

ENLARGED AUTUMN NUMBER

ALL-BRITAIN THREE

*Six-page Supplement
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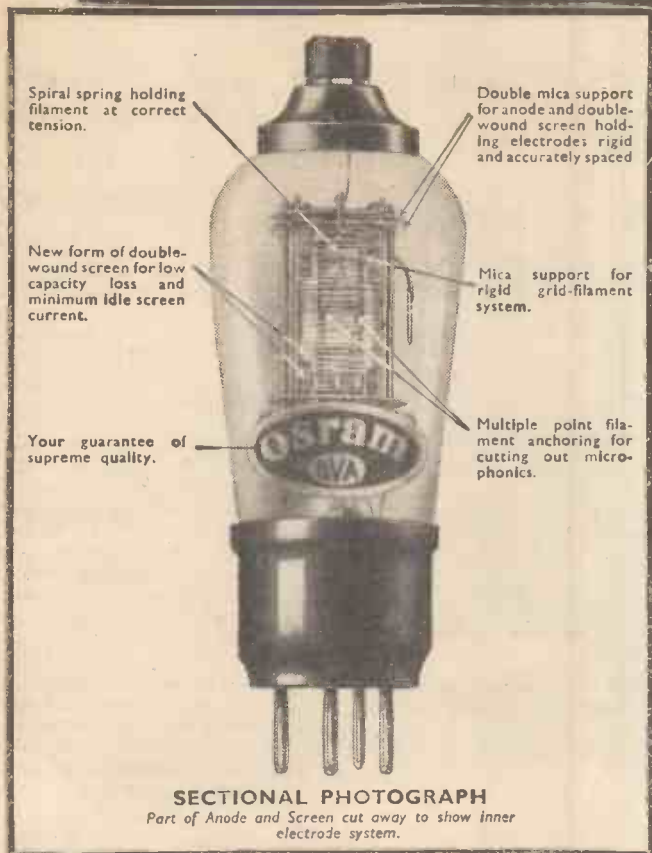
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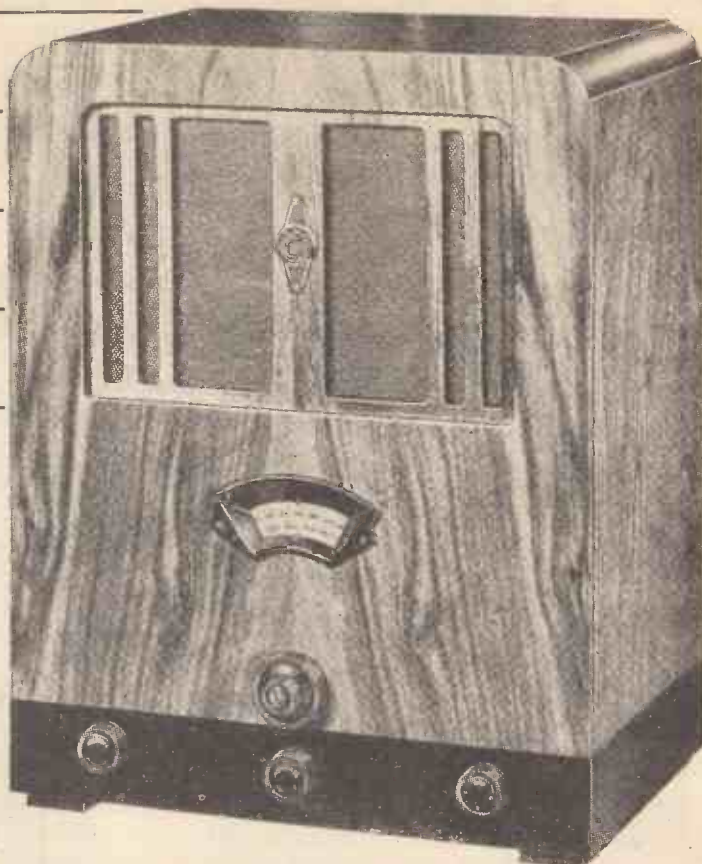
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News and Gossip of the Week

All Britain's Set!

IT has all the hall-marks of a positively great set. That is the opinion of all who have been privileged to hear and work the All-Britain Three.

Get along to pages 365 to 370 and read about it for yourself—the second of the Crusaders' designs. And in many ways the best three-valver we have ever designed.

For the Beginner

YOU can begin to understand wireless without tears if you read the new series of articles that starts this week under the alluring title of "Learn with a Smile."

Even old hands will probably find the series useful in brushing up technicalities they thought they knew—but didn't.

Maida Vale, Now

NOW that the engineers have got Droitwich off their minds, Maida Vale is their next excitement. The main orchestral studio is now finished and the control cabinet and listening rooms are being wired.

Panels and amplifiers are being installed and some of the equipment is entirely new. A recording unit is being fitted which will "play back" within fifteen minutes of a record being taken.

New Recording

THE Watts system will be used for the first time by the B.B.C. By this method a composition covering to a metal disc on a turntable takes an impression from a needle which travels from the centre of the record outwards.

In this way the smaller centre grooves of the record—which are more tricky than the larger circles—are in use when the needle is new.

Another Innovation

A MOBILE gramophone unit with two turntables is another innovation at Maida Vale. Beneath the turntables are cupboards with racks for records and the whole outfit—in the usual B.B.C. ebony finish—is mounted on castors and can be wheeled into position wherever required.

As the studio is 125 ft. by 72 ft., time and trouble will be saved by having this cabinet where it is wanted. A flexible cable will connect the machine to plugs in the wall.

Other Studios

DESIGNS are being prepared for other studios on the site. Details remain to be settled, but accommodation for the dance-band and a general-purpose studio will be included.

Meanwhile, Henry Hall and his boys are moving from Broadcasting House to relieve the pressure on studios. From October 15 the band will be playing for a spell in No. 10.

Much Too Large!

THIS studio is too large for a dance band and too far away to be convenient. Some place nearer to Broadcasting House will have to be found.

They are looking for a suitable spot.

about the most popular song of the time.

But how will Eric Maschwitz get the right figures?

Series Shows

"PLAYBOX" is the title of another short feature. In this a compère will describe and give samples of music from new films and plays.

Ronald Frankau and Tommy Handley are joining forces in a new cross-talk act. As Mr. Murgatroyd and Mr. Winterbottom, they will broadcast once a fortnight.

"Dotty Ditties," another series show, aims to become the silly symphony of radio.

If this idea intrigues you, imagine the sound part of a Walt Disney film without the picture!

wanted, signals can only be modulated to a depth of ten per cent.

So to give the same service over the same area with single-sideband working, Droitwich would need to be about one hundred times more powerful. Guess they will have to improve that modulation figure!

Newcastle Changes

DROITWICH gives a strong signal in Newcastle and some changes will be made in the local programme on October 8.

The North Regional Children's Hour will be broadcast in place of the dance music which has been relayed from London.

Not the Critic!

"GEOFFREY," who is helping "Mac" in the London Children's Hour, is not the well-known radio critic with the same Christian name.

In private life he is a Mr. Prout.

No Mike Crasher!

GERALD COCK is preparing a teaser which will give the "O.B." engineers some extra work. They like it!

The idea is to relay all kinds of sounds and then ask listeners to guess their origin. The scuffle as a "mike crasher" is repelled from a restaurant is not, at present, included!

B.B.C.'s Posterity Stakes

THE B.B.C. is determined that posterity shall have a record of its early work. Archives are kept at Broadcasting House and antique engineering equipment will be displayed in a "museum" at Avenue House, Clapham, when the new building is finished.

The new premises are going up alongside the old Victorian mansion, which serves as depot for stores and equipment.

The Launch "O.B."

WHEN the new Cunarder slid down the slips at John Brown's yard, we heard the first ever of a launch sound-picture.

"O.B." men spent several days studying the layout before fixing the mike points. They were ready to float a microphone and risk its loss in order to get the sound of waves tapping the hull, but in the end it was not necessary, they found to cast their gear upon the waters of the Clyde.

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"Best Sellers"

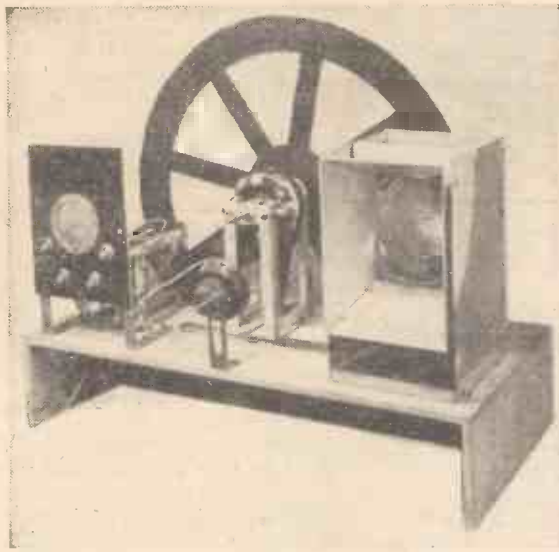
THE informality of the "In Town To-night" shows has proved infectious and is spreading to other parts of the variety programmes. Short, snappy features are the order of the day.

In "Best Sellers," a new monthly programme, tunes will be played which head the list of sales of records and music. This method should put an end to speculation

Single-sideband Signals

IF you hear a single-sideband transmission around 1,500 metres it will be Clapham calling at the research station. B.B.C. engineers are experimenting with a system which, if perfected, would enable twice as many stations to use the ether.

The difficulties of the Lucerne Plan are not likely to be solved that way. If first-class quality is



One of the very simplest types of apparatus for receiving television signals. This home-made receiver uses a disc for scanning and a neon lamp to interpret electric-current changes as light variations

TELEVISION is not yet, strictly speaking, a science or an art. It's an ambition! For years, scientists in many parts of the world have been trying to solve the problem of seeing at a distance.

Which is what television means—*seeing at a distance*. Not in the same way as a telescope enables us to see at a distance, but in the much more spectacular way of seeing through brick walls, houses, mountains, across oceans.

Television is trying to give us all an extensible optic. It is trying—some say it has succeeded—in many and various ways to make use of wireless waves as the medium of this seeing at a distance.

In wireless waves, we have a ready-made medium of long-distance communication. It is true that until now this medium has been devoted exclusively to the contacting of intelligences by sounds—or rather their electrical counterparts. But from the purely wireless point of view, there is nothing to stop us interpreting light waves into the same intangible medium.

"Stuff" of Television

Perhaps that is not quite true. There are communication difficulties in television, as we shall see later. For the moment, though, the more detailed job of converting light waves—the "stuff" of vision—into high-frequency wireless waves is the most interesting point.

Now you just think for a moment of what happens in ordinary broadcasting. A man speaks into a microphone at the studio. His speech consists of composite sound waves, all of which impinge on a sound-to-electricity converter called the microphone.

This microphone has the wonderful ability to "hear" electrically the exact sounds impinging upon it—be they ever so complex. The microphone does not stop to analyse the trill of a soprano or the blare of a band's crescendo—it just vibrates in sympathy with the sound as a whole.

No less wonderful at the receiving end is the way in which the diaphragm of the loud-speaker vibrates to produce the complete sound all of a piece, so to speak. Years of familiarity with wireless can never quite breed contempt for the unique wonder of the miraculous vibration that makes sound broadcasting possible.

What a pity, then, that there is nothing analogous to the microphone and the loud-speaker in this new thing called television. It is just because we cannot find a device that will "see" a picture all of a piece as a microphone "hears" sounds that television is still such a problem.

As soon as we begin to think about television, we come slap up against the well-established science of optics. Not an easy science for the layman, with its mirrors and lenses and prisms and things.

But, optically speaking, we can say that we see things "all at once"—as distinct from any question of succession. When we see, for example, a bus coming down the road we see the picture all at once—light waves from every point arriving at our eyes simultaneously—and, at short distances, practically instantaneously.

Get out that album of yours, and look at any photograph. What is the picture made up of? A very large number of shades or gradations of lightness and darkness. What makes the picture what it is? Surely the relative positions of these varied shades—and their degree of brightness?



Philo Farnsworth, 27-year-old television research engineer of America, is seen here demonstrating his latest apparatus—focusing the picture at the transmitting end

You don't need to know this just to look at and appreciate that the picture is of dear old Aunt Sally. But before you could hope to "reproduce" Aunt Sally, you would have to understand that her "picture" was made up by the positioning of this vast number of shades in a certain relation to one another.

Already, you see, your problem is pretty stiff. You have to find something that will interpret electrically a picture made up of an almost infinite variation of light areas—and in a fixed relative position to one another. There is nothing yet discovered that will do this at one go.

Devices so far discovered can certainly give us an electrical counterpart of any light intensity—can vary electrically as light impinging on them is varied. But they can't

do this for more than a single light element at a time.

On the face of things then, television, looks a fairly hopeless sort of proposition, doesn't it? But actually the position is not quite so gloomy as all that. There is, mercifully, a natural phenomenon known as "persistence of vision." But for that remarkable effect television would indeed appear to be impossible. So, too, would the cinematograph—but that's another story.

Time Lag in Our Eyes

Thanks to the slight but appreciable time lag in our eyes' action, we can send to it a succession of light signals, and so long as one follows the other before the eye has time to "forget" we can gain the visual impression of "oneness" where actually at any given moment there is no "whole-piece" picture but only a very small constituent part—only one light element, as we say.

Television therefore assumes that we will

THIS is the first of a short series of articles aiming to give the wireless listener a rudimentary introduction to television. The articles are written in as nearly non-technical terms as possible. It is not intended to go into details of any one aspect, as that would be outside the scope of the present series. For more detailed information you should make a point of reading "Television," our monthly contemporary, which always includes articles for the novice.

look at the original picture piece-meal—a little bit at a time, but that we will explore—or scan—the whole picture in this way so rapidly that the eye gets the impression of a "one-piece" complete picture.

The device that can "see" one light element at a time is often called the electric eye. Actually it is a photo-electric cell—a bank of which are usually used in modern television experiments.

Between the electric eye and the object or picture is the exploring device—enabling a little spot of light to travel rapidly over the whole light area in which the object is confined. The object is thus scanned or looked at a little bit at a time, and its light message is picked up bit by bit on the photocell, which in turn interprets these successive light changes as electric-current changes.

These changes can be made to modulate a transmitter just the same as do the electrical changes in the microphone.

But it is very important to note, before we go any deeper into the problem, to understand that the whole succession of changes—the whole process of scanning, that is—must take place within a fraction of one second, otherwise the persistence-of-vision effect is lost.

It may sound a colossal task, but in practice scanning itself is a more or less straightforward job. This will be explained more fully in the article, which will appear next week.—I. C. U.

Learn with A Smile!

By L. O. SPARKS

THE other evening I was preparing to settle down to try over some new records when who should blow in but my worthy friend, Smithers. I could see at a glance that he was not himself. He is usually bubbling over with life and importance and goes around handing out thumps on the back which seem to jolt one's teeth out.

He Couldn't Get a Squeak

I feared the worst, and made a silent vow that I wasn't going to have my evening messed up by anybody when I remembered his help with my soldering difficulties. Well, to cut a long story short, he blurted it out in the end. He had undertaken to put his aged and wealthy uncle's set right, but something must have gone wrong, as he couldn't get a squeak.

THIS is the first of a series of informally written articles for the newcomer to wireless. We are not assuming that you know absolutely nothing about wireless—several volumes would be needed to help you in that condition. But we are assuming that you have a rough-and-ready acquaintance with the subject—though puzzled with many of its problems. "Smithers" is taken as typical of the listener who does not know—but wants to. Follow him on his journey of enlightenment and you too will learn—with a smile, we hope. That is really the whole idea—to teach the elements of wireless without tears!

There was nothing for it, I suppose, but to try to help him out, so I told him to bring the remains with, I must confess, a certain degree of jubilation that it was now my turn to show the mighty Smithers something.

"Here it is," he exclaimed, when he returned, bearing a large cabinet which looked considerably more ancient than his esteemed uncle. I let him into my work-room—I daren't tell you what my wife calls it!—and dumped the box of tricks down on the bench. After a hasty glance at the set I proceeded to disrobe it until the hideous thing was exposed to our gaze.

"My sacred aunt!" I gasped. "When in the world was this made?"

"I don't quite know," answered the very humble Smithers, "but I think it was quite some time ago. What I had in mind," he continued, as I flicked various cobwebs off the 'innards,' "was to modernise it a little."

I chuckled a couple of chucks. "You know what you want to do with this," I said, "keep it until November the fifth and use it as a foundation for the bonfire."

Poor Smithers! I could see that his visions of getting into Uncle's good books were rapidly fading away, so I added rather quickly: "Now, then, out with it! Just what do you expect

me to do with this relic?"

"Well, the trouble is," he explained, "the set has no power and all the stations come in together. It has no—no, ah, what do you call it?"

"Oh, selectivity, you mean," I answered, looking very learned.

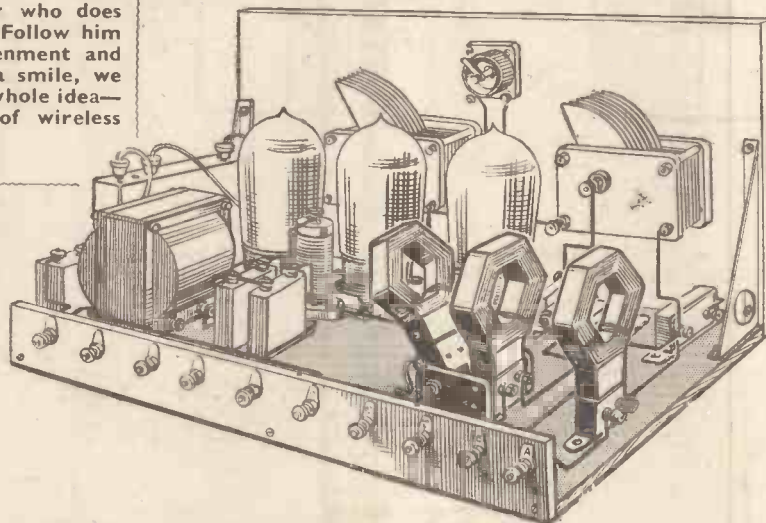
"Yes, we do say a set is unselective or very selective, according to the way it can tune-in a station without another one on a near wavelength butting in all the time.

"You can't expect a thing like that to be selective, though," I told him.

"Why not," he asked, "it looks a good coil, and the variable condenser seems quite good. Besides, it used never to mis-behave when it was first made."

"My dear old chap, when this set was made I shouldn't think there was more than 2LO working. You completely overlook the fact that the stations nowadays are jammed as close together as they can get them and, unless the set has good selectivity, you are bound to hear some in the background.

"Another thing that you have to remember is that this selectivity business depends upon the number of variable condensers and coils (tuned circuits) used in a set. Therefore, you



This is Smithers' old set, which for reasons explained this week is much too unselective for modern wireless reception conditions. Note the old-fashioned coils, which are unselective and cover only medium waves

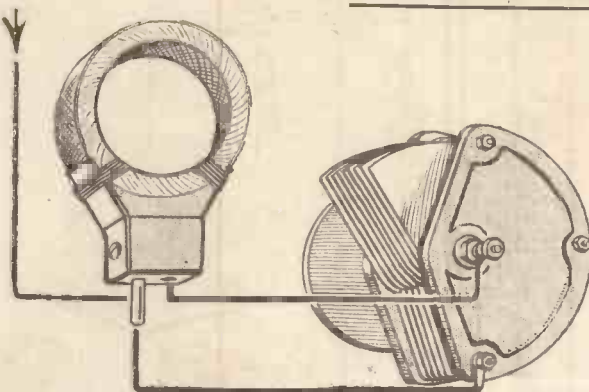
cannot expect the same degree of selectivity from a simple circuit as you would from some of the more complicated kinds."

"But we've got two variable condensers and three coils in this . . . er . . . set, haven't we?"

"Yes, we have, certainly, but unfortunately the coils were designed in the days when selectivity was not a vital problem and we were out to get all the power we could."

"Why, what's power got to do with it?" he asked. "Surely the coils don't affect that?"

"Get this under your hat and bear it in mind in future," I exhorted. "The more selective you make a set the more you reduce its power and if the point is carried far enough you will affect the quality of reproduction.



One of the simplest possible tuning circuits, a plug-in inductance coil with a parallel variable condenser

"It comes back to the old saying that you can't have your cake and eat it, so designers have had to compromise between the two."

"Well, what do you suggest, then?" he asked, with rather a hopeless expression. "Can't we fit those coils that are all boxed up and provided with a switch?"

Silently said Goodbye

"Why, of course we can—as a matter of fact, I have a pair here. The very latest type," I said, as I brought them out of the cupboard and silently said goodbye to them.

"Ah, they certainly look posh!" exclaimed Smithers, his hopes now rising. "H'm, switch and all," he chortled—like a kid with a new toy. "Here, I say, though, what is the difference between these and those other things?"

The big gump wasn't satisfied with winning a pair of coils—he must want to know all about their pedigree!

"Come over here," I invited, as I dragged him to a table and seized a pencil and some paper.

"Now look here, this is what your old circuit is like"—as I sketched out Fig. 1.

"Oh, heavens, old man, I can't follow that stuff," he apologised. "Well, it is about time you learned, then," I said. "I can't see why you fellows get mystified. Surely, the curly bit looks like a coil, doesn't it?"

"Um, yes, I suppose it does," he replied, "but it's rather confusing."

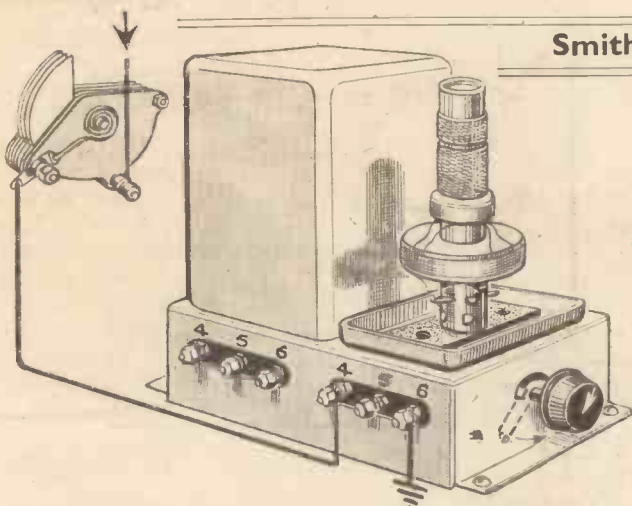
I tried to sketch it out in pictorial form, showing the plain coil with the variable condenser connected to its two terminals.

"There you are, then; can you understand that? You see, the aerial comes straight to one end of the coil and goes to the grid of the valve, which in this case is used to make the signals louder before they reach the detector. We folks usually call a valve doing this job a high-frequency amplifier.

Improving the Selectivity

"Well, by connecting the aerial at this point we get the strongest signals but the most unselective results. If we make our coil so that we can try the aerial at two or three points along it—see Fig. 2—we find that as we go down the coil towards the earth end the tuning will be sharper and the power will decrease slightly. Another way you can improve the selectivity is by winding on another small coil—Fig. 3—and connecting this to the aerial. This is called a coupling coil and the

Smithers Learns All About Tuning Selectivity



Modern screened type of two-coil unit, such as Smithers was recommended to use to make his old set selective. Note the small condenser in the aerial lead

number of turns will govern the degree of selectivity. This method is used quite a lot as it is very simple and efficient."

"How about the question of long and short wavelengths?"

"In your esteemed uncle's... ah... set you had to heave out three coils, scratch around and find some as big as a cart wheel and then proceed to plug them in, if you wanted to receive the long wavelengths.

"Speaking from painful memories, that used to be a job which hardly soothed tired nerves, as it was usually impossible to see inside the set without a match or light of some kind. In these enlightened days we simply flick a switch to make the change and this is how the windings are arranged to enable us to do this—Fig. 4.

"The medium wavelength section is usually wound with larger wire than the long-wave portion, as you can readily understand that the former has a comparatively few turns to the other.

When we want to receive the medium wavelengths we must arrange so that the long-wave part is completely ineffective. This is easily done, luckily, by a simple make-and-break switch which is connected right across that portion of the winding as shown in the diagram."

By now poor old Smithers was gaping like a fish. "I've got you," he said after a pause, "... actually, you earth the unwanted section of the coil?"

"Wonderful, old boy! The switch, mind, can be housed in the coil base or mounted on the panel, according to the make and type of coil."

"Why is it that the present-day coils are so small and put in these metal cans?" asked Smithers.

"In the first place, the coils

are canned or housed in metal cases to prevent them affecting or being affected by any other components. In some circuits this is very important, while in others of the more simple kind it does not matter so much. This called for small and efficient coils, otherwise the cans would have been too bulky. So somebody had the bright idea of bunging some metal in the middle of the coils and found that they could then reduce the size of the coil and the quantity of wire used. Incidentally, inserting this iron core improved the general efficiency.

"The cans not only screen the coils as I have just mentioned, but they also prevent them from actually picking up the signals from a powerful station, thus again increasing the selectivity."

Fig. 5 and sketched the coil unit. "You can see it is not very difficult."

"But what is this?" he asked, pointing to the small variable condenser I put in between the aerial and the coil.

"Oh, that... why, that little fellow helps quite a lot to increase the selectivity and can be added to practically any aerial circuit with great advantage."

"There are various kinds of condensers for this job. The condenser I show can be either a small variable type or it can be of the pre-set type, with a maximum capacity of .003-microfarad."

What's This Pre-set?

"What do you mean—pre-set?"

"Ah, yes, of course, you don't know that. A pre-set, as its name implies, is a little condenser whose capacity can be adjusted and then set fixed at that point—pre-set, in other words, to the capacity giving you just the right capacity for the degree of selectivity required."

"But don't you want to vary this condenser?"

"Well, it all depends. If your set hasn't a proper volume control, the pre-set is sometimes used instead. As you decrease the

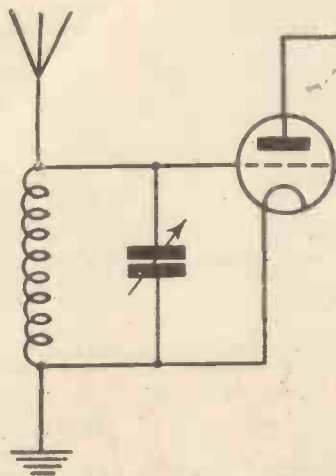


Fig. 1.—Plain coil and condenser tuning—very unselective

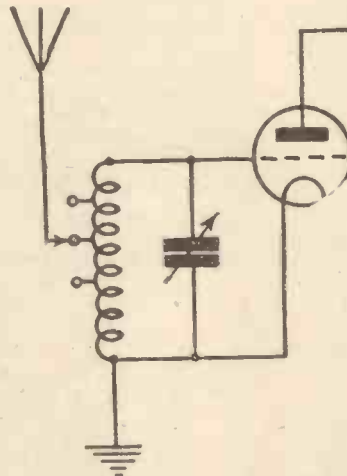


Fig. 2.—Tapped coil reduces aerial damping—increases selectivity

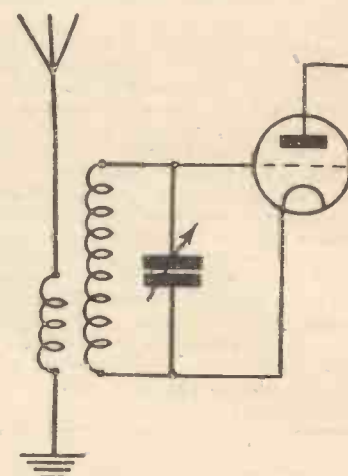


Fig. 3.—Separate coil for aerial and earth also improves tuning

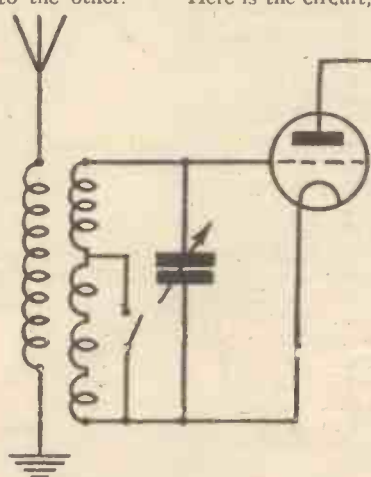


Fig. 4.—A make-and-break switch is used for all-wave coils—large coil shorted for medium waveband

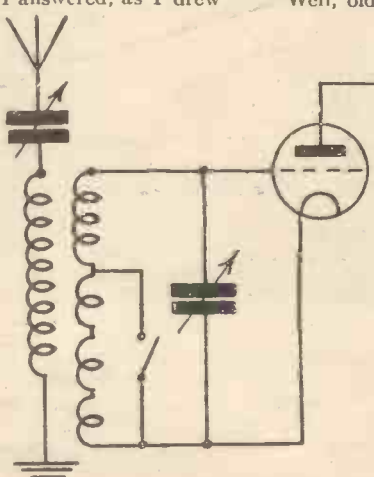


Fig. 5.—Circuit for Smithers with all-wave coil and aerial series condenser for selectivity

"I say, that sounds very hopeful," chortled Smithers, "but how is it connected up to this outfit?"

"Here is the circuit," I answered, as I drew

capacity you increase the selectivity but decrease the aerial input and hence the volume output as heard in your loud-speaker.

"Well, old chap, it is awfully good of you, but what is the next step in rejuvenating the old music-box?"

"My hat!" I exclaimed as I looked at my watch. "The next step is for you to pick up the set and *scram*. The wife is due back any moment now and I haven't put the coffee on yet.

Pick up the Exhibit!

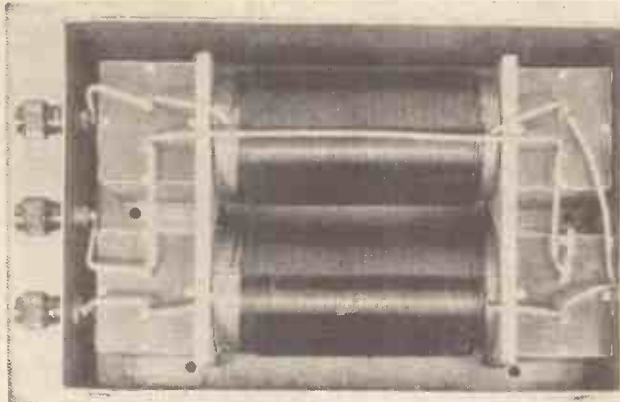
"Come on! Pick up the exhibit and get that coil unit fixed, and I'll see you again soon—and perhaps tell you more about the thing."

"Here, but I say," he gasped as I helped him to the door, "what does *band-pass* mean? Isn't that..."

"Band-pass my hat. *Scram!* Here is the wife coming and the coffee is still cold. Good-night!"

This Unit Tames Noisy Mains

With this issue of "Amateur Wireless" our inimitable—we use that word advisedly—contributors hiding their amateur identities under the pen-name "The Experimenters," return to delight the hearts of all true experimenters. In their free-and-easy style—which has been sub-edited as little as possible!—these two keen amateurs will give you week by week plenty of scope for



radio experiments in your own homes. Their articles are real-life records of work actually done beforehand—they never write an article just for the sake of filling space. In this introductory article "The Experimenters" offer a really helpful suggestion for cutting out that bane of so many mains-set users—background crackles and other noises. You can make your chokes!

If you imagine that we are going to tell you where we have been all summer, we're afraid you're doomed to disappointment. Because, much as we should like to recount a few of our more diverting adventures, the Editor has sternly forbidden us to do so.

"You chaps have been away quite long enough," he said; "so that, now you are back, don't waste time—and our space—in telling readers about your holiday frivolities."

Still, we are sure you would like to know we are fine and dandy—full of that vitamin A you see in all the fancy-food "ads" these days. Oh, yes, and we are beautifully sunburned—tanned beyond belief by the sun of (remember what I told you!—Ed.)—oh, well, never mind.

Never Heard of Us?

It occurs to us, ever modest and full of inborn humility, that some present readers may never have heard of us. At this time of year all the wireless papers' circulations seem to swell with novices and newcomers to the great game. AMATEUR WIRELESS is, apparently, no exception, adding teeming thousands to its already robust readership.

That being so, as we say, some of you may never have heard of "The Experimenters." We are two amateurs—er, someone once said "gifted," but we don't insist on that.

In his omniscient way the Editor opened the pages of AMATEUR WIRELESS to us last year—and had a deuce of a job to close them for months afterwards. We very nearly monopolised the paper, in fact.

Readers seemed to like the stuff. It was not always original—and, for our sins, we must say not always utterly free from silly little mistakes. But, then, we never did pretend to be experts—either at wireless or writing.

Well, well, whether you know us of old—or are just wondering who these chaps are to think so much of themselves—we are back again and hope to stay back for some months. In fact, if enough of you write in to the Editor he might even be persuaded to keep us in for the whole winter.

For a kick-off we are

not going to attempt anything very bright. It seems to us that this would impose upon ourselves a terribly high standard that might be just a little difficult to live up to.

When we did get back from our travels—oh, yes, we have travelled!—we were met with moans on all sides. Listener friends came to us

By

The Experimenters

with sorrowing tales of interference, of background crackles, hisses and bangs and things.

Electricity, the boon of the tired housewife, is the bane of the listener. Epigram number one—please chalk it up, someone.

Every time the white woman's burden is lightened with a vacuum cleaner, electric washing machine, or other domestic appliance the air is filled with "noises off"—and on.

"Now that you ARE back," moaned a near

friend, "for goodness sake DO something about all these crackles—or I'll sell my set and buy a piano."

That settled it. We had enough of Sammy's ear playing in the pre-wireless days. Anything better than that. Off came the travel-stained coats, on went the nice clean workshop overalls—and a new gadget was conceived.

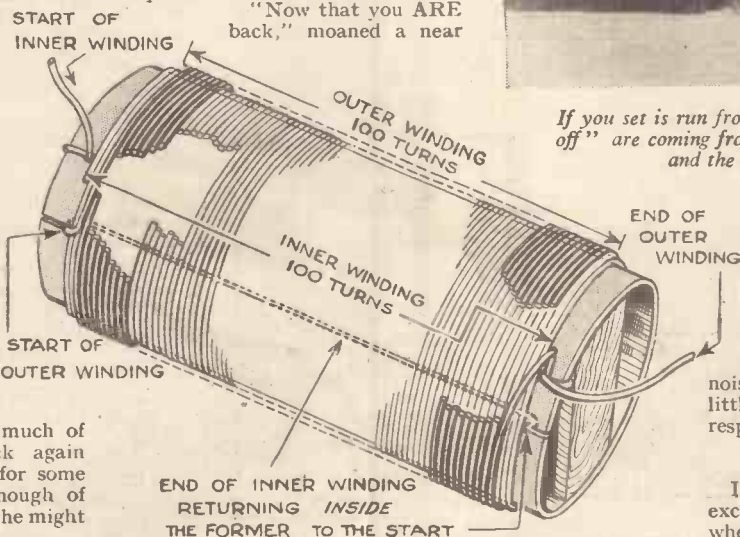
We made ourselves a gadget. Quite a simple sort of gadget. Nothing very special in gadgets. But, nevertheless, a gadget that does a lot to cut out those horrible crackles and hisses and bangs, and—well, you know.

If you look at the nice drawings done by the staff artist—that man is a bit of a genius, don't you think?—you will get the main idea.

It is nothing more or less than a mains-noise stopper; so, before you go any further into what it does, perhaps we had better decide



If your set is run from a mains unit is it just possible the "noises off" are coming from the mains. This unit between the mains and the unit will help to cure the trouble



From this detailed drawing of one of the high-frequency chokes you can see how the two layers are put on—100 turns per layer. Note the end pieces of wood for fixing to the framework.

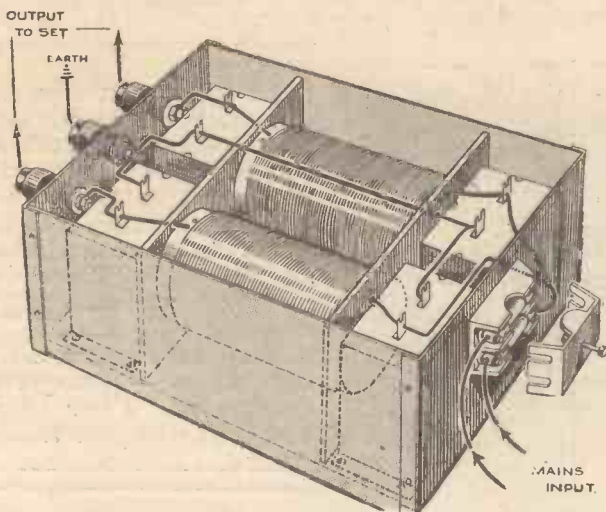
whether your particular trouble really is coming in via mains—or whether, as is not wildly improbable, it is an aerial parasite. Let's assume that you are pestered with crashes, bangs, and such-like noises in the background. How to prove that it is coming in through the mains? Quite easy! Just take off the aerial and earth connections. If the noise is still there, or only goes down very little, you can be sure that the mains are responsible.

If the Noise Stops . . .

If, though, the noise stops, with perhaps the exception of the slight hum you usually get when the earth is taken off—well, that is another story. We shall have to deal with that another time.

For now we will assume that the taking off

ONLY IN "AMATEUR WIRELESS" CAN YOU FOLLOW 'THE EXPERIMENTERS' EACH WEEK



Now you really know how the unit is assembled! An artist's impression of the completed mains-noise suppressor, showing how the two high-frequency chokes and four condensers fit snugly

of the aerial and earth does not materially affect the noise and that you are justified in assuming the mains are responsible—are carrying in some way interference from nearby electrical apparatus connected to the same supply.

We Were Sorely Troubled

A little example will prove the effectiveness of this gadget to cut out mains noises. Last winter we were sorely troubled with very bad, but mysteriously intermittent, background noises on all our mains-set tests. Post Office engineers were baffled. Application of the usual commercial suppressors was unavailing.

Quite by accident we found out that the snake in the grass was a maker of billiard-cue tips. He was making these out-of-the-way whatnots in a private house with the aid of a little four-horse-power motor, which not unnaturally was being badly overrun.

Of course, had we known all about these goings-on in the first place, we might have been able to put some condensers across the brushes of his motor—thus stopping the interference at its source. We didn't know that at the time; but we did cure the interference, in spite of our ignorance.

Most of you probably know that the normal interference suppressors consist simply of two large fixed condensers connected in series across the mains, with the centre point going to earth. Quite effective, too, on many mains supplies. In fact, the Post Office consider this the almost universal remedy.

Really Effective Filter

We have gone a step ahead of the estimable P.O. men, though. Double the amount of smoothing has been used and a high-frequency choke has been inserted in each side of the mains supply. Altogether, then, we have a really effective filter.

Another very important point is that the whole box of tricks can be made up from components for a total cost of not more than 30s., which, in view of the very great boon of silence it confers on reception, is not dear, do you think?

For flat-dwellers plagued with vacuum cleaners, lifts, hair driers, and so on, the gadget is a sure cure for the resulting noises.

Then there is the question of clicks from light switches—another bane in flats, and even in houses. We find that with our gadget fitted to the mains all the clicks, except those

caused by the switch in the actual reception-room, are entirely wiped out. And if you put a condenser across the room's switch you can cut even that out.

Before we go into the making of the gadget, just you take a look at the circuit diagram. You will see that the input from the mains is fed into a fuse box—a precautionary measure we are sure you will approve of.

From the safe side of the fuse box the mains go to the high-frequency chokes. These are specially designed to carry 4,000 watts—a good bit more than you are ever likely to want in a radio set. The chokes are by-passed on both sides by two 4-microfarad condensers in series, with centre points connected to earth.

The whole group is mounted inside an iron case—quite a compact affair, only 3 in. high, complete with lid. At one end are three terminals, the outside two being for the output and the centre one earthed.

We beg you to make very sure that the outside two terminals are carefully isolated from the metal box—special washers are supplied with the terminals for this—while the centre inside terminal must make actual contact with the case.

About the components. The 4-microfarad condensers are 300-volt-working type, such as you can get from T.M.C. for 5s. 6d. each. The two high-frequency chokes we wound ourselves. You can see how from the detailed drawing. If you hate coil-winding, you can buy them already wound from Kimber & Allen, of 8 Myron Place, Lewisham, S.E.13, price 5s. each.

The metal case can also be made at home, though we admit it is a bit of a job for the novice. Peto-Scott has promised us that they will make up suitable cases for readers who want them. Write to this firm at 77 City Road for further details.

Perhaps we ought to tell you how to make these chokes—if only to prove that we do know how. First, two pieces of paxolin former, 2 in. diameter by 5 in. long. We got our formers from Wright & Weaire, by the way.

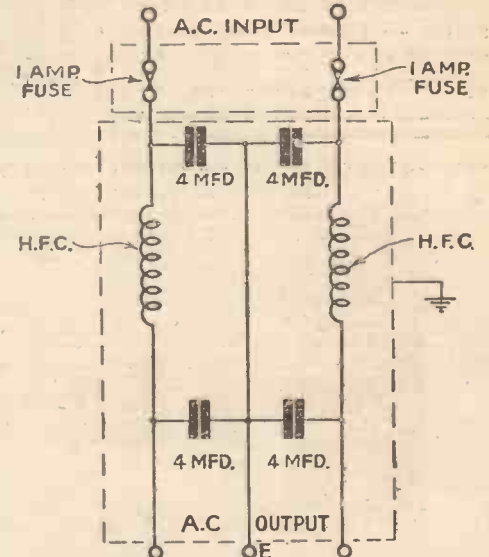
Then you want 1 lb. of No. 18 gauge enamelled-covered wire. Look at the drawing and you will see that you wind on one complete

layer of 100 turns. At the end of the first layer winding you cut a little slot in the former, take the wire through this slot, pull it up through a slot at the other end of the former, and then begin all over again with the second 100-turn layer. This is easier than it sounds because, in any case, 200 turns is not much to worry about—and the gauge of wire is thick enough to make the double layer extremely manageable.

When You Have Finished

When you have finished congratulating yourself on making one high-frequency choke according to our specification, make another.

Now for the usual snag, inseparable from our ideas. Of course, if you are really clever at making things, there isn't any snag; but we ourselves are pretty poor at sheer mechanical work. The spot of bother—imaginary or real, according to your upbringing—is in the fixing of these chokes to the baseboard.



Complete theoretical circuit diagram of the unit. From this you will see that it consists of two high-frequency chokes with four by-pass smoothing condensers. In addition there are fuses in each mains lead

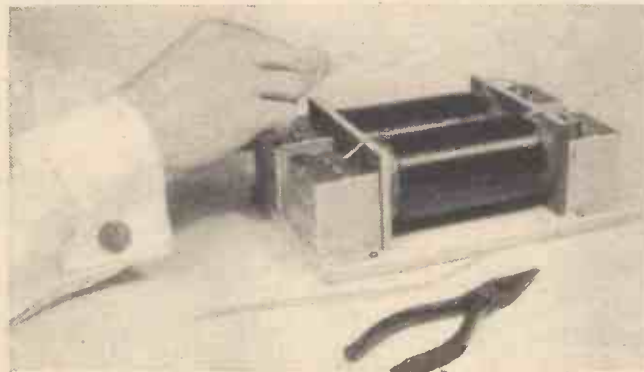
We got a small piece of plywood about 1/4 in. thick, cutting four pieces 2 in. long and about 1 in. wide. We shaped off the ends of the wood with a penknife so as to make them fit snugly inside the formers. Then just fix these inside and permanently anchor them with a couple of brads through the former into the wood. The drawing shows all this; so we won't furrow our brows any more trying to explain it.

You now need two more pieces of plywood, 5 in. wide by 2 1/2 in. high. These are screwed to the baseboard 5 in. apart and about 2 in. in from each end of the baseboard. Then you simply drop the chokes down between these end pieces and put two wood screws through each end piece so that they go into the wood struts—or whatever you like to call them—so laboriously fitted into the ends of the coil formers.

The rest is child's play; we found it easy. Don't be in such a hurry as we were, though. We put the terminals and fuse box on the metal case first—and had to take them all off again in order to get the baseboard inside.

Four wood screws will hold each of the condensers on the baseboard, and then you can

Continued on page 361



Final wiring up of a condenser of the unit before inserting the baseboard into the metal case. A very simple job!

THIS SEAL ... AND WHAT IT MEANS TO YOU!



It means that the component inside the carton which bears this seal has been designed and manufactured to the highest standards of efficiency by a production technique evolved only after long and extensive research, and from materials controlled at every stage for quality and accuracy of dimension. It means also that the component has passed the most exacting tests in the process of production, and that its mechanical and electrical precision, its freedom from breakdown and its permanent efficiency are definitely guaranteed.

THEREFORE ALWAYS INSIST ON

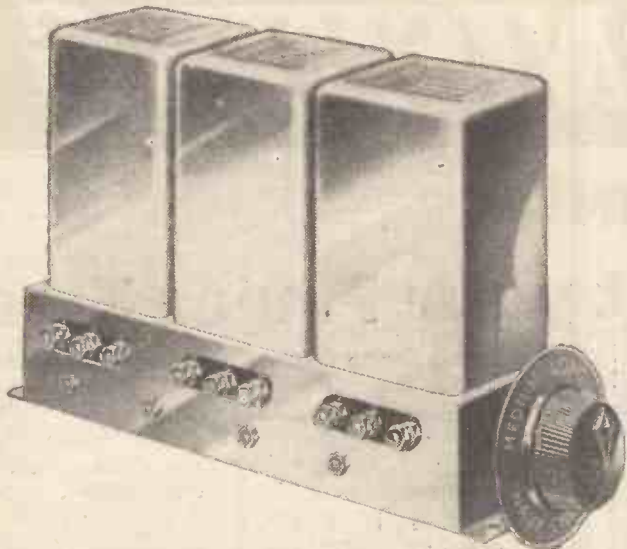
TELSEN
Triple Tested
GUARANTEED COMPONENTS



Permanent efficiency

with matched performance—the outstanding characteristic of all Telsen Components—is an exceptionally distinctive feature of the new Telsen Superhet, Preselector and Oscillator Coil Unit with built-in switching.

A solenoid short-wave winding ensures lowest self-capacity, "skin-effect" (the tendency for the current to flow only on the surface of the wire) being largely reduced by the use of stranded fine Litz wire. This is also used for the long-wave winding, in which case the wire is built up in a cylindrical form, each turn being air-spaced from the next. The built-in switching employs non-corroding gold/silver alloy contacts, supported by high quality phosphor bronze strips, with a snap-action cam, operated by the wave-change knob. In addition, a special type of iron core is employed, giving considerably increased permeability (nearly 40 per cent higher than earlier types) with a further decrease in the total loss.



TELSEN SUPERHET, PRESELECTOR & OSCILLATOR COIL UNIT

Consisting of an oscillator coil and two iron-cored coils, providing the maximum selectivity when used in a Superhet circuit. The Preselector coils can also be used as a separate Band Pass unit where an H.F. stage is not employed.

30'



ANNOUNCEMENT OF THE TELSEN ELECTRIC CO. LTD., ASTON, BIRMINGHAM

On Your Wavelength

The Week's Radio Gossip :: By THERMION

Car Radio is Fun!

I SPENT last week-end tootling round the countryside with a friend who has just had his car fitted up for listening on the road—and very good it was, too. Quality first-rate, and remarkably free from fading, except once, when we ran through a deep-cut road between heavily-wooded hills.

Not a sign of "spark" disturbance either, though I listened for it carefully. As far as I remember, the only local interference we got came from the tram-lines on our way out.

Car radio is still sufficient of a novelty to attract attention from other users of the road. In fact we created quite a sensation in one village, when a group of "the lads" registered mixed emotion at hearing a powerful soprano voice coming from a car where it obviously shouldn't. However, we were out of range before they discovered the solution—if any!

I am told that over a million motorists were listening-in "on the road" in America at the end of last year, and that another half a million sets have been sold since, and I can't say I'm surprised. It is definitely an attractive proposition for those who are inclined that way.

Let's Be Technical

WHEN electrons are passing through a valve, the speed at which they move is controlled first by the voltage on the grid and afterwards by the high tension on the plate, which causes them to accelerate quite a

lot. In spite of its almost infinitesimal size, each electron possesses a certain amount of mass, and mass in motion is the same thing as energy. One electron-volt in fact measures the energy acquired by one electron in passing through a potential gradient of one volt, and it takes nearly a billion of them to make one erg.

This sounds too small to be worth talking about, you may say, but, on the other hand, all sorts of things begin to happen when the EV figure gets beyond a certain value. In a gas-filled tube, for instance, ionization sets in and produces a glow discharge, whilst in the case of a hard valve high-speed electrons can cause a lot of trouble. They begin by knocking secondary electrons off the plate, and these get mixed up with the main stream and so interfere with the proper working of the valve.

"Crowding" the Layer

SOME time ago I referred to a curious kind of interference which is liable to occur when two high-powered stations both send their waves into the Heaviside layer at the same time. In the ordinary way, waves pass through the layer just as they pass through the ether—except for an occasional spot of fading. But if the layer is "jostled" by two high-powered waves at the same time, things begin to happen. Each signal starts to "modulate" the other in such a way that it is impossible to separate them afterwards by any amount of tuning.

The effect was first observed in Holland where the Hilversum long-wave programme sometimes came in with a mysterious "background" from Mühlacker—in spite of the difference between the two wavelengths. And it was found impossible to disentangle the two programmes once they got welded together in this way.

I see that Professor Bart van der Pol has now discovered the same kind of interference between Athlone and certain other stations. So far the effect is more of a scientific curiosity than a source of real trouble, but one is never quite sure how these things are going to develop.

The Little Nationals

IN a bulletin just received from the B.B.C. I read that as from October 7, "between 5.15 p.m. and 6 p.m. Droitwich and the little Nationals will transmit a programme consisting of dance music and light music on alternate days."

The little Nationals, ye gods! These are the 75-kilowatt stations that but yesteryear we were hailing as "those giant transmitters of the Regional scheme."

How times change! It is not so long since Langenberg increased its power from 1.5 kilowatt to 15. It was then the most powerful station in Europe, at any rate on the medium waveband, and, of course, it was known as the giant. Now 75-kilowatt stations are called, even by the B.B.C. that owns them, the little Nationals!

FORMO COMPONENTS CONTRIBUTE TO THE

The ASTONISHING

EUROPE—and BEYOND—

at your Finger Tips

A home-constructed 3-valve set with Range and Selectivity, the equal of the most perfectly balanced "EIGHT-STAGE"

Bristling with new ideas and features—here is the 3-valve Battery Receiver that has astounded the experts! Never before has any 3-valve set boasted a comparable performance: volume, selectivity, sensitivity—these demand an utterly new conception of the capabilities of a 3-valver. Yet every constructional detail is rational—easy to follow. Complexities of assembly and wiring—superfluous gadgets—these are conspicuous only by their absence.

For twelve years Formo Products have held undisputed leadership in the Component field—this latest brilliant success in "The Raider" sets the seal on Formo achievement.

Complete details, wiring and operating instructions and a Free Full-sized 1/- BLUE-PRINT of the "RAIDER" are given in "CONTACT," price 3d., from all radio dealers and book-stalls, or post free 4½d. from



MASON'S HILL, BROMLEY, KENT

B.B.C. Orchestra on Tour

LONDONERS have had many opportunities of seeing the B.B.C. Symphony Orchestra at work under the conductorship of Adrian Boult, but so far the provinces have not got beyond hearing its performances. During the coming winter the orchestra is to visit four provincial cities, where it will give public performances.

The Symphony Orchestra will be at Manchester on December 5, at Bristol on February 13, at Birmingham on February 27, and at Dundee on April 2.

This is a sufficiently startling innovation. Still more surprising is the announcement that the orchestra will visit Brussels and give a concert there on March 12. Let us hope that one of Belgium's fine orchestras will return the compliment by visiting us.

Electrifying Britain

NOT so very long ago under four million out of Great Britain's eleven and a quarter million homes had electric current supplies of any kind. Recent figures published by a trade paper show that the total number of homes is now 11,297,795, of which 4,312,556 are supplied with A.C. and 1,080,244 with D.C.

Thus close on 48 per cent. of our homes are now on the electric mains. But it is quite wrong to jump to the conclusion that every one of these homes is supplied with current suitable for operating a wireless receiving set. In some cases the current is D.C. at 100 volts or a little more and you cannot do very much with that!

In other places, again (I dare say you know some of them—I do), the plant is so antiquated that the voltage wobbles all over the place and is never the same for many minutes on end.

We still have nearly six million unwired homes. Add on to these those with unsuitable electricity supplies and those whose owners

dislike the idea of mains sets, and you will see that the market for battery sets is still by far the biggest.

Training the Service Man

THE Radio Manufacturers' Association is backing a scheme for the training of wireless service men in different parts of the country. This is a thoroughly sound idea, for hitherto the wireless trade has been rather like the proverbial Topsy: it just grew.

The result is that, though you find a great many self-taught service men who are thoroughly good at their jobs, there are others, far too numerous, who know very little about the theory of wireless and rely upon luck or intuition more than anything else when it comes to tracking down faults.

A sound training scheme, besides raising the status of the radio mechanic, will be all to the benefit of the listener, since it will mean that when his set goes wrong it will be attended to by a competent man.

What Bad Service Means

THE incompetent service man can run the user of a wireless set into pretty considerable and completely unnecessary expense when breakdowns occur. I have no doubt that many readers have had experience of this kind of thing.

The set breaks down and the local "expert" is called in. Too often he arrives armed with nothing but a screwdriver, a pair of pliers and an ancient moving-iron voltmeter. After fiddling about for some time he announces that the valves are worn out and is bidden to fit a new trio, quartet or quintet, as the case may be.

This having proved of no avail, he shakes his head and says that he must take the set away with him. Later on he reports that the



"A.W." phot

Out in the park with our Family Portable—a good straight four described in our September 22 issue

trouble is obscure and that it must go back to the makers.

The trouble eventually turns out to be nothing more than, say, a broken-down primary in a transformer; but you find yourself stung for the cost of carriage both ways, for labour and so on.

Training in wireless servicing would aim at putting an end to all this silly business and any scheme that can ensure such desirable results has my blessing and, I make no doubt, that of my readers.

Valves and the Deaf

A GOOD while ago, now, I told you something of the wonders that had been done for the deaf by means of the wireless valve and of special apparatus used in conjunction with it.

SPECTACULAR PERFORMANCE OF

"RAIDER"



TWO-GANG CONDENSER Type DUS

Extremely robust construction. Finished in dreadnought grey and supplied complete with Chrome and Bakelite full-vision floodlit drive and Dust Cover 12/6

FORMO SENSITY COILS

The air-cored Litzendraht winding is disposed on a bobbin moulded of an entirely new material, and is mounted on white Steatite base having negligible H.F. losses.

The screening can, finished in dreadnought grey, adds just that touch of distinction to an already distinguished design.

Aerial Coil, Type T.I., without Reaction. 5/- each
H.F. Coil, Type P.P. 5/- each

FORMO METAL TUBULAR CONDENSER

An entirely new and up-to-the-minute Tubular condenser design, supplied in the following capacities:

1-.1 mfd. 1/6 each
2-.25 mfd. 1/6 each
Test voltage 750v. D.C. Working voltage 375v. D.C.

NOTE.—We are requested to announce that the Set known as the "Sky Raider" and described under that name in Radio Contact No. 1, will be known as "The Raider" so as to avoid confusion with the sets of certain other Radio manufacturers.



Philips photo

The Panchen Lama, one of the two supreme pontiffs of the Buddhist faith, bestowing his benediction upon Chinese during a recent visit to Shanghai. Note the "mike"!

The most difficult of all cases is naturally that of the deaf-mute—the person who is deaf from the hour of his birth and can never hear either his own voice or that of anyone else.

For a long time it has been possible to teach deaf-mutes to speak, but owing to the fact that they cannot hear their own voices they invariably develop a completely unnatural pitch. Male deaf-mutes, for instance, who have learnt to speak nearly always have high-pitched voices.

The Multitone Deaf-Aid apparatus has proved remarkably successful in enabling even those born deaf to hear and some of the results achieved are astonishing.

Bringing Out the Bass

HERE is a recent instance of the wonders that it does for those deaf from birth. At the beginning of September a gathering of old pupils was held at the famous Deaf School at Burgess Hill. To them the headmistress, Miss Hare, demonstrated the Deaf-Aid apparatus, which was new to most of them.

Amongst them was a young man who had been taught to speak but had developed the usual weird, high-pitched voice.

On using the apparatus he was able to hear both his own voice and the voices of other people. He decided to cultivate a natural voice and by hard work he had made such progress that when he returned at the end of his holiday he completely astonished his employer by producing a natural bass voice instead of the squeaky enunciation to which the latter had become accustomed.

"In Town To-night"

ON Saturday next "In Town To-night," the programme feature which was so popular with listeners last winter, will be heard once more. It will be in the programmes each Saturday, but from next week on it will be put half an hour earlier, running from 7 to 7.30 p.m.

This is part of the new policy of putting on good stuff from 6.30 p.m. onwards. For many years past we have sort of marked time until eight o'clock, when the evening programmes began. Now all this is going to be altered. The B.B.C. Dance Orchestra, for instance, will play twice a week between 6.30 and 8.30 p.m. and during the same period plays, variety entertainment, orchestral concerts and so on will be given quite frequently.

Worth Writing For

FROM the Cossor people I have just received a copy of a handy little forty-page booklet entitled "The Cossor Wireless Book." It

isn't just a catalogue of Cossor valves, but actually more than half of it is devoted to really valuable wireless hints. When I mention a few simple headings such as "How to Cure Motor-boating," "Tone Correction," "Automatic Volume Control," and "How the Super-heterodyne Works," you will see that it does contain some pretty good stuff.

I was so impressed with its usefulness that I have asked Mr. C. A. Quarrington, of Cossor's, whether readers could obtain it. He tells me that he will be glad to send a copy to any "A.W." reader who cares to write for it.

Well, there's the offer. It's up to you!

Wonderful Foreign Stations

MY long-distance reception log extends back for more than a dozen years and it is most interesting to turn over its pages and to compare conditions now with what they were in past years.

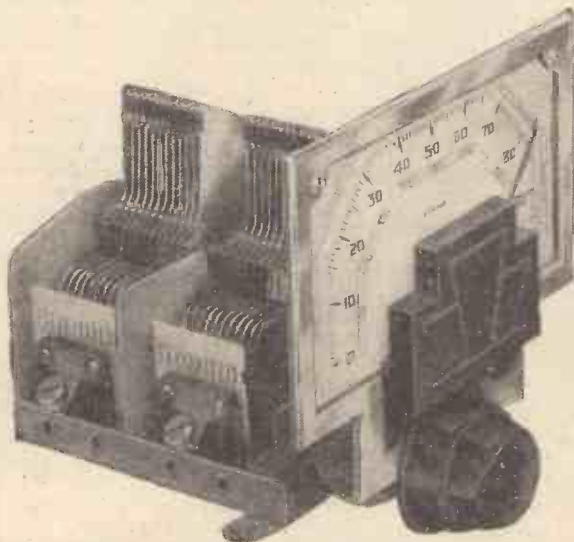
Without any hesitation I can say that never at this time of year have so many foreign stations been well received. When I say "well received," I don't mean that by screwing up reaction to its uttermost limit in a straight set or working a superhet all out you can just bring them up to loud-speaker strength.

What I do mean is that there are now so many stations that will give full volume from the loud-speaker when the set is working well within itself and therefore producing its best quality.

Here are just a few first-rate samples that you may care to try next time you feel like a trip abroad. On the long waves: Huizen, Radio-Paris, Luxembourg, Kalundborg, Oslo. On the medium waves: Budapest, Beromunster, Athlone, Stuttgart, Vienna, Florence, the two Brussels stations, Cologne, Rome, Munich, Leipzig, Milan, Berlin, Hamburg, Breslau, the Poste Parisien, Hilversum, Frankfurt, Trieste and Nurnberg.

Spectacular Success of

Miles ahead in design and purpose—



TWO-GANG CONDENSER Type DUS

Extremely robust construction. Finished in dreadnought grey and supplied complete with Chrome and Bakelite full vision floodlit drive. Dust Cover 1/6 extra. Price **1/1-**

Here they are—the complete range of Formo Components: advanced in design, purposed to practical needs, precision-tested. Remember this: twelve years ago Formo were laying the foundations of their present-day popularity. The antecedents of each component are these years of endeavour and solid experience. To-day no constructor counts his set complete without the inclusion of Formo Components wherever possible.

Ask for Formo Products when constructing or modernising your receiver. They achieve the greatest possible success in home-built radio—give results that will thrill and astound you. ALL good Radio Dealers hold stocks.

SINGLE UNIT TUNING CONDENSER

Type SU5

A really substantial Slow Motion Condenser supplied complete with full vision Mystic Drive requiring no special panel cut-out.

Extraordinarily low losses and consequent sharpness of tuning. Dreadnought grey finish. The full vision floodlit scale of the Mystic Drive is engraved in dual colours.

.0005-mfd. Capacity with Mystic Drive **6/6**



Triumph of Lucerne

THE list given in the last paragraph contains twenty-six stations, every one of which is a "cert." in the ordinary way. The stations mentioned, by the way, are just those that always come in well. I can extend it by about a dozen if I include stations that are nearly always well received.

Now let's see what was happening this time last year, before we had the Lucerne Plan. Here's what my log has to say about it. Instead of twenty-six reliable stations there were only fourteen. Which were they, you probably wonder? Radio-Paris, Budapest, Florence, Prague, Langenberg, Beromunster, Rome, Stockholm, Katowice, Toulouse, Leipzig, Strasbourg, the Poste Parisien and Hilversum.

A bit of a difference, isn't there? At this time last year no fewer than a dozen otherwise good stations are shown in my log as being perpetually heterodyned; heterodynes now very rarely occur on stations worth listening to.

This Unit Tames Noisy Mains

Continued from page 356

wire up the components as shown by our diagram. Then drop the baseboard down into the case, and finally fix the three terminals and the fuse box on afterwards.

Then you can complete the wiring, and all will be fun and games in the noise-infested household. It doesn't really matter which way round you connect up the unit. But perhaps it is advisable to connect the thing so that the fuse boxes come on the mains side.

The remaining side of the set, with the centre terminal going to the earth terminal of the set.

Well, that's it. Now, for goodness sake, don't go making up this unit until you are sure that your interference is mains-injected.

Start writing to us again—slang us as you did so charmingly during last winter.

Start Collecting These Panels!

A.W. Reference Sheet—No. 1

Grid-leak Rectification

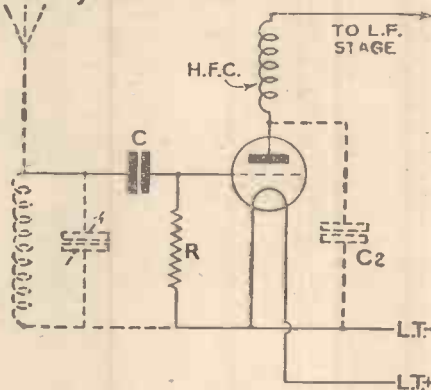
EVERY transmitter when in operation creates very rapid electro-magnetic waves. The rapidity or frequency of these is so high that they are beyond our audio range. The object of these is to provide a carrier on which to superimpose the electrical equivalents of the sound to be transmitted, and we refer to these as the "carrier waves." The superimposing process is known as "modulation."

When we speak of rectifying we really mean the separation of the high-frequency oscillations from the audio frequency. It is obvious, therefore, that every receiver must have some kind of rectifier to perform this function, and it is usual to employ one of the following methods—crystal, metal, or valve.

Grid-leak rectification is one form of valve rectification and is widely used owing to its simplicity, sensitivity to weak signals and ability to amplify.

The operation depends on the grid-current characteristic of the valve. At certain grid potentials current will flow between the grid and the filament, and a point is reached where any increase in positive potential causes a greater variation in the flow than a similar negative value.

When the carrier wave is applied to the grid circuit, the positive halves of the waves will cause a greater increase in grid current than the negative halves will a decrease. The result is that we have a certain increase which flows back to the filament via the



Typical leaky-grid-rectifying circuit. C is the grid condenser, R the grid leak, C2 the high-frequency by-pass condenser, and H.F.C. the choke to prevent high-frequency oscillations passing on

grid leak and causes a drop in voltage of the grid. To this must be added that produced by the steady grid current which was flowing before the signal was received. Now if the carrier is modulated the voltage drop will vary according to the frequency and amplitude of the modulation.

In other words, we obtain a voltage on the grid fluctuating at audio frequency which in turn affects the anode current to a corresponding amplified degree.

the Formo Range!

—yet right in line with economy!

SENSITY IRON-CORED COILS

Represent the greatest advance in scientific coil design in recent years. Comprehensive tests in all parts of the United Kingdom, under widely varying conditions, indicate their enormous possibilities.

The air-cored Litzendraht winding is disposed on a bobbin moulded of an entirely new material and is mounted on a white Steatite base having negligible H.F. losses.

The screening can, finished in 'dreadnought' grey, adds just that touch of distinction to an already distinguished design.

- /erial Coil Type T.1 without Reaction ... 5/-
- /erial Coil Type A.1 with Reaction ... 5/-
- H.F. Coil Type P.P. ... 5/-

5/-



FORMO SCREENED PAPER CONDENSER

An entirely new and up to the minute Tubular condenser design, supplied in the following capacities:

.1 mfd. ... 1/6	.5 mfd. ... 1/9
.2 " ... 1/6	1 " ... 2/-
.25 " ... 1/6	2 " 3/-

Test voltage 750v. D.C. Working voltage 375v. D.C.

1/6

FORMO-DENSOR

The Formo-densor is eminently suitable for use as a Neutralising condenser, Aerial condenser, Grid condenser, Reaction condenser, and Tone Control condenser.

Available in the following capacities:

Max. Min.	
F 0001 to 00005 ... 1/6	1/6
J 0003 to 00025 ... 1/6	
G 001 to 0002 1/6	
H 002 to 001 2/3	



FORMO PRODUCTS, LTD.,
153 Masons Hill, Bromley, Kent.

With the Amateurs

KENNETH JOWERS TUNES THEM IN



This is the transmitting gear at the Dutch station PAOHJ, which is often heard in the 80-metre band. The lead-in wires go to a Zepp aerial. Underneath you can see the modulator power pack. The second operator is at work!

IT looks as if I am going to get into hot water by neglecting the weekly reports sent in from various parts of the country. For the past two weeks, in response to many requests, I have been giving more practical articles for the beginner.

From the letters to hand, it appears that I am on the wrong track again! So here we are again with the amateurs on the short waves.

Indefatigable Listener

One of our most indefatigable listeners is R. D. Everard, of Standon, Herts, who from time to time pulls in some amazingly good DX stations on his eight-valve super-het plus convertor. He mentions that far too many of the stations reported use morse, which he thinks is hardly a fair test for a receiver.

Last week I pointed out that FM4AA was being heard all over this country. Mr. Everard tells me that he can pull in this station every day on the loud-speaker, although the power used is only 20 watts.

One of his best logs this week was HC1JW (Ecuador) on the 40-metre band; but, in addition, W9PZ, VE1VA, W4AZI, W4BFH, and W4BUX have been heard on the loud-speaker using phone.

W. A. Clemenson, of Hampstead, suggests that we organise a short-wave listening competition to see who has the best short-wave set. What do you all think about the idea? Mr. Clemenson goes on to say that in his area conditions are not too good except on the 20-metre band from 1800 onwards. I find that this is a little early, for in Letchworth the W's do not come in until around 2100.

He goes on to say that the 40-metre band in Hampstead brings in plenty of stations in the early hours from 0630 to 0830, including Americans and Australians.

I have some cards from W. A. C. which I wish could be reproduced here; but, unfortunately, they are not quite suitable. One in particular, from SY1AB (Canal Zone), finishes off by saying that the operator is a first-class radio man, is married, but has no little Ops.

Amongst my mail this week was a very welcome letter from Torquay. Listeners do not seem very interested in short waves in that part of the world; so I hope that my correspondent, W. F. Head, will carry on with the good work.

He tells me that the 20-metre band is very lively from 2230 onwards, and amongst the phone stations he has logged are W2DC, W4UP, W8GLY, W9BRX, W1CGY, W8CHR, H17G, VE2CA, and W2EDW calling our friend Everard. The 40-metre band, although full of stations, is unfortunately spoilt by French hams with broadly tuned stations.

2BXC, J. V. Warner, of Worksop, does his listening at definite times. The three most usual periods are between 0630 to 0830, 1530 to 1700, and 1800 to 2230. These are nice convenient times, and should suit most people at some time or another.

Amongst the stations heard during these periods were W1OXDA, SU1SG, W2HHG, SV1B, ES3AA, EZ4SAC—the last three are unusual bags—and YL2BQ. Good going, 2BXC!

By the way, F. A. Beane is at Ridgewell rather than at Halstead, Essex, which is ten miles away. Halstead is the postal town. F. A. Beane, christened the "Ear of Ridgewell," has evolved a novel report sheet which gives all the dope the average amateur is likely to want.

I cannot tell just of what it consists, but, take my word, it is one of the most interesting cards I have come across.

What do you think of the Dutch station PAOHJ of Tiel? This station is operated

HAVE WE HAD PHOTOGRAPHS OF YOUR STATION?



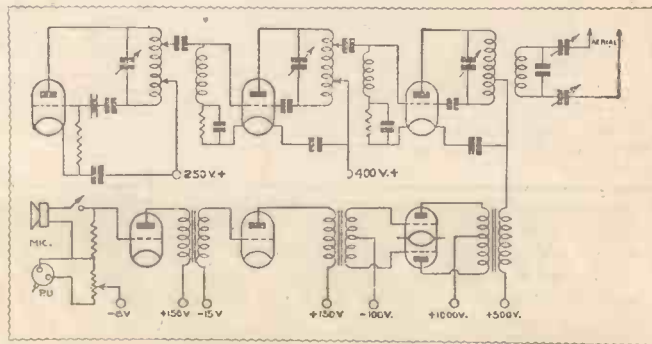
Receiving side of Dutch Station PAOHJ, showing the lady who handles the English QSO's. She speaks very good English, as many amateurs will no doubt testify

What is the ideal short-wave set? We are preparing new designs for the Autumn and shall be glad to learn of your preferences

by J. Hansen and uses 45 watts on the 80-metre band. —It is received in this country at R9 by most readers, who, no doubt, will be interested to see photographs of the station they hear so often.

Quite a good idea, don't you think, to keep a lady operator to deal with English-speaking QSL's?

The English stations are not coming over so well, although the transmission of G2LZ through the Dutch station PAOASD last Sunday morning was a real treat. I spent a most amusing morning listening to the doings



From this circuit you can see how PAOHJ has arranged his crystal oscillator and modulator stages—a model all keen transmitters might well study

of 2LZ and his YL, who were spending a holiday in Holland.

After he had told the Essex hams all about it there was a general rush to work PAOASD and the following few minutes were most interesting.

On Thursday evenings at 2300 G5MM transmits what amounts to a news-letter on the 160-metre band. Look out for it next week—it is worth hearing.

During the morning from 7 until 8 a.m. quite a number of the amateurs in the south of England send out test programmes, and this is a time of the day when it does not matter if the volume from the loud-speaker is heard in the garden.

Static Spoilt Reception

Static has rather spoilt reception just recently, and most of my work has been on a three-valver with a tuned high-frequency stage. With this set I have raked in most of the American stations of any importance.

Don't get the idea that a big set is essential for short-wave listening. It is easier to tune a big set, but the same stations can usually be heard on the small fellow and generally without so much background noise.

Resistance Changes As You Alter the Wavelength

Says J. H. REYNER, B.Sc., A.M.I.E.E.

PRACTICALLY all the resistors used in a modern radio receiver are of the small cartridge type. They are usually made either of a sand-and-carbon composition or else the resistance material is deposited by a hydro-carbon vapour on to a suitable ceramic material. In some cases wire-wound resistors are employed, particularly for the lower values.

In most positions the resistors are used under D.C. conditions—breaking down voltage, decoupling, or some similar purpose; but there are occasions where the resistor has to handle a certain proportion of radio-frequency current.

Radio-frequency Performance

Sometimes, indeed, the whole function of the resistor is concerned with its radio-frequency performance, as in grid stoppers or, in rarer cases, as an anode resistor in a high-frequency or intermediate-frequency valve.

It is generally assumed that the behaviour of the resistor under these conditions is practically the same as under D.C. conditions and, in particular, that the value remains substantially the same. This is far from being true, the value to radio frequency currents being considerably less than the specified resistance.

I came across this effect recently during some investigations on the damping of tuned circuits. The grid leak used in rectifying for high-frequency circuits, for instance, absorbs energy from the tuned circuit across which it is connected, but in endeavouring to analyse the various losses it was found that the damping due to the resistor was not in accordance with calculations. This led to a detailed investigation of the matter in the course of which the serious discrepancies just mentioned were discovered.

The apparatus used for the test was that employed for estimating the performance of

for a high impedance and vice versa. The device under test is then replaced with a small calibrated condenser, which is adjusted to give the same reading as before. If the frequency is known the impedance of the condenser can be calculated and this is then equal to the impedance under test.

In the present case the impedance being measured was a resistor, but otherwise conditions remained the same. The method is rough and ready, but it measures what we are primarily concerned with—the actual impedance of the resistor to a high-frequency current.

Various makes of resistor were measured, all of the composition or deposited type. Wire-wound resistors were not tested. It may be said at once that they all exhibited the same effect to much the same degree, namely, that the high-frequency resistance was appreciably less than the rated value. The defect is thus not peculiar to any one make.

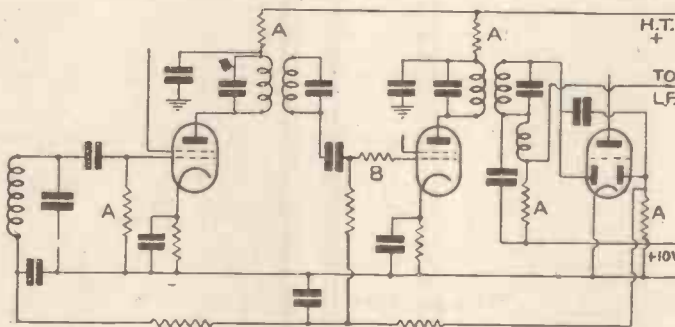


Fig. 4.—Simple super-het with all vulnerable resistances plainly marked to prove the point made in the accompanying article

The first tests were conducted at a frequency of 600 k.c. (500 metres), and the results are shown at Fig. 2. Various values of resistor were measured in succession and it was found, as one might expect, that the discrepancy became steadily worse as the value of the resistance was increased. For values of a few thousand ohms the high-frequency resistance was not greatly different from the specified value, whereas for values of the order of megohms the effective resistance was less than half what it should be. Fig. 2 is a graph showing the ratio between the actual value and the d.c. value, and it shows the effect quite clearly.

The actual results are shown by the full line curve, the others being estimated as explained later. This curve only applies to the particular frequency of 600 k.c., and hence the next move was to find just how the effect

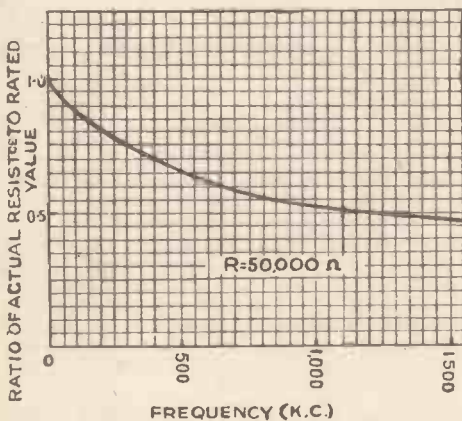


Fig. 3.—Results of the tests are further indicated by this graph, explained by J. H. Reyner in his article

high-frequency chokes and similar high impedances, as shown by Fig. 1. Current from an oscillator is forced through the impedance to be measured in series with a valve voltmeter.

It gives a reading which is proportional to the value of the impedance—a small reading

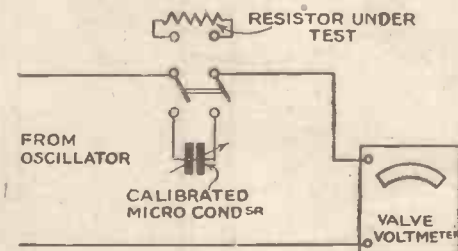


Fig. 1.—Test apparatus used for determining the value of resistances at various wavelengths on medium and long bands

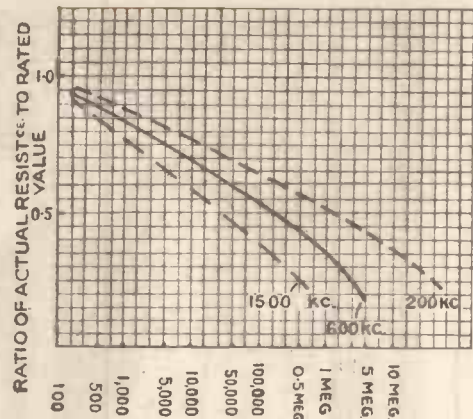


Fig. 2.—This graph shows how there is a big discrepancy in resistance value as the wavelength is changed

altered with frequency. For this a 50,000-ohm resistor was taken and the high-frequency resistance measured at frequencies ranging from 200 to 1,500 k.c.

The results are shown at Fig. 3, and they will be seen to be generally as one would expect. At low frequencies the effective resistance is between 70 and 80 per cent. of the nominal value, and as the frequency gets higher the falling off gets more noticeable until at 1,500 k.c. (200 metres) the same resistance has only about 60 per cent. of the value it had at 200 k.c. (1,500 metres). At zero frequency, which is the same as D.C., the ratio of actual resistance to rated resistance is unity as, of course, it must be.

Further tests were made with smaller resistances of the 1/2-, 1/4-, and 1/8-watt types (all the previous experiments having been made with the usual 1-watt type), but the same effect was found. This seems to rule out any suggestion that the effect is due to the self-capacity of the resistors.

As a matter of fact an examination of the curves will show that this cannot be the explanation. Take the 50,000-ohm resistor at 1,000 k.c. The parallel capacity necessary to reduce the impedance of the resistor to the value of 26,500 ohms which it was actually found to show would be 3 micro-microfarads. This is too high a value to be reasonable.

Impedance of the Resistor

Furthermore, if one assumes this value of capacity, the impedance of the resistor at other frequencies is not in accordance with the measurements.

The change is thus due mainly to some alteration in the behaviour of the resistance material itself. Self-capacity does play some small part, and of course any stray capacity due to wiring, etc., must be carefully avoided where a resistor has to carry high-frequency current. Otherwise the current will all be by-passed, particularly at the higher frequencies. But even so allowance must be made in the design of the set for the reduction in the effective value of the resistor itself.

It is difficult to give any rough-and-ready rules to indicate how this effect may be estimated. The curve shown at Fig. 2 represents an average state of affairs and it may be taken as a rough guide for the ordinary broadcast wavelengths. On the long waves the conditions will be somewhat better than would be expected from this curve, and worse at the bottom of the medium waves.

For instance, a resistance rated at 100,000
Continued on page 388

Show Those Sound Waves the Way!

By the Amateur Wireless Technical Staff



On its neat pedestal stand the new Ekco circular bakelite set for universal mains connection is well able to throw out the sound from the loud-speaker so that it is evenly distributed throughout the reception room

WE don't know everything about sound projection—not by a long way. The public-address people have done marvels, of course, and are constantly improving the standard of reproduction; likewise, they are always trying methods of adding to the realism of the received sounds.

More Truly Life-Like

Similarly, in the cinemas we find constant efforts to make the sounds from the loud-speakers more real—more truly lifelike. But in the home we seem to take the loud-speaker very much for granted, sitting down under its limitations or specially good reproduction without any attempt to study the problem from the angle of sound diffusion.

It is a fascinating aspect of loud-speaker reproduction, actually. When you have finished trying one circuit against another, when you have finally hit upon the very finest combination of set and loud-speaker to give you aesthetic pleasure—just spare a few moments for the actual positioning of the reproducer.

Even if you have a commercial set with built-in loud-speaker, it is probable that you often listen on an externally connected one. And if you are a constructor, more than likely

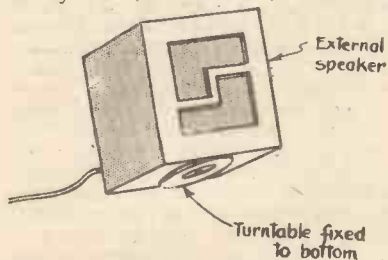


Fig. 1.—Any loud-speaker cabinet can be fitted with a little turntable, so that you can experiment with various angles of sound projection in the room

you use an external loud-speaker without any question of an internal one.

Whichever it is, you must have been impressed at some time or other with the remarkable differences in realism that could be accounted for only by a change in the position of the loud-speaker in the room. Perhaps you have found that putting it high up on a shelf has had the desired effect, or

turning the loud-speaker towards the opposite corner. There are dozens of possible positions, but only a few that will give the most life-like overall effect.

The acoustics of your listening room very largely determine where it is best to put the loud-speaker. As acoustics differ in an extraordinary way from room to room, perhaps you now begin to see the sense of a few personal experiments.

We do not hope to tell you in such a short article all the things you ought to know—and do—about this aspect of loud-speaker reproduction. It is a

big subject.

But we can give you just a few practical hints; and that is all we are going to attempt. As a beginning, then, you might take that

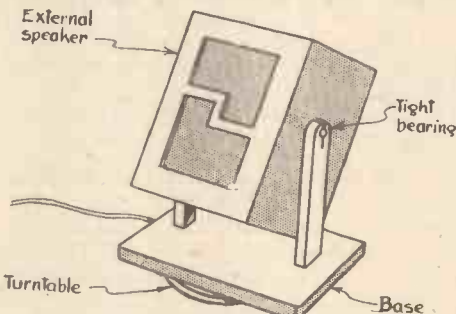


Fig. 2.—In addition to a turntable to permit the swinging of the loud-speaker, you can arrange it to pivot

cabinet loud-speaker and give it a little sub-turntable—such as you can pick up quite cheaply for gramophone or portable use. See Fig. 1.

With such a turntable fixed to the base of the cabinet you can readily swivel the loud-speaker round. If it is a heavy instrument—as many are—this will be a great advantage in your comparative experiments.

There will in all probability be just one direction for any given loud-speaker position that will give you the most realistic reproduction. Take your time over this simple experiment; it is worth while.

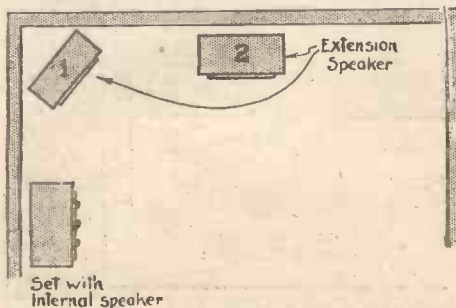


Fig. 3.—Suggested layout of set and external loud-speakers to enable you to experiment with different relative angles

You can carry the experiment a step further—a very valuable step further, as a matter of fact—by mounting the loud-speaker cabinet on the swivel bearings suggested by the Fig. 2 diagram.

Strong Wooden Supports

Here you will see that two strong wooden supports are fixed to a suitable base. The bearings at the tops of the supports should be tight enough to hold the loud-speaker in any given position without fear of it sagging. Or you could elaborate the mechanics of the job by adding locking screws; but with moderate-sized loud-speakers that ought not to be really necessary.

With this Fig. 2 arrangement you can experiment with the upward propagation of the sound waves; it is surprising what a difference to realism this can make if carried out carefully to find the best position.

Well, now, you have got much farther along the road of true realism than most listeners; but if you are interested you can go still deeper into the business. See Fig. 3.

You can try the effect of one or more loud-speakers in relation to the loud-speaker fitted inside the set. By fitting the externals with the turntables and swivels, you can have a lot

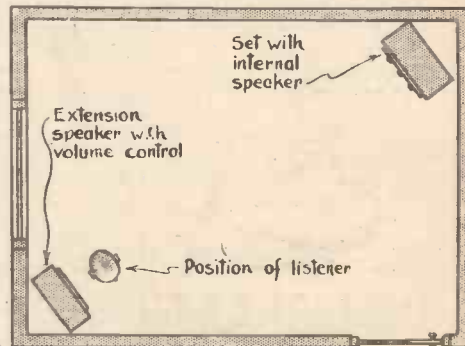


Fig. 4.—This shows how you can obtain a form of what is known as stereophonic reception—aural perspective

of fun getting remarkably close to what is known as stereophonic reproduction—that is, loud-speaker signals in aural perspective.

At a certain position of your ears in relation to the loud-speakers you can gain an appreciable increase in the sense of "depth"; and that adds enormously to the effect of realism.

A regular set-up for a stereophonic-reception experiment is shown by Fig. 4, where you see the set with internal loud-speaker placed in one corner of the room and the external loud-speaker in the opposite corner.

You listen with one ear to the volume of sound coming from the corner loud-speaker and with the other ear to the volume of sound coming from the set.

If you have a suitable volume control on the external loud-speaker, so that you can regulate the output to the same level as that actually heard from the set's loud-speaker when listening to the corner loud-speaker, you can gain a most amazingly realistic effect; but it needs care on that volume control.

The Three for All Britain

WITHOUT any "ballyhoo," we take special pleasure in presenting you with six pages of information about our new Constructor Crusader set.

It is a three-valver. We go so far as to assert that it is a three-valver for all Britain—the three, in fact. We can go that far because—well, quite frankly, we believe in this three-valver sincerely and without reserve.

We know that all Britain still needs a good three-valver; that much is obvious from the hundreds of individual letters received through the Constructor Crusade.

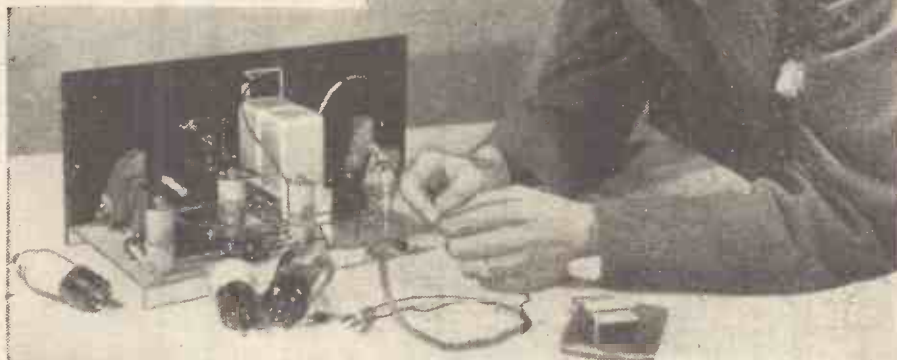
Our Planned Campaign

Yes, this is a Crusaders' set—the second great effort in our planned campaign. We have built this three-valver from our twelve years' experience in designing sets for home constructors, augmented by dozens of hints and modifications suggested by Crusaders.

Enough of the fanfare! Let us, in this first page, run through the "high-spots" of the All-Britain Three.

A metal-baseplate set. Does that convey anything to you? Not a chassis. We have come to the conclusion that a chassis design is too complicated for the average—as distinct from the advanced—home set-builder.

Not a chassis set; but not just an old-fashioned panel-and-baseboard layout. No, something modern, without any of the snags of the chassis. A metal-baseplate set—a set with a pleasing layout, practically no sub-chassis wiring, but retaining all the advantages of



full-blown chassis construction. The best of two worlds, in fact!

Selectivity? Looked after by two of the latest iron-cored coils in the form of high-frequency transformers. Not only do these coils give great selectivity, but they save us several small components, such as high-frequency chokes.

Tuning? Not by a gang, although the two-coil unit—fully screened—would lend itself to such a condenser. But, bowing to the wishes of the majority of Crusaders, we have used separate condensers.

Our specified condensers have wavelength-calibrated tuning scales, which simplify the setting of two condensers for every station received. Then again, single condensers give you that last ounce of performance all round the wavebands—medium and long.

THE ALL-BRITAIN THREE

IS THE SET FOR ALL BRITAIN!

DESIGNED BY THE "AMATEUR WIRELESS" TECHNICAL STAFF TO MEET CONSTRUCTOR CRUSADER REQUIREMENTS, THIS SET IS ONE OF THE SIMPLEST AND MOST EFFICIENT THREE'S EVER PRODUCED

Join the Constructor Crusaders
To-day and Get a Free Full-size Blueprint of This Set!
There Is An Application Form on the Inside Front Cover

Utmost Amplification

Amplification? A team of three modern valves that gives the utmost amplification for the minimum cost. We use a high-frequency pentode for the first stage—giving enormous amplification before detection. But an ordinary screen-grid can be used if you prefer it. Then an ordinary triode detector; again because, really, we don't think, after many experiments, that the pentode cost is justified at this stage for the little extra signal gain.

Pentode output for power and purity; but you can use an ordinary triode if you like. The detector-to-pentode coupling is just a straight transformer, with the maximum flexibility of type and ratio.

Simplified battery operation; automatic grid-bias has been included for the pentode output stage; and this has more than just a convenient advantage. As the voltage on the anode drops, so the grid bias lowers in sympathy and keeps quality—at, of course, diminished volume—up to standard.

Straight Foolproof Wiring

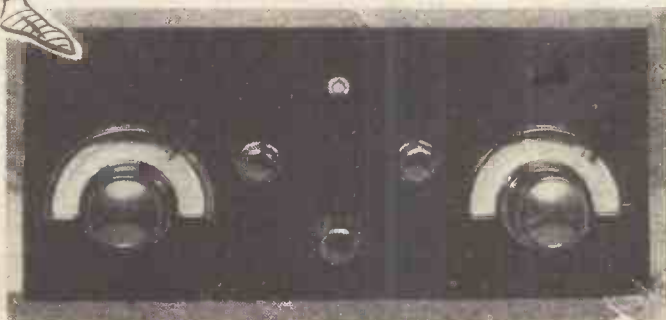
Straight wiring that you can follow even from a photograph. No "hay-wire" jumble to sort out in this set! With our Readichex foolproof wiring system you simply cannot go wrong—especially with our full-size blueprint, which, don't forget, is given free to all Crusaders.

Lastly, in this brief review of the "high-spots," a word on the battery current. Only 9 milliamperes total anode current from the high-tension battery; and that with an undistorted output to the loud-speaker of 450 milliwatts.

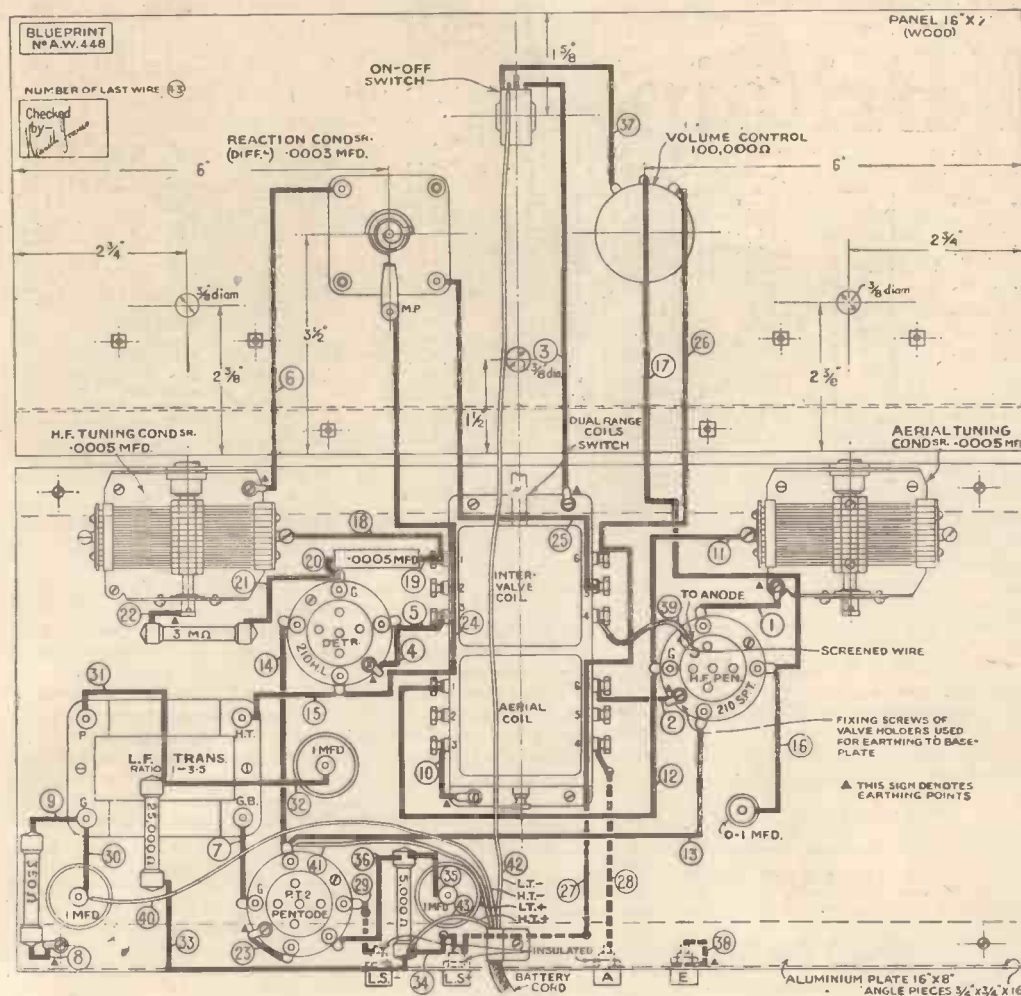
Well, there it is, constructors! A specification like that does not need "blah"—it is self-evidently a good thing.



In response to hundreds of requests from Constructor Crusaders, separate tuning condensers have been used for the All-Britain Three—a feature that will appeal to all experimenters



Circuit Whys and Wherefores of—



This third-scale layout and wiring guide should be used in conjunction with the photo-plan on page 369. By becoming a Constructor Crusader (see the details on cover ii) you can get a full-size blueprint free. Otherwise the price is 1s., post paid; mention No. AW448 when you order from the AMATEUR WIRELESS Blueprint Dept., 58/61 Fetter Lane, London, E.C.4

—simplification of connections. Note, in passing, that the blobs in the circuit correspond exactly with the blobs on the blueprint; so that you need never be in any doubt about the actual earthed connections.

With all earthed components so treated, it is no wonder the circuit—simple inherently—looks doubly simple in the theoretical circuit diagram. You must imagine all those blobs connected together and the whole lot earthed if you are to get a picture of the circuit's action.

Popular Sequence

Three valves, arranged in the popular—perhaps inevitable!—sequence of high-frequency amplifier, detector and power output.

No "boom" set in years has had such a free-and-easy choice of valves, we think. For example, although we specify and enjoin you to use a high-frequency pentode for the first stage, we tell you frankly that you can use your

FOR a three-valve circuit the All-Britain Three is unusually devoid of stunts. That may strike you as a funny thing to say—aren't such simple set circuits usually stunt free?

No, they are not, for the very simple reason that designers with only three valves to play with usually include all sorts of little dodges to boost up the signals from the loud-speaker.

We don't think that is at all necessary. Britain's three-valver is a vindication of utter "straightness" in design. That straightness pays we have proved; but let's analyse this circuit and leave you to judge for yourself.

Queer-looking Circuit

First of all, it does look a little queer, we admit. Utterly simple, certainly; but queer. When you come to look into the circuit in detail you will soon hit on the cause of the queerness. *Those little triangular blobs here and there!*

Another "A.W." aid to simplification; Crusaders ought to tell their friends about this. Each of those little blobs indicates a direct earthed connection. By direct we mean a connection straight from the component terminal to the nearest point on the metal—that is, earthed—baseplate on which the set is assembled.

That, incidentally, is one of the very sound reasons for using a metal baseplate

PARTS YOU SHOULD USE TO BUILD THE ALL-BRITAIN THREE

BASEPLATE

- 1—Aluminium baseplate, 16 in. by 8 in., with two 16-in. lengths of 3/4-in. channeling (Peto-Scott).

COILS

- 1—Two-gang unit (Telsen type 478). (Alternative connections for Varley and Goltone coils will be published next week.)

CONDENSERS, FIXED

- 1—.0005-microfarad tubular (T.C.C.; or Dubilier, T.M.C.).
- 1—.1-microfarad tubular (Formo screened paper type).
- 3—.1-microfarad tubular (Formo screened paper type).

CONDENSERS, VARIABLE

- 2—.0005-microfarad, with Mystic slow-motion dials (Formo type SU5; or Jackson, Telsen).
- 1—.0003-microfarad differential reaction (Graham Farish; or Jackson, Bulgin).

HOLDERS, VALVE

- 2—4-pin (Telsen; or Graham Farish, W.B.).
- 1—5-pin (Telsen; or Graham Farish, W.B.).

PLUGS AND TERMINALS

- 2—Wander plugs, marked: H.T.+, H.T.— (Clix; or Ealex, Goltone).
- 2—Spade terminals, marked: L.T.+, L.T.— (Clix; or Ealex, Goltone).
- 4—Plugs and sockets, marked: Aerial, Earth, L.S.+, L.S.— (Clix; or Ealex, Goltone).

RESISTANCES, FIXED

- 1—350-ohm (Dubilier; or Ohmite, Eric).
- 1—5,000-ohm (Ohmite; or Dubilier, Eric).
- 1—25,000-ohm (Ohmite; or Dubilier, Eric).
- 1—3-megohm (Dubilier; or Ohmite, Eric).

RESISTANCE, VARIABLE

- 1—100,000-ohm potentiometer (Eric; or Ferranti, Graham Farish).

SUNDRIES

- Connecting wire and sleeving (Goltone).
- 2 yd. thin flex (Goltone).
- 6 in. screened sleeving (Goltone).
- 12—6 B.A. soldering tags (Peto-Scott).
- 24—1-in. 6 B.A. bolts and nuts (Peto-Scott).
- 3—Matched knobs (Bulgin type K10).
- 1—Set of tags, numbered 1 to 50 (Readichex).
- 1 1/2 yd. 4-way flexible lead (Goltone).

SWITCH

- 1—Three-point shorting (Bulgin type S87).

TRANSFORMER, LOW-FREQUENCY

- 1—Intervalve, ratio 1:3.5 (Ferranti AF8; or Varley Niclet, Telsen Ace).

ACCESSORIES

BATTERIES

- 1—120-volt high-tension (Vidor type 13080)
- 1—2-volt accumulator (Exide type DTG).

CABINET

- 1—Table model with 16 in. by 7 in. panel (Peto-Scott).

LOUD-SPEAKER

- 1—Permanent-magnet moving-coil (W.B. Stentorian type PMS2).

VALVES

- 1—High-frequency pentode, metallised (Cossor 210SPT).
- 1—Triode detector, metallised (Cossor 210HL).
- 1—Output pentode (Marconi PT2).

(Complete kits of parts or individual components for this set can be obtained from the Peto Scott Co., Ltd.)

—the Crusaders' All-Britain Three

old short-grid-base screen-grid in its place—without any alteration at all. Of course, you won't get quite the same amplification—not such good volume on the weaker foreigners.

Similarly, the detector valve is a straight triode, and if you have one on hand by all means try it out before you buy a new one. If you do buy a new one, keep to our recommendations, please.

Your Own Choice of Output Valve

Then about the output valve. You see from the circuit that it is a pentode; a very good little pentode, too. Again, though, you can substitute this for your old triode output if you are prepared to put up with less volume and possibly with less clean-cut quality. Again, too, there is absolutely nothing to alter in the circuit in order to put in the old valve.

High-frequency pentode for super high-frequency amplification, ordinary triode for normal detection, transformer-coupled pentode output for good quality and plenty of volume without too great a drain on the high-tension battery. That's the combination.

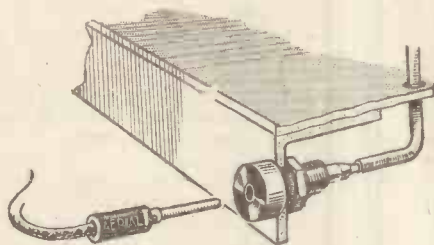
Free from Specialities and Stunts

You might justifiably ask what all the song and dance is about, then, if the circuit is so jolly straight, so utterly free from specialities. We know it cuts both ways; you can't have simplicity and pretend that your three-valver is as good as a seven-valve super.

But—and this is a big but—you can so engineer your simplicity that you do get the utmost out of each valve stage. And that, precisely, is what we have done with the All-Britain Three.

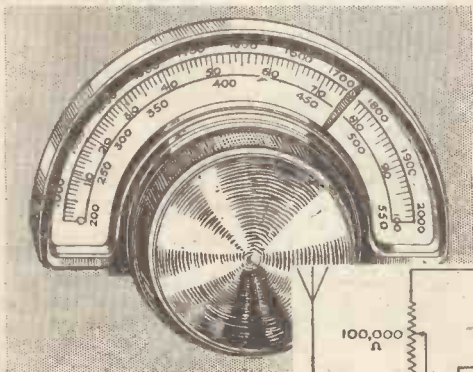
Take a look at the tuning, for example. You will see that the old tuned-grid system has been thrown overboard, in its place tuned high-frequency transformers being used; not merely for the intervalve coupling between the high-frequency stage and the detector, but between the aerial and the input of the high-frequency pentode.

Two tuned transformers with iron-cored coils make a sequence of selectivity that we can honestly claim is practically up to three-circuit selectivity. There again tests confirm



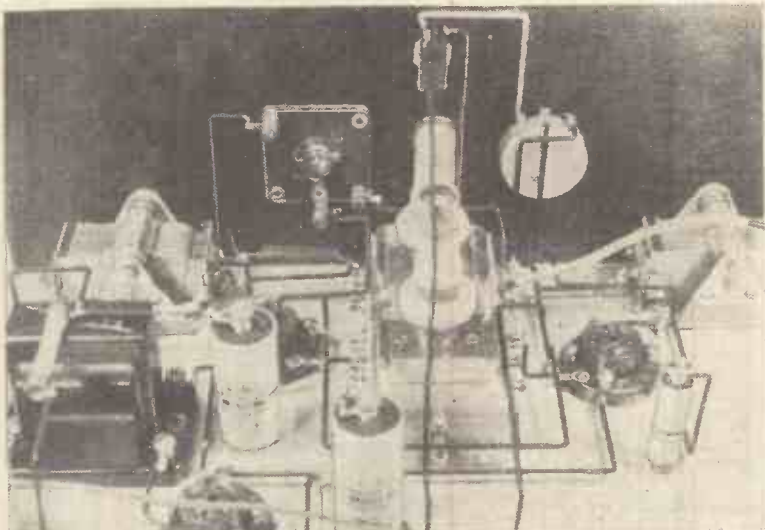
How the insulated sockets for external connections are fixed to the metal baseplate of the All-Britain Three

On the left: Approximate wavelength calibrations are a feature of the tuning dials used on the All-Britain Three



what we are reluctant to boast about in theory.

Screened coils, of course. From the theory circuit you will see that around the transformers are dotted lines, which roughly indicate the screens. As the screens are fitted to the baseplate they are automatically earthed and do not need any connecting wires; hence there is no indication in the circuit or blueprint that these things are earthed.



This photograph gives a good idea of the general layout of the All-Britain Three. The latest type of iron-core high-frequency transformer is used for tuning—they give great sensitivity and adequate selectivity

As you can see, the aerial and earth are connected to the primary winding of the high-frequency transformer, with the tuning condenser connected across the secondary. The medium- and long-wave switching is very simple, being only on the secondary with the usual make-and-break switch to short out one length of winding when you want the medium waves, bringing this in series for long-wave reception.

Controlling the Signal Volume

Volume control is a separate fitment—not done by reducing the aerial input, note. A potentiometer resistance network is across the high-tension supply, with the screen-grid taken to the slider so that the screen-grid volts are varied. This varies the valve's sensitivity and thus, in effect, the overall volume.

We have used this system in order to make the high-frequency pentode interchangeable with an ordinary screen-grid. As the Cossor 210SPT is the only four-pin high-frequency pentode available, we are limited to that

if we want the convenience of interchangeability.

Another little point; maximum volume is not necessarily at the maximum setting of the control. In our set it comes at about 9 o'clock; but you will find out that for yourself.

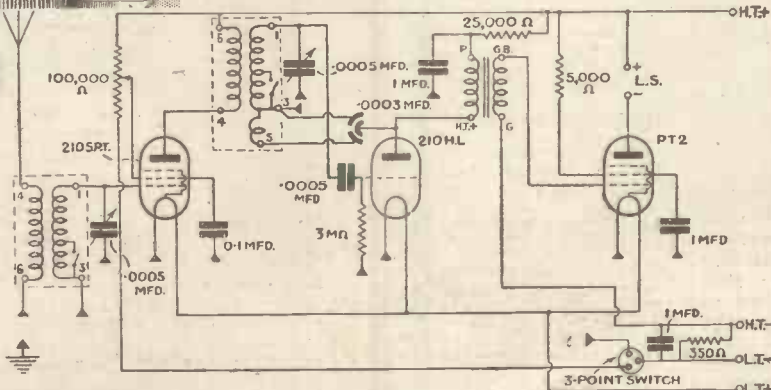
Differential Control of Reaction

The intervalve coupling is very simple indeed—an untuned primary and a tuned secondary as before. There is, in addition, a winding on the end of the secondary for reaction. The reaction is controlled by a .0003-microfarad differential between the detector anode, reaction coil, and earth. Detection is ordinary leaky-grid, with a .0005-microfarad

grid condenser and a 3-meg-ohm leak—values we advise you to stick to if you want the last ounce of pep and quality. The grid leak goes to earth, you see, and not to low-tension positive.

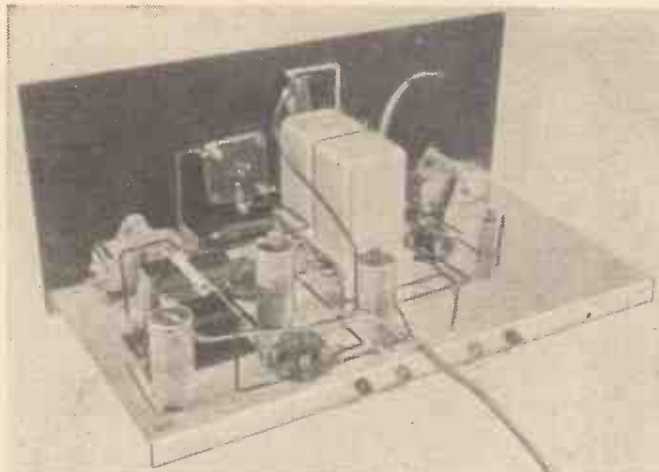
No need to say much about the transformer coupling—quite standard with the usual decoupling resistance and condenser for stability of working.

Automatic grid bias for the pentode is obtained by inserting a 350-ohm resistance between high-tension negative and low-tension negative, at the same time connecting the grid-bias end of the transformer secondary to high-tension negative.



Here is the circuit of the All-Britain Three. The black triangular symbols indicate direct connections to the metal baseplate

How We Have Made the—



A view of the All-Britain Three which clearly shows the simple but efficient layout of the parts



Another view of the set with the three valves in position ready for preliminary testing before inserting in cabinet

PARAMOUNT in the simplification of the construction of this All-Britain Three is, of course, the metal baseplate. This, in conjunction with the specified wood—or, as an alternative, an ebonite—panel makes a neat, robust and essentially modern layout possible with the very minimum of constructional difficulty.

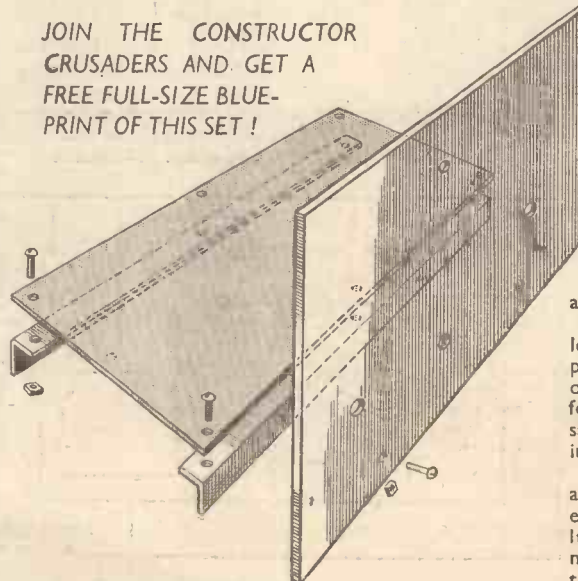
The metal baseplate is just a flat piece of aluminium of the specified size, supported on two short pieces of channelling. A hole in each corner of the main plate suffices to take bolts to hold the channelling in position and thus to lift the plate off the bottom of the set's cabinet.

Free Blueprints

If you look at the photoplan and blueprint reproduction—or at the free full-size blueprint, should you be a Crusader—you will see that the two-coil unit takes the centre of the stage, with a single tuning condenser on each side and the rest of the smaller parts grouped in convenient wiring positions.

Every effort has been made to avoid complication. For example, the four fixed condensers for by-passing—those tubular fellows—are bolted to the chassis and thus

JOIN THE CONSTRUCTOR
CRUSADERS AND GET A
FREE FULL-SIZE BLUE-
PRINT OF THIS SET!



This sketch shows how the baseplate is assembled and how the panel (of ebonite or wood) is fixed to it

make automatic contact with the earthed plate, saving leads all along the line.

These four condensers are for the screen-grid by-pass, detector decoupling, pentode decoupling and automatic-bias by-passing—all having an earthed or negative terminal.

Then again, the two single condensers for tuning have each an earthed terminal, so that by bolting them direct to the baseplate we again save connections—and complications!

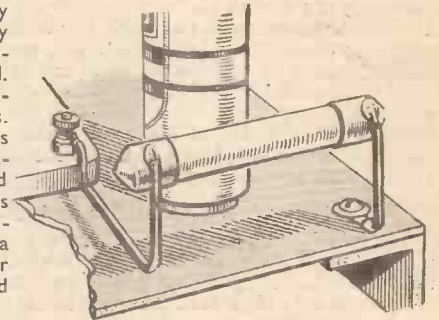
All unnecessary components have been eliminated in order to make the construction really easy and snag-free. There is no high-frequency choke in the detector anode lead, and by-passing of high frequency is effected by the differential reaction condenser—no separate condenser being needed. Similarly, there is no high-frequency choke in the high-frequency stage, as transformer coupling has been adopted. This saves yet another component and its connections.

As a matter of fact this is an advantage, this deviation from the accepted standard, because it is easier to match the high-frequency pentode with a high-frequency transformer than with a tuned-grid circuit.

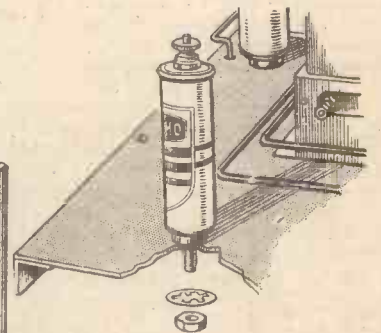
Still another way in which we have made the construction easy is by eliminating the grid-bias battery and its attendant connections. Automatic bias has been obtained by a resistance and by-pass condenser—more of which anon.

The filament negative terminals are taken to soldering tags by short leads, so that these are earthed by fixing bolts—but make sure the tags come between the heads of the bolts and the tops of the valve holders. Don't put the tags under the holders—otherwise you may chip off the moulding—it has happened to us.

Wherever possible the negative side of a component is taken direct to the nearest point on the metal chassis—as you will appreciate from a study of the blueprint. Wiring has been arranged for the very minimum of crossing—another potent aid to simplicity. There are only three wires below the baseplate, and these are very short and do not cross those above. It is thus possible to show, them, as we have done, dotted on the blueprint



On the All-Britain Three a number of connections are made to the metal baseplate. This diagram shows a typical example

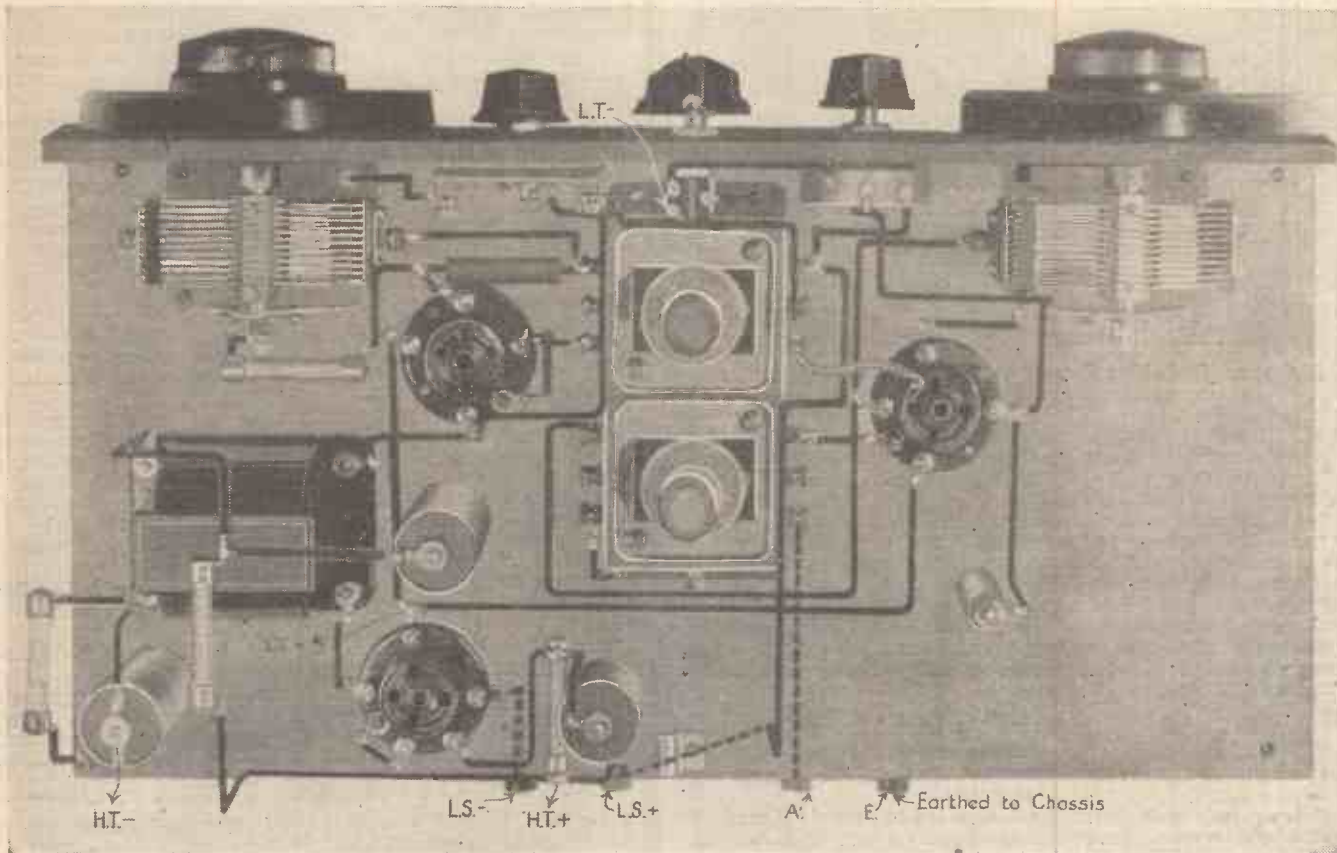


The fixing of four of the condensers is very simple indeed, as this sketch shows; only one external connection is needed

as though they were really above. You will see that there is a screened lead for the anode of the high-frequency pentode coming from terminal No. 4 of the intervalve high-frequency transformer. This is not earthed. That is to say, the outer covering is not connected in any way to any earthed point.

We really do not think there is anything very important that we can enlarge upon in the actual construction. It is so simple that there is literally nothing much to tell you. If you study the blueprint and compare the plans there with the various photographic views and the detailed drawings by

—Construction Easy for You



This special photoplan of the All-Britain Three will be of great help to beginners. It should be consulted in conjunction with the layout and wiring diagram on page 366. Of course, by joining the Crusaders you will get a full-size blueprint quite free

our artist it is almost as good as having our original model before you. Don't forget that all Crusaders have had the full-size blueprint **FREE**—and that there is nothing to stop you from enjoying a similar privilege if you enroll as a Crusader. The membership application form is on the inside front cover—why not fill it in now?

From the blueprint you will get the dimensions and layout of all the components actually used in the set. It shows the drilling dimensions for the tuning condensers and their calibrated scales, for the volume control, the reaction condenser and the on-off switch.

Moreover, when you come to the wiring the blueprint really is a very great help. Each of the leads is marked with a number, from No. 1 up to No. 43. This numerical ordering of the connections should be made use of—it forms an infallible check on the accuracy of your connections as compared with those in the original.

Readichex System

More especially is this true if you make use of our Readichex system. You buy a batch of fifty numbered discs, and you place these discs on their corresponding numbers on the actual blueprint. Then, one by one, you remove the discs and slip them on to the connecting leads as you make them in your set.

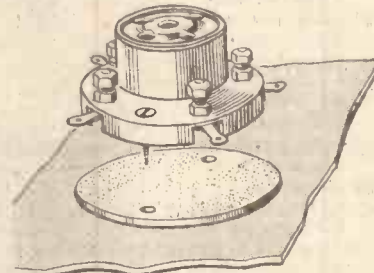
Your last disc will therefore be marked No. 43, and this you will slip on to the last lead in the set.

When thus wired up you know all the time that you are making an exact replica of the original model. Furthermore, if at any future time you want to carry out any alterations, you can always know in an instant which lead

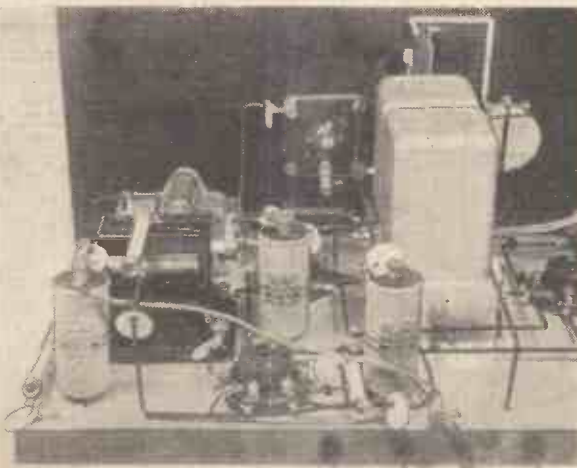
is which in the set—by comparing its numbered disc with the blueprint numbers.

As far as we know this is the most infallible system of constructor wiring ever presented in a wireless paper. We should very much like your opinions of it—we ourselves consider it a great advance in simpler wireless.

Some of the wiring has to be done with soldered joints—such as the little resistances that are held in position by the wiring.



It is a good plan to slip insulating discs under the valve holders before they are bolted to the baseplate



All beginners are advised to use Readichex tags when wiring up the set. As this photograph shows, they are quite unobtrusive, although of the greatest help in wiring

If, though, you have difficulty with soldering you can use Ohmites in place of the specified resistances—Ohmites have terminal connections instead of wire ends.

Don't forget the battery cord, will you? It is held by a small aluminium bracket to the back of the baseplate.

And now you ought to be able to go ahead with the making of your All-Britain Three. Nothing simpler in threes is likely to be offered to you, of that we are certain.

Now Bring In All Those Stations!



Fixing nuts for holding the components to the metal baseplate can be screwed up with a pair of pliers

YOU know all about the set's high-spots, all you need know for the present about the technical story, and enough about the construction to enable you to go right ahead. Now what of the results that you will obtain?

Let a Crusader speak:

"The All-Britain Three," writes CCI864, "received its first test on a Sunday morning. This gave me a good chance to see what it could do in daylight at a time when the B.B.C. stations were off the air."

"In view of the fact that many constructors would not be in a position to erect a full-size outdoor aerial, a small indoor one was used for the test—some 30ft. long overall. The earth was also rather poor, wandering about the house for some 25 to 30 ft. before finding a 'mains water pipe."

Surprising Results on the Long Waves

"On the long waves results were very surprising indeed. With no use being made of reaction Hilversum, Radio Paris, and Luxembourg were tuned-in at full loud-speaker strength.

"As was only to be expected, some use had to be made of reaction on the medium waves, but the following stations were easily received at good entertainment volume:—

"Stuttgart, Brussels No. 1, Prague No. 1, Poste Parisien and Fécamp.

"But, of course, the real test of the set's capabilities came later in the evening. Starting with the long waves again, one very good point at once made itself apparent. There was absolutely no 'breakthrough' of medium-wave stations at the bottom of the dials. This is something often claimed but

"The fact that no on this waveband iceable during this during the day. Hil-Droitwich, Luxem-and Oslo were all No trace of Droit-either on Radio

"Out of the the medium waves very easily identified:

"Stuttgart, Ath-lone, Beromünster, Vienna, Florence, Brusse's No. 1, Prague No. 1, Cologne, North Regional, Paris P.T.T., Stockholm, Rome, Midland Regional, Leipzig, Scottish Regional, Berlin, London Regional, Helsinki, Hamburg, Brussels No. 2, Breslau, Poste Parisien, West Regional, Huizen, North National, Scottish National, Bari, Bordeaux, Madrid, Belfast, London National, Frankfurt, Gleiwitz, Cork, Nurnberg, Fécamp, and Milan.

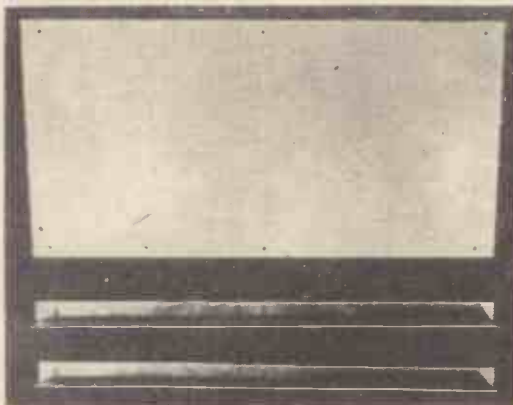
Excellent Selectivity

"When the number and cost of components is taken into consideration, the above results are extremely good, and they give some idea of the range to be expected from the receiver under adverse conditions.

The fact that all these stations were definitely identified while the B.B.C. stations were working says a lot for the set's selectivity.



seldom realised. reaction was needed was even more not-evening test than versum, Radlo Paris, bourg, Kalundborg, good hefty signals, wich could be heard ParisorLuxembourg, stations heard on the following were



This photograph shows the parts for the metal baseplate, which can be obtained from any ironmongers for about 2s. 3d.

"Provided that the two dials are kept in step, no difficulty should be experienced in tuning-in all the worth-while European stations. The quality is much better than the simplicity of the set suggests—it is, in fact, worthy of the best loud-speaker the constructor can afford.

"To those readers whose only source of high tension is batteries, the All-Britain Three should make a very special appeal, the total consumption under test being only 8 milliamperes—meaning that the standard-capacity battery would give several months trouble-free service.

"All things considered," concludes this enthusiastic Crusader, "this receiver should be one of the most popular of the season."

Things We Couldn't Say Ourselves!

Well, there speaks a Crusader—not us! We selected a typical Crusader to say the things that, in all modesty, we refused to say ourselves. We are glad that this reader did not try out the set with a super aerial-and-earth system, because the results he has obtained are all the more valuable.

Just one or two little points about the working and operation. For one thing, the question of high-tension consumption. Remember that as the high-tension voltage falls with the increasing age of the high-tension battery the bias requirement also tends to fall. Normally with a fairly old battery there is the danger that the power valve will be overbiased—due to the fact that the bias tapping is left in its original position whereas actually it should—for good quality—have long since been reduced a peg or two.

With the automatic bias of this set there is no question of bad quality through overbiasing. The bias drops in sympathy with the anode voltage.

A standard-capacity battery can be used, but of course a double-capacity battery is much the more economical.

About waveband switching. You switch to the right for long waves, remember, and to the left for medium waves.

Keep the two tuning dials in step once you have found their correct

LOOK OUT NEXT WEEK FOR—

—further helpful details about the All-Britain Three. There has been very great interest in this set for some weeks, as we know from correspondence with Constructor Crusaders.

One of the chief features of the design is its adaptability and next week we shall give the connections for some alternative tuning coils.

There will also be a point-to-point wiring guide—of particular value to the beginner.

And for the benefit of those who already have a

good stock of valves we shall go into further details regarding the most suitable types and how results are affected by making typical changes.

Remember, by the way, that by becoming a Constructor Crusader you automatically get a free full-size blueprint of this and three other sets—and that you are entitled to free technical advice about them.

If you have not already done so, fill in the membership application form on cover ii.

relation to one another on a station about the middle of the scale. The aerial condenser dial will vary slightly from time to time, but the intervalve transformer tuning ought to remain constant—and fairly true to the calibrations.

No reaction ought to be needed when you tune in the powerful stations, such as the locals. Only use reaction sparingly unless it is a question of cutting out the locals in favour of near-by wavelength foreigner. Then the best plan is to cut down the volume control and bump up the reaction—this procedure exerting a selective effect that is most helpful under the conditions mentioned.

For simplicity in the blueprint the on/off switch is the reverse of normal—the set being on when the switch is up and off when down. You can reverse this without much complication if you want to.

Now bring in those stations—they simply roll in on Britain's Three!

That Radio Applause Meter

CHECKING PROGRAMME POPULARITY

A NEW type of radio "applause meter," by which listeners can record their opinions of the broadcast programmes, has recently been developed by an American scientist, Dr. Nevil Monroe Hopkins, lecturing on engineering at the New York University.

This invention, which can only be used on mains-driven receivers, is contained in a small wooden box about the size of a cigar box, and is fitted with two small switches, marked "Yes" and "No."

Fitted to Any Mains Set

The device can very quickly and easily be fitted to any mains receiver, and Dr. Hopkins states that it could be sold for less than a dollar.

After listening to a programme, the listener would either press the "Yes" or "No" button if he liked or disliked the programme.

The act of operating either of these two switches causes a small electric clock contained within the case to begin working, and at a pre-determined time, Dr. Hopkins recommends 2 a.m., because at this time the power output of the electric power station is at its lowest and steadiest, the clock is designed to switch on for a short time, a small electric lamp if the "Yes" button was pressed, while if the "No"

button was pressed the clock would not light the lamp till ten past two.

The effect of tens of thousands of these electric lamps being switched on at precisely the same time would be immediately observable on the power output meters of the electric power station.

Exactly at 2 a.m. when the "Yes" lamps were switched on the increase in current consumption, divided by the current consumption of one lamp, would give the approximate number of listeners who liked the programme.

At ten past two when the "No" lamps were switched on, if the same procedure as before was repeated, the number of listeners who disliked the programmes could be ascertained.

It may be thought that if any one was to switch on a number of ordinary household

electric lamps at exactly 2 a.m., or ten past two that they would influence the voting signals, but Dr. Hopkins states that with special apparatus this could be prevented. G. R. W.



Wide World photo
Here is Dr. Hopkins with his new invention—the radio applause meter which he has arranged to test out in Washington, D.C.

Clearing the Ether

By
Morton Barr

PROGRESS made from year to year in receiver design at Radiolympia shows that there is no lack of inventive talent in the radio industry. At the same time, most of it seems to be spent in an effort to keep the listener more or less on equal terms with an overcrowded ether.

As a general rule, inventors are inclined to think that the problem of selectivity can only be tackled at the receiving end. They appear to overlook the possibility of bringing new methods of transmission into play.

A State of Deadlock

The result is that we are gradually coming to a state of deadlock, moving in a vicious circle, without getting very much "forarder." Congestion obviously starts at the transmitting end and it is therefore only reasonable to try and check it there.

The question of limiting the total number of European stations raises too many issues of a political—or international nature to be discussed here. On the other hand, it seems hopeless to depend upon progressive improvements at the receiving end to provide a really permanent remedy.

The modern valve, for instance, gives us a tremendously wider "reach" than before, but it cuts both ways in the sense of making it more difficult to separate the various stations within range. In the same way, we discover what seems to be a comparatively simple system of automatic volume control to counteract fading, only to find that it leads to amplified and quiet A.V.C.

involving the use of double-diode-triodes, "noise-gates" and visual tuning.

Altogether, the business of keeping pace with modern conditions almost tempts one to ask if the game is worth the candle and to wonder whether we are really so much better off now, than when we used a simple crystal or one-valve set to hear the local station.

It is not possible to put back the hands of the clock so light-heartedly. The big appeal of modern broadcasting is its power of bringing into the home, the culture and talent of other countries—so that we can hear opera from Paris, Berlin or Milan at choice—or go even further afield in the search for "atmosphere" and entertainment. Having once reached this stage of progress, it seems unthinkable to lose grip of it.

Yet this is precisely what is foreshadowed by the progressive overcrowding of the ether. It is no doubt unfortunate, but we have to face these facts: that the number of transmitting stations is bound to grow as time goes on; that there is a general tendency for existing stations to increase their power-output; and that room will have to be found for television programmes in the near future.

Most experts agree that we are already nearing the limits of selectivity on the receiving side. In other words, we cannot push "separation by tuning" much further without definitely sacrificing quality.

In searching for some other line of attack, particularly on the transmitting side, one naturally looks to see if the best

possible use is being made of the medium and long waves already allotted to broadcasting.

So long as we continue to use amplitude modulation with its "sideband spread" of approximately 10 kilocycles, there seems little chance of improving matters by any further re-shuffling of wavelengths. In spite of its shortcomings, the Lucerne Plan is probably as good a scheme as can be devised in present circumstances.

Must we necessarily stick to amplitude modulation when other methods of transmission are available offering a more definite promise of reducing the overcrowding from which we are all suffering?

For instance, there is single-sideband transmission, in which both the carrier wave and one side band are suppressed, so that the signal only occupies half its usual space in the ether. It is true that an oscillating valve is required to restore the missing carrier at the receiving end. But we are already accustomed to using a local-oscillator—though for a different purpose—in the ordinary super-het receiver.

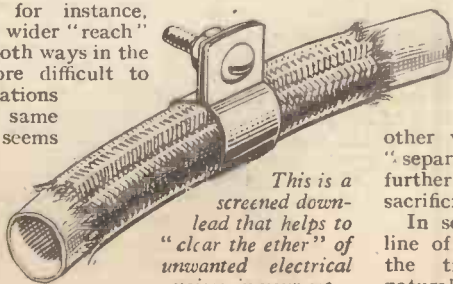
Frequency Modulation Disappoints

Frequency modulation, which at one time was thought to occupy less ether-space than ordinary modulation, has proved disappointing in this respect; and so has the closely-allied method of phase-modulation.

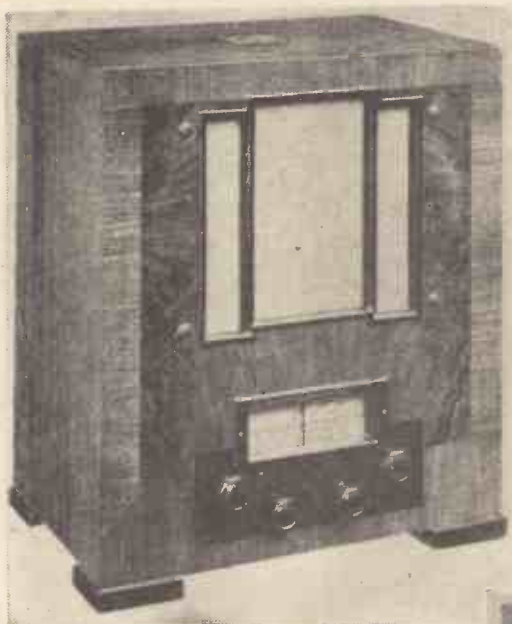
It is possible to transmit one programme in the ordinary way and to radiate another programme on the same wave length as a frequency-modulated signal.

A special circuit is required to separate the two programmes at the receiving end, though this is not in itself a fatal bar.

Here again, the prospect is offered of practically doubling the existing amount of
Continued on Page 388



This is a screened down-lead that helps to "clear the ether" of unwanted electrical noises in your set



Although so inexpensive, this H.M.V. super-het has a well-calibrated tuning scale, marked in wavelengths and stations. The cabinet looks expensive, too!

ALTHOUGH it has had a long run in one form or another, I do not think that anyone will dispute that the H.M.V. 440 super-het is still one of the most popular sets of its kind.

Being a very ordinary mortal, my taste in radio sets should coincide with the tastes of many readers; so I will tell you why I have just brought out one of these receivers for general family use.

Easy to Operate

Not being keen on knob twiddling, the set I use must be easy to operate—not that modern sets are hard, anyway—just the contrary—but I do like a receiver which, with just the turn of a knob, will bring in several stations at full volume.

Background noise can be very aggravating, and as my mains are particularly noisy, the receiver must be quiet and free from hum. Also, as there are other sets working in different parts of the house, it must be non-radiating and able to work from a moderate aerial.

Finally, it must be trouble-free, unobtrusive, and give good reproduction.

These qualities are, I am sure, representative of the general public's wants; so I will tell you why I like the H.M.V. 440.

Firstly, by the use of an ingenious selector circuit, the re-radiation has been completely overcome; so a second receiver can be worked in the same room if necessary. A duplex-action whistle suppressor ensures clear reception, free from interference; so that anyone hearing the set for the first time remarks on the clarity of reproduction.

Lazy Man's Set

So much for that. Then there is the simple tuning arrangement. With the receiver set to the local station, I can lean over from my armchair and tune in a further dozen stations by merely twiddling the main knob. A real lazy man's set!

If the quality does not suit my taste or the stations vary in pitch, this can be remedied by turning the tone-control knob up or down, as the case may be.

The walnut cabinet will go with most furniture, as it is dark-walnut and very unobtrusive. It stands on ebonised feet, has been designed to overcome box resonance and

H.M.V. Four Forty Super-het

INEXPENSIVE TABLE CONSOLE FOR A.C. MAINS

boom. This is at once obvious to the average listener.

If some remote foreign station is wanted, with any luck at all it can be pulled-in after dark. The selectivity is 9 kilocycles, so that most stations conforming to the Lucerne Plan can be separated. The tuning scale is calibrated in wavelengths; so, by reference to a wavelength sheet, the positions of the stations can be located.

of these features help to make up an ideal family set.

A final point: Who isn't keen on saving money? The 440 super-het consumes only 60 watts, or the same as one light bulb, giving 16½ hours for one unit.

What the Set Will Do

I suppose I had better tell you what the receiver will do, otherwise the foreign-station fans will be up in arms.

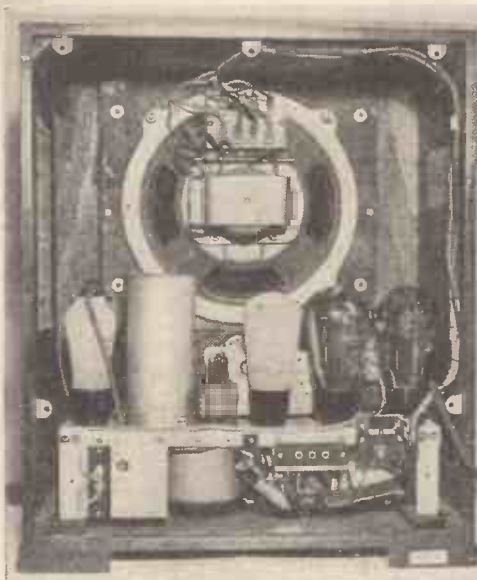
With an aerial 60 ft. in length and the usual water-pipe earth connection, the receiver was put through its paces in the same way as intending buyers would do. Nothing special about it—the test conditions—tested thirty miles from the two London stations.

During the morning, a number of stations, not counting the B.B.C., could be brought in at really good loud-speaker strength. Radio Normandy could be held like a local from 10 a.m. Trieste was another good station, with Hilversum almost as good.

Poste Parisien could always be relied upon to be of interest, while Langenberg and Athlone came through at lunch times very well.

Generally speaking, during the day the medium waves brought in twelve stations on the loud-speaker. This number could be doubled on Sunday mornings.

As usual, the long waves were better during the day. Huizen, Radio Paris, Luxembourg, and Kalundbourg were as



Well packed into a typical metal chassis are all the components of this well-designed four-valve super-het. The moving-coil loud-speaker has a good frequency response

All switching is done with one master control that brings into circuit long and medium waves or the gramophone pick-up. The pick-up terminals are at the back of the chassis and, incidentally, the radio volume control works on the pick-up as well.

If you want to run a second loud-speaker into the kitchen, this can be connected to two terminals on the chassis of the internal unit.

A point I found useful was the mains aerial. The receiver could be carried up to a bedroom or to any room where there was a power point and, without any aerial or earth connection, would bring in the local and more powerful foreign stations at good strength.

As most sets of this kind are fundamentally similar, perhaps some of you may wonder why this one set should be out of the rut. It is due to little technical ideas that have removed all the usual annoying snags of reception.

First of all, band-pass tuning and constant peak aerial coupling. Then a special intermediate-frequency wavelength. Power-grid second detection with a new arrangement of low-frequency coupling.

A pentode valve that will give 2 watts without distortion is used, and a cabinet specially designed to give good quality. All

BRIEF SPECIFICATION

Makers: The Gramophone Co., Ltd.

Model: 440.

Price: £11 11s.

Valve Specification: Combined detector-oscillator (Marconi MS4B), band-pass coupled to a single intermediate-frequency stage (Marconi VMS4). Power-grid detector (Marconi MH4), with special low-frequency transformer coupling to a power pentode (Marconi MPT4).

Power Supply: A.C. mains 200-250 volts, 50-100 cycles.

Type: Self-contained table model super-het.

Remarks: Still one of the most popular sets of the season.

good as the local for signal strength, while the quality from Droitwich was superb. After dark, the log of stations for the two wavebands could be increased to over sixty without trouble, most of which were of entertainment value.

You will see now why in my opinion this is an ideal family set.

It was introduced at the latter part of last season so has had time to overcome teething troubles.

At the price it is one of the most efficient receivers of its kind, as you will agree.

At eleven guineas it is very cheap, and do not forget that a D.C. version is available for a guinea extra. P.T.



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- 3 Formo screened paper type condenser, 1 mfd. 6 0
- 1 Formo screened paper type condenser, .1 mfd. 1 6
- 2 Formo type S.U.5 variable condensers .0005 mfd. with slow motion dials 13 0
- 1 Graham Farish .0003 mfd. differential reaction cond. 2 0
- 3 Telsen valveholders (2) 4-pin (1) 5-pin 1 8
- 4 Clix plugs and sockets marked A.E. LS + LS 1 6
- 4 Dubilier 1 watt type fixed resistances values—350, 5,000, 25,000, ohm and 3 meg. 4 0
- 1 Erie 100,000 ohm variable resistance pot. 3 6
- 3 Bulgin matched knobs type K.10 1 1/2
- 1 Set Readichex tags numbered 1 to 50 1 0
- 1 1/2 yds. 4-way flexible leads with plugs and spades 1 6
- 1 Bulgin 3-point shorting switch type S.87 1 9
- 1 Ferranti L.F. Transformer type A.F.8. 11 6

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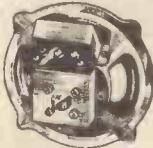


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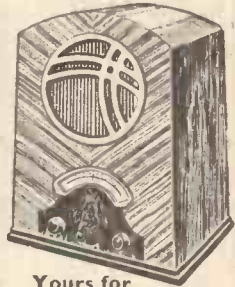
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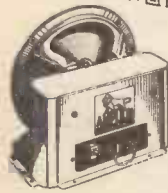
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J. GODCHAUX ABRAHAMS Discusses—

The Opening of the DX Season

SEPTEMBER might be registered in our diaries as the end of the duller period of radio and October as the start of a more active season which reaches its culminating point during December and January. Conditions generally, for listening to distant stations, rapidly improve; the transmissions, which we have either not heard at all or only captured faintly, appear to grow in volume daily, and our log steadily takes on a busier look.

Sudden Extension of Listening

It is a curious point that the casual listening to which we devote possibly a few minutes nightly during the brighter periods of the year is suddenly extended with the change over from summer to winter time; the rapid shortening of daylight and resulting addition to the earlier evening hours impels us to turn more to our wireless receiver for entertainment in our leisure hours.

From October to March is the best period of the year, and it is during these months that we are granted the best conditions to tune-in broadcasts from more distant lands. I need only look at my log for July and August and compare it with this week's catch to notice the difference, for I now find in it as fresh entries the names of stations which have not appeared on those pages since the early spring.

Note that it is not only the weaker transmitters which have been conspicuous by their absence: in many instances stations of a power of 20 kilowatts and more have been poorly received. When Europe possessed fewer transmitters, and they were more widely spaced in the broadcasting band, it was not such a difficult matter to hear them, although at the time their output was much weaker.

To-day, with a crowded broadcast band, including a large number of giants and super giants, the smaller fry encounter some difficulty in making their voices heard; it is only when conditions become favourable that it is possible to disentangle them from the mass of sounds which shatter the ether.

Distance, as the ordinary listener can easily prove, is not necessarily a dominating factor; you may often hear a transmission put out by a comparatively weak station nearly a thousand miles away much more clearly than from a heftier competitor nearer home.

We need not go into the questions of ground and reflected waves, skip-distance, radiation, or geographical position; all we are interested in is the actual concrete fact.

To-day, with the modern radio instrument at our disposal, we are no longer restricted to broadcasts from relatively near-by stations; most receivers will permit their users to roam the European Continent to their heart's content,

and if we care to exercise somewhat more patience and sacrifice a few hours of sleep occasionally, we may bridge the Atlantic, and in the later night or early morning hours capture strains of music or speech from the United States, Canada, or even from more distant points in South America.

In favourable circumstances, we are not limited to mere snatches of programmes, but are able to hold the broadcasts for an appreciable length of time.

Methodical Searching

I recommend the adoption, if long-distance listening is your aim, of some method or system in your search. Log firstly the stations you can tune-in easily, with their respective wavelengths; then as a sequence, having thus established convenient land-marks, try to tune-in the lesser-heard broadcasters. From the list of wavelengths published regularly in AMATEUR WIRELESS, you may ascertain the approximate positions they should occupy on your condenser dial.

In view of their power, almost anyone to-day can turn the pointer of a dial so as to bring in such transmissions as Rome, Prague, Turin, Brussels, Poste Parisien, Stuttgart, and others on the medium waves; and doubtless even more easily Luxembourg, Warsaw, Radio Paris, and so on, in the long waveband.

But, in my opinion, it affords more pleasure in picking out from the ether broadcasts from Juan-les-Pins, Cork, Copenhagen, Monte Ceneri, Bari, Poznan, to mention only a few. Most of these—as well as many others—had disappeared during the summer months; yet, with the approach of autumn and the shorter days, they have gradually come back.

It must also be borne in mind that comparisons made with the corresponding period twelve months ago cannot always be accepted, as in many instances since then the power of the station has been increased. If you consult



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the Set to build!

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The Circuit and Set hitherto known as "SKY RAIDER" will in future be known as the RAIDER in order to avoid possible confusion with Sets of certain other Radio Manufacturers.

NEW iron-cored Coils
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a list of wavelengths you will notice that some transmitters share channels.

Do not trouble with these as, if they are properly synchronised, you cannot receive either broadcast (unless obviously they are taking the same programme), and if they are even slightly off their wavelength, they set up mutual interference which completely mars their performance in your ears.

Personally, the stations I turn to nightly, as alternatives to the home programmes, are Radio Paris, Kalundborg, Luxembourg, Warsaw, and Kootwijk (on the long waves); and Trieste, Milan, or Florence, Hilversum, Poste Parisien, Hamburg, Strasbourg, Leipzig, Rome, Prague, Brussels (No. 1), Vienna, Stuttgart, Bero-muenster and Budapest on the medium band.

You Can Rely on These

These are all stations which on most nights can be relied upon to provide a steady signal at full loud-speaker volume. Where in some instances interference prevails, it is nearly always possible to find an alternative channel for the same programme.

As regards the Transatlantic broadcasts, the best method to use is to make a short list of the stations you wish to search for, and to find the nearest European equivalent of the wavelengths used. If you twiddle the condenser between 2 a.m. and 4 a.m. you are sure to hear some broadcast, but it is an easier matter to search for definite transmissions by restricting the movement of your condenser to small areas only.

I suggest you try for the following United States stations; in brackets I have given wavelengths with their approximate European equivalents in the broadcasting band: U.S.A.: WAAB, Boston (212.8 m.—above Newcastle); WNAC, Boston (243.9 m.—Gleiwitz); WOAI, San Antonio (252.1 m.—Frankfurt); WCAU, Philadelphia (256.4 m.—Copenhagen); WHAM, Rochester (260.7 m.—London National); KSL

Salt Lake City (265.3 m.—Hörby); WRVA, Richmond (270.1 m.—Moravska-Ostrava); WPG, Atlantic City (272.6 m.—Naples); KMOX St. Louis (275.1 m.—Madrid, EAJ7); WTAM, Cleveland (280.2 m.—Bordeaux PTT); WTIC, Hartford (288.3 m.—Rennes PTT); KYW, Chicago (294.1 m.—Barcelona EAJ15); WBZ, Boston (302.8 m.—Hilversum); KDKA, East Pittsburgh (305.9 m.—West Regional); WENR, Chicago (344.6 m.—London Regional); WABC, New York (348.6 m.—Strasbourg); WHAS, Louisville (365.6 m.—Bucarest); WCCO, Minneapolis (370.2 m.—Milan); WBBM, Chicago (389.3 m.—Toulouse PTT); WJZ, Boundbrook (394.5 m.—Katowice); WGN, Chicago (416.4 m.—Rome); WOR, Newark (422.3 m.—Rome); WLW, Cincinnati (428.3 m.—Stockholm); KPO, San Francisco (440.9 m.—Sottens); WEAJ, New York (454.3 m.—Cologne); WSM, Nashville (461.3 m.—Lyons PTT); KFI, Los Angeles (468.5 m.—Prague); and WEEL, Boston (508.2 m.—Vienna).

Of the Canadians, the most likely to be heard are: CFCN, Calgary, or CKLW, Windsor

(291 m.—Königsberg); CKY, Winnipeg (312 m.—Poste Parisien); CRCM, Montreal (329.5 m.—Radio Toulouse); CRCT, Toronto (356.9 m.—Berlin); CKAC, Montreal (410.7 m.—Munich) and CKOK, Windsor, 555.2 m.—Wilno).

Trying for Mexico

If a search in Mexico is desired try for XENT, Nuevo Laredo (291.3 m.—Königsberg); XEAW, Reynosa (315.8 m.—Breslau); XEW, Mexico City (337.1 m.—Graz); and XEPN, Piedras Negras (508.5 m.—Vienna).



Shipping an urgent order for G.E.C. sets to France via Imperial Airways—cheaper and speedier than other means of transport. It will come as a surprise to many to learn that British sets are exported to the Continent

G.E.C. photo

the Sensation of 1935 Radio

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MY IDEAL THREE

To the Editor, "AMATEUR WIRELESS."

YOU inquire: "Anything better than a S.G., detector, pentode circuit?" I want briefly to express my views and get down to

facts. I have followed wireless circuits and developments for a very long time, but my favourite circuit has not yet appeared.

Now, here is my humble wish for your "hot" three, and I shall explain the "why's" afterwards.

Valve sequence: High-frequency pentode, detector, super power. Iron-cored coils, separate tuned circuits and the low-frequency portion resistance-capacity coupled. Differential reaction, and an "economiser" incorporated in the low-frequency section.

There would be a loss due to a single resistance-capacity stage and low-impedance power valve, but with an efficiently arranged high-frequency stage, using iron-cored coils and separate tuning condensers, this loss is not so very serious, and a judicious use of reaction makes a lot of difference in distance-getting.

The number of knobs would be: on-off, wave-change, tuning, reaction and volume control.

Loud-speaker: Stentorian Senior or Amplion Lion Super.

Now for the "Why's": In the first place, please forgive me if I "let myself go": I do not understand wireless a bit, and as a Crusader I am only a very enthusiastic constructor with no knowledge but simple ideas.

Now, unless volume is big without distortion, together with a correct balance of the frequency range from top to bottom, and, finally, with a dead clear background, I think that at least

50 per cent. of real listening pleasure is gone.

Now, honestly, how many constructors, using the hackneyed screen-grid-detector-pentode set run from batteries get, hold, and sit and listen to a foreign programme?

Be quite honest, and I shall be right in saying that although we have twiddled about searching and getting stations which fade or played gramophone records, we have never really sat and enjoyed listening to foreign stations for very long. I know I haven't, and I know my friends haven't.

Distinct Improvement

At the Olympia Show a distinct improvement in quality amongst the better speakers was plainly evident, the people with mains have been well looked after with publications of "quality amplifiers," but the battery user has had to be content with noisy class-B or a pentode. He has not been credited with the idea to get real quality—say a battery push-pull circuit using two PM202 or 230XP valves, with a mains unit to supply the power.

But a sensitive speaker (the new alloy magnet has worked wonders) and a resistance-capacity-coupled stage to a Cossor 230XP, worked on the quiescent principle of class B, would give these advantages:—

1.—Almost perfect clarity of background, no mush, rushing noises, etc.

SPECIFIED FOR THE



OHMITES the Supreme RESISTANCES

Admitted by Experts and Constructors alike to represent the highest standard of perfection yet achieved in reliable Resistances. Better than wire-wound. All values 50 ohms to 5 megohms.

1'6

EACH

HEAVY DUTY 2/3

GRAHAM

- 2.—Real quality and adequate volume; a musical treat.
- 3.—Minimum of anode current, allowing a good super-power valve to be used with the best advantage.
- 4.—Careful use of reaction would give ample results from foreign stations.
- 5.—Should a PM202 type of valve prove to give too much volume, as in the case of certain small rooms or in flats, then a PM2A or LP2 could be usefully employed.
- 6.—And lastly but, in these days, a long way from least, inexpensive and good.

Some Disadvantages!

I suppose I must end my "ideal" three by summing up its disadvantages. Well, candidly, I shall have to *make* some!

- 1.—Amplification insufficient after the detector stage for worth-while foreign reception.
- 2.—Anode current required by a 230XP valve (even with an economiser) would be excessive, and a PM2A would hardly give enough volume.
- 3.—Some particular relation between the circuits which may render it unsuitable, and about which I am unaware.

Now, to defend myself against the above disadvantages I want to define first of all the expression "hot"—a really "hot" three.

Some people may at once state, "Why, my set is really 'hot'—it gets over sixty stations."

Really Good Quality

My own view would probably be expressed thus: "Wireless fans and others, I have heard mains sets costing up to £30 using the popular pentode 3-watt valve; and super-hets which get almost any station at great volume and noise; but my ideal set costs probably a round £5 including speaker and is red-hot in regard to what should be the aim of every listener, *really good quality.*"

W. K. JOYNSON. [1148]

Acton, W.3.

BAFFLES AND SHORT WAVES AND SO ON

At last I am tempted (by John Clifton's article) to sit down and record on paper my opinions, desires and experiences in this difficult constructors' world—*vide* John Clifton.

Now my experience of constructing dates back to December, 1919—makes me feel quite old when I get all reminiscent like this! I was quite young then, and my spare money necessarily limited—so had to eke it out with what ingenuity I could muster. I well remember making variable condensers then—using old ebonite accumulator casings (saturated with acid) for end plates—and making vanes by laboriously cutting same out of empty fruit tins.

The end plates were naturally frightfully hygroscopic, so that to preserve the signal strength we baked the whole condenser in the oven once a week—and being on the coast, what a wealth of untuned spark transmission was ours—and of how we sweated over balanced circuits as a means of relief.

But enough of this—what do I think of radio of to-day and to-morrow?

Well! I am afraid that it is not so easy as I thought. To begin with, I am insistent that the place for the speaker is *not* in the same cabinet as the apparatus. Three years ago I pandered to the modern fashion and built (being also a keen woodworker) a radiogram cabinet with a built-in speaker, but I have just lately added a Blue Spot Star in a separate cabinet, mounted on a baffleboard 2 ft. square by 3/4 in. thick—which has finally convinced me that this is the right place for it, because it is obvious that it is impractical to incorporate this very necessary baffle in the cabinet owing to size and weight—and not only that, one cannot push around a radiogram or other cabinet to suit the peculiar acoustical properties of a room without a "slight demur" on the part of the good wife!

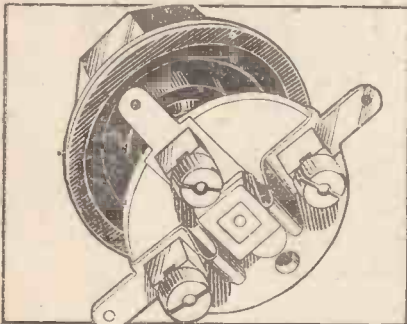
Now as to this all-wave business—I am all



Winter is nearly here—so get ready for another season of constructional activity by becoming a Constructor Crusader!

against it. As a start, I am not a selfish man and if my family want to benefit by our broadcast service, who am I to deny them this pleasure? Secondly, I have owned (until I built the A.V.C.4) during the last six months a popular make of all-wave receiver which also has further convinced me of remark No. 1—and also convinced me that it is not really practicable, inasmuch that I do really and truly believe that if a receiver is giving of its maximum efficiency on the 150-1,500-kilocycle band

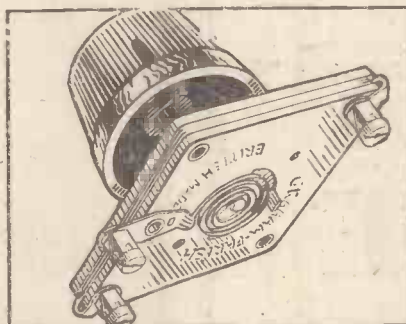
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Employ a new type of self-wiping contact. Firm and positive snap action with electrically dead silent contact. Specially durable. Tested for 10 years' use. Supplied complete with black bakelite knob. Prices:

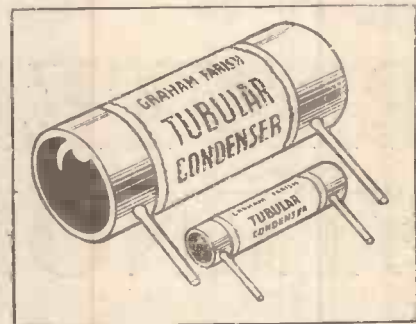
2-point Snap Switch **10d.** 3-point Snap Switch **1/2**



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A very carefully constructed Condenser, compact in size and efficient in design, with accurately gauged bakelite dielectrics. Two sets of fixed vanes, enabling rotor plates to engage differentially between them.

All capacities up to .0005 mfd. Price **2/6**

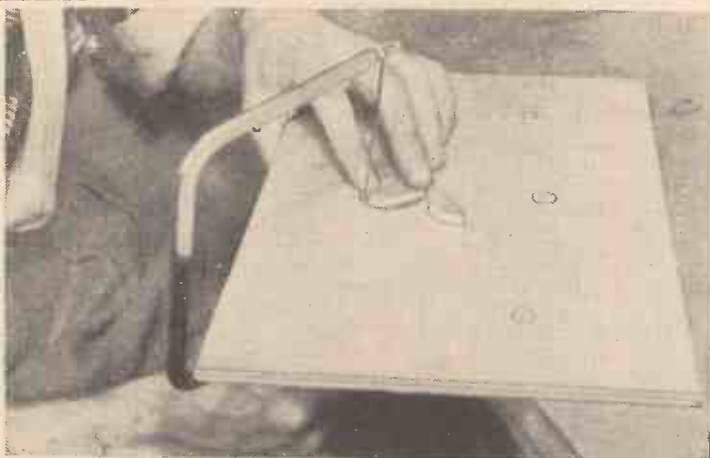


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All capacities
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1/4 1/3 1/6

FARISH PRODUCTS



Large holes in wood and ebonite panels can easily be cut by means of a fretsaw as you see being done here by a keen amateur

it will not give maximum efficiency on the 5,000-25,000-kilocycle band.

Conversely, if you design a set to give of its maximum efficiency on the 5,000-25,000-kilocycle band, etc., to obtain the same 100-per-cent. efficiency on the higher band will become uneconomical. This is just my own opinion, of course.

Really Good Short-waver

Now as to what I want, or what I hope to see next in our corner—a really good short-wave receiver—this must incorporate A.V.C. !—really indispensable in short-wave work! Of course, it must be straight; I don't want the super-het principle—short-wave high-frequency coupling is now practicable—so let us have 2 H.F., detector and power, or 2 H.F. and

detector that we can plug into the low-frequency side of our A.V.C.4.

As regards gang condensers — speaking in terms of 1930-1933—I have no hesitation in decrying same, but when we come to 1934-35 and see them with concentric trimmers, I say yes — incorporate this gang in a receiver; it is a step forward in the right direction; and whilst I am on the subject of condensers let me associate myself with John Clifton (?) in his remarks on these dials, and say how pleased

I am that the J.B. people have made such a good and easily readable dial for their new condensers.

Baseboard-chassis Controversy

As regards the baseboard-chassis controversy, I would hesitate to plump or condemn either—they each have their uses and the choice of same in my opinion depends entirely on the need of the receiver and is quite beyond our immediate control.

And now, sir, I must apologise for taking up so much of your time with what (on re-reading) seems to be a hopeless meandering of ideas—but trust that anything I might have written will perhaps help towards our goal—“Better Radio.”

KENNETH T. RICHARDS.

Penzance, Cornwall.

[1149

STENODE MAD !

AS a Crusader I never wish to turn back. Ten years ago the super-het was a problem, but it is AMATEUR WIRELESS that has made it a household word. So why go back to straight three- or four-valve sets?

I would not exchange my Super Senior for a new four-valve set. As I am now on the A.C. mains I want a new set, but what I saw at Olympia disappointed me—all those I liked cost money, but when you looked inside seemed worth half the price.

My Design of a Set

If I can help in some way, my design of a set would be for A.C. mains, a super-het with metal chassis, five of the most up-to-date valves, a pick-up with separate switch to cut out valves not in use, separate power supply, medium and long waves, pentode output suitable for P.M. or mains speaker.

I should like you to ask Crusaders what they think of Paul Tyers' *Wireless Magazine* Stenode, and if we are going to have a set called The Crusaders' Stenode. You can tell them from me that the Stenode has come to stay, and I think next year the show at Olympia will be like me—stenode mad !

W. MILLER.

Edmonton, N.18.

[1150


If you haven't already joined the Constructor Crusaders, then don't delay in sending us the membership application form to be found on cover ii

The

“W.M.”

BATTERY

STENODE



See full details in the

OCTOBER

WIRELESS

MAGAZINE

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* These prices do not apply to the Irish Free State.

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R75

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You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers

Criticisms by WHITAKER-WILSON

My Broadcasting Diary

I NOTICE the programmes for the Proms are timed. I have often wondered why this has not been done before. Why not time all the programme items? On the whole they are very punctual. It is an easy matter because the exact length of every work performed is known.

Then we can take our choice still more. We can switch into the National at 8.50 p.m. for a certain song and into the Regional at 9.8 p.m. for another song by a different singer. In programmes lasting all day and half the night, the more closely they are timed the better for us.

Sunday

I LIKED the Central Band of His Majesty's Air Force very much. If this is the Central Band I should like to hear the Band belonging to either wing. I see the conductor is named O'Donnell. Wonder whether he is any relation to Walton of that ilk?

Monday

GOLDEN DRAGON CITY! The title attracts me. Lord Dunsany's new radio play. I have respect for his writing.

So I hear it

My job is to judge the value of any play

in the broadcasting sense. I had better say at once I liked Lance Sieveking's production. Angela Baddeley as Lily; Charles Mason as Bill; Marie Ault as Mrs. Lumley. All perfect.

Now then; the play. Bill meets an Oriental. Purchases from him a window. Nice little window with tiny panes. Takes it to his lodgings, gets his landlady (Mrs. Lumley) to agree to its going in front of his tea cupboard. Lily is a friend. They look through the window. Tea things *non est*. Instead, a mediaeval city. Archers guarding ramparts. Golden dragons on the flags. Then there is a spot of war. So Bill throws a pair of tongs through the window. City *non est*. Tea things back again.

Well, that's it. Now, what on earth does it mean?

Fantasy? Of course, but surely it has some meaning? Otherwise what a poor ending! Let's be fair to the thing. Entertainment? Well, yes in a way. Sub-title wanted for that play: *Ever been had?*

Too much ado about far less than nothing.

That was after ten o'clock, that was. I heard the Wagner Prom—at least part of it. I did a bit of interlacing with the White Coons. Awful mixture, but I am hardened to that.

Regarding the Prom I just want to say how beautifully Marie Wilson played in *Traume*. Charles Woodhouse still away. She honoured him by playing like that. Thought I'd like to tell her so.

Coons very good indeed. Caught most of their comedy. Laughed much. Glad to find I can be made to laugh.

I particularly like Denier Warren. He is the Bones of the Kentuckies, surely?

Wednesday

WHAT'S the sense of putting Christopher Stone and Frederick Grisewood on opposite programmes at ten o'clock to-night? Christopher nearing his last broadcast from London and people will want to hear him all through, and yet won't want to miss Freddie. I'm taking Freddie first and I'll be seeing Christopher at 10.15

"Our Bill" is now a microphone character whether Freddie puts him into a book or not. His account of the cricket match was a vivid picture. I followed that match as though I were actually an eyewitness.

I want the B.B.C. to arrange for a further series of Mr. Grisewood's broadcasts. They have been a huge success—or I am a very bad judge.

Christopher Stone's programme—at least the last part of it—very entertaining.

Thursday

A GOOD many people told me they found the Liszt Prom very heavy going. Well, that just shows. If you like Liszt you can stand a couple of hours of him. I do like Liszt and had nothing to complain of. On the other hand I never care to listen to Brahms for so long at a time.

Emilie Hooke has a soprano voice of good and somewhat unusual quality. My only complaint was that I could not hear her words. I would have put that down to something in the transmission except for the fact that I heard all the Eric Greene sang and every syllable of the Wireless Chorus.

Friday

ONE does get shocks by leaving a set on without fore-knowledge of what is being broadcast. I had looked through Sir Richard Terry's programme of Tudor music with interest because I was soaked in that sort of stuff in my youth. I thought it a bit severe for general consumption but took the "do 'em good" sort of attitude (quite wrong for a critic!) and decided to hear the broadcast.

Continued on page 382.



"There you are, my dear..as good as new. You can't deceive a PIFCO ROTAMETER"



9 SEPARATE METERS IN ONE

ROTAMETER-DE-LUXE

1. 0-5 volts.
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4. 0-400 volts.
5. 0-10 milli-amperes.
6. 0-50 milli-amperes.
7. 0-250 milli-amperes.
8. Resist/valve test.
9. Plug-in test for valves.

42/-

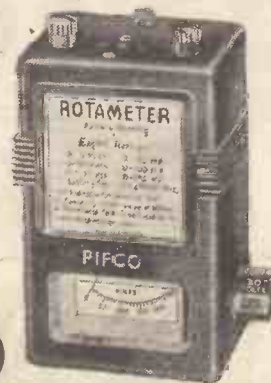
ROTAMETER

1. 0-8 volts, for low-tension voltage test.
2. 0-30 volts, for grid-bias voltage test.
3. 0-250 volts, for high-tension voltage test.
4. BATTERY TEST.
5. 0-20 mA, for individual valve test.
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29/6



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“RADIOLUX” SUPER-HET RECEIVERS — RADIOGRAMS

The spontaneous success of “Amplion” Super-hets at “Radiolympia” has made it necessary for an immediate increase of output, and readers of “Amateur Wireless” benefit by this because it has enabled us to give greater radio value than ever.

Amplion offer the finest “Super-het” value in radio entertainment that it is possible to secure. The name Amplion is your guarantee of quality performance and craftsmanship.



19" High. 15" Wide. 12" Deep.

D.C. Model 190/265v.

H.P. Terms: £1 8 0
Deposit and 12 Payments of £1 2 9

13 GNS.

“RADIOLUX” SUPER-HET RECEIVER

5-Valve including rectifier. For A.C. Mains 190/265 or 110 volts, 40/100 Cycles.

AUTOMATIC VOLUME CONTROL. NEON LIGHT VISUAL TUNING. FULL VISION SCALE illuminated, and calibrated in metres and degrees. ENERGISED MOVING COIL SPEAKER. GRAMOPHONE PICK-UP AND EXTERNAL SPEAKER CONNECTIONS.

TWO-TONE WALNUT CABINET with Gold Silk grille with ebonite black surround panel.

A.C. Model.

H.P. Terms: £1 6 6
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12 GNS.



36" High. 23" Wide. 19" Deep.

“RADIOLUX” SUPER-HET RADIOGRAM

A very remarkable instrument with all the outstanding features of the “Radiolux” Super-het Receiver mentioned above.

Collaro gramophone motor is electrically operated. Fitted with full automatic stop. Pick-up is the well-known Amplion unit.

Beautiful cabinet veneered in two-tone walnut with burr walnut control panel.

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21 GNS.

In addition to the above there is the Amplion “Radiolux” Autogram, a luxury super-het fitted with the latest British Capehart automatic record changer. Price 50 Gns. H.P. Terms available.

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Why wait to build YOUR “All Britain Three”?—you can get IMMEDIATE delivery of the Specified Varley Coils (two BP51) from your nearest radio dealer. These “Nicore” flat gang units are essential if you aim at the fullest satisfaction with the “All Britain Three” circuit. Remember Varley were the first with powdered iron cored coils and have kept first as befits the great Varley tradition of pioneers. Insist therefore on Varley. Write for full information of Varley’s latest achievements for the up-to-date home constructor.

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NICORE FLAT GANG UNIT (2 BP51) 22/-



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Please Mention “A.W.” When Corresponding with Advertisers

Super-power Dutchman?

Asks Jay Cooté

IT HAPPENED to mention last week that interference caused to the Kootwijk 1,875-metre broadcasts by Brasov was increasing. I am now informed that in many parts of Holland it is, even spoiling the Dutch programmes.

Speeding Up

As, apparently, the only move made by the U.I.R. was to express the hope that both countries would shortly find a means to by-pass the trouble, Holland is seriously considering the question of speeding up the installation of a super-power transmitter which will assure on its long-owned channel a satisfactory service to its listeners. In most instances remedies seem to be sought by the interested parties alone and the possession of these long-wave channels is a much-prized asset.

In Victoria, Australia, the authorities have been trying out a short-wave transmitter at Lyndhurst; reception of its signals has been good both in Europe and in the two American continents, but unfortunately bad in Australia. In view of the poor reports received, it is now projected to build a high-power station to work on about 1,500 metres. What a contrast!

The race for kilowatts still persists in Europe. Droitwich is only the forerunner of a series of supers to be launched in 1935; when the Deutschlandsender, the new Lahti and Roumanian stations will be ready to function. Poland also has already started on a new transmitter at Torun, which may be ready by Christmas. Norway, with the recent opening

of the 20-kilowatt Trondelag (Trondheim) station, has started to make an all-round increase in the power of its broadcasting plants. Stavanger (10 kilowatts) will shortly work on a wavelength common to a new relay to be installed at Haugesund. Bergen and Kristiansand are both to blossom forth as 20-kilowatts, and at Aalesund the 5-kilowatt transmitter will start working on March 1, 1935.

Although the question of doubling the power of Kalundborg has not yet been definitely decided, the Swedes have taken steps to bring Motala up to 150 kilowatts, with the possibility of obtaining much higher power in the near future. We may pick up its initial tests towards December.

Of the Scandinavian countries, Denmark is the most favoured; owing to their mountainous districts, Sweden and Norway both find difficulties in providing a broadcasting service throughout their kingdoms. Oslo, in addition, suffers from being sandwiched between Leningrad and Moscow.

The Perfect "A"

At times, by mere chance, you may have picked up a Prague transmission just at the moment the time signal was broadcast, in which case you will have heard the tuning note preceding it. You may be interested to learn that by arrangement the transmitter broadcasts a perfect A, by which musicians may tune their instruments. The transmission is carried out several times daily and is repeated by Bratislava, Brno, and the other relays.

My Broadcasting Diary
Continued from page 380

Very well done! It brought back pleasing memories. I thought Sir Richard would have done better to have written down his little comments and introductions because he hesitated a great deal. He is evidently not an orator as well as a musician. It is always better to read if you are not sure of fluency.

I then left the set on and found the B.B.C. had somewhat cunningly thrown a sop to the Lowbrows after all this lofty Tudor stuff. The Wireless Chorus sang Student's Songs for half an hour. One always associates the Student's Songs with raw, uncouth voices having a sing-song. To hear them rendered in this ultra-refined manner rather amused me.

Still, they infused a good deal of vocal humour into their renderings and the result was pleasing. Thus good entertainment—the standard by which alone we must judge.

The Variety was goodish here and there. Not brilliant anywhere. Alec McGill and Gwen Vaughan have improved their act considerably. McGill's interrupting lines are much more carefully thought out. I think they might give the whole act a twist and make something new out of it even now. Not a grumble; merely a suggestion.

Saturday

BILLY COTTON'S BAND gave a very acceptable dance-tune recital. None of it gave me the least desire to dance. Strange how these recitals—for that is what they really are—leave you without that desire, yet the later transmissions have a real dance feel about them. Probably the fact that people are actually dancing is responsible.

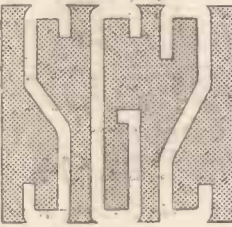
Galsworthy's *Skin Game* made better broadcasting than I should have thought. He is not easy to cut because his plays are so tightly packed. Very good entertainment.



**A JOB WORTH DOING—
is worth doing WELL!**

That's why so many designers and constructors insist on BENJAMIN Radio Components—made by engineers who have a thorough grasp of modern Radio requirements and who realise their responsibility to the enthusiastic constructor. The Class "B" Input Driver Transformer illustrated is a representative example of Benjamin quality and reliability. For use with all types of circuits and valves and tapped to give choice of overall ratios 1½-1 and 1-1. Price - 10/6

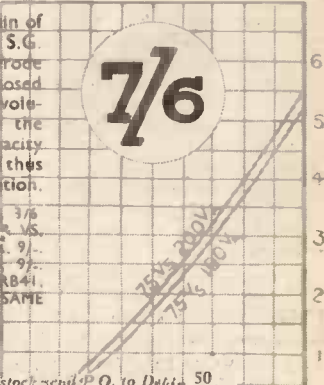
Insist on BENJAMIN RADIO COMPONENTS
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A HIGH MAGNIFICATION SCREENED GRID VALVE

As you know, the actual stage gain of an H.F. circuit employing an S.G. Valve is limited by its inter electrode capacity. Exceed the limits imposed and instability sets in. The revolutionary design of the anode of the 362 type S.G. 2. reduces this capacity to an unprecedented low level thus permitting a far higher magnification.

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7/6. RB42, 10/- DC MAINS at SAME
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362 VALVES

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Postcard Radio Literature

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THIS is the claim made on the leaflet containing details of the new B.I. copper earthing rods, which are made from solid drawn high-conductivity copper. Multiple fins form the big feature as these provide a larger surface area and better contact with the earth than other methods having the same diameter, and nearly 50 per cent. more contact area than a circular rod of equal diameter. It possesses great mechanical strength and is not easily turned aside by obstructions. Two sizes are available, 18 in. and 24 in., at 1s. 6d. and 1s. 10d. respectively. **196**

Ward & Goldstone

IRON-CORED coils in seven types are described on the leaflet to hand from the above firm. For those who are not familiar with the history and principles of this form of coil construction, interesting details are given together with technical points. The medium-waveband coils have an inductance of 157 microhenries, while those for the long wave have 2,200 microhenries. In each case the figures are for screened coils. The leaflet is well worth securing as many points are explained which every constructor should bear in mind when considering purchasing new coils. It is interesting to note that the types R11/GIC₄ and GIC₃ are suitable for use in The All-Britain Three. **197**

All the Telsen Components

THE 1934-35 folder issued by Telsen's contains illustrations and details of all their numerous components. The constructor is catered for in every direction, from mains units to loud-speakers, so that no difficulty should be experienced in finding the component you require. A wide range of coils and coil units is given, from the simple unscreened dual-range type to the screened intermediate-frequency transformer for superhets. In the variable-condenser section one is able to choose from those costing between 2s. 6d. and 22s. 6d. **198**

Trace Your Troubles Like a Shot

THIS is what the makers of the famous Pifco Rotameter tell you to do with one of their instruments. The comprehensive folder gives details of all their products and tells you all about the numerous tests that can be carried out. For 12s. 6d. the popular "All-in-One" pocket type is available, or, for those who want to measure A.C. and/or D.C., a Radiometer can be obtained at the same price. The de-luxe model, at £2 2s., has nine ranges of readings, each of which is brought into use by simply rotating a small knob. It has a moving-coil action and can be supplied with an adaptor for testing 7- and 9-pin valves at a very slight extra cost. A reliable meter is always a good investment, so why not send off for the interesting folder. **199**

Dynatron Receivers

THE 1935 range of Dynatron radio gramophones and receivers, as described in detail in their latest folder, fully maintains the Dynatron tradition of high-quality reproduction first, and foremost. In these days of super-hets it is very interesting to note the makers' statements regarding quality and the straight receiver. They say: "The chief technical reasons for the superiority of the straight receiver over the super-het may be simply expressed as follows: Infinitely better quality reproduction; improved signal-to-noise ratio, resulting in cleaner signals; impossibility of introducing phantom station points and foreign noises within the receiver; and consistent performance, not critically dependent on valve characteristics." **200**

Anacos Earthing Rod

THE necessity of a really good "earth" is so often overlooked, that many set owners would be astonished to find such an improvement in the power and selectivity which an efficient earth provides. The "Anacos" Earthing Rod has been designed in a cross-section of carefully calculated proportions. It is made of the purest copper and is quite unaffected by corrosion in any soil. A very neat and strong clip is provided, to enable the lead-in wire to make perfect contact. Two sizes are obtainable, 18-in. and 24-in., at the low price of 1s. 8d. and 2s. respectively. Drop a postcard for the leaflet now available. **201**

Here "Observer" reviews the latest booklets and folders issued by well-known manufacturers. If you want copies of any or all of them FREE OF CHARGE, just send a postcard giving the index numbers of the catalogues required (shown at the end of each paragraph) to "Postcard Radio Literature," AMATEUR WIRELESS, 58-61 Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire. Please write your name and address in block letters.

Exclusively Specified for the All-Britain Three for its sensitivity and superb quality



Stentorian Senior (PMS1), 42/-.

100 per cent. dust protection oversize cone.

Stentorian Standard (PMS2), 32/6.

Stentorian Baby (PMS6), 22/4.

Write for the new W.B. Stentorian leaflet.



"We are making a big song about the quality of reproduction from this set," says "Amateur Wireless." It is significant that a W.B. "Stentorian" speaker is exclusively specified.

Previously, Mr. A. K. Jowers, "Amateur Wireless" technician, had said about the "Stentorian," "A definite advance. These units are considerably better than the average loud-speaker."

You must hear the difference a W.B. "Stentorian" will make to your set. Its revolutionary magnet (of an exclusive new alloy) will bring greatly increased volume and a wider frequency response. Its new "Whiteley" speech coil will bring crisper attack and a new vivid realism which will astound you.

Ask your dealer for a demonstration to-day.

STENTORIAN

Whiteley Electrical Radio Co., Ltd. (Dept. A), Radio Works, Mansfield, Notts.

Sole Agents in Scotland: Radiovision, Ltd., 233 St. Vincent Street, Glasgow, C.2.
Sole Agents in I.F.S.: Kelly & Shiel, Ltd., 47 Fleet Street, Dublin.

ELECTRADIX BARGAINS



COIL TURN COUNTERS, for checking the number of turns up to 9,999 on dial. Soiled only, 1/3 each.

METERS. We carry large stocks of Meters, all ranges. Special Charging CZ 3-8-3 amps., 5/-; Pole Testers, 2/6. 0-20 volts, 5/-; 0-50 volts, 5/-; 0-100 volts, 5/6. 0-200 volts, 6/-; all A.C. or D.C. **MIPANTA A.C. Test Meter**, 300 v., 150 v., 7 1/2 v., 3 Scales, 19/6. **Dixonometer**, the 50-range tester, 55/-; Moving-coil 1st grade meter movements for own tester, 5/-.

Permanent Magnets. Tungsten 1 in. horseshoe, No. 1 is 1 lb., 2/6; No. 2, 3/4 lb., 2/-; No. 3, 1/2 lb., 1/6; No. 4, 3/4 lb., 1/-; **Speaker Magnets.** Large Four-claw M.C. **Speaker Magnets** under manufacturers' price, 12/-; with speech coil and frame, 14/-.

Dynamos. Hand-gear Alternators, 80 v., 30 m.a., 10/- only. Two comm. H.T. and L.T., D.C., 600 v. 90 m.a. and 6 v. 5 amps., 40/-; Lighting or charging: 18/20 volts 10 amps., 25/-; or complete with switchboard fitted meter fuses, auto cut-out and in main, 8/W, etc., 40/-; **Dors A.C. Fractional H.P.** 100 v., 15/-; 220 v., 17/6. Large Stock of all sizes. State volts and supply.



A.W.11 TABLE MIKE. This is a splendid pedestal Microphone for speech and music. The bakelite case, containing a 2 in. mike and transformer, is on a bronze pedestal. Switch and plug sockets are fitted on the case. It stands unrivalled for quality and price. **15/6**

CROONERS. Lapel Mikes for dance bands. American type **12/6**

PHONES. 120 ohm Sullivan Head-phones, W.D. model, at a tenth price.

of cost. For circuit testing, fault spotting, broadcast listening, microphone experiments. All one type and new. Aluminium body and headbands. Maker's price to-day is 15/- Our price, 2/6 per pair, 3d. postage.

PARCELS of experimental odd coils, magnets, wire chokes, condensers, switches, terminals, etc., post free. 10 lb., 7/-; 7 lb., 5/-; 1,000 other Bargains in New Sale List "A."

Write for Special Bargain List "A."

ELECTRADIX RADIOS

213, Upper Thames Street, London, E.C.4.
Phone: Central 4611.

RADIO MADE EASY for the BEGINNER!

"An Elementary Wireless Course for Beginners" has been written particularly for the listener who wants to know how his wireless set works. The Course takes the reader in easy stages right through all the processes of wireless reception. It successfully avoids textbook style, yet every line in the book is technically accurate.

131 ILLUSTRATIONS!

The unique illustrations, of which there are 131 in all, are a remarkable feature and constitute the finest series of explanatory diagrams ever included in any volume on the subject.

AND OVER 270 PAGES!

The 32 chapters of this book cover nearly 300 pages and at the remarkable low cost of 3s. 6d., is the simplest quickest, and easiest way of understanding the science of wireless.

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BERNARD JONES PUBLICATIONS LTD.
58-61 Fetter Lane, London, E.C.4

Leaves from a Short-wave Log

By J. GODCHAUX ABRAHAMS

IF I had required any proof of the value of a short-wave set, I duly received it during the past week. My friends—like most British citizens—were keenly interested in the results of the races for the America's Cup.

Conditions were exceptionally favourable for the reception of distant broadcasts even on the higher frequencies, and it was no difficult matter to pick up news and running commentaries from such stations as W8XK, Pittsburgh, on 13.93 metres, 19.72 metres and 25.27 metres; also through W3XAL, Bound Brook, on 16.87 metres and 49.22 metres. (The last-named channel, however, was usually very noisy.)

Further Good Channels

Further channels were W2XAD on 19.56 metres, and after midnight the same station on 31.48 metres. At odd times, I also captured good signals from W3XAU, Philadelphia, (31.28 metres), and W1XAZ, Springfield (31.35 metres).

So great was the general interest, inside and outside of the U.S.A., that it would appear that the majority of short-wave transmitters were used for broadcasting the running commentaries and descriptions of the races in the news bulletins.

By this means I was able to keep myself and other's informed of what was actually taking place, and therefore in advance of home broadcasts or published news. Well, anyway, it struck me that the set had paid for itself!

The transmissions from the Empire (Davenport) stations are also easy to receive, and you will probably find that the best of the batch are GSB (31.55 metres), GSD (25.53 metres), GSE (25.28 metres), GSC (31.3 metres), and GSF (19.82 metres). GSA (49.59 metres) is somewhat inclined to be noisy.

Better News Bulletins

It is essential to bear in mind that the channels are used at different hours of the day and night. Another point to remember is that the news bulletins are not the same as those given out by the home stations; in most instances they are much longer and detailed.

The German stations, DJD and DJA, Zeesen, on respectively 25.51 and 31.38 metres, are particularly good at present; their power is remarkable. The DJD and DJC (49.83 metres), broadcasts to Africa between B.S.T. 18.00 and 22.30, as well as the DJB (19.74 metres) 14.00—17.30 and DJD and DJC transmissions from 23.30—04.45, are destined to respectively Africa and North America, the announcements

Continued on page 385

MORE TELEVISION BROADCASTS!

From October 8 onwards the restriction on television broadcasting is being lifted, and 30-line television signals will then come to you on Wednesday nights and Saturday afternoons. See the October issue of "TELEVISION," now on sale, for full details.

SCREEN PICTURES with a DISC RECEIVER!

This issue of "TELEVISION" also gives full constructional details of a unit which, used in conjunction with a disc machine of any type, will enable pictures to be projected on to a screen.

TELEVISION MADE EASY for the BEGINNER!

There is a special section which explains in simple language the theory and practice of television, and also gives essential data and constructional details of simple television apparatus which the average amateur can make for himself.

BAIRD TALKS to the AMATEUR

We are gratified in being able to present to our readers, in the October issue of "TELEVISION," an article by Mr. J. L. Baird, who is of the opinion that the amateur will play an important part in the future development of television.

Now that there is every sign of real progress in television transmission, no enthusiast should miss this remarkably fine October issue which is now on sale at all newsagents.

TELEVISION OCTOBER ISSUE—Price 1/-

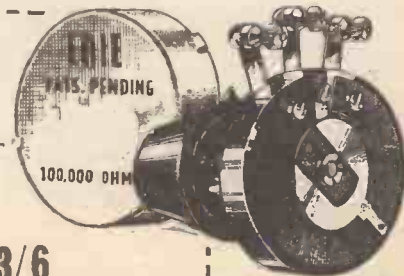
SPECIFIED for the

ALL-BRITAIN THREE ERIE VARIABLE RESISTANCE

Here is the volume control that will not develop insidious faults—never become noisy, or create grating sounds. All the experience behind Erie Resistors has gone to its development. The hard Erie resistance element and nickel silver contact ensure the smoothest, quietest efficiency through years of roughest use. Every part is constructed to give a lifetime's perfect service.

Ask your dealer to show you this new ERIE achievement—but if any difficulty send direct.
THE RADIO RESISTOR CO. LTD., 1 Golden Square, London, W.1

ERIE VOLUME CONTROL



3/6

Also supplied with built-in mains switch **5/-**

Leaves from a Short-wave Log

Continued from page 384

are all made in English and consequently are of entertainment value to listeners in the British Isles.

Jeloy (Norway) on 31.45 metres continues to be one of the best signals of the whole bunch, and the quality is excellent; it now relays the bulk of the Oslo evening programme.

Skamlebaek (40.5 metres) with the Copenhagen radio entertainments may also be relied upon; it is a station singularly free from fading, and although in a noisy area can be held for very long periods.

So far, I have been disappointed with OER2, Vienna, which, although advertising a lower wavelength, will be found immediately above the Dane. It has now taken over the relay of the daily Vienna broadcasts and on a recent date transmitted a complete opera as performed at the Vienna Opera House. The power, however, is not what it should be and as this is recognised by the Austrians, we may shortly expect to hear that they are building a new transmitter.

Alternative Channels

Rome I2RO appears to have closed down and I have been trying to trace the short-wave transmissions on other channels. If you care to do so, make a note that this station has been allotted the following channels: 25.4 metres (11,811 kcs.); 30.67 metres (9,780 kcs.); 31.13 metres (9,635 kcs.); 31.25 metres (9,600 kcs.); 49.28 metres (6,980 c/s.); 48.7 metres (6,160 kcs.); 49.3 metres (6,085 kcs.); 49.46 metres (6,065 kcs.); 52.4 metres (5,725 kcs.); 53 metres (5,660 kcs.); 53.48 metres (5,610 kcs.); and 54.01 metres (5,555 kcs.).

It is from one or two of these frequencies that the channel will be selected. So far, no information has come to hand regarding the choice made.

Flourishing Radio Society

JUDGING by the programme for the coming season which we have just received from the Exeter and District Wireless Society, those amateurs within reach of its headquarters should consider themselves fortunate.

Some very fine items have been arranged for the members, including lectures, visits to the Bridgewater beam station, the Singer Laboratories, and on Dec. 10, a junk sale of members' apparatus.

The annual subscription is only 5s., or 2s. 6d. if you happen to be under 17 years of age. Full details can be obtained from the Hon. Secretary, W. J. Ching 9, Sivell Place, Heavitree.

Television Course

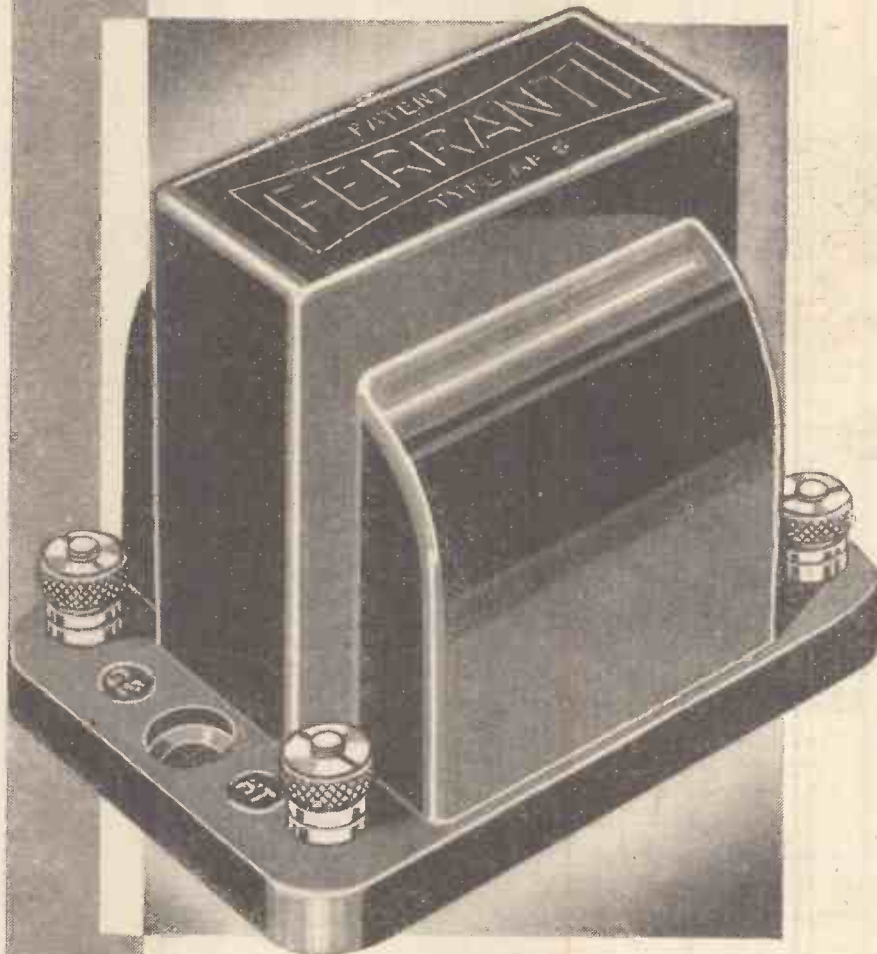
A COURSE of lectures on television, illustrated by experiments and demonstrations, will be given on Thursdays, commencing on October 4, at the Borough Polytechnic, Borough Road, S.E. 1.

The course will include the consideration of the principles involved and details of the most recent developments. The fee for the session is £1 and the syllabus can be obtained on application to the principal.

All Britain Is Talking About the All-Britain Three :: Have You Read About It on pages 365-370?

ONLY ELEVEN AND SIX -

and a FERRANTI at that!



This AF 8 Transformer has no superior in its price class.

It employs the FERRANTI patent air-spaced sectionalised windings, which are known the world over. It is not only capable of providing fine reproduction but will keep on doing it indefinitely. Robust construction being a well known feature of all Ferranti Transformers.

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Dependability always demands DUBILIER

WHEN buying condensers and resistances, it should be remembered that Dubilier Condensers mark the greatest advance in Condenser design and more than maintain Dubilier's established position as the foremost manufacturers of the highest quality condensers at competitive prices.

There are Dubilier Condensers eminently suitable for use in the "Crusader's All-Britain Three." Be sure to specify Dubilier when ordering.

It would be to your advantage to be more familiar with the latest developments in condenser design. The new Dubilier Booklet tells you all there is to know. Write for your free copy.



Dubilier Condenser Co. (1925),
Ltd., Ducon Works, Victoria
Road, N. Acton, W.3.

Medium-wave Broadcasters

CONSULT THIS LIST OF WAVELENGTHS BEFORE YOU TUNE IN!

This week we give details of all the important European medium-wave stations. Next week we shall publish a list of short- and long-wave transmitters.

Metres	Kilo-cycles	Station and Call Sign	Country	Power (Kw.)	Metres	Kilo-cycles	Station and call sign	Country	Power (Kw.)
203.5	1,474	Flymouth	Great Britain	.3	304.3	986	Genoa	Italy	17
203.5	1,474	Bournemouth	Great Britain	1	304.3	986	Cracow	Poland	1.7
204.8	1,467.2	Pecs	Hungary	1.25	307.1	977	West Regional	Great Britain	50
206	1,456	Fecamp	France	.2	309.9	968	Grenoble PTT	France	15
207.3	1,447	Miskolcz	Hungary	1.25	312.8	959	Poste Parisien, Paris	France	60
209.9	1,429	Newcastle	Great Britain	1	315.8	950	Gesblau	Germany	60
209.9	1,423	Beziers	France	1.25	318.8	941	Goteborg	Sweden	10
211.3	1,420	Tampere	Finland	1.2	318.8	941	Algiers	North Africa	12
215.4	1,393	Radio Lyon	France	.5	321.9	932	Brussels (2)	Belgium	15
216.8	1,384	Warsaw (2)	Poland	10	325.4	922	Brno	Czechoslovakia	32
218.2	1,375	Basle, Berne	Switzerland	.5	328.6	913	Radio Toulouse	France	60
221.1	1,357	Turin (2)	Italy	.2	328.6	913	Limoges PTT	France	7
222.6	1,348	Konigsberg	Germany	.5	331.9	904	Hamburg	Germany	100
222.6	1,348	Dublin	Irish Free State	1	335.2	895	Helsinki	Finland	10
222.6	1,348	Milan Vigentino (2)	Italy	4	338.6	886	Graz	Austria	7
222.6	1,348	Rordeaux S.O.	France	1	342.1	877	London Regional	Great Britain	50
222.6	1,348	Dorpat	Estonia	.5	345.6	869	Poznan	Poland	20
224	1,339	Lodz	Poland	1.7	345.6	868	Fredrikstad	Norway	7
224.2	1,337.9	Montpellier	France	.8	349.2	859	Strasbourg	France	11.5
222.6	1,331	Paris (Vitus)	France	.7	352.9	850	Bergen	Norway	1
225.6	1,330	Hanover and other Hamburg relays	Germany	1.5	352.9	850	Valencia	Spain	7
227.1	1,321	Magyarova	Hungary	1.5	352.9	850	Sofia	Bulgaria	1
230.2	1,303	Danzig	Germany	.5	356.7	841	Berlin	Germany	100
231.8	1,294	Linz and other Vienna relays	Austria	.5	360.6	832	Moscow (4)	U.S.S.R.	100
233.5	1,285	Aberdeen	Great Britain	1	362.8	827	Radio LL Paris	France	2
233.5	1,285	Dresden	Germany	.25	364.5	823	Bucharest	Roumania	12
235.1	1,276	Stavanger and other Oslo relays	Norway	.5	368.5	814	Milan	Italy	50
236.8	1,267	Nurnberg	Germany	.2	373.1	804	Scottish Regional	Great Britain	50
236.8	1,267	Augsburg	Germany	.25	377.4	795	Lwow	Poland	16
238.5	1,258	San Sebastian (EA)8	Spain	3	377.4	793.8	Barcelona (EA)1	Spain	8
238.5	1,258	Rome (III)	Italy	1	382.2	785	Lelzig	Germany	120
240.2	1,249	Juan-les-Pins	France	.8	386.6	776	Fredrikstad	Norway	7
241.9	1,240	Cork	Irish Free State	1	386.6	776	Toulouse PTT	France	7
243.7	1,231	Gleiwitz	Germany	.5	391.1	767	Midland Regional	Great Britain	25
245.5	1,222	Trieste	Italy	10	395.8	758	Katowice	Poland	12
247.5	1,211.9	Lille PTT	France	1.3	400.5	749	Marselles PTT	France	1.6
249.2	1,204	Prague Stranice (2)	Czechoslovakia	.5	405.4	740	Munich	Germany	100
251	1,195	Frankfurt-am-Main and relays	Germany	17	410.4	731	Seville	Spain	2
253.2	1,185	Kharkov (2)	U.S.S.R.	20	410.4	731	Madrid (Espana)	Spain	3
255.1	1,176	Copenhagen	Denmark	10	410.4	731	Talinn	Estonia	20
257.1	1,167	Monte Ceneri	Switzerland	15	420.8	713	Rome	Italy	50
259.1	1,158	Moravska-Ostrava	Czechoslovakia	11	426.1	704	Stockholm	Sweden	50
259.1	1,158	Kosice	Czechoslovakia	2.5	431.7	695	Paris PTT	France	7
261.1	1,149	London National	Great Britain	50	437.3	686	Belgrade	Yugoslavia	2.5
261.1	1,149	West National	Great Britain	50	443.1	677	Sottens	Switzerland	25
263.1	1,140	Turin (I)	Italy	7	449.1	669	North Regional	Great Britain	50
265.3	1,131	Horby	Sweden	10	455.9	658	Cologne	Germany	17
267.4	1,122	Belfast	N. Ireland	1	463	648	Lyons PTT	France	15
267.4	1,122	Nyiregyhaza	Hungary	6.25	470.2	638	Fragus (I)	Czechoslovakia	120
271.7	1,104	Naples	Italy	1.5	476.9	629	Trondelag	Norway	20
271.7	1,104	Madona	Latvia	1	483.9	620	Brussels (II)	Belgium	15
274	1,095	Madrid EA)7	Spain	1.3	491.8	609	Florence	Italy	20
274	1,095	Vinnitsa	U.S.S.R.	10	499.2	601	Sundsvall	Sweden	10
276.2	1,086	Falun	Sweden	.5	499.2	601	Rabat	Morocco	6
276.2	1,086	Zagreb	Yugoslavia	.75	506.8	592	Vienna	Austria	120
278.6	1,077	Bordeaux PTT	France	13	514.6	583.2	Riga	Latvia	15
280.9	1,068	Tiraspol	U.S.S.R.	4	514.6	583	Agen	France	6
283.3	1,059	Bari	Italy	20	522.6	574	Muhlacker	Germany	100
285.7	1,050	Scottish National	Great Britain	50	531	565	Athlone	Irish Free State	60
288.5	1,040	Leningrad (2)	U.S.S.R.	10	540	556	Beromunster	Switzerland	60
288.5	1,040	Rennes PTT	France	1.3	550.5	545	Budapest	Hungary	120
291	1,031	Parade (Lisbon)	Portugal	5	559.7	536	Wlino	Poland	16
291	1,031	Hellsberg	Germany	60	559.7	536	Bolzano	Italy	1
293.5	1,022	Barcelona (EA)15	Spain	1	569.3	527	Viipuri	Finland	10
296.2	1,013	North National	Great Britain	50	569.3	527	Ljubljana	Yugoslavia	5.3
298.8	1,004	Bratislava	Czechoslovakia	14	578	519	Innsbruck	Austria	5
301.5	995	Hilversum	Holland	20	696	431	Oulu	Finland	1.2
					748	401	Geneva	Switzerland	1.5
					748	401	Moscow	U.S.S.R.	20
					765	392	Ostersund	Sweden	.6
					726	413.5	Boden	Sweden	.6

DX'ers on the Short Waves

YOU have heard about the International DX'ers Alliance many times in these pages. It is an organisation emanating from America, with the object of bringing together DX fans all over the world.

They don't just sign on the dotted line and say "let's be all friends," though. There is a definitely competitive element in the game, members vying with one another to establish the largest possible number of verifications of distant stations received.

When this organisation came into being last year, it attracted large numbers of keen broadcast-band listeners in various parts of the world—the lure of really long distance by ordinary broadcasting channels proving very strong.

Now there seems to be every indication of a fundamental modification of the original conception of the I.D.A. In future it will be

possible to become a member through short wave channels.

The applicant will not win his spurs too easily. He will have to furnish to the President in charge of short-wave activities evidence of reception of broadcasting stations—not "ham" or commercial—from at least three different continents exclusive of his own.

Enlarged Scope

This new angle of I.D.A. developments should greatly enlarge the scope of the organisation. For while it is true that there are many broadcast band DX'ers there must surely be very many more short-wave fans. Further developments will be reported in due course.

Meanwhile you can obtain further information from Richard L. Rawles, of Blackwater, Isle of Wight.

The EXPERIMENTERS' NOISE SUPPRESSION UNIT

TWO chokes are wanted for the "Experimenters'" NOISE SUPPRESSION UNIT. These high-frequency chokes have been specially made to the "Experimenters'" original design. They are wound on a 2-inch Paxolin former that incorporates cover wire and have an inductance of 500 microhenries. They have been wound to stand 1,000 watts or large enough for any radio set or the majority of domestic appliances. The price is 5/- and deliveries are from stock. These chokes are also suitable for use in any type of noise suppression unit and can be used to cut down background noises with any Mains receiver.

Send 5/- to the Sole Makers for immediate delivery postage free

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1935 EDDYSTONE SHORT WAVE MANUAL



Fully illustrated with constructional details for building Battery and Mains S.W. Receivers—6v. B.W. Super-het with A.V.C.—All Wave Wave-meter—5-metre Receiver—Simple 5-metre Transmitter—Crossfeeder Aerial System—Battery and Mains S.W. Converters—Amateur Bands Receiver—100 watt Transmitter—Eliminators, etc.

COMPILED BY THE LEADING SHORT WAVE SPECIALISTS

PRICE 1/6

Obtainable from your radio dealer, W. H. Smith, or in case of difficulty, direct from STRATTON & CO., LTD., (Dept. 20), Bromsgrove Street, Birmingham. London Service Depot: Webb's, 14 Soho Street, W.1.

DOUBLE YOUR VALVE OUTPUT WITHOUT COST

"TWINL," a clever Valve-doubling Device makes this possible. Highly praised by Wireless Press as "something new with very great possibilities." Post free with full instructions to make a 2-Valve Receiver equalling 3-4 Valves, 2/6. Details stamp.

Eastern Radio Co., 35D Waterloo Street, King's Lynn

H.T. PROBLEM SOLVED

"Had your battery in use for 21 years, think it best solution to H.T. problem. I study economy as much as performance." Writes A.R.P. Dagenham. Lasts years, saves pounds. 120v. 12,500 m.a. £2. complete. Carriage paid. Cheap annual replenishment. All Standard H.T. Spares supplied. Write: WET H.T. BATTERY CO., 95 DEAN STREET, LONDON W.1.

New Apparatus

New Heptode

A NEW heptode valve for battery operation requiring only 1 ampere at 2 volts has just been released by A. C. Cossor, Ltd. It has variable-mu characteristics, thus allowing it to be controlled in an S.A.V.C. receiver. The type number is 210PG.

The voltage ratings for the modulator and oscillator anode are 150 maximum, while up to 80 volts can be applied to the screen. The modulator grid voltage is variable from 0 to 9 volts. Price 18s. 6d.

Another new valve which is also available now is the 13SPA high-frequency pentode designed for series running, such as in A.C./D.C. or D.C. receivers, when it can be used as a high-frequency amplifier or detector. Price 17s. 6d.

Skeleton Mains Resistance

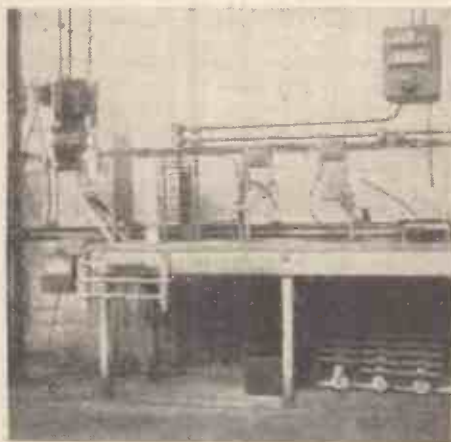
A NEW type of skeleton D.C. mains resistance has just been added to an already extensive list by A. F. Bulgin & Co., Ltd.

It is wound for 13-volt .3-ampere valves and can be obtained for use with any number of valves between two and five.

Tappings are arranged for 200 to 250 volts, while an extra tapping is provided to give an additional adjustment of 10 volts. The price is 3s. 6d.

T.C.C. Condensers

ADVANCE information has been received dealing with price reductions for many of the low- and medium-voltage dry electrolytic and tubular-type paper condensers. Mention is also made of new types which will shortly be released. The price reductions will come into force on October 1.



Testing cut a transmitting valve in the Ediswan experimental department at Ponders End

Those Crooners!

To the Editor, AMATEUR WIRELESS.

IN reply to Mr. C. E. Taylor's letter (No. 1143), to hear a crooner croon gives me a pain in the lower regions, as it were.

To appreciate any form of music or noise, one must live with it.

Living with the tune of a crooner, then, must surely make one feel sloppy-minded and just any-old-how.

Every time a crooner starts going on my set the low-frequency stages revolt, and give me a spot of high-frequency feed-back.

Perhaps Mr. Taylor has trained his receiver to accept such horrible noises for his pleasure. He is welcome to them for sure!

W. A. CLEMENSON.

West Hampstead, N.W

[1151

Easy Terms

Why wait weeks for that new Radio accessory? You'll get it quicker from N.T.S. Any items advertised in this Journal on Easy Terms. Strict Privacy Guaranteed. Cash or C.O.D. if preferred. Orders over 10/- Carriage and C.O.D. Charges paid. SEND FOR QUOTATION FOR ANYTHING IN RADIO OR TELEVISION YOU NEED.

STENTORIAN SENIOR

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Resistance Changes As You Alter the Wavelengths

Continued from page 363

ohms will have a value of 55,000 ohms at 600 k.c. At 200 metres (1,500 k.c.) it will be only 41,500 ohms, while at 1,500 metres (200 k.c.) it will be 71,500 ohms. At intermediate frequencies of the order of 110 k.c. the resistance will be some 80,000 ohms—a value approaching the nominal rating, but still appreciably less.

To assist in estimating the effect, two curves are shown dotted at Fig. 2, one for 200 k.c. and the other for 1,500 k.c. These curves, however, are not the result of a complete set of actual measurements, but are estimated from isolated readings at various points.

Practical Applications

Immediate practical applications of this effect suggest themselves. Any circuits having grid leaks connected across them—and they are legion in a modern set—should be examined to see whether the value of the leak cannot be made higher. If a 1-megohm leak is used at present, 2 megohms should be tried. It will result in better signals and higher selectivity, unless the working of the circuit is affected in some other way. This is more important in straight sets or in those parts of a super-het which deal with the initial radio frequency.

An exception to this is the ordinary grid detector, because the damping here is due mainly to the grid current of the valve, which is equivalent to a resistance of the order of 100,000 ohms—much less than the value of the grid leak, but there still remain many positions in which the high-frequency resistance of the various resistors is of importance. Fig. 4 gives a typical circuit with some of these critical points indicated.

Clearing the Ether

Continued from page 371

ether room since two programmes only occupy the space of one.

There are various other directions in which a solution might be found. In direction finding for example, we make use of different planes of polarization to separate one signal wave from another.

In the course of its travel, the ordinary ground wave from a transmitter is automatically polarized so that its magnetic field lies parallel with the surface of the earth. The directive action of a frame aerial is due to the fact that it responds only to this magnetic field and not to the electrostatic component. That is, of course, when it is properly designed for the purpose.

The ordinary frame aerial as used for broadcast reception is not so designed. There is nearly always a vertical-antenna effect, caused by capacity leakage to earth. This allows the electrostatic field to contribute to the total pick-up, and so wipes out most of the directive action.

Effect of Proper Balancing

With proper balancing, the electrostatic part of the wave can be made quite ineffective, so that the aerial picks up only the horizontal or magnetic component. This is the principle of the Adcock aerial used in direction-finding.

Here one sees two distinct possibilities. First, the development of sharply directional frame aerials as a real aid to selective reception, and secondly the use of differently polarized waves as a new means of transmitting signals.

What is wanted is a scheme for transmitting one programme say on a horizontally-polarized wave, and a second programme on a circularly polarized wave of the same wave length so that both programmes can be separated at the receiving end.

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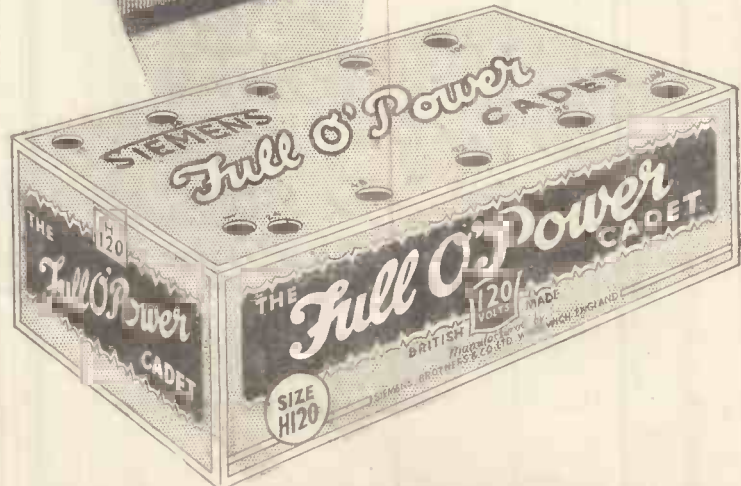
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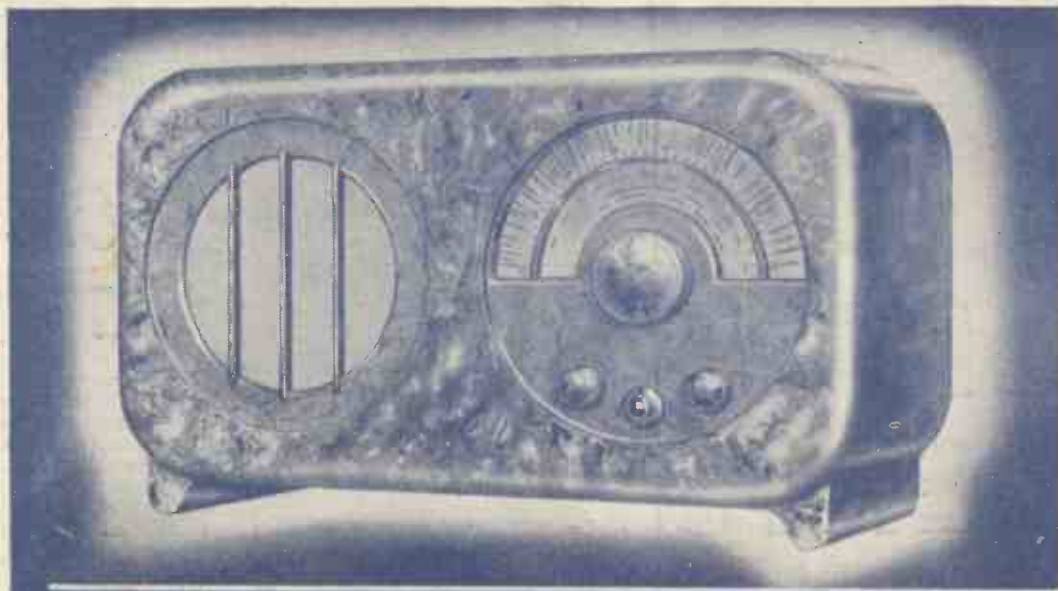
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