., Hydra, Dubilier, Mullard, Ferranti, etc.)
- 1 Batten-type lamp holder.
- Wire, screws, flex, etc.

unit, and there is no more to be done, except perhaps to reverse the adapter in the socket on the panel to get the polarity right.

VERY EASY TO MAKE



There are very few components, and only a small number of leads are required to connect them up. Of course, a little care in connecting up the power transformer is necessary.



simple, and you will observe that it is just a matter of mounting three parts on the base, and a batten-type lamp holder on the front panel and connecting up with well-insulated leads.

Perfectly Safe.

The connections of the completed unit are these: upon the adapter in the base of the "Safepower" box you place a lamp holder on the end of a flex lead from a mains point, thus locking the cover of the unit in place in the well-known "Safepower" fashion.

The output point of the Converter is the lamp holder on the panel, and in this you insert the lamp socket adapter on the end

FOR YOUR NOTEBOOK.

If high-frequency voltages or currents are present in the L.F. stages of a receiver the result will be a peculiarly unpleasant form of distortion.

It is not generally realised that two H.F. chokes in series may be used instead of one with advantage in many cases when instability due to insufficient H.F. choking is suspected.

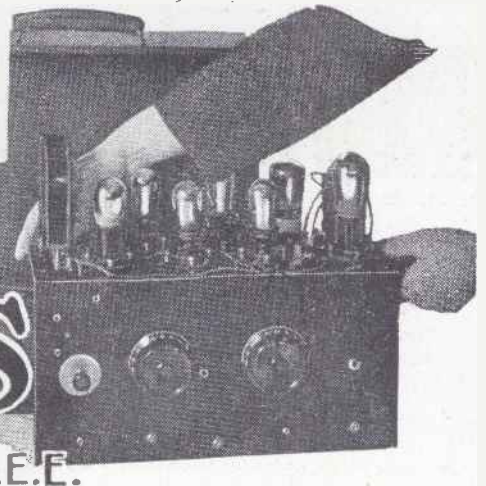
Owing to the large magnetic field surrounding it, the correct spacing of the H.F. choke from other components is of the utmost importance.

When six-pin coils must be mounted in fairly close proximity to one another inside the set, it is often a great advantage to mount one vertically and the other horizontally.

Do not place your loud-speaker lead underneath the set, or in close proximity to the aerial or earth leads, as this is a common cause of unwanted interaction and L.F. instability.

EQUIPPING YOUR PORTABLES

BY G.V. DOWDING ASSOCIATE I.E.E.



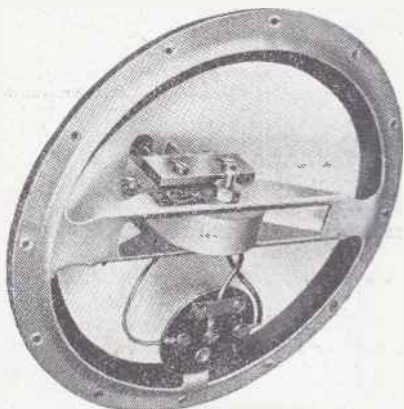
WHEN you buy a portable set you generally get the thing complete. It is fitted with a loud speaker that is built in, and valves and batteries are supplied. If it is a good make of portable you can depend upon it that the accessories are quite respectable, but I have known cases where this could not be said.

I remember a particularly bad instance. No doubt to the inexpert eye the instrument appeared to be perfectly sound, but it did not take me long to see that the manufacturers concerned had assembled the outfit with no view at all to the future—either the purchaser's or their own!

Inadequate Battery Power.

The main idea seemed to be to get the set sold and to ensure that it worked for at least a few hours. After that, well, the purchaser would have to get on the best way he could. And when you come to

EXCELLENT FOR PORTABLES



This is the Mullard Loudspeaker Unit, which is exceptionally suitable for portables owing to its compactness, robustness and efficiency.

think about it, that, especially with anything of a radio nature, is an artful scheme and a mighty dishonourable one, too.

A wireless set at the best of times is a complicated sort of affair, at any rate in comparison with many commodities. And thousands, if not millions of people, know that the best of even "household" types of receivers can, at times, pack up through some obscure faults.

How easy then for a portable, which might receive some slight knock in its travellings, to succumb through no fault of its maker! In actual fact, of course, a good portable

 ♦ A portable is no better than its ♦
 ♦ batteries or loudspeaker! Here ♦
 ♦ are some hints concerning those ♦
 ♦ essential items. ♦

can stand quite a bit of rough handling without it being affected in any way.

Now I am not dealing with the portable receiver itself in this article, but with its incidentals, although it was actually in regard to these that the receiver to which I have been referring was particularly badly equipped.

The set achieved its undoubted sensitivity through the use of a screened grid valve and a pentode valve. Now as you know, unless specially arranged, such valves as these demand a fair amount of H.T. current. In this receiver no special arrangements were made.

The portable was a most compact affair—one of its best selling points—and there was just room for two small 60-volters.

Much the same sort of things applied to the L.T. supply. There was a tiny little accumulator that might have graced a pocket flash-lamp and got away with it, but which could not stand up for any length of time to the half an ampere that the valves supplied with this set demanded.

Using the Mains.

Altogether it was a very bad case, and I do not think you are likely to come across anything quite so nasty as that nowadays. Nevertheless, if you are buying a complete portable outfit pry very closely into the question of L.T. and H.T. current requirements and the batteries that are supplied for fulfilling these.

By the way, there is a practice that is becoming popular which has much to commend it. This is to use mains units with portables while they are in operation indoors. There is quite a small L.T. accumulator and a small H.T. battery which are put into the set when it is to be used in the wide open spaces; back home again, out come the batteries, and you connect up an H.T. mains unit in place of the H.T. battery and join the L.T. accumulator to a trickle charger arrangement.

Such a scheme makes a portable a very pleasing affair. It enables it to be used both as a household and as the holiday set. Further, its portability in the house is

remarkably useful, as it can without difficulty, even with its H.T. arrangement, be taken from room to room, and ordinary aerials and earths are not required.

When it comes to replacing or choosing a team of valves for a portable it should be remembered that some valves are much more microphonic than others. I would advise constructors to take the portable set along to the radio store and have them fitted there.

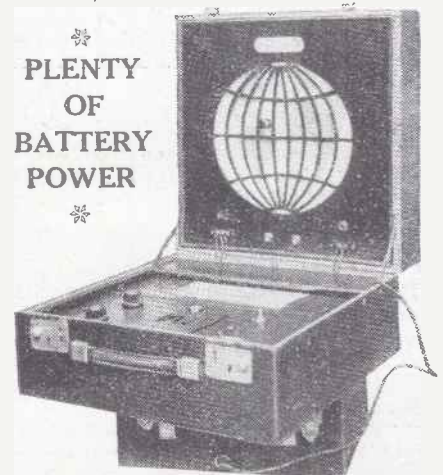
I know that there is the knotty problem of the breaking of the seal of the carton or box in which a valve is generally sold, but the larger dealers generally have comprehensive ranges of loose valves on hand.

Loudspeakers Out of Doors.

After all, a team of say, four valves, costs two or three pounds if it includes an S.G. or a pentode, so that it is up to the constructor to see that he gets good value for that money. However, I do not suppose he wants me to tell him that!

Finally, do not forget that a loud speaker working in a room or a shop may sound vastly different in the open.

What sounds full and loud in an enclosed space may go weak and reedy in the open. Listen to the portable working and imagine about 50 per cent of its volume lost; then you will get a fair idea of the reduction the banishment of four walls may probably cause.



The Igran Universal Five portable outfit includes a separate battery case which also acts as a turntable. This is an excellent scheme, for it distributes the weight and enables respectable-sized batteries to be carried.

LATEST BROADCASTING NEWS.

**SIR JOHN SIMON
ON INDIA.**AN ETHER SERIAL—MR.
THOMAS ON SAVING—THE R100
"ON THE AIR, Etc., Etc."

IT is understood that, through the personal intervention of Sir John Reith the B.B.C. has been able to arrange for Sir John Simon to broadcast on June 17th and 25th for about twenty minutes at 9.35 p.m. on the National frequencies, and perhaps also on the Regionals.

The first talk will deal particularly with the first part of the Report of the Commission on India of which Sir John is Chairman. (This will appear on June 9th. The second part will appear on June 24th, the day before Sir John's second broadcast.)

Philip Ridgeway Looks Ahead.

Philip Ridgeway, the producer of the series of old-time vaudeville programmes which have been so much appreciated during the last few months, is to let his imagination run riot in a special programme, to be broadcast in July, in which he will give his impressions of what our music-halls will be like twenty years hence. The betting is that he will be miles from the truth but his broadcast should prove enjoyable.

An Ether Serial.

The first instalment of the B.B.C.'s serial story, which as already announced in our columns, is to be broadcast by distinguished authors on Saturday evenings during June and July, will be given on June 14th, by Mr. Hugh Walpole.

The instalment, which Mr. Walpole calls "Behind the Screen," is a thriller, and listeners will be particularly interested to see how the plot is developed on succeeding Saturdays by Agatha Christie, Dorothy Sayers, Anthony Berkeley E. C. Bentley and Ronald Knox.

Another new series of talks is due to begin on June 10th, when Mr. Bernard Darwin is speaking about golf. These talks are intended to be hints on sport, and it is hoped that the series will include as contributors H. W. Austin and Mrs. Fearnly-Whittingstall on tennis and Mr. P. G. H. Fender on cricket.

The Miners' Derby.

A running commentary on the Northumberland Plate ("The Miners' Derby") will be given by Mr. R. C. Lyle for Northern listeners on June 25th.

An 1831 Concert From Belfast.

The original programme of a concert given nearly a hundred years ago—to be precise on October 8th, 1831—by Paganini at the Belfast Theatre, is to be broadcast to Ulster listeners on June 16th.

It will be given by Ernest A. A. Stoneley, who will have the assistance of May Busby and Clifton Helliwell.

Mr. Thomas on Saving.

Arrangements have been made to broadcast a speech by Mr. J. H. Thomas at the

National Savings Assembly Dinner which is to take place at the Hotel Metropole, Llandrindod Wells, on June 20th.

The R100 "On the Air."

Millions of listeners will look forward to a broadcast of the official account of the arrival of the airship R100 when the giant dirigible carries out her projected flight to Canada.

The description will be relayed from Montreal by the beam system to England and broadcast in the same way as any other "O.B."

Here and There in the Programmes.

The first concert of the season by the National Orchestra of Wales at the Mumbles Pier Pavilion has been arranged for Sunday afternoon, June 15th, when an attractive programme will be relayed to listeners

throughout the Western region; the soloist is Miss Gwladys Naish.

The monthly service in Welsh for West Regional and Daventry (5 X X) listeners will take place on Sunday, June 15th, and will be relayed from St. Mary's Welsh Church, Aberdare. The preacher will be the Rev. Canon J. A. Lewis, Vicar of Aberdare.

Another programme of Madrigals and Folk Songs will be heard by West Regional listeners on Tuesday evening, June 17th. It will be given by members of the Bristol University Madrigal Society conducted by Mr. A. S. Warrell, and will be relayed from the Physics Lecture Theatre, Royal Fort, Bristol.

Holiday-makers will be particularly interested in a talk on the Castles of Carmarthenshire which is to be broadcast from West Regional stations on Thursday, June 19th.

The talk will be given by Mr. George Eyre Evans, who for seventeen years has been Inspecting Officer for the Royal Commission of Ancient Monuments in Wales, and who is also Honorary Secretary of the Antiquarian Society for Carmarthenshire. Mr. Evans claims to have walked nearly 24,000 miles in connection with his antiquarian researches.

Dr. Adrian Boulton, the new Music Director of the B.B.C., will pay his first official visit to Belfast on Friday, June 20th, when he will conduct an orchestral concert which is to be broadcast from the studio at 9.45 p.m.

PORTABLE BEATS THE BOY FRIEND!

This young lady apparently finds all the holiday companionship she needs in a portable radio receiver!

FOR THE LISTENER.

A Specially Contributed Criticism of Current Broadcasting Events.
By "PHILEMON."

Who will long be remembered for those wise and witty broadcasts entitled "From My Window."

Happy America.

MR. HUGH WALPOLE described America from a new and original point of view. It is, he said, a country of happy people. More than any other people they have the power of being happy, and of knowing it. "Therefore," he concluded, "they are a great people." I like that "therefore."

All the American people, as they rush about hither and thither, are catching the happy moment as it flies. Sounds like swallows!

Empire Day.

I don't know whether we are a happy people or not, but we are a great people! And the B.B.C. took jolly good care to tell the world about it on Empire Day! The Prime Minister gave the programme his blessing, and then off we went westward

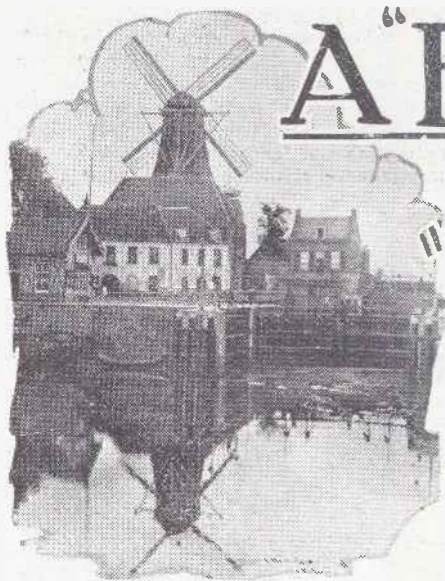
round the world, led by voices answering each other antiphonally, and high bursting with pride!

And Amy Johnson flinging her pneumatic cushion into the sea, standing up in the cockpit, and patting the sides of her aeroplane, and shouting "Glory be!" as she came in sight of Australia! Yes, we are a great people.

The antiphonal voices took us westwards, and round the world, home again, and never once off the Red Line. I believe in waving the flag occasionally. One hears such a lot of sour-berries who run their country down. Well, here's to us, and (as they say in Scotland) who's like us! So that's that!

Was It £500?

It was reported that the B.B.C. paid £500 for the privilege of broadcasting the
(Continued on page 360.)



A "FAN" ABROAD

③ RADIO IN WINDMILL LAND

"P.W.'s" Special Correspondent visits Holland, and records his interesting radio experiences for the benefit of "P.W." readers.

THEY say that you don't need to know French to enjoy a holiday in France. Years ago I believed this—and was "stung" in tips! It's cheaper to learn French! But the extraordinary thing about our other close neighbours, Holland and North Belgium, is that everyone there really can speak English.

British Stations Best?

In Amsterdam, where I spent a radio week-end, people look English, they can speak English; and they listen every evening to the B.B.C. stations.

I found this out in an astonishing way. My little four-valve portable was bumped in the train and a valve "went west." So immediately I had found my feet in Amsterdam, I went in search of a radio shop for a new *schermroosterlampen*—which horrible word means "screened-grid valve."

The shop discovered, I was astonished by two things: first, the window was full of many English components, all the popular condensers, switches, transformers and what nots being stocked; second, a demonstration set was blaring in the doorway, and English (the first King's English for three weeks during my Continental trip), *real* English, floated out of the loud speaker.

It was, need one say it, a talk; the news bulletin as a matter of fact. It was the 261-metre London National, and several office men and women stopped for a while at the shop in their rush for a 'bus or tram, listened to the news items and carried on short discussions about them just as if the announcements were in their natural Dutch!

When, later, I had my own set working again, I found out part of the reason. Our B.B.C. stations come in wonderfully in Holland. 5 X X is like a local station, just as it is in France, and the Brookmans Park stations and 5 G B are always easy to get.

Plenty of Programmes.

That is in Amsterdam. Rotterdam is not so good, and perhaps that is because of the huge amount of metal in the latter busy port. Amsterdam is nearly all water, for the little canals (*gracht*, they call them) run all through the main streets, and this seems to make for good reception.

In an upper room of the Hotel Krasnapolsky in Amsterdam I spent a whole evening logging stations. And what a log! I was glad of the selective frame aerial in the portable to separate the hosts of B.B.C., French, and German stations which simply flocked in at every degree of the dials. All the new flats in the city have out-door aerials, and why, goodness only knows: these listeners must need wave-traps.

A Dutch acquaintance said that Holland was very dissatisfied with the way she had

to see that a leading weekly radio paper gives regular skeleton programmes of Hilversum, Huizen, Brookmans Park, and 5 X X, 5 G B, Kopenhagen, Kalundborg, Radio Paris, Langenburg, and Zeesen.

So it is generally recognised that there are plenty of fish in the Dutch radio ether!

During my evening's listening I was a bit upset by the noise made each time the lift went up and down: and as the "Krasnapolsky" has "umpty-umpty" floors (that is not Dutch!) it became a little wearisome.

I should have had the heart to have left behind a couple of fat fixed condensers to earth those noisy motor brushes: but I didn't.

THE WATER HELPS



"In Amsterdam, little canals run through all the main streets, and this seems to make for good reception"

faired in the Prague Plan, and put this down to the religious and political troubles at present rather rife in the little country. It is true that Holland has only three exclusive wave-lengths, and only the stations of Hilversum, Huizen, and Scheveningen-Haven; but Dutch listeners probably fare better than we do with regard to variety. They can listen-in much easier than Britishers to the concerts of all Europe.

There are all kinds of little things which help radio men in Holland; for example, the fact that the electric light supply is so nearly constant all over the country has resulted in very cheap mains gadgets.

Gebrom (hum) is very slight, and the *metaal-gelijkrichter* (metal rectifier) is the most common means of converting from A.C. to D.C., except in the commercial sets, most of which use valves. Valves are very cheap indeed.

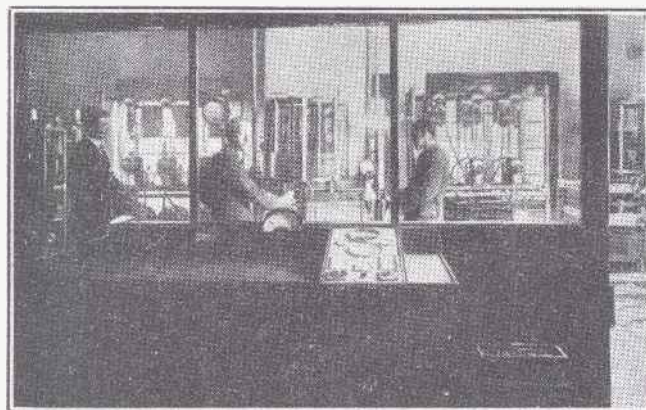
Harking back for a moment to the good fortune of Dutch amateurs, it is interesting

B.B.C. stations came in with local-station strength.

The only little trouble was occasional pick-up from the 'phone wires, many of which run parallel with the canals, at no great height above the side walks. Clickings and buzzings rather than occasional scraps of conversation were experienced; and by degrees another trouble developed—on-

(Continued on next page.)

THE HUIZEN STATION



The 65kw. transmitter at Huizen, the Dutch station that works on a wave-length of 1,875 metres.

“P.W.’s” BIRTHDAY

This week we celebrate the eighth anniversary of “P.W.’s” birth, and below we give some of the kindly greetings we have received from British leaders of radio.

From Capt. P. P. ECKERSLEY.

So POPULAR WIRELESS reaches another birthday! May I wish it many happy returns of the day? I have done so many times before, and I therefore hope the sentiment will be assessed at its true value, which lies above the dutiful.



Capt. Eckersley, M.I.E.E., Late Chief Engineer of the B.B.C., and now “P.W.’s” Chief Radio Consultant.

the reality of any person or things, and reality in people is infinitely better in any case than the dull mask of “dignity.”

I wish POPULAR WIRELESS well because it always seems to me to have the reality of an objective outlook and serves in the end the only thing that counts—Broadcasting.



Lt.-Commander Kenworthy, R.N., M.P.

From Lieut.-Commander KENWORTHY, M.P.

Please accept my best wishes to POPULAR WIRELESS on its birthday, and as I have had on many occasions the pleasure and privilege of contributing to its columns, please convey my best wishes to your readers.

They will join with me in congratulating you on the paper. The healthy infant of eight years ago is now fully grown, and every issue is full of interesting reading matter

I am truly happy to possess a close association with POPULAR WIRELESS. Until recently it was hard to prove that I did not subscribe to the dictum that popularity was intrinsically contemptible.

To me popularity is the criterion of

for the millions of wireless enthusiasts all over the country.

In addition to this, the Technical Department of the paper is the greatest possible help to amateur wireless technicians, and is admirably conducted; as Chairman of the Radio Association, I can testify to this, not only from personal experience but from the remarks of many members of the Association.

Every good wish for “many happy returns of the day,” the best of luck to the Editor, his staff, and his readers.

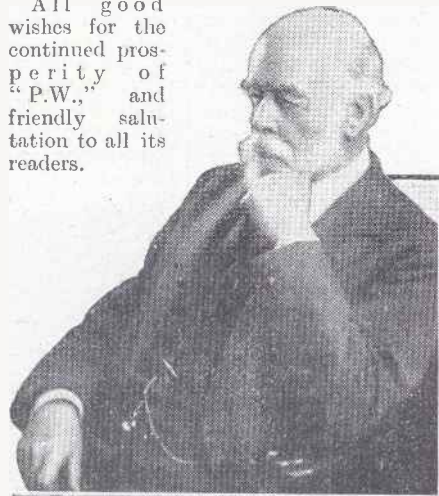
From Sir AMBROSE FLEMING, D.Sc., F.R.S.

I beg to congratulate POPULAR WIRELESS on its eighth birthday, and wish it many happy returns.

There are now nearly three million listeners in Great Britain and many of these will need advice on the subject of how to manage or build their wireless receivers. I am sure that the advice they will receive from POPULAR WIRELESS on all wireless difficulties will be sound and sufficient for their needs, and that the journal will prove to be a “friend in need” to all inexperienced wireless amateurs.

From Sir OLIVER LODGE, F.R.S.

All good wishes for the continued prosperity of “P.W.,” and friendly salutations to all its readers.



Sir Oliver Lodge, F.R.S., “P.W.’s” Scientific Adviser.

From Sir JOHN REITH.

I confess it gave me something of a shock to realise that POPULAR WIRELESS was about to celebrate the eighth anniversary of its birth. Of course, one has always associated POPULAR WIRELESS with enterprise and ingenuity, and I wish you many happy returns of your birthday.

From A LEADING RADIO MANUFACTURER:

Eight years of steady progress finds “P.W.,” a firm favourite with the trade as well as with the public. In serving the listener and experimenter so well, it has incidentally done its bit for British trade by popularising the world’s greatest hobby—radio. Whatever Friday night may be, Thursday is certainly “P.W.” Day! So good luck, and go ahead.



Sir John Reith, Director General of the B.B.C.

RADIO IN “WINDMILL LAND.”

(Continued from previous page.)

lookers! Portables aren’t so common in Holland as they are in England, and little boys with their papers and yoghurt barrows and late strollers home from the cinemas and theatres stopped to listen and stare.

This I didn’t object to, but when a youth with a barrow drawn by a mastiff underneath (a common form of light transport in the big towns) stopped so close that the dog tried to accompany the music in the doggy fashion common to every country—I went home!

Short Waves Popular.

As time was pressing, I hadn’t the opportunity to listen to the short waves. But one of my Dutch friends listens in regularly, and reports reception very strongly from our 5 S W and, from the beginning of this year onwards, of the more powerful Americans, W 8 X K, W 2 X A F, W 3 X A U and the Canadian station C J R X. Pretty good going, I think.

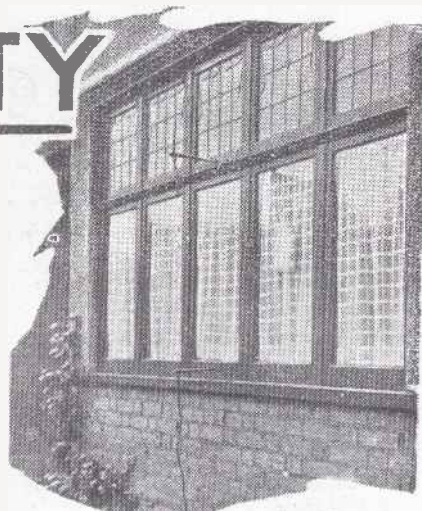
But many Dutch listeners are keen short-wave “fans,” owing to Holland’s possession of the 16·88-metre Huizen, and P C J. Both these stations are used as regular broadcasters by many amateurs, and short-wave sets are much more common than in England. Owing to the short distance, *sluieringsvervorming* (excuse these long words; it only means D X fading) doesn’t matter.

And, while talking of words, have you noticed that most Dutch stations use the word *Omroep* in announcements? In the old Dutch villages the *omroeper* was the man who went round with a bell giving out the news: a sort of town-crier, and the modern word *omroep* means “broadcast.”

EARTHS & STABILITY

"Out of sight, out of mind," could never be more aptly applied than to the earth connection of many radio installations. Stability is necessary in every type of receiver if the results are to be satisfactory, and here you will find a reason for the need of a good earth put forward in a simple manner.

By A. S. CLARK.



"AN earth will stop instability, but is often the cause of it." This will probably seem a terrible paradox to start an article; in fact, it sounds almost like an Irish paradox. Yet it is quite true, and serves to indicate the multitude of ways in which the earth connection can affect a wireless receiver on both the H.F. and L.F. sides.

Let's consider the first part of our apparently illogical statement. There are three types of instability, which can be reduced if not completely cured, either by the addition of an earth or by improving the present earth connection. These are H.F. oscillation, L.F. oscillation, and hand-capacity effects.

The Effect of an Earth.

If you remove the earth connection from your set, you will find that the receiver will oscillate much more easily, and, in some cases, it will be impossible to stop it. The reason for this is chiefly that the earth produces damping on the H.F. end of the receiver, and consequently slight feed-backs of H.F. are not sufficient to cause trouble.

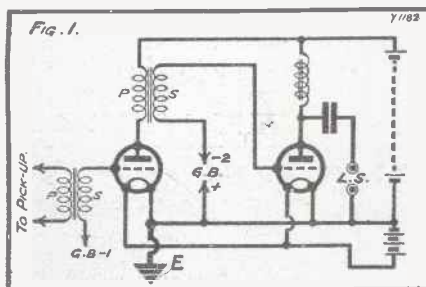
However, as soon as you remove the earth lead the set goes "up in the air," as it were, and the slightest bit of feed-back (even perhaps the minimum capacity of a .0001 reaction condenser) may start it oscillating.

L.F. instability such as continuous whistles, howls, grunts, etc., are influenced by a good or bad earth connection in a very similar way to H.F. trouble. Without going into the technical explanation of why it is, it may be stated here that the addition of an earth to a pick-up amplifier will often overcome L.F. oscillation.

A Simple Explanation.

The connection should be made to L.T. negative, or a point connected to it (Fig. 1), and if D.C. mains are being employed, a

EARTHING AN AMPLIFIER.



The addition of an earth connection to the L.T. negative of a gramophone pick-up amplifier will often cure an L.F. howl.

2-mfd. fixed condenser should be used in series with it.

Hand-capacity effects are due to the proximity of the hand to the tuning controls actually altering the wave-length to which the set is tuned, thereby weakening or completely cutting out reception of any station that may be coming through at the time.

In Fig. 2, a single-valve circuit is shown with no earth. In order to keep the explanation as simple as possible, direct coupling is indicated. The aerial has a certain capacity to earth indicated by the condenser A; this capacity will, to all intents and purposes, have no effect on the tuning coil when condenser B is not present.

Capacities of Body.

Condenser B represents the effect of bringing the hand near to the tuning condenser. The body has a certain capacity to earth, and the body also has a capacity to the condenser (and consequently the L.T. circuit, etc.) via the hand. There is, therefore, a double condenser effect, the centre plate of B representing the body.

You will see that A and B are in series across the tuning coil so that, as the hand approaches the tuning dial, and consequently the capacity of B increases, so the tuning is affected, causing the much-hated hand-capacity effect.

Suppose, now, we join the points X and Y, thus adding an earth of which the resistance R is negligible, B will be shorted and the effect of A across the coil will not be affected by hand-capacity.

If, however, our earth is poor, due to R being high, B will provide an alternative path for H.F. currents and its capacity will have a small effect, thus giving slight hand-capacity trouble.

Hand-capacity is always worse or more noticeable on short waves since a given capacity then has a larger effect on wave-length.

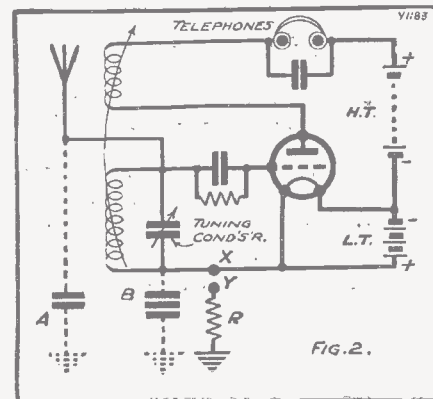
You will now appreciate the second part of the opening sentence which, out of a sense of fairness, I will admit, is better written thus: "A good earth will stop instability, but a poor one is often the cause of it."

Obtaining a Good Earth.

With water-pipe earths it is very important that the wire should be attached to the main pipe, and the earthing instrument in the case of a buried earth should be of a non-rusting material.

With regard to earths in general, all joints and connections must be securely

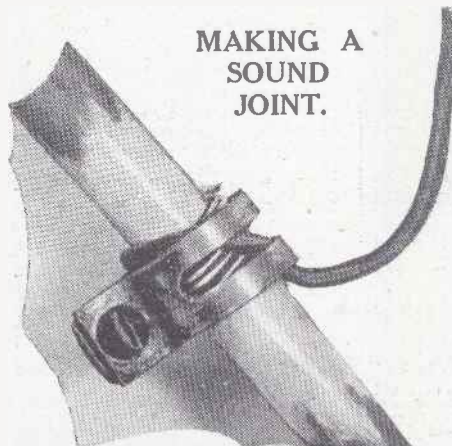
HAND-CAPACITY EFFECTS.



This diagram illustrates how the greater the resistance of an earthing connection, the greater the effects of hand-capacity can be.

made and a fairly large contact surface should be provided. Wherever possible, make a soldered connection; also keep the actual earth lead as short as possible, and use some really stout wire for it.

MAKING A SOUND JOINT.



A good way of making a solderless earth connection to a water-pipe. After twisting the bared wire several times round the pipe, it is held tightly in place by means of a clip.

If you have a poor earth, namely, one with a high resistance, your set is really only partly earthed, and therefore will be less stable than with a good earthing connection. The worse the earth the more likely is the set to oscillate, and no earth at all can really be considered as an earth connection of practically infinite resistance.

THE NEW CHAIRMAN.

As we go to press rumour follows rumour concerning the next B.B.C. chairman. Who will it be? Here is the latest news.

By THE EDITOR.

BY the time this issue of POPULAR WIRELESS is on sale the vexed question of who will succeed Lord Clarendon as Chairman of the B.B.C. will probably have been settled. Anyway, the latest rumour, which is certainly a very strong one, is that the Rt. Hon. J. H. Whitley, P.C., is to be the next chairman.

Will Mr. Whitley Accept.

When POPULAR WIRELESS heard this news, a few days ago, inquiries were made which elicited from Mr. Whitley this statement:

"The appointment has not been offered to me. That is all I can say."

But rumour persists in whispering that the appointment *will* be offered to Mr. Whitley. When he was asked whether, in the event of the offer being made, he would accept, he said:

"That depends on circumstances which are not within my knowledge. I am under certain pledges, and they might be found to conflict with other duties."

In any case, it is a very great pity that all this speculation should be aroused in connection with the Chairmanship of the B.B.C. As our readers know, many names have been mentioned, including those of Lord Lee, Mr. Geoffrey Dawson, Lord d'Abernon, Sir John Reith himself, Mrs. Philip Snowden, and several others. So we sincerely hope that by the time this issue is on sale we shall know definitely one way or the other who is to succeed Lord Clarendon.

Why the mystery nobody can say. But there it is, and the result is a considerable amount of disquietude in circles which are associated with broadcasting, where it cannot but have deleterious effects.

Sir John Reith.

It is also understood that Sir John Reith, the present Director-General of the B.B.C., will be invited to join the Board of Governors. If this is correct, the move is an excellent one, for it is common knowledge that, although the Director-General occupies a most important position—probably one of the most important posts in the country—the peculiar arrangement of the affairs of the B.B.C. at the moment—which result in Sir John not being on the Board, have not been conducive to the absolute harmony and unanimity which one would expect at Savoy Hill.

There is no suggestion of any other Governors being appointed to the Board of the B.B.C. as far as we know, but it would have been an excellent move to have appointed Captain Ian Fraser to the Board.

Incidentally, it is worth mentioning again that the Chairmanship of the B.B.C. carries

with it a salary of £3,000 a year, the Vice-Chairmanship £1,000, while the other Governors receive £700, and the Director-General £6,000.

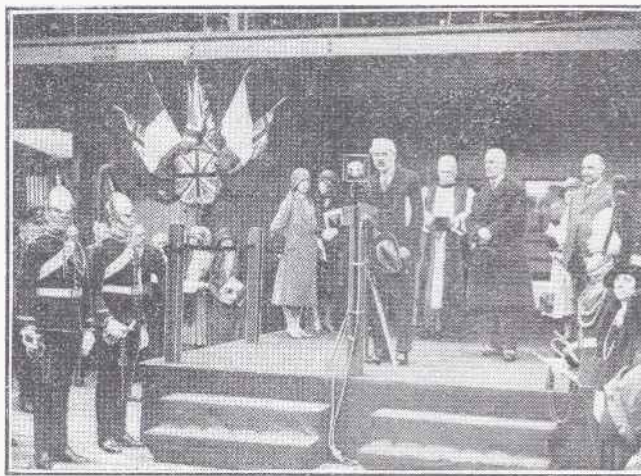
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Captain P. P. Eckersley and Mr. Noel Ashbridge, the former and present Chief Engineers of the B.B.C., have produced an extremely interesting paper, which was recently read before the Wireless Section of the Institute of Electrical Engineers, concerning Brookmans Park.

Important Considerations.

As well as a detailed technical description of the Twin-Wave Transmitting Station, the authors gave interesting details which show how they were led to choose the particular site for the Twin-Wave station. They point out that, in choosing a site on the outskirts of London, various important considerations had to be taken into account. For example, to choose a site eastwards along the Thames would have been wrong, as most of the service

LONDON'S LATEST LANDING STAGE.



Mr. J. Ramsay MacDonald, the Prime Minister, declaring the Port of London's new landing stage at Tilbury duly open.

area of this station would have been over the North Sea.

Also, a southerly site was rejected because of the fact that Aviation regulations will not permit the erection of tall wireless masts on the North Downs—in view, of course, of the ever-increasing air mail and passenger traffic. To have chosen a western site would also have been wrong, as programmes would have been very weak in Essex and the Eastern counties, where listeners already suffer far too much from Morse interference from shipping. In short, after all considerations had been given to various sites, the possibilities of a Twin-Wave station being erected near London pointed very definitely to a Northern site, and this choice was given further emphasis by the fact that there are existing telephone cables for connecting Studio Headquarters with the trans-

mitter which are better than anywhere else.

An examination of the Brookmans Park Site indicated that the earth losses, which reduce the radiation efficiency of an aerial, were less than at any other site examined. The site was also chosen because it was flat, telephone cables ran close to it, while the problem of supplying 10,000 gallons of water a day was solved because an available mains supply could easily be tapped.

Avoiding Breakdown.

This paper indicates the considerable amount of detailed research work the engineers of the B.B.C. had to undertake before a site was definitely chosen. For example, the problem of whether to install a self-contained generating plant or use the mains was an important one, for experience has taught the B.B.C. that breakdowns at stations—or what the public would call breakdowns—often occur because of the failure of the local public supply mains. The economic factor also came in, for it was found that it would be cheaper to generate power at the station than it would be to have taken power from the local mains.

As our readers know, Diesel engines are now used at Brookmans Park to supply the power for the station, and direct-current generators to supply the anode voltages for the transmitting valves. The transmitter used is that of the low-power modulation type, while the L.F. currents from the control room are made to modulate a low-power transmitter, after which the modulated high-frequency energy is faithfully magnified by the high-power system before being led by feeders to the aerial systems.

Incidentally, readers will be interested to note that the input to the 356-metre aerial at Brookmans Park is at present approximately 30 kw., while the input to the 261-metre aerial is 45 kw.

POINTS ABOUT PENTODES.

The "screening" grid of a pentode valve is placed between the other two "grids," and is connected either to a small terminal on the side of the base, or to a centre pin.

* * *

Inside a pentode valve the next-the-plate "grid" is joined permanently to the filament of the valve by the maker.

* * *

Usually a pentode valve may be substituted for an ordinary output valve very easily, it being necessary only to provide an additional lead to the H.T. battery for the additional terminal.

EASILY OVERLOADED.

As pentode valves are much more easily overloaded than ordinary power valves, they should, as a rule, be used for sets with one stage of low-frequency amplification only.

* * *

The idea behind the pentode valve is the greatest possible magnification with a minimum number of valves.

POINTS ABOUT PORTABLES

When choosing your portable receiver there are several vital points you should watch. One concerns the stability of the set, for perfect stability, though not "woolliness," is essential for successful operation. It is also advisable to consider several other important features which are dealt with in this article.

By L. ROBINS.



WHEN you are choosing a portable receiver there are one or two points which you have to look out for if you are to ensure success with your set over any reasonable period of time.

An untrustworthy portable set may appear to give quite good results as demonstrated in the showrooms, but when you get it home it may not be quite so easy to control as it appeared at the demonstration, and, moreover, after a few weeks' or a couple of months' use, you may be troubled with all sorts of distortion and possibly instability.

Must Be Stable.

One of the main things to look out for when buying a portable set is stability of control. I have come across several instances where the set apparently gave good results in the hands of a demonstrator, but when one handled it oneself it was discovered that there was a hidden snag in the fact that the H.F. valve was always in a practically oscillating condition, while on the lower condenser readings it did actually go into oscillation when the aerial and the anode circuits were in tune.

This sort of thing is no good, for if a set does this when it is new, one has no criterion at all of what it will do when the H.T. battery is beginning to run down, and battery resistance begins to exercise its bad coupling effects. One may reasonably expect worse oscillation, and possibly threshold howl, and if the L.F. side of the set is not above reproach (as it probably will not be under the circumstances) motor-boating and other troubles may occur.

If a set is to be perfectly satisfactory in use it must be absolutely stable, so avoid an unstable portable set like you would the plague. Don't have anything to do with it.

You should be able to tune through both high and low wavelengths all the way without encountering a single carrier wave or a single sign of oscillation unless you use the reaction. So many portables of unsound origin manage just not to oscillate when the condensers are exactly in step.

Another thing to look out for is the anode consumption of a portable set. If possible, get the demonstrator to place a milliammeter in the negative H.T. lead so that you can see exactly how many milliamps. the set is taking.

If you can see exactly how many milliamps. the set is taking you will know for yourself what to expect from the H.T. battery, but such phrases as "abnormally low anode consumption," or "extremely economical with H.T.," may or may not mean anything, and if the set has a rather heavy consumption you are almost sure to get trouble with H.T. batteries.

You must not forget that with a portable set it is not always possible to use large capacity H.T. batteries, owing to the small amount of room you have to "park" them, and you are probably confined to the small type of battery which, if the set consumes more than 7 milliamps. will mean frequent renewal and frequent periods of unsatisfactory results while the battery is nearing its end.

Battery Accessibility.

Accessibility of the batteries is another point you should watch, and before you take your portable away you should be absolutely certain which connections go to which points on the batteries, so that when you have your L.T. battery charged or have to renew the H.T. battery you will be able to connect them up again without any trouble.

And in the matter of connections do not forget the grid-bias battery, for proper connections to grid bias make very largely for proper working of the set. You have only got to drop your grid bias by about 1½ volts, that is, one of the sockets at the top of the battery, and you may put up the H.T. consumption by two or three milliamps., making all the difference between a reasonable drain on the H.T.B. and over-running it.

Another thing you should make absolutely sure of is the selectivity of the portable set. Although it is equipped with a frame aerial it is not an absolute certainty that the set will be sufficiently selective to separate the two Brookmans Park stations if you live within a few miles of them.

Selectivity and Sensitivity.

The directional properties of the frame aerial cannot be used if you are tuning in a twin-wave station of this description, and so you have to look for selectivity in the set itself rather than in the frame.

So if you are living anywhere near a high-power station, make absolutely sure that the set you buy will deal with that point satisfactorily.

Provision on a portable set for its use with an outside aerial and earth is a very important factor, and one which should be taken advantage of if you want to use the set more as a transportable at home than for taking out for picnics, and that sort of thing.

Similarly the use of the set on the mains is another very important feature, and if you can get a set on which you can use on either batteries or mains, you will have a receiver which is about as adaptable as any it is possible to make.



The back view of the Lissen 2-valve portable receiver, showing how very accessible the batteries are.



The "Efesca-Phone" Three, which has been specially designed for operation within a 40 miles radius of Brookmans Park.



RECTIFIER OUTPUT—TONE “FLAT AND LIFELESS”—INDOOR OR FRAME AERIAL?

Under the above title, week by week, Captain P. P. Eckersley, M.I.E.E., late Chief Engineer of the B.B.C., and now our Chief Radio Consultant, will comment upon radio queries submitted by “P. W.” readers. But don't address your queries to Captain Eckersley—a selection of those received by the Query Department in the ordinary way will be dealt with by him.

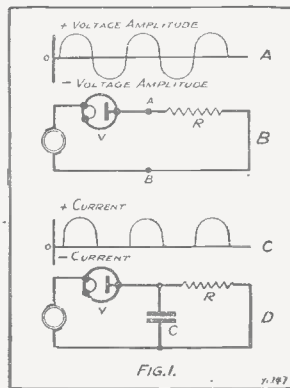
Rectifier Output.

F.D.C. (Finchley).—“I have in use an H.T. eliminator using half-wave rectification. Is it correct to assume that double the output would be obtained if a full-wave rectifying valve were used with a suitable circuit?”

Steady, chaps! We've got to begin somewhere near the beginning to answer this.

An alternating voltage can be represented diagrammatically like A, Fig. 1. Now we want to make this into D.C., so we can connect a two-electrode valve in series with the supply (B, Fig. 1).

Now this two-electrode valve only allows the current through R to go one way, and the



Turning an A.C. supply into D.C. is not an easy matter to visualise, but this diagram will help you to understand Capt. Eckersley's clear exposition.

current goes like C, Fig. 1. But this is not steady D.C. current, it's all bumpy. So we connect a big condenser D, Fig. 1.

Then we must imagine that the leak away through R is slower than the rate which will empty the condenser between impulses, and we get Fig. 2A. If the condenser is very big we get Fig. 2B. If it's too small we get an effect like Fig. 2C. Also, if the condenser is big but R small, i.e., the loading, we get a hum.

If we have double rectification we have the D (Fig. 2) effect before we connect a condenser, and we need a smaller condenser only. The power given by the rectifier is the same practically with full or half-wave rectification, because we design the rectifier in any case with sufficient emission to let through enough to keep the condenser full.

If you want a perfect analogy, look at my final picture, Fig. 3.

Water is tried to be pumped round this circuit of pipes both ways—we want a steady flow through R. If the R is small

(pipe large) the tank (condenser) is emptied at each gulch from the supply, and we get a variable flow through R (bad rectification). This could be rectified by putting in a bigger tank (bigger condenser) making the gulches come in twice as quickly for a given size of tank (double rectification) or by making a restriction in pipe R. The power is determined only by the load of water (voltage), not whether the water comes in quickly or slowly, because a ballcock acts to stop any more water coming in when the tank is full—(you cannot charge a condenser more than a certain amount!).

Tone “Flat and Lifeless.”

S. R. (Wimbledon).—“I have been experimenting with a super-pentode valve and a 25 to 1 step-down output transformer connected to a low-resistance moving coil loud speaker. This combination gives me excellent results, and when I replace the transformer by one specially intended for use with a pentode and for a low-resistance speaker, I get a greater volume, but otherwise very ordinary results, tone being ‘flat and lifeless.’ Why is this?”

I really am sorry, but without further quantitative data and without a fuller explanation of what flat and lifeless means—too much bass or too much treble—I cannot answer the question at all definitely.

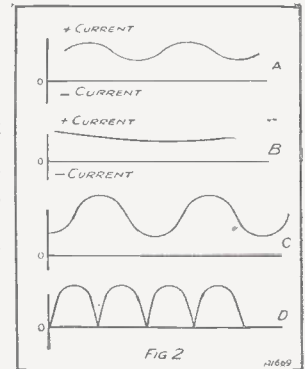
Is it that with one arrangement the output transformer fits the loud speaker, i.e., the too much bass given by the loud speaker fits the too little bass given from the transformer? Is it that the “proper trans-

former” giving a truly flat output makes the loud speaker seem dead?

Usually the effect of a pentode, especially when the output transformer primary has too low an impedance is to cut off the bass. Usually the effect of a moving coil loud speaker is to give a bass resonance to the outfit, when the faults of one cancel the faults of the other.

Indoor or Frame Aerial?

C. T. O. (Brighton).—“I am thinking of constructing a set for the reception of the two Brookmans Park transmissions only. As you will see, I am living about fifty miles from London. Which do you consider the better plan—to use a frame aerial



Big humps on the line may mean a big hum in the set. Read the reply to F. D. C. (Finchley) on this page, about smoothing out alternations.

with two stages of H.F., or a fairly efficient indoor aerial with one stage of H.F. The L.F. stages would be arranged so as to give an output sufficient to operate a moving coil loudspeaker.

I would always advise an indoor aerial as against a frame if you are studying economy rather than convenience and appearance. A frame is very pretty, compact and convenient, but it involves a more sensitive set and thus a more expensive set both in first cost and filament and H.T. consumption.

You just have to balance up in your mind which you think best, economy or convenience. You are quite right in realising that there's about one stage of H.F. difference for a given volume between frame and indoor aerial.

By the way, there is a further advantage in a frame inasmuch as you have a chance of eliminating interference from some spark jamming in the Channel. Of course, if the line is giving London (which will be most jammed) and the jamming goes through your receiver you can't cut it out.

THE WATER ANALOGY

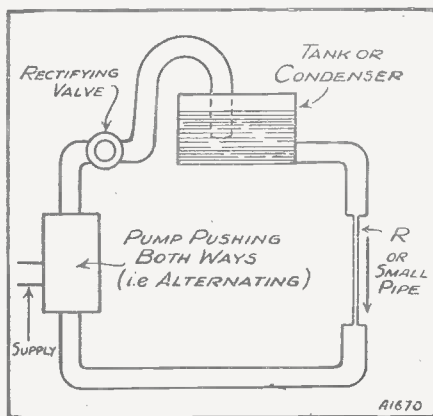


Fig. 3. The pump represents the supply, the tank a condenser, and the small pipe the resistance.



THE portable set of to-day is quite a different proposition from what it was two or three years ago. Not only is it lighter to carry, if you want one for "picnic" use, but it is neater in design, and the whole outfit is far more efficient.

In addition to the real "portable," there are many "transportables," so-called because they are not light enough to be carried about with ease everywhere one goes, and these are often available for use with either battery or mains H.T. supply.

This type of set is rapidly solving the problem of the flat dweller, and the person who wants to take his set from room to room as occasion demands, or who does not wish to erect an outside aerial.

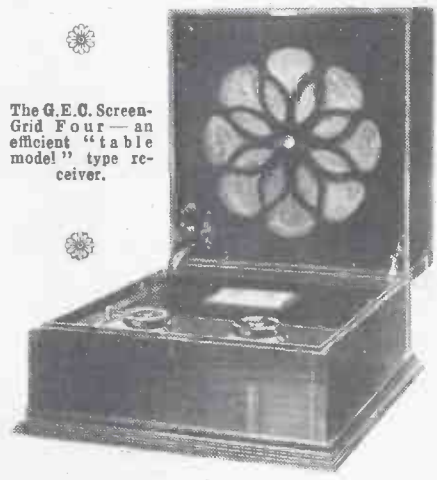
Compact and Convenient.

There are many advantages in having a frame aerial, as most of my readers know, for it is a great aid to selectivity, and as incorporated in a portable receiver is by no means unsightly.

The portable can be placed on a chair, or an occasional table by one's side and switched on and off as desired, while on a

Owing to its compactness and versatility the popularity of the portable set is rapidly increasing, and the following article will be of interest whether or not you own one of these remarkable receivers.

good set one can tune-in several of the main stations in this country and on the Continent.



The G.E.C. Screen-Grid Four—an efficient "table model" type receiver.



Marconi portables have long been well to the fore. Here is the latest, "Model 55."

Let us have a look at some of the portables now available. First of all we will see what Burndept (1928), Ltd., have to offer us. Two distinct models are available, the Screened portable and the Super-Screened Portable. The former costs 19 guineas, and the latter £23 10s., while the difference between the two lies mainly in the finish.

An Efficient Circuit.

The 19-guinea model is darker than the other instrument, and the case is covered in a pronounced crocodile grain, while the Super-Screened Portable is of brown hide with a fairly fine grain. On the whole the

Super-Screen set is more attractive, though the results on the two sets are identical.

The circuit is a screened grid H.F. stage, tuned anode coupled to a detector, and two transformer-coupled L.F. stages. Two-volt valves are used, with a two-volt accumulator. The H.T. consumption of the set is somewhere about 9 milliamps, and the wave-length ranges from 255 to 530, and from 900 to 2,000 metres.

Excellent Quality.

By means of an adaptor plug you can use a pick-up if you want to do so. The weight of the set is roughly 30 pounds, and a free edged cone with a balanced armature drive is employed for the loud speaker. It is a thoroughly attractive job, and the quality of reproduction is very good indeed.

Both the suitcase and the "transportable" types of set are "turned out" by Burne Jones & Co., Ltd., the suitcase model being covered in blue leatherette, while the

(Continued on next page.)



An unusual radio-gram—"The Westminster"—made by Dubilier, Ltd. It contains a pick-up and complete gramophone motor and turntable.

PORTABLE RADIO RECEIVERS—A REVIEW



The New "Chakophone" Screened-Grid Four-Valver, which is sold at a very reasonable figure.

transportable is in a mahogany case. They are alike in general design, and the difference in weight between the two is only about a pound or so. The prices are identical, being 18 guineas, so that you can take your choice from a model that you can carry about to picnics and that sort of thing, or a model to keep in the house or occasionally to take out in the car.

Low H.T. Consumption.

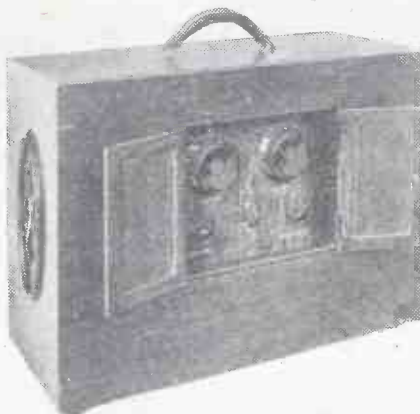
The suitcase model, of course, is better for picnics, while the transportable model is rather more convenient for home use. Two choke-coupled H.F. stages are employed, followed by a detector and two L.F. stages; one resistance and one transformer coupled. The H.T. consumption is round about 7 milliamps, and, of course

wave-change from medium to long waves is provided.

One of the finest portables we have ever tested is made by a newcomer to radio—Columbia. Here we have the Model 303A and Model 303B. The former can be obtained in an oak cabinet with handles at the sides, and the latter in blue crocodile leather with a spring carrying handle at the top. This set is more of the transportable than the ordinary portable type, really requiring a car to take it out in the open.

A waterproof cover with a special strap handle can be obtained at an extra cost of about 15s. on the 303A. The 303B can be provided with a waterproof cover at the price of 12s. 6d.

The control panel is very neatly arranged, having a narrow metal face with two



An unusual design is favoured by the G.E.C. in their 7-valve super-het model.

horizontal drum-tuning dials and recessed knob. The portable is provided with its own turn-table in the base. Incidentally a



Neatly arranged in a leather suitcase, the K.B. uses an S.G. stage followed by Det. and 2 L.F. valves.

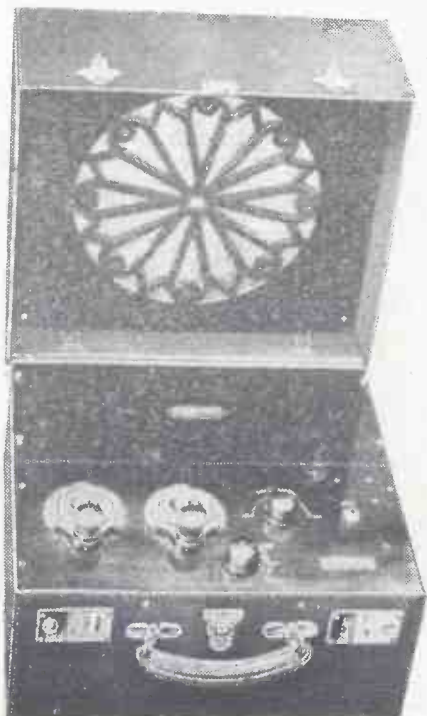
Exceptionally wide wave-ranges are covered by this receiver.

very useful arrangement in the design provides for the removal of the batteries at the back, and the substitution of an electric mains unit, when A.C. valves can be employed if desired.

All-Electric Drive.

The all-electric model costs £26 15s. 6d. in oak and £28 17s. 6d. in crocodile cloth, whereas the battery model costs 17 guineas in oak and 19 guineas in cloth.

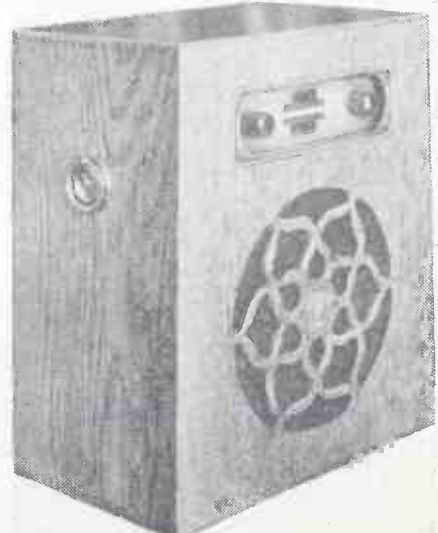
The weight is roughly 28 pounds, and the total H.T. consumption is round about 10 milliamps. Five valves are included, with choke-capacity coupling, and the quality obtained is certainly exceedingly



The Lotus four-valve suitcase S.G. model is an old favourite.



The "Rover" is well called, and acts up to its name. (Peto-Scott.)



The Columbia 303A Screened-Grid Transportable Receiver. It has ring type handles on the sides.

SOME HANDSOME TRAVELERS

Many "transportable" sets can be obtained from the main manufacturers. They should be considered when you are buying a portable receiver.

OPERATE YOUR SET FROM THE CAR

VIEW OF THE LEADING MAKES (Contd.)



The Ultra Air Chrome Portable Five which is fitted with a station rejector beneath the speaker.

Good quality reproduction is an outstanding feature of this set.

good, and this portable must rank amongst the best from the point of view of a sure programme provider. The range is extremely good, and is, of course, due to the efficient H.F. section, which has been very carefully designed.

The "Westminster" transportable radio-gramophone is still the chief Dubilier product in the way of portables, this being rather a heavy model weighing 58 pounds, but incorporating not only a battery and speaker and radio set, but also a gramophone turn-table, a pick-up, a gramophone motor, and the necessary switching for changing over from radio to gramophone.

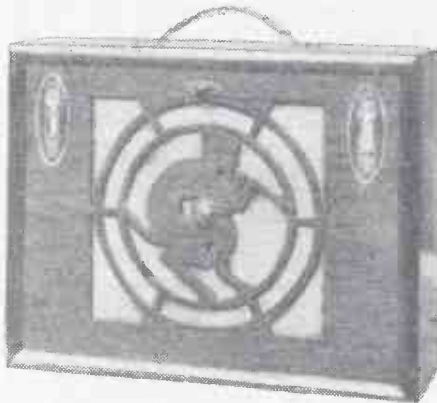
Two screened-grid H.F. stages, a detector and transformer-coupled pentode output

comprise the circuit, the anode current total being somewhere about 7 to 8 milliamps; and, of course, we have wave-change switching.

A novel feature, from which the set gets its name, is the silhouette of the Houses of Parliament on the speaker fret, a pilot lamp inside the set lighting up "Big Ben" when the set is turned on.

New S.G. Model.

Two portables, a five and a four-valver, are provided by Messrs. Dunham's. The five-valve portable has two H.F., det., and two L.F. stages, the H.F. stages being transformer coupled, and is available either in Rexine or leather. As the photograph



A Jack for pick-up work and terminals for external aerial and earth are provided on the Pandora Portable Five.

shows, a very neat layout is obtained, and the transportable weighs 25 pounds. Wave-change, of course, is provided, and the



An exceptionally clean design is shown by the Burdett Super Screened Four illustrated here

price is 17 guineas. The total anode consumption is round about 6 milliamps.

The other model is a new four-valver which contains a screened-grid H.F. stage. Oak or Rexine finishes are available in this case, which is of the upright type and weighs 28 pounds. The consumption is eight milliamps, and the price 3 guineas more than the suitcase type. If desired, both sets can be arranged to work off the mains.

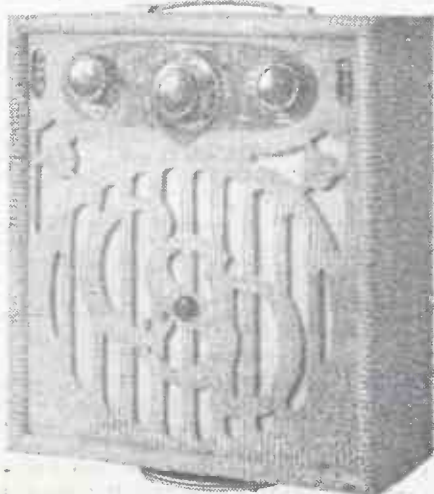
A Large Selection.

A large number of portable sets is marketed by the Eagle Engineering Co., Ltd. There is the Portable Five, the Junior Five, the Junior Four, a Screened Four, an All-in Three and an All-in Two, so plenty of choice is given to the prospective purchaser.

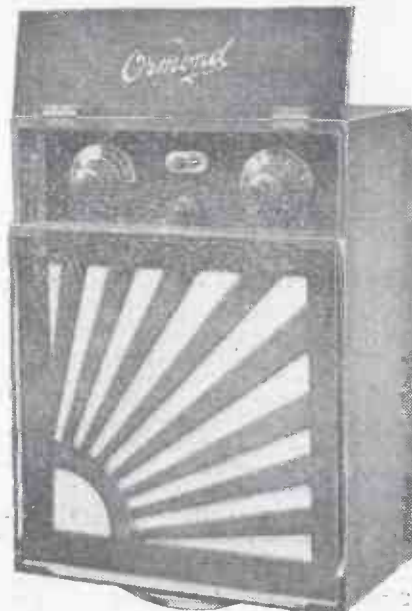
Taking them in order, the first one is the transportable type. It contains two H.F. aperiodic stages, a det., and two transformer-coupled L.F. stages, and the outfit takes

(Continued on next page.)

TRANSPORTABLE RECEIVERS



This Dunham set is tastefully finished in crocodile leather, and is provided with sockets for aerial and earth and for an extra loud speaker.



The Ormond transportable shown here is both efficient and inexpensive.



This set needs no introduction for it is the Pye, one of the best known of all portables, and noted for its excellent quality.

THE ELECTRIC LIGHT SUPPLY

PORTABLE RECEIVERS.

(Continued from previous page.)

about 10 milliamps for anode current, and weighs 34 pounds. The price is 16 guineas.

The Junior Five is also finished in walnut, but the price is only 14 guineas, and the milliamp consumption is only 8.

The "Chekaphone" Junior Four is also in walnut and contains two aperiodic H.F. stages, a detector and a pentode.

Two further models brought out by the Eagle Engineering Co. are the Screened Four and the All-in Three.

A well-known "Picnic" Portable at 17 guineas (de luxe) cabinet model, or 16 guineas in leather suit-case model is still to be found in the Edison Bell catalogue. There is a more recent one, the "Maison" Transportable, in an oak cabinet, containing a three-valve circuit with pentode output.

The set can be converted for mains drive, if required.

A "Regional" Portable.

The "Regional" Three is one of the most recent Efescaphone products (Falk Stadelmann and Co.), and is designed specially for use within a forty mile radius of Brookmans Park or for a similar-powered transmitter. The circuit has a detector and two L.F. stages, and the price is £12 15s. in maroon leatherette.

Two Lotus (Garnett Whiteley & Co.) portable sets are available, the S.G. Portable in leather suitcase and the All-mains Transportable in oak or mahogany cabinet. The suit-case model employs one aperiodic H.F. stage, a tuned anode S.G. stage, detector and a transformer-coupled pentode making four valves in all.

The price is 19 guineas. Good reception range is obtained, and good loudspeaker strength is made possible by the pentode. Provision is made for an external speaker if one is desired.

The all-mains Transportable is a handsome piece of furniture employing one stage of S.G., detector and transformer-coupled pentode. It is suitable for A.C. mains, weighs 35 lbs. and costs £25 in oak, or £26 5s. in walnut or mahogany. When not in use a couple of swing doors hide the panel and controls.



The new Philips transportable has an exceedingly neat and convenient design.

Long famous for their Osram valves and ordinary sets the G.E.C. have placed on the market two portable sets—a portable and a transportable. The transportable is enclosed in a mahogany cabinet employing three valves, an S.G., a detector, and one L.F. pentode output and is provided with all mains drive for A.C.

The famous Gecophone Stork loud speaker is employed, and provision is made for an outside aerial, if required, but with the indoor or frame aerial, the set is perfectly self-contained and costs £28.

New Amplion Portable.

The portable, in imitation leatherette and mahogany maroon leather or in cabinet form, consists of two tuned anode S.G. valves, detector and two transformer-coupled L.F. valves.

A special accumulator is provided having solidified acid, a very convenient form for portable work. The turntable is detachable and provision is made for an external aerial and earth. Twenty-three guineas is the price of the attaché-case model, and £26 the price of the cabinet model.

I wonder how many hundreds, or thousands, of my readers favour the Amplion Speakers! Here is a chance for them to go one further, and have an entire Amplion portable! The first set of this

LUNCH-TIME MUSIC



Enjoying a spell of fine weather in the sunny south.

description made by this firm. A four-valve circuit is employed consisting of two S.G. stages, detector and pentode, and the anode consumption is only 9 to 10 milliamps. The price is £24 15s., and the instrument is very notable for its extremely dignified and somewhat severe appearance.

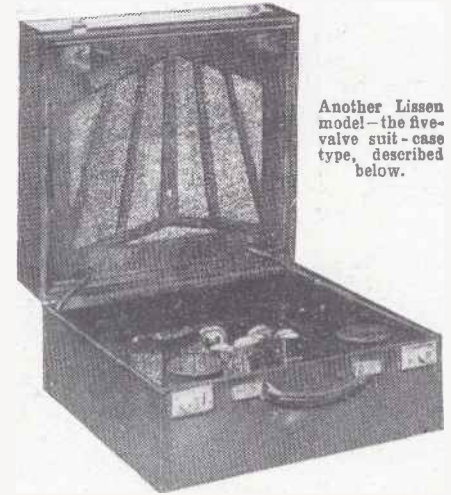
It looks extremely business-like and the whole set, valves and all, are totally enclosed, a very valuable point if the set is to be carried out of doors. It is contained in a case of real hide and can be relied on to be a first-class job.

Separate Battery Box.

The Universal portable is the main Igranic model, the next firm on our alphabetical list. It is contained in a leather suit-case, and has two S.G. stages, a detector, and two L.F. valves.

The batteries are contained in a separate box so that the weight is evenly distributed if you want to carry the set out of doors or

for any distance. The battery box, incidentally, constitutes a stand for the set, and provides a turntable for it. A novelty is a



Another Lissen model—the five-valve suit-case type, described below.

small compass provided on the panel facilitating the turning of the set in the required direction.

We must also not forget the Igranic Neurosonic Seven receiver, a super-hot portable of amazing capabilities. It is in fact, one of the most sensitive portables we have ever tested.

Do you listen to the K.B. programme on Sundays, from Hilversum or Toulouse? It is quite an interesting programme and is well within the reach of portable receivers. In this connection the Kolster Brandes portable is worthy of the attention of the seeker after a portable set. The circuit is a screened grid, detector, and two L.F. stages, the latter being transformer coupled, and the consumption of the set is 9 milliamps. It can be provided with mains drive for H.T. and G.B.

A Novel Portable.

The Lamplugh people have an interesting transportable five, contained in an oak cabinet. It can be used with either an external aerial or earth. The circuit contains two choke-coupled H.F., a detector, and two transformer-coupled L.F. stages, and the price of 15 guineas.

E. J. Lever are famous for their "Trix"—of which five portables are available—a five, a screened-grid four, a portable two, a "Portette" one-valver, and an all-mains regional portable.

The smallest one, the "Portette," is a rexine-covered set having one detector valve. It weighs 6 lb., and the price is 5½ guineas complete. They claim that it is the smallest self-contained receiver manufactured. The phones are contained in a separate compartment in the cabinet.

Several fine portable receivers are now produced by that wonderful firm of Lissen, Ltd., a five-valve de luxe portable, a five-valve competition model, and a long-wave transportable four. The first consists of two H.F. stages, detector and two transformer-coupled L.F. valves. It consumes 9 milliamps and may be converted to mains drive. The price is 19 guineas. The second one has a similar circuit, weighs 30 lb., and costs 16 guineas.

The long-range Transportable Four is contained in a mahogany transportable cabinet, and consists of two screened-grid

(Continued on page 356.)

COMPARE THESE FIGURES WITH THOSE OF ANY OTHER 2-VOLT POWER VALVE



P 240

The goodness of a valve is determined by the highest amplification factor for the lowest anode impedance. This is expressed as mutual conductance, therefore the higher the mutual conductance the better the valve.

The mutual conductance of the Mazda P.240 is considerably higher than that of any other 2-volt power valve. It will operate a moving coil loud speaker with most satisfactory results.

THESE FIGURES PROVE IT . . .

Amplification Factor	7
Anode A.C. Resistance (ohms)	1,900
Mutual A.C. Conductance (MA/V)	3.7

MAZDA P. 240
PRICE 15/-



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ALL ELECTRIC - 2

A SET WORTH LISTENING TO

£13



£13

The Igranic All Mains 2 operates entirely from A.C. Mains. Compact design. One knob control. Dual wave switch to eliminate coil changing. Perfect reproduction.



Supplied in attractively designed oak or mahogany table cabinet. Price £13.0.0 complete with valves and royalties.

Please state exact mains voltage when ordering.

Write to Dept. R. 151 for details.

Bring in those Distant Stations on the "STAR-TURN" TWO

This remarkable two-valver surpasses all others in the wonderful selectivity and sensitivity which it evinces.

Fully described in the June

MODERN WIRELESS

which also contains a SPECIAL VALVE SUPPLEMENT, profusely illustrated, and telling you all you want to know about the Modern Valve. Also in "M.W." is

"THE WORLD'S PROGRAMMES"

A most valuable feature for the DX enthusiasts.

With this and the "Star-Turn" Two, you will be able to
Make those Continentals your Local Stations.

Don't miss the June "Modern Wireless"

Price 1/-

TELL YOUR FRIENDS
ABOUT IT.

NOW ON SALE

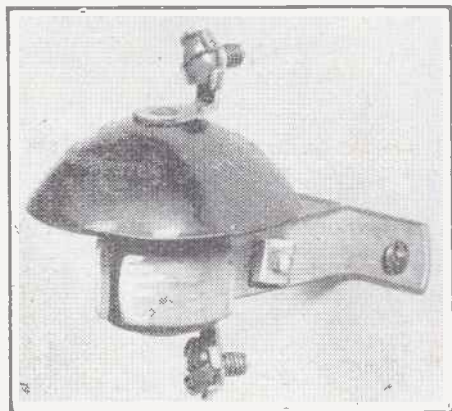
FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found—?



WIRT LIGHTNING ARRESTER.

I often wonder how many radio licence-holders employ a lightning arrester or lightning switch. It is seldom that lightning plays nasty tricks in this country, and I cannot recollect that, despite the millions of receiving aerials that are fixed up, lightning has ever done anything really bad through a radio outfit.



The aerial lead-in is joined to the top terminal screw and an earth lead to the bottom one.

There have, I know, been one or two sets slightly damaged. However, to be on the safe side some protection against lightning is advisable. As good as anything I have seen is the Wirt Radio Lightning Arrester, which is sold by E. R. Morton, Ltd., of Holborn Circus, London, E.C.4.

The price of this device is 7s. 6d. and it is completely weatherproof and requires no attention or adjustment whatever. The actual air gap is embedded within a bakelite moulding.

"EUREKA" SWITCH.

Switches are excellent devices, but once you leave the simple on-off filament type you find yourself in a maze of different varieties for all purposes.

A complicated type such as the double-throw double-pole is a nasty proposition, and it is to the credit of manufacturers that so many easily-fitted, compact, easily-operated makes are now available. It was very different a few years back.

One of the newest I have come across is the "Eureka," due to L. Person & Son, of Shaftesbury Street, London, N.1.

It is a robust one-hole panel-mounting

switch with a twist-knob control of a definite character. Its contacts are positively engaged and the points are self-cleaning.

It is available in two, three, and even four-pole types, so that it enables quite involved switching to be carried out.

COMPRESSION CONDENSERS.

I have examined samples of the Sovereign compression condensers manufactured by the J. R. Wireless Co. These condensers can be used in the "P.W." Brookmans Rejector, and in other circuits where such condensers are specified.

They are well-made little devices, and at 1s. 9d. each (the new price) appear to be good value for money.

I have also inspected the new Sovereign Dual Range Coil—another J. R. Wireless speciality. It is sold at 8s. 6d. (baseboard mounting) and at 9s. for panel mounting.

It is quite a good little coil, and I find the results possible with it are of a good standard.

A SELECTIVITY UNIT.

The British General Selectivity Unit is an "automatic" affair; there are no adjustments at all. You just connect it across the aerial and earth terminals of the set and take the aerial lead to a third terminal.

Its primary object is, I learn, to enable the new high-power stations to be separated, and not necessarily to enable you to tune in foreigners at their original strength.

It certainly fulfils its object very excellently, and in the most adverse conditions you can easily separate the two Brookmans transmitters.

A NEW MULLARD VALVE.

The latest Mullard valve is the P.M. 256A, at least, that is to say, it is the latest Mullard valve to hand at the time of writing. The P.M. 256A has an impedance of 1400 ohms, while its Amplification Factor is 3.6. These are figures which line up very creditably as you will see.

Multiplying the 3.6 by a thousand and dividing it by 1400 you get approximately 2.6 as the mutual conductance of the valve, and 2.6 is some 300 or 400 per cent. better than the mutual conductance of any valve in the world at the beginning of broadcasting.

The 256A is a six-volt valve with a .25 amp. filament. Its maximum anode voltage is 200. It is a very excellent output valve for medium size sets.

"RADIO DATA CHARTS."

This is an excellent work by Dr. R. T. Beatty, M.A., published by Iliffe's at 4s. 6d.

It comprises some 90 or so pages of easy-to-read charts, in the form of tables, together

with ample explanatory matter, making the task at arriving at various radio calculations very simple for the non-mathematical amateur.

The designs of various components are covered, and all the various calculations

WHEN YOU ARE BUYING—

(17) SWITCHES

Give preference to types that have "rubbing contacts." These help to ensure that good connections will be given.

Rubbing-contact indicates that the two pieces of metal that are alternately pressed together and pulled apart wipe across each other with a self-cleaning action.

The rubbing action need be only minute—just visible—to be sufficiently effective.

In some cases there is a very pronounced "wipe," almost the whole action of the switch depending on this.

Next week we will go further into the very important subject of switches.

that are more commonly needed in radio (coil couplings and sizes, transformer data, etc.) are given.

NEW CAMCO CABINETS.

Quite a breakaway from the conventional in radio-set cabinet design is to be seen in a new Camco range which is now on sale.

The base of the cabinet forms the actual baseboard of the set and this simplification makes for a more solid assembly than is usual.

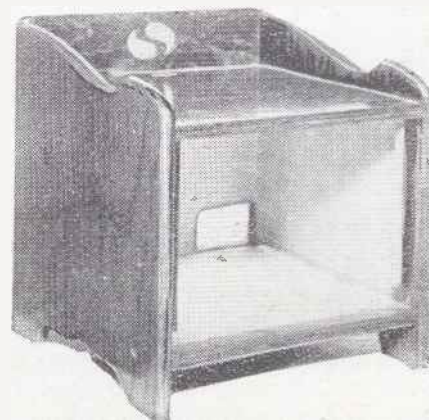
These new cabinets are being supplied by the Carrington Manufacturing Co., Ltd., either assembled or unassembled.

In the assembled form accessibility is obtained to the back of the panel by sliding up the back of the cabinet.

One of these Camcos suitable for a 9 in. x 6 in. panel in oak and beautifully polished costs 11s. 6d.

A NEW MICROPHONE.

The Igranite Transverse Current Microphone and Microphone Control Unit form the subject of a new brochure issued by the Igranite people. The microphone is designed for broadcasting, band repeating, and public address systems.



A Carrington cabinet of novel design. The bottom piece acts also as the set's baseboard.



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 card 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 specialities described may be the subject of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

QUESTIONS AND ANSWERS.

A WET WEATHER CRACKLE.

P. H. (Putney, S.W.15).—"My final improvement was to instal a mains unit, and with the extra H.T. thus obtained I got a quality and a strength hitherto undreamt of. There is only one slight drawback—a crackle. I never noticed this at all with batteries, but since I had the mains unit it often happens that there is a distinct crack-

ling sound as a kind of background. I notice it particularly in wet weather. What do you think can be the cause of that?"

The fact that you notice it particularly when it rains points to defective aerial insulation.

We think it is probable that either your insulators have become dirty (covered with soot or grime), or else that your lead-in tube needs cleaning. Poor aerial insulation is particularly likely to be the trouble if your mains unit is of the D.C. type and the positive is earthed, for in that case your aerial may be at a high potential difference from earth, and slight imperfections of insulation would be very noticeable in their effect upon reproduction.

If the aerial is an old one, and if the insulators have not been cleaned for some time, have the whole thing down and renew it. Porcelain insulators are likely to be perfectly O.K. if washed in soapy water, but we should examine the aerial wire carefully to make sure that none of the strands have

PORTABLE RECEIVERS.

(Continued from page 352.)

stages, a detector and pentode. Lissen valves are used, and the set is available for use on A.C. mains when it is fitted with 4-volt valves and a power pentode.

In addition to these the Lissenola two-valve transportable must be mentioned—this being a little set completely contained for operation on A.C. mains at 11 guineas, or on batteries at 8 guineas, but designed for use with an external aerial.

A mains-driven model of the five-valve Competition Model transportable is to be available shortly, the price not yet having been decided upon.

Well Finished.

The Marconiphone people have but one portable, the Model 55, which is contained in a small oak cabinet and consists of two semi-aperiodic H.F. stages, a detector and two transformer-coupled stages. The H.T. consumption is from 9 to 10 milliamps., and the weight 28 lb. The price is 18 guineas, and includes a turntable and waterproof cover. Like all Marconiphone models, it is exceedingly well finished, and is a really handsome piece of furniture, the woodwork especially being beautifully carried out.

Messrs. Mullard do not make a portable, but have a special portable circuit which can be built up from their parts. Mullards are noted for their "kit" sets, which are always reliable and easy to build. In

addition their speaker chassis is very valuable for portable set constructors.

Two five-valvers and two four-valvers are on the Ormond programme, each being provided in suitcase and transportable style. The five consists of two H.F. stages, detector and one transformer and one resistance L.F. stage and H.T. from the mains can be provided for. The consumption is low, and the weight of the suitcase model is 28 lb., and the cabinet model is 30 lb. The price in each case is £15.

For Mains Only.

The four-valve transportable is for mains H.T. only, and weighs 30 lb. It costs 16 guineas in oak, and 17 guineas in mahogany. This set has one S.G. stage, and two transformer-coupled L.F. valves. The suitcase four is, of course, battery worked, and weighs 28 lb., costing 16 guineas, and the consumption is only 7 milliamps.

Three Pandona models are available, the screened-grid four, the super-five, and an ordinary five. The S.G. model can be obtained in wood covered rexine, and is convertible to mains drive. It costs £18 7s. 6d. and weighs 30 lbs. It is claimed that it will give loud speaker results up to 300 miles.

All Pandona products are guaranteed for one year, and are very attractive propositions.

An innovation among portables is made by Philips Lamps, Ltd., which has the speaker grille at the back of an upright type of receiver. The controls are mounted on a neat panel, and a hinged lid is arranged to cover this, the lid automatically switching the set off when placed in position.

broken. Be particularly careful, too, of the lead-in, especially if this is placed near a gutter-pipe or where it is well-exposed to the wet.

It might be a good plan to erect a wooden shelter over this to keep it as dry as possible, and we should also place a .0002 mfd. fixed condenser in series with your aerial lead, but inside the house. After that the crackle should trouble you no more.

THE DIFFERENCE BETWEEN D.C. AND A.C. MAINS UNITS.

G.A.W. (Lee).—"Is it possible to use a D.C. high-tension eliminator on A.C. mains, or a A.C. eliminator on D.C. mains?"

There is a big difference between a mains unit designed for D.C. mains use and one designed for use

(Continued on page 358.)

WHAT DO YOU THINK ABOUT THIS?

So successful was his new set that a Lincoln reader thought he would fit a volume control to "hold it down" a little on loud items. He used a potentiometer he had on hand, and connected its ends across the secondary of the L.F. transformer, and slider to grid. But all the volume went! There was no "control" with the slider, but a complete wipe-out in all positions. Can you say

WHAT WAS WRONG?

N.B.—There is no prize for answering this but from time to time we shall give a radio problem (followed the next week by the answer) in the hope that readers will find them both interesting and instructive. (Look out for the solution to above next week.)

The bad contact in the well-wired outfit described last week was not in the set itself, nor in the leads, but was the old trouble of a loose connecting bar on the accumulator.

A provision is made for external earth, an external aerial and a pick-up. The set costs £27 10s., and weighs 37 lb., and can easily be converted to mains drive. The circuit consists of a S.G. transformer and tuned anode stage, detector, and one transformer-coupled L.F. stage and a pentode output. The total anode consumption is 11 milliamps.

Messrs. Pye need no introduction, and their portable set has always been noted for its first-class quality, both in construction and in reproduction. Two aperiodic H.F. stages are employed, and the set is mounted in walnut or mahogany cabinet.

It weighs 27 lb., and costs 19 guineas. The loud speaker is situated at the front, while tuning is controlled by a single dial mounted on the right-hand side on a recessed panel. Provision is also made for the connection of an external aerial and earth.

Kits of Parts.

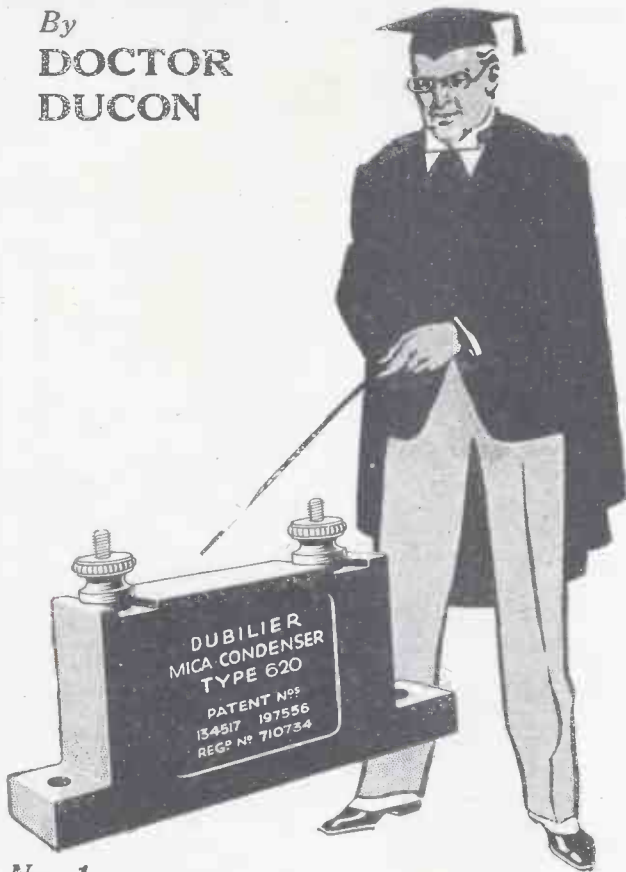
Sets of parts for well-known portable set designs are available from Ready Radio, who will always supply full kits at a moment's notice.

Stratton & Co., Ltd., offer us an efficient three-valve portable, the "Eddystone" Scientific Three. Priced at £26 15s. it contains a Celestion speaker and triple-capacity H.T. battery. The weight is 34 lbs.

The famous loud speaker firm of Ultra Electric Co. provide a portable and a transportable five, the former being of the suitcase type and the latter in a cabinet. Two H.F. stages are provided, and the set can be converted to mains drive. The cost is 16 guineas in each case.

CONDENSED CHATS

By
**DOCTOR
DUCON**



No. 1
**FACTS ABOUT
MICA CONDENSERS**

The most important things in designing fixed Condensers are to ensure constant capacity and to provide against all sorts of climatic conditions. If these points were not provided for totally unsatisfactory condensers would result.

Small capacity Mica Condensers such as are used in radio sets and amplifiers must have special care because the whole performance of an otherwise fine set can be completely ruined by only one faulty condenser.

Dubilier type 610 and type 620 condensers are designed and manufactured with the utmost care. They are specially clamped to avoid change of capacity and hermetically sealed to combat climatic conditions, and you can be certain that with Dubilier Condensers in your set it's performance will be remarkable and you are certain never to suffer from Condenser breakdowns. Specify Dubilier for your next Set.

Type 610
and 620
'00005 to '0009
2/6
'001 to '003
3/-
'007 to '009
3/6

DUBILIER

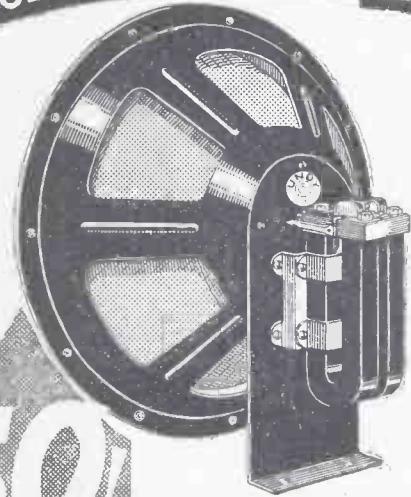
CONDENSER CO. (1925) Ltd.

DUCON WORKS, VICTORIA ROAD, N. ACTON, LONDON, W.3

8 Pole!

DYNAMIC

A MOST AMAZING INVENTION
IN LOUD SPEAKER UNITS



50%
INCLUDING
CHASSIS

Do not be misled by big words. Anything can be written on paper. Reports about loud speakers covering many pages should not be taken as a guide. Let your ear be the judge. Many loud speakers are offered as being the very latest invention of radio science. But ask for a demonstration of the "Undy 8-pole Dynamic Unit." This speaker stands alone, ahead of all others, as the best. Only the "Undy 8-pole Dynamic Unit" will please your ear. The "Undy 8-pole Dynamic Unit" occupies a unique position owing to the negligible amount of energy it requires due to its novel design, for which patents are pending in all civilised countries. It thus obviates the necessity for expensive, high-power final-stage valves, while its reproduction is as rich in volume and at the same time as true to nature even on the smallest set as that of the best moving-coil loud speaker. The "Undy" can be used with any final stage valve on the market, so that you can still utilise your old receiver and valves. Before you buy a loud speaker, it is to your own interest to hear the "Undy." See that you get an original "Undy" 8-pole Dynamic Unit, as many competing makes are offered as being of equal value.

Inlaid
Polished
Walnut
Cabinet
£4 : 10 : 0

OBTAINABLE FROM ALL WIRELESS DEALERS

"UNDY"

RADIOTORIAL QUESTIONS AND ANSWERS (Continued from page 356.)

with A.C. mains, although in both cases the effect is the same, namely, to supply the set with high-tension current from the electric-light system instead of from the ordinary high-tension battery.

When the house is fitted up with direct-current (D.C.) mains, the lamps are being supplied with current somewhat similar to that given by a battery, the main differences being that the voltage is higher (in most cases); that the mains are capable of supplying an enormous current, and that the mains supply when compared with a battery is very "rough."

This latter feature is no disadvantage for lighting lamps or working heaters, vacuum cleaners, etc., but when applied to wireless it results in a very loud hum which completely drowns reception. So that a D.C. mains unit always includes some "smoothing" apparatus, which usually takes the form of several large condensers and one or more low-frequency chokes, of large size, capable of carrying the necessary current.

An H.T. battery supplies direct current and so do D.C. (direct-current) mains, so that apart from the smoothing required there are great similarities between the H.T. battery and the D.C. mains supply.

RECTIFIER IS NECESSARY FOR A.C.

A.C. mains, on the other hand, supply a different class of current altogether, called "alternating current." And before you can get high tension for your set from this kind of supply, the alternations from which it gets its name must be rectified, until they resemble the direct current such as supplied by the D.C. mains or by a battery. Therefore, the A.C. mains unit always embodies some form of rectifier.

This may take the form of a special rectifying valve (or ordinary receiving valves may be used under certain circumstances in a valve-rectifying circuit). Alternatively, dry rectifiers may be employed, and there are other less popular methods, but in all cases where A.C. mains are used it is necessary to embody in the unit a rectifier, as well as the smoothing apparatus such as is used for D.C. mains.

From this brief explanation the answer to your question will now be obvious. If you have a D.C. mains H.T. unit and you wish to use it on A.C. mains, you can do so provided you incorporate the extra rectifying apparatus which is necessary (advice as to the procedure in any given instance will be obtained from the Query Department).

In cases where it is desired to use an A.C. H.T. mains unit on D.C. mains, the change-over is comparatively easy, because an A.C. eliminator (as explained above) is, to all intents and purposes the same as a D.C. eliminator but with extra rectifying apparatus. In most cases it is quite easy to arrange that this apparatus should be cut out of circuit.

If a diagram is forwarded to the Technical Queries Dept., the probability is that it could be marked for an easy change-over from A.C. to D.C. mains by cutting out the now unnecessary rectifying system. But it should be remembered in all such cases that it is dangerous for inexperienced persons to handle apparatus for connection to electric-light mains, so that although details may be forwarded any necessary alterations, etc., should be carried out by a qualified electrician.

"WORKING A GHOST!"

C. H. B. (Liverpool).—"I am going to work a ghost with a loud speaker and a pair of earphones. The ghost is in one room and the set is in the other. Could you tell me what the connections to the set are?"

CAN WE HELP YOU WITH YOUR SET?

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

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

Full details, including 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 free and post free immediately. This application will place you under no obligation whatever, but having the form, you will know exactly what information we require to have before us in order to solve your problems.

LONDON READERS PLEASE NOTE: Inquiries should NOT be made by 'phone, or in person at Fleetway House or Tallis House.

B-r-r-r-rh! Your letter gave us "the jimmies," C.H.B., until we read that "the ghost" was to be only a ghostly voice.

The way to work this stunt is to have one loud speaker in the room where the ghost is to appear, and this will be worked from the ordinary loud-speaker terminals on your set. Preferably, of course, the loud speaker should be disguised in some way so that its presence is not suspected and this is generally quite easy if it is of the cone type (we must leave this part of the programme to your own ingenuity).

When you can get the ordinary programmes through on this disguised loud speaker satisfactorily, you can leave that end of the set alone and proceed to modify the set in the other room from which the ghostly voice will originate.

What you have to do is to disconnect the detector and any H.F. valves which may be in use, and employ the set from only the first L.F. stage. Probably this is a low-frequency transformer, and in that case you undo both the primary terminals (one of which is marked IP and the other OP, or one H.T.+ and the A. or P.). By doing this you have completely separated the first low-frequency stage from the detector and you are ready for the final preparation.

For this you need either a small microphone, a spare loud speaker, or else a telephone earpiece. Suppose you use the loud speaker, the connections are as

also that no coils are in position in the coil sockets when these are tested.)

Complete circuits may be tested in this manner. For example, if the A.T.C. is in parallel with the A.T.L. in a simple tuned aerial circuit, one flex lead placed on the aerial terminal and the other on the earth terminal will give a certain test for continuity between these points.

THE SHORT-WAVE AERIAL.

W. V. F. (Letchworth, Herts.).—"I cannot get the short-wave set working properly and I think it is my aerial. Tried out in London (in a flat in Fulham where it was made), it brought in America at tremendous strength. Yet since I have had it out here I cannot get any stations at all, and it will not oscillate. My aerial is perfect for ordinary waves but does not seem to suit the short-waver. What can I do?"

For short-wave work it generally happens that the aerial itself, as judged by ordinary standards, is not half so important as the method by which it is connected to the short-wave set.

If the aerial is a short and apparently inefficient one, such as is used in a flat or other places where space is limited, the effect of connecting it is not so pronounced as with a bigger aerial. For if a good long aerial is too tightly coupled to the short-wave set it is quite sufficient to prevent oscillation and to destroy its long-distance properties.

Your best plan, we think, would be to try loosening the coupling between the aerial and the grid circuit. If you have a separate aerial coil (placed close to the grid coil which is tuned by the variable condenser) use a smaller aerial coil, i.e.—a fewer number of turns.

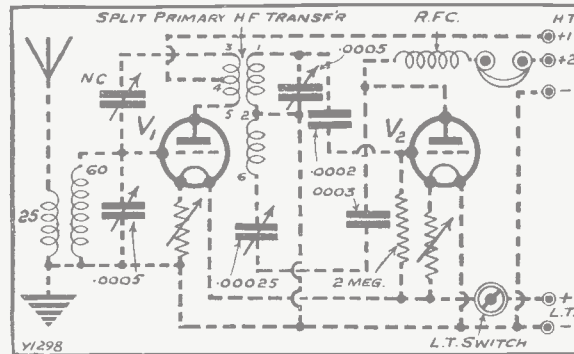
If you are not using a separate coil, but your aerial lead terminates in a clip which can be placed on any of the turns of the grid coil, try altering the position of this clip on the coil. Remember that this arrangement gives the tightest coupling when the clip is adjusted near to the grid end, and the looser coupling when it is adjusted near to the earth end of the grid coil.

The larger the aerial which is employed with the set, the nearer the earth end of the grid coil the aerial connection must be clipped, and if you have been attempting to use the set with the clip near the grid end of the coil, that alone would be sufficient to account for your poor results.

One or other of the above hints is pretty sure to cure your trouble, but some sets employ the condenser method of aerial coupling. In this a small variable condenser is placed in series between the aerial lead and the aerial terminal, the degree of coupling being varied from maximum when the condenser is "all in," to a minimum when it is "all out."

(Continued on page 360.)

POPULAR "WIRELETS" No. 11



The dotted lines show the connections for the sensitive H.F. and Det. receiver, the "components" for which were shown in last week's "Wirelet."

follow: One side of the loud speaker to one of the primary terminals which has been disconnected, and the other primary terminal goes to the other side of the loud speaker.

Now you will find that if you speak down the loud speaker with the set switched on in the ordinary way, the voice will be amplified and come out in the other loud speaker in the other (haunted) room. Practice whispering until you get a really good, ghostly, haunted-grange sort of voice, and when that has been done you are ready to call up the ghost of the Old Squire, the murdered village miser, or whoever it is that you have chosen to "work."

FAULT FINDING.

R. Y. (North Acton, London, W.).—"What is the correct method of using 'phones to find a fault in a set?"

One tag of the 'phone should be connected to one terminal of the dry cell and two flex leads should be connected, one to the remaining phone tag and the other to the remaining terminal of the dry cell (a flash-lamp battery is quite satisfactory).

These two flex leads, if now touched lightly together, will produce a strong double click in the 'phones, one click when they make contact with each other, and another when they are separated again. They may thus be used for testing for continuity in leads, etc., since the loud double click is ample evidence that contact is satisfactory.

A fault on the coil-holder, for instance, such as a break between the terminal and the plug or socket to which it is connected, may now easily be detected, since if one flex lead is connected to the terminal and the other to the side of the holder to which the terminal should make connection, absence of the double click is positive evidence that the component is faulty.

On the other hand, if one of the flex leads is connected to the socket of the coil-holder and the other to the plug, if a double click is heard, there is a short-circuit across the holder.

Similar tests may be made with valve holders, both for testing for a connection between each terminal and its socket and for testing for short-circuits between the sockets.

Variable condensers may also be tested by this method, a short-circuit between the plates giving rise to the usual double click, which should not be present in the usual way.

(It is, of course, essential to see that all leads have been removed from the components under test and

TECHNICAL TWISTERS

No. 13.

Counterpoise "Earths."

CAN YOU FILL IN THE MISSING LETTERS?

A "counterpoise" can be used instead of a earth connection.

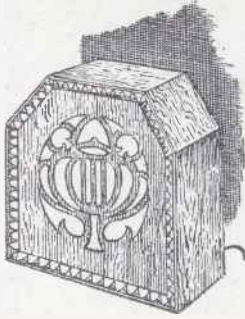
It consists of a wire or wires, like the aerial, and placed directly ; it, if possible.

A counterpoise should always be as carefully as the aerial.

If placed out of doors it should have an switch.

The use of a counterpoise often the tuning.

Last week's missing words (in order) were Galena; Light, Heavy; Crystal, Cat's-whisker; Rust (or "Dull").



Everybody's
calling for

*Player's
Please*



Maurice Tate

Famous Sussex and
England cricketer,
contributes a special
article on the

**TEST
MATCHES
of 1930**

in this month's

**CASSELL'S
MAGAZINE**

Buy the JUNE Issue To-day, 1/-

The ideal power detector....



MAZDA L.210



With the large increase in the power of several of the B.B.C. Stations, and the knowledge that further increases will take place in the future, it behoves you to use a detector stage that is capable of handling large inputs without distortion.

The Mazda L.210 is an ideal valve for this purpose and, in addition, can be relied upon for all-round efficiency and long life.

The Amazing

MAZDA RADIO VALVES

**PRICE
10/6**



THE EDISON SWAN ELECTRIC CO., LTD.,
Radio Division,
1a, Newman Street, Oxford Street, W.1.
Showrooms in all the Principal Towns.

EDISWAN

V.36

RADIOTORIAL QUESTIONS AND ANSWERS.

(Continued on page 358.)

If you are using this type of coupling and even at the all-out position the set will not oscillate, try (a) shortening the aerial to see whether this enables it to do so, and (b) disconnecting the earth lead, at the same time trying the usual variations of H.T. voltage on the plate of the detector, slider positions on the potentiometer (if one is used) and filament temperature if the set is provided with a filament rheostat.

Provided that one of the components has not been damaged in transit we do not doubt that by trying one or other of the above you will get results just as good as those obtained on your first try-out.

A QUESTION OF VOLUME CONTROL.

"FANNY" (Batley).—"Should I be able to increase the volume if I employed one of the proper volume controls?"

No. A volume control is not a method to increase volume at all, but to enable it to be reduced to the required degree when signals are too loud. To increase volume you need either a larger set (employing more valves), a better aerial, an extra valve, a better arrangement of your present set, or the same valves and circuit but with a higher high-tension and grid bias, if this is permitted by the valve-makers' specification.

BACK NUMBERS OF "P.W."

S. M. (Caterham).—"Where do I get the back number?"

Back numbers of "P.W." still in print can be obtained from The Amalgamated Press, Back Number Dept., Bear Alley, Farringdon Street, E.C.4, Price 4d. per copy, post free.

"THE SINGAL-DROP BATTERY BLOTTER."

The address given on page 292, "P.W." No. 416 (May 24th issue), should have been 20, Manor Park Road, Sutton, Surrey.

FOR THE LISTENER.

(Continued from page 342.)

Command Performance from the Palladium the other night. Their Majesties got more fun out of it than we did. I amused myself—apart from enjoying the programme thoroughly—by giving marks to the various performers according to their entertainment value to the listener.

You may be interested to know my order of merit. Gillie Potter heads the list, pure gold, and full marks. I should like him oftener in the studio. Will Hay, close on his heels, a good second. George Clarke next. He sounded the most popular of all in the Palladium; but they had the advantage of seeing his "business" with the motor car; and we missed that.

Julian Rose talks so rapidly that he does not broadcast very well, and the thickness of the Hebraic speech is against him. De Groot with his violin was very good, when the piano didn't drown him.

The turn that made me laugh most of all had, oddly, no broadcasting value whatever. I mean the Hungarian Tumblers. I hadn't the foggiest idea what they looked like or what they were doing, but the announcer from the wings tried to keep us *au courant*.

"They're forming a pyramid. Now they're coming down. They're turning cart-wheels very swiftly," and so on; and all you heard was the silence and occasional thuds on the floor. I thought that was very funny!

Recollections.

Mrs. Claude Beddington, giving her musical recollections of the 'nineties, made

me jealous on account of the excellent way in which she pronounced several foreign languages. It put our polyglot announcers into the shade!

Her voice sounded as if she oughtn't really to have been born before the 'nineties. She told some good stories; and drew some interesting thumbnail pictures—of Joachim, for instance, whose violin was "like a branch growing out of a tree"; of Rubenstein, who said "My mistakes are better than anybody else's music"; of Caruso, wanting to spit on the carpet at Windsor Castle! A very sprightly talk.

Been "Ironed" Lately.

You want iron in your body; but, oddly enough, as Dr. Elvejham told us in a very interesting talk, the iron is not much good without copper. It is copper that makes the blood red.

You may chew iron all day, if you are anaemic, but it won't redden you unless you have the proper supply of copper. This doesn't mean that you need suck ha-pennies! Oysters will do just as well; and when you can't get oysters, parsley and pig's liver. Did you ever see an anaemic policeman? Well, now you know why!

GOOD NEWS FOR THE LISTENER!

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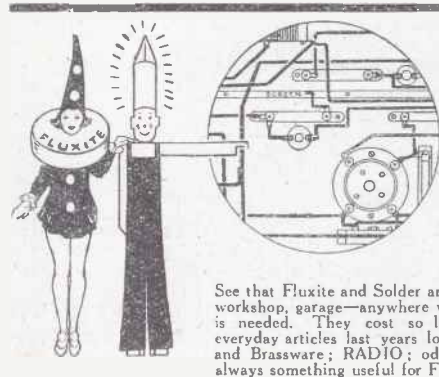
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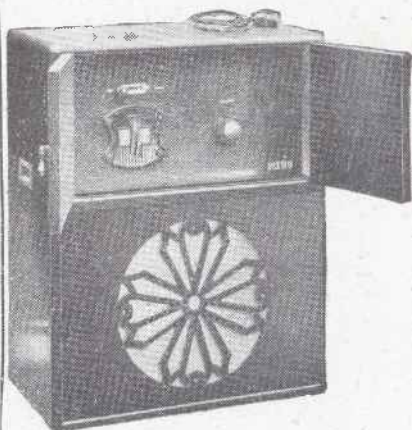
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TECHNICAL NOTES.

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

Concerning Frame Aerials.

MANY readers have pointed out to me, since my recent remarks on the properties and use of frame aerials, that the direction-finding property of a frame aerial is not by any means invariably reliable, and in several cases instances are mentioned to prove this.

Owing to the great advance in popularity of portable receivers (in most cases employing frame aerials), the number of listeners who are, consciously or unconsciously, interested in the frame aerial question has greatly increased.

Some Important Experiments.

As a matter of fact, however, I have more than once pointed out that the simple frame aerial, as used in a portable receiver, can only be expected to indicate the direction of the waves as they arrive actually at the frame; if the waves have suffered any deviation on the way from the transmitting station to the receiver, clearly the frame can take no account of that.

One of the most frequent causes of deviation is the presence of steel girders in a large building, and in such circumstances as these the position of the frame aerial for maximum results may be very different from the actual bearing of the transmitting station.

In this connection some very interesting experiments have been made by the Radio Research Board, in their laboratories at Slough. One of the important subjects which the board is handling is the question of direction-finding in connection with ships and aeroplanes.

Elaborate frame-aerial devices are used, but it has been found that the older types are very unreliable owing to a number of causes, one of which is the "night error." This night error is sometimes very pronounced, and if the incoming signals have their origin more than about 20 or 30 miles from the receiver, the direction of in-come of the signals is sometimes entirely wide of the mark.

Indeed, in one set of observations during the evening, a certain broadcasting station appeared, according to the observations on the frame aerial receiver, to have shifted several times, even to a position diametrically opposite to its true position!

The Radio Research Board, however, have now developed a completely new type of direction-finding frame-aerial device, by means of which the night error is overcome and the correct bearing of a ship or an aeroplane may be obtained, even in fog or darkness. The receiving station is then enabled to send a radio message to the ship or plane, giving the precise bearing.

Automatic Signals.

Reversing now the order of things and considering the receiver placed on board ship, for instance, a new type of combined receiver and compass or, to describe it more accurately, a radio compass, has been devised which automatically indicates the direction in which radio signals are arriving.

(Continued on next page.)

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TECHNICAL NOTES.

(Continued from previous page.)

A spot of light appears in the centre of the dial of the device, and this spot is controlled by the action of two frame-aerials, one of which points north and south, and the other east and west. When signals are received, the spot of light is drawn out into a line which shows on the dial the direction from which the signal is coming.

These exceedingly important developments may fairly be said to have revolutionised afresh the problems of safety at sea and safety in the air.

Tracing Troubles.

One of the commonest troubles with a radio receiver is the presence of crackling noises which often seem to be quite unaccountable. I suppose there is scarcely a radio listener who has not experienced this trouble at some time or other.

Readers very frequently ask for advice on this question, but as there are several quite different causes of crackling and similar noises, it is impossible to say definitely in any particular case what the cause may be.

Of course, as you know, a very common cause is a bad contact somewhere in the set, particularly in the filament supply circuit or in the H.T. You can easily verify this for yourself by making and breaking the filament circuit, or disconnecting one of the leads to the L.T. battery and scratching it lightly against the terminal from which it has been removed.

A similar cause of trouble in this connection is a bad filament rheostat, one in which the slider is not pressing firmly against the resistance element.

Plug Connections.

Another very common cause of crackling trouble is due to badly-fitting wander plugs in the H.T. battery, or to the plugs having become corroded.

Unfortunately the majority of wander plugs on the market seem to me to be very unsatisfactory, and, in nine cases out of ten, either they can scarcely be persuaded to go into the tappings on the H.T. battery,

(Continued on next page.)

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TECHNICAL NOTES.

(Continued from previous page.)

or else they are so loose that they fall out on the slightest provocation. The result is that the slightest shaking or jarring of the set causes crackling which is due to the vibration of a badly-fitting wander plug.

If you are troubled with crackling noises it is a good plan, before attempting to find any other cause, to look carefully over all H.T. and L.T. connections, wander plugs, filament rheostats, and so on; in most cases the cause will be found during this preliminary investigation.

A Substitution Test.

Another cause of a somewhat similar kind is a defective or decaying H.T. dry battery in which bad contacts have developed or in which the internal resistance owing to drying up and so on, has become very high.

If you have cause to suspect this, try taking out the H.T. battery and substituting one which is known to be good. This will immediately tell you whether the cause lies in this quarter.

Aerial Wiring.

Crackling may also be due to a defect in the wiring of the aerial to the set. This can easily be tested by disconnecting the aerial from the set and then switching the set on. If the trouble is in the aerial connection, obviously it should disappear when the aerial is disconnected.

There may be a very slight background or even something resembling a faint hum, but the crackling (if due to the aerial) will cease. If it does not cease, obviously it is not due to the aerial.

If it does cease, however, and is therefore proved to be due to the aerial, you should look carefully over the aerial lead-in and examine all insulators, taking care also that the aerial (including the lead-in and all other connections) is not at any part touching any wall or other such-like objects.

Faulty Transformers.

A further cause of crackling noises which, although uncommon, occasionally arises, is a broken connection in a low-frequency transformer or allied component. If the break is complete, of course, neither signals nor crackles can get through, but sometimes there will be a partial break.

Probably it is not really a break, but a partial breakdown or partial contact. I have known cases where loud and most irritating crackles have been produced in the set from this cause.

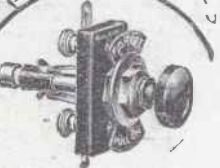
Valve Trouble.

Still another cause, which is not so uncommon as you might think, is the touching of two of the electrodes of the valve, generally the filament and the grid. If for any reason the filament has stretched or sagged, it may come into extremely close proximity to the grid and the slightest mechanical vibration, which can never be really avoided, cause it to make intermittent contact. This kind of thing will give rise to the most appalling noises in the set.

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