

LONDON'S NEW "BROADCASTING HOUSE"

Popular Wireless

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1934.

AND TELEVISION TIMES

"P.W.'s"
LISTENERS'
SERVICE
□
RADIO AND
SAFETY AT
SEA
□
GERMANY'S
TELEVISION
□
Etc., Etc.

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Mr. Christopher Stone, the popular gramophone broadcaster, who recently gave his final recital from the B.B.C. stations. It is interesting to note that his first broadcast, seven years ago, was the result of writing a frank letter to the B.B.C. criticising the way they presented record programmes.

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POPULAR WIRELESS AND TELEVISION TIMES

MANAGING EDITOR: N.F. EDWARDS.

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**HELPING PILOTS
S.T.'s NEW SET
JAPANESE RADIO
NEW AIR STATIONS**

RADIO NOTES & NEWS

**RADIO'S DRY ROT
RAPID WARNINGS
AMERICAN NOVICES
STILL MORE POWER**

Would You Believe It?

A PERFECT example of wild exaggeration appeared in a well-known Scottish journal recently in connection with colour television.

It concerned a newly patented receiver, among the attractions of which was that it could readily be converted for television in colours. Moreover, it was claimed, *coloured results were already being obtained on it from ordinary black-and-white transmissions!*

That may be all right in miracle working, but it's useless for television.

Homing Aircraft.

WHEN the Singapore-Brisbane section of the England-Australia air route opens in December the five new four-engined aircraft (D.H.86's) will be fitted with Marconi equipment to keep them in touch with ships or ground stations.

It will include the newly developed homing device which permits the pilot to set a direct course towards any suitable wireless station on his route.

This invention has already been successful on the African and Indian air routes.

Queer SOS's

THE B.B.C.'s recent broadcast of a message in connection with the queer plight of Scunthorpe, Lincs. (where a quantity of dangerous high explosives was missing), reminds me of another strange SOS which originated, I believe, in Switzerland.

It concerned a rare disease, and the broadcast was made because correct treatment for it existed, though it was known only to few doctors owing to the rarity of the disease.

Time was of the utmost importance, but, oddly enough, this unusual SOS was at once successful,

and a telegraphed reply from a specialist hundreds of miles away gave the necessary information.

The "600."

IMPATIENT souls who cannot wait until October 24th for the S.T.600, and all those who want to steal a march on their fellow readers, are hereby notified

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that it is useless to write to me for information upon the subject.

All I know is this: The S.T.600 will be a veritable bombshell. It is timed to explode on Wednesday, October 24th. And every wise set builder in the country will get under cover of that day's "P.W." as quickly as he can or take the consequences. I can't say fairer.

Television Developments.

WHILST the British governmental inquiry is still going forward the Germans are getting on with the practical side of television. Their Post Office is erecting a new transmitter in the Hartz Mountains to work on ultra-short waves, and designed to give a television service of sight and sound over a range of 150 miles.

The Loewe Co. have announced that they are already beginning production of "look-listen" receivers to pick up these programmes.

Japan, Too.

ALL this talk about bigger, better, brighter radio has fired the Japanese with enthusiasm. And they now propose to spend ten million yens to enliven the Pacific ether.

Tokio is to get a 150-kw. station within the next eighteen months. Osaka is to have a high-power station. So is Kiosho. And about a dozen other regionals on lower power will fill up any chinks which may be left between their service areas.

The small boys of Japan are delighted at this prospect, and esteemed parents are already receiving broad hints about the advancement of radio science—and of a couple of yens!

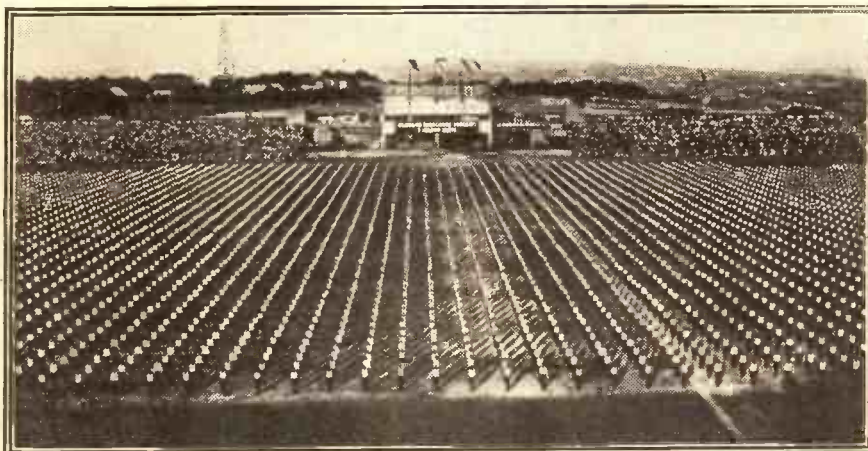
Air Additions.

TWO new wireless stations to aid in the development of the airways of Britain were recently announced by the Air Ministry.

One is at Newtownards—at the aerodrome on Lord Londonderry's estate—and the other at the Portsmouth airport.

Like Croydon, they can operate either Morse or telephony. And both will have direction-finding equipment, enabling
(Continued on next page)

PERFORMING THEIR EXERCISES TO AMPLIFIED MUSIC



This unusual photograph gives a glimpse of an imposing spectacle recently staged in the Strahov Stadium, Prague. Ten thousand gymnasts performed their exercises with military precision before an audience of 120,000 spectators. The music was supplied by an orchestra consisting of 120 musicians, magnified by four 120-watt amplifiers and distributed by 24 horn loudspeakers, each six feet long. The amplifying equipment was installed by Philips engineers, and the experiment proved to be a great success.

THOSE KEEN RADIO CLUB SECRETARIES

the aeroplane's exact position to be determined from its wireless signals.

Anæmic Athlone.

ARE all these complaints about the strength—or rather lack of it—from Athlone providing us with another instance of how a station's transmissions decline as its pristine polish wears off the instruments?

It always seems the same—grand results when the station is new, and then a sort of slow dry rot sets in.

As I have said before, it is time this phenomenon was investigated scientifically to see what causes the slump. Come on, B.B.C.!

A Society Note.

THIS is the month when that wily bird the Hon. Sec. (Radio Club variety) is on the prowl nightly for new members.



So great is their gift of persuasiveness that some of these fellows not only enrol the married man, but they make him take the missus along to the meetings. Here she meets Mrs. So-and-so, and while they talk about the new curtains ("An

absolute bargain, my dear) their respective hubbies can try out new circuits in a peace that passeth understanding. Hats off to the astute Secretary Bird!

Admiralty Intelligence.

THE First Lords are ambitious where quick signalling is concerned, but even they are said to be satisfied with the latest Admiralty scheme of warnings by wireless.

Every ship in the Navy or Mercantile Marine which carries radio, whatever its position in the seven seas, can now be warned of danger from Whitehall within about half a minute!

The method is to divide the whole globe into eleven areas, each having a clearing-house which is in constant touch with London. In each area every ship can keep in touch with the Local Boss station, and so can be reached instantly, if necessary, by a coded message.

Shorter Still.

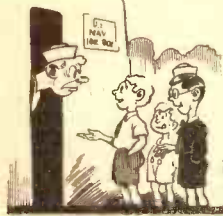
WHERE is this fashion for shorter and shorter wavelengths leading us?

I see that Professor McClellan has been advocating transmissions of continuous waves a centimetre or even a millimetre in length.

The latter is equivalent to a frequency of three hundred thousand million cycles per second (300,000,000,000). And although the good Professor's idea was to study the biological effects of such waves, the effect in practice would be to create a world shortage of noughts and to make us all 0-conscious.

In Ice.

THE curious fact that short-wave messages from the stratosphere, sent by Professor Cosyns on his last balloon flight, were not received by the listening ground stations suggests that we have much to discover about such transmissions.



With characteristic thoroughness the U.S. Navy is investigating this problem by means of a huge "ice-box," receiving

station. Special air locks allow high-altitude conditions to be reproduced.

BROADCASTING TOPICALITIES

The coming of autumn and the opening of the new Droitwich transmitter have necessitated certain changes in the B.B.C. programmes.

For example, commencing on Monday, October 8th, continuous alternative programmes will be broadcast on the National and Regional wavelengths between 10.45 a.m. and 6 p.m. from Monday to Friday each week.

Another innovation takes the form of a regular alternative to the late dance music between 10 and 11.15 p.m., when a general programme will be broadcast from the National transmitter.

The second general news bulletin in the National programme will normally be timed for 9.30 to 10 p.m., and the programme will include topical talks. The second news on the Regional transmitter will be given at 10 p.m.

"In Town To-night," the topical supplement to the week's programmes which proved so popular last winter, will be heard once more as a Saturday evening feature, commencing this week (October 6th).

The only snag has been the number of small boys attracted to the scene, under the impression (erroneous) that free ices were to be had!

Amateur Night.

ONE of the American stations, WHN, has been trying out amateurs in a manner that has made the hopeful aspirants provide good entertainment.



In the studio they have a quick-decision compère who is equipped with a gong.

He introduces a competitor, listens to his opening lines, and, if he doesn't like them, bang! goes the gong and another starts. All

in half a minute, with a running fire of caustic comments from the compère.

The new turns love the publicity—and listeners laugh and rely on the gong!

Short-wave Revival.

SLEEPING in from hither and yon comes more and more evidence of a boom in short waves.

Both the Glasgow and Manchester Radio Exhibitions confirmed Olympia's verdict that there was increased public interest in this country. And from all over Europe the story is the same.

In the U.S.A., where short waves have always been relatively more popular than elsewhere, they have increased in favour, especially since the broadcasting chains have used them more and more for spectacular long-distance broadcasts, such as those from the Antarctic.

Nothing seems more certain than a world boom on the high frequencies.

Going Up.

"LOUDER still and louder" seems to be the motto to-day for all broadcasting authorities. The Hungarians reviewing with satisfaction the first eight months of their 120-kilowatt, Budapest No. 1, announce that the No. 2 station's power is shortly to be raised to 20 kw.

Cologne will probably be using 100 kw. instead of 60 by the time these words are in print, and the Germans have now fixed on the site for the new Deutschlandsender, which is to employ 150 kw.

Incidentally, Cologne (455.9 metres) will be trying out one of those new anti-fading aerials in which the Germans are specialising.

Hidden Treasure.

I HEARD recently of a young Italian student who found in an old family book a clue to an ancestor's buried treasure; but to unearth it he needed the advice of an uncle in America. He worked his passage to the States, persuaded the uncle to come back, and after a long absence arrived home confident of success.

But in the meantime the Government had put a big wireless station there, and, as far as they could see, the mast, weighing over 100 tons, was erected right over the treasure.

If that isn't cruel luck, what is?



In Days of Yore.

I AM not one of those who hold that auld acquaintance should be forgot and never brought to mind. But I do recommend that line of conduct when it comes to the "quality" we used to get on our radio sets ten years ago.

I know that many a good honest burgher will still swear roundly that you can never beat the marvellous purity that his crystal-L.F. combination gave 'way back in '24. But it's illusion, my friends, staged by a kind memory. If you could really compare that fondly remembered masterpiece with a good modern set you would weep for very shame. Now, wouldn't you?

ARIEL

RADIO & Safety at Sea

By THE RT. HON. LORD STRABOLGI

"Wireless"—to use the words of the author—"is one of the most valuable aids to navigation since the Chinese invented the compass." Although this may seem a sweeping statement, it is, nevertheless, absolutely true, because Science has now made it possible to pilot a ship to port through even the densest fog with no guide other than that of a radio control station. In this article Lord Strabolgi (Lieutenant-Commander Kenworthy), who has a thorough knowledge of navigation in all its phases, tells you about the big part radio is playing in ensuring safety at sea.

WIRELESS telegraphy is the most important of the modern inventions for making sea voyages safer and more certain. Thousands of lives have been saved by radio already, both by the prevention of disasters and the rescue of passengers and crews of ships that have been wrecked. It is true to-day to say that a sea voyage is safer than a journey by railway train or motor-car. That this should be so, despite the force and uncertainty of the elements and the perils of navigation, is due very largely to the use of wireless at sea.

An Exceptional Case.

The terrible disaster to the cruising pleasure-liner Morro Castle off the New Jersey coast must not be allowed to shake the confidence of other ocean travellers. The cruising fashion has been of great benefit to British shipping. It opens out possibilities of travel and foreign visits to great sections of our population who never had the chance before.

There will always be a danger of the failure of the human element, however. In the case of the Morro Castle there were some mysterious points to be cleared up. For example, the delay in sending out the S O S message is, at the time of writing, still unexplained, and the ship was apparently on fire for some time before any distress signals were made. Here the circumstances were exceptional. The captain had died suddenly in his bed; the acting-captain had a terrible responsibility thrust upon him, and there seem to have been great panic and confusion.

The S O S Signal.

No S O S signal can be sent out to-day, by international law, without the authority of the captain. Some modification would appear to be necessary here, and my own suggestion is that the second-in-command—in most ships the chief officer—should have a joint responsibility, including the duty of representing to the captain that the distress signal should be made if he, the second-in-command, thinks this desirable.

We have a similar joint responsibility in the Royal Navy for

the safe navigation of the ship. While the captain is primarily responsible, the navigating officer has the duty of making representations if he scents danger. Something of the kind appears advisable in the Mercantile Marine in connection with wireless signals of distress.

Yet there have been very few of these human failures, if human failure it was in the case of the Morro Castle. So long ago as the disaster to the Titanic wireless was used, for the first time, in a great sea wreck. Even in those early days the flashing of the S O S signal brought every ship within reach racing to the scene of the collision between the Titanic and the iceberg which ripped open her side. Hundreds of her passengers and crew were rescued. Before the days of wireless at sea the casualty list would have been much heavier.

The utility of wireless at sea is, however, by no means confined to the sending of distress signals. It is one of the most valuable aids to navigation since the Chinese invented the compass. I will describe a few of the modern uses of wireless and the added safety they confer on ocean travel.

Accurate time-keeping is of the utmost importance at sea, for the longitude, and therefore the position of a ship, can only be calculated by means of chronometers. These must be accurate to the tenth of a second. In the old days all large ships carried three chronometers, and the larger warships five. A kind of average was struck. There was no means of correcting the chronometers, except in port, when intricate observations were taken of the moon, using an artificial horizon by night on shore. By laborious calculation it was possible to correct the chronometers fairly accurately. To-day the time signal can be received by any ship with wireless anywhere at sea, even beyond the Arctic or Antarctic circles. By means of this time signal the accuracy of the chronometers can be checked with complete confidence.

Finding the Exact Bearing.

Wireless is now used for giving a ship her exact position at sea. All round our own coasts, and on the coasts of most civilised maritime countries, are direction finding wireless stations. It is possible from these stations to get the exact bearing of a ship at sea making a spark, even a hundred miles away. The directional wireless stations are in telephonic touch with one another.

By comparing notes the exact position of the ship can be plotted on a chart and communicated to her captain: for this position is the point of intersection of the bearing lines from the two independent stations.

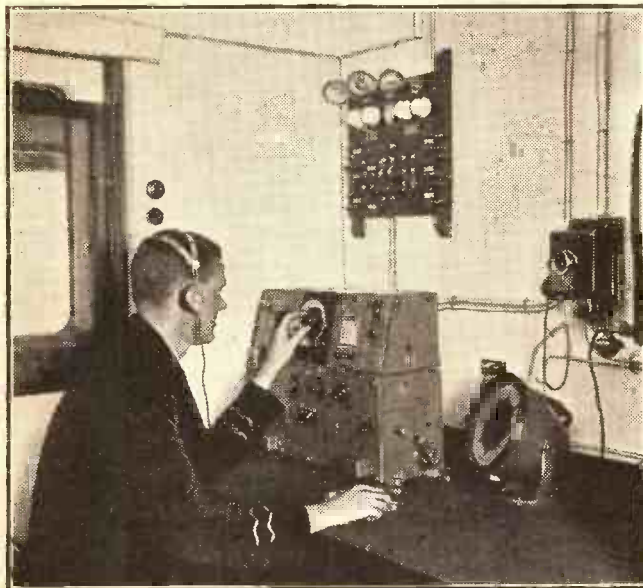
Steering Through Fog.

Indeed, it is possible to-day to pilot a vessel to port through a heavy fog in the English Channel or the Irish Sea by means of wireless without her sighting a lightship, or land or any other fixed point. In the old days fog was the worst terror of the seaman. All he could do, once he had lost his bearings, was to anchor and remain there until the fog lifted, with continual danger of being run down by some other vessel.

Another wonderful invention is the wireless beacon. This works by combining

(Continued on page 118.)

OBTAINING THE SHIP'S POSITION



With the aid of the wireless direction finder the captain of a ship is able to determine his position with a high degree of accuracy. The photograph shows the Marconi direction-finding equipment on the s.s. Queen of Bermuda.



A general view of one of the elaborately appointed studios.

NOT far from Oxford Circus, in the heart of London's shopping centre, I have just discovered a miniature Broadcasting House which, in the excellence of its studios and the completeness of its equipment, is practically a rival to the B.B.C. "palace" in Portland Place. And yet listeners will never hear any of the concerts or talks which are given in the studios of London's new "Broadcasting House"!

Some idea of the thoroughness which has gone to the building of the studios is given by the two photographs on this page, which show the No. 1 studio—used for orchestral items—and the control-room, where the amplifier and associated equipment is combined with recording apparatus almost exactly similar to that now being used by the B.B.C. And the whole of this studio accommodation, which is far more up-to-date than many of the Continental broadcasting stations, will be used for teaching would-be radio "stars" the art of the microphone.

A Pioneer Director.

For six years Mr. Bertram Fryer was Vaudeville Director for the B.B.C. You have possibly never heard his name before. And yet the whole development of broadcast vaudeville, from the days when there was just one short programme once a month up to a few months ago, is due to his work. Recently Mr. Fryer left the B.B.C. It is he who is responsible for this new microphone school, the first of its kind in the country.

Singers, pianists, comedians, talkers—all are catered for at the London School of Broadcasting, as it is called. And the training which they are given is carried out under conditions almost identical with those in force at Broadcasting House.

Last week Mr. Fryer taught me how to be a radio star. In No. 1 studio I learnt how to sing a full-blooded song of the sea without "blasting." In No. 2 studio, under the expert guidance of Colonel Brand, who will train speakers, I was shown how to give a topical talk. In No. 3 studio I acquired the gentle art of crooning. And all the time signal lights were flashing and instructions were being given to me through the studio loudspeakers. At the end of the morning I felt that I could have walked into Broadcasting House and

LONDON'S NEW "BROADCASTING HOUSE"

A visit to the London School of Broadcasting, where would-be radio "stars" are taught the art of the microphone.

By PATRICK CAMPBELL

given any kind of programme that was required!

But the most intriguing part of the whole business was that, after everything I did, my performance was played back to me immediately

through the loudspeaker. Over and over again the record which had been made of my talk was played with suitably caustic comments by Colonel Brand. And as a final blow to my pride a record which had been made in the studios the day before by A. J. Alan was put on just to show me how it should have been done!

Advantages of "Microphone Atmosphere."

This new system of recording, which enables a performance to be played back within twenty seconds of its performance, is one of the principal features of the training. For the London School of Broad-

years as Station Director at Newcastle and Bournemouth, followed by six years in London, when my responsibilities ranged from the Children's Hour to Grand Opera, I do feel that I know something about the requirements of the B.B.C.

Teaching Radio Aspirants.

"However, I know perfectly well that my old colleagues in the programme department are busy men whose sole aim is to secure new talent for the microphone. They haven't got the time to teach radio aspirants how to do their job when they come to Broadcasting House for an audition.

"In every profession, whether it be music, the stage, the cinema or the platform, talent is required and welcomed. But unless the artist has been trained his natural ability is often overlooked entirely. Broadcasting is no exception. If an artist goes to an audition his snap, his patter, his delivery, his subject matter must all be put over.

"That is why I have tried in my studios to reproduce the conditions of Broadcasting House. So familiar does the student become with studio atmosphere and apparatus—announcers, red lights, etc.—that there is nothing left to frighten him when he goes to the B.B.C."

THE CONTROL AND RECORDING ROOM



This is where records are made of students' performances and played back to them within twenty seconds. Note the small window communicating with the main studio.

casting is not intended solely for beginners.

Established radio artists with engagements ahead come to the school to try over new "acts" under microphone conditions and to take advice on new material. Talks experts with a new series ahead come along to polish up their delivery. Dance-band crooners learn the technique of recording before going down to the gramophone studios.

I asked Mr. Fryer how far his new school was connected with the B.B.C.

"The London School of Broadcasting has no official connection with the B.B.C.," he told me. "At the same time, after four

TIMING THE VARIETY SHOWS

The Bourne Fitch Trial—
"Golden Dragon City"—"The
Skin Game"—Two Good Talks.

IT is a good idea of the Editor of the "Radio Times" to prefix a time to the different items of the Promenade Concerts. The advantages are obvious. I suggested the same thing some time ago, but I asked for it especially in the Variety programmes. I had thought at the time that my suggestion was scorned, but now I am encouraged to think that it was just pigeon-holed.

If the idea is being tried out first on the Proms I hope it will be judged sufficiently successful to extend it to Variety. In this branch of entertainment it would be an immense boon. One doesn't always want to hear every item of a Variety bill.

In a recent Variety bill I was attracted by two names only. I wanted to listen to Ernest Shannon and Jack Barty. Fortunately, Ernest came on fairly early. I had no idea when Jack was to appear. It wasn't convenient to listen to the whole show. So I switched off. Now, had I known, for instance, that he was due at 8.55, I certainly would have switched on again for him. Timing a Variety bill seems to me the easiest thing in the world.

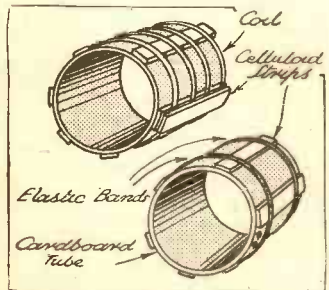
I thoroughly enjoyed the Bourne (Lines) Fitch Trial, or the bit of it we were allowed to hear. Stainless Stephen, the appointed judge, was in perfect form. What a pity we couldn't hear his final summing-up! It must have

(Continued on page 116.)

A PAGE of Recommended WRINKLES

MAKING S.W. COILS.

THOSE amateurs who construct their own S.W. coils may be interested in the following method: Any old piece of cardboard tubing of a diameter slightly less than that of the required coil and twelve strips of celluloid are required. Six strips are equally spaced around the tube and held with elastic bands. One end of the wire is temporarily fixed to the tube and the coil wound over the strips.



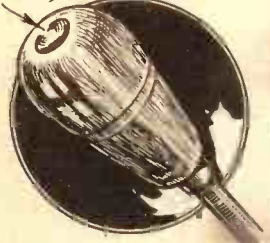
The coils are robust in construction and are self-supporting.

A liberal amount of a viscous solution of celluloid, dissolved in acetone, is placed on the strips between the turns and six more strips placed over these, further elastic bands holding these in place. The "dope" softens the strips slightly, and they can be pressed fairly close together, forming practically solid spacers when the "dope" sets. The coil can then be slid off the tube and mounted in any convenient way.

IMPROVING THE SCREW-DRIVER.

MOST screwdrivers with wood or composition handles, sold for small jobs, can be improved as far as the wireless fan is concerned. The ordinary turn-screw has a domed end, which may be hollowed a little to

Hollowed to Receive First Finger



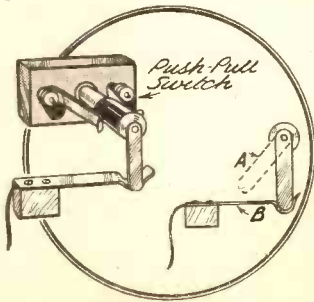
Convenience in holding the screw-driver is increased by the hollow in the handle.

receive the first finger-end, while the handle is rotated with the thumb and second finger.

This I find ideal, as most little jobs to a radio set are done with the driver in a vertical position.

PANEL-LIGHT SWITCHING.

TWO pieces of brass, $\frac{1}{4}$ in. wide, are cut and shaped, as shown at A and B. B is attached to the base-board by means of two screws, using pieces of cardboard to lift it up, directly



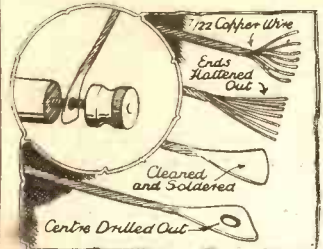
The panel light cannot be switched on when the set is "off."

beneath the on-off switch. A is attached firmly to the spindle of the switch by means of a small screw. If there is no room for the screw to enter, the metal and ebonite pieces at the end of the spindle may be screwed out a little. B should be so placed that A cannot make contact with it when the switch is in the off position. One side of the lampholder is wired to B, the other to either L.T. + or L.T. - (which can be found by trial).

All that need be done to switch on the panel light is to rotate the knob of the switch. An arrow can be scratched on the knob and filled with white chalk to indicate the contact position.

AN AERIAL HINT.

MANY good aerials of 7/22 copper wire end in a poor connection to the lead-in, due to the difficulty of



Straggling ends, and consequent inefficiency, at the point where the down-lead joins the lead-in tube are easily overcome in this fashion

securing the bulk of wire under a small nut. This may be overcome by cleaning each strand for an inch or two at the end and hammering the whole bunch to a flat surface. Thoroughly coat this with solder, and the result is a flat piece

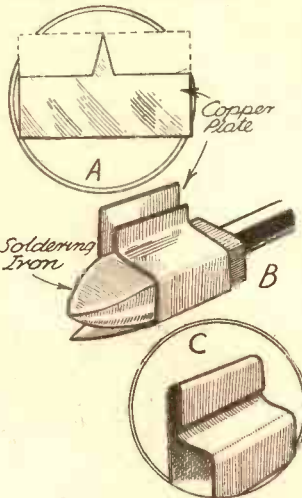
of solid metal. Drill this, and the result will be very good contact and increased efficiency.

FOR FINE SOLDERING.

IT is sometimes found when soldering small jobs that the iron is too big and clumsy for the task. An easy way out of the difficulty for those who do not wish to purchase an extra soldering iron is as follows:

Take an old piece of copper plate—about 2 in. by 2 1/2 in. will do for most irons—and cut it as at A. Then bend it round the iron, as at B. The joint may be fastened tight, as at C.

The fit should not be too tight, but just tight enough to enable the thing to be slipped on and off the iron when holding the ridge with pliers.



A specially shaped copper sheath is fitted over the bit of the soldering iron when "ticklish" jobs have to be done.

I find this very useful for slipping on the iron when doing such jobs as soldering very thin wire, etc., where the big iron by itself tends to get in the way.

A VALVE HOLDER TESTER.

IT is often no easy matter to make sure the L.T. current is reaching the valve legs. The voltmeter terminals are often too thick to make contact in the valve holder sockets, and testing across the holder terminals would not reveal a break inside the holder itself.

A useful tester can be made from an old valve and a flashlamp bulb. Solder two short pieces of wire to the bulb terminals—i.e. the screw part—and



A burnt-out non-metallised valve is used for this scheme. The glass bulb makes the insertion of the tester an easy matter.

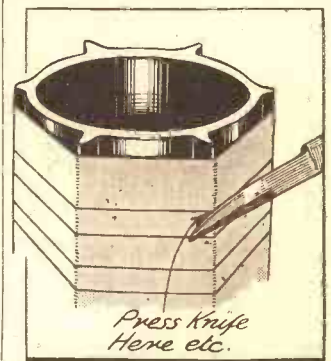
solder knob in the middle of the bottom. The other ends of the wires should be soldered to the filament pins of the old valve.

The wires should be just long enough to hold the bulb on the top of the valve. The old valve can then be inserted in the suspected holder, the L.T. switched on, and if the connections are sound the bulb lights.

MARKING OUT SLOTS.

THE marking of slots on ribbed formers has to be done with extreme accuracy.

If parallel lines are drawn on a piece of plain paper, at the correct intervals, and the paper then wrapped round the former and fixed with "Seccotine," a knife can be pressed through the paper at every point where the lines cross the ribs.



The knife cuts through the paper and marks the positions for the slots in the former.

When the paper is removed the slot positions are clearly and accurately marked.

For a short-wave coil the lines on the paper can be drawn on the slant, so that the resulting marks on the former are spiral.

ONE GUINEA FOR THE BEST WRINKLE!

Readers are invited to send a short description, with sketch, of any original and practical radio idea. Each week £1 ls. will be paid for the best Wrinkle from a reader, and others published will be paid for at our usual rates.

Each hint must be on a separate piece of paper, written on one side of the page. Address your hints to the Technical Editor, "Popular Wireless," Tallis House, Tallis Street, E.C.4, marking the envelope "Recommended Wrinkles."

Will readers please note that the Editor cannot, in any circumstances, guarantee to return rejected Wrinkles, and that payment for published hints is not made until ten days after they appear.

The best Wrinkle in the issue dated September 22nd was sent by Mr. M. J. C. Wright, 25, Launceston Place, S. Kensington.

OFF TO SCOTLAND!

THE S.T.600, Mr. John Scott-Taggart's great new receiver, is on a tour of England, Scotland, Wales and Ireland.

It is going into scores of readers' homes and undergoing the most amazingly exacting tests.

When on October 24th, details of the S.T.600 are published in POPULAR WIRELESS, the whole constructing public will eagerly read the pages to see how so high a performance can be obtained.



Mr. Scott-Taggart bidding farewell to members of the "P.W." staff at the commencement of his tour.

Get ready, yourself, to build this set—the climax to twenty years' designing for the technical Press. Mr. Scott-Taggart has excelled by far the results obtained on his own famous sets, the S.T.300, S.T.400 and S.T.500.

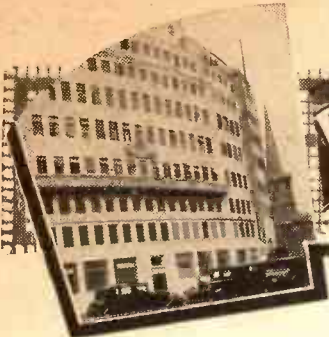
Tell your friends about this new receiver. Tell them to Look for it, Wait for it, Build it! Advise them to "Act in Oct." for on Oct. 24th will come the great annual opportunity for building a great national S.T. design, tested and proved in every part of the country.

Reserve your S.T.600 copy of POPULAR WIRELESS now. There will be a 300,000 rush for this issue, which is dated Oct. 27th, and will be on sale on Oct. 24th.

ACT IN OCT.!

P.W.'s LISTENERS' SERVICE

The most comprehensive weekly Guide to modern receivers



FERRANTI ENTER CAR-RADIO FIELD

All the latest news and views of the various commercial set makers' activities are contained in this weekly "P.W." feature, in addition to our unique Triple-Test service which has already been hailed on all sides as an invaluable guide.

IMPORTANT VISUAL-TUNING DEVELOPMENT

OUR TRIPLE TEST THIS WEEK



The subject of our Triple Test this week is the new Ekco Model A.C.85 receiver—one of the new-season's instruments which created such widespread interest at the recent radio exhibitions, and with which, superficially, at any rate, you are probably already familiar. First there is the usual "musical test," which appears on page 100, while on the next page appears "P.W.'s" detailed technical report. Finally, there is the "man-in-the-street" test which this week, and in answer to Ekco's widely advertised "Ask-the-postman" challenge, has actually been conducted by a postman. His observations on page 102 make interesting reading.

THE manifold advantages of the various vision-tuning schemes have already been established beyond all doubt, and, judging by present tendencies, it is reasonable to suppose that this 1934 innovation will have become universal practice by this time next year.

Climax are the latest people to interest themselves in the idea of tuning by sight, and they are to be congratulated for having made their debut with a scheme totally different from anything else that has yet appeared.

The device for which they are responsible—and which is to be incorporated in a new Climax set to be released in a week or two—embodies no moving parts whatever, and is based on a common or garden 2-volt flashlamp bulb.

A Particularly Sensitive Device.

The precise details of the scheme have not yet been released, but it works upon the principle of increasing brilliance as a station is tuned in. When no transmission is being received it glows only dimly, but as a station is tuned in the degree of illumination increases until it reaches maximum, which indicates the point of correct tune.

Several of the modern sets incorporate illuminated indicators based upon the neon-tube principle, but none so far have succeeded in obtaining the desired effect with an ordinary flashlamp bulb, and Climax, therefore, are deserving of every credit.

It is claimed that this new Climax device is particularly sensitive, and will provide a visual indication of the point of maximum resonance on even the weakest stations.

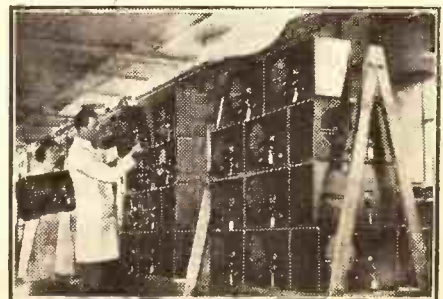
POPULARITY OF "HIS MASTER'S VOICE" BATTERY MODEL

AS was rather anticipated when it first came out, the new H.M.V. "Long Three" is proving tremendously popular and the makers are experiencing a big demand.

This set, which is a battery instrument, is the cheapest of all the sets in the H.M.V. range, and at £7 19s. 6d., which includes valves, batteries and a moving-coil loud-speaker, it must certainly be considered as extraordinarily good value for money.

The H.M.V. "Long Three" has, as its name implies, a horizontal type of cabinet which is attractively finished in light walnut. It is completely self-contained, and with its screened-grid H.F., power-grid detector and pentode-output circuit it is capable of putting up a performance which is certainly in keeping with the prestige of the name that it bears.

A battery set by H.M.V. at an inclusive price slightly below £8 is an event of no small importance, and that the listening public has been quick to appreciate that fact is evidenced by the phenomenal demand.



In this "behind-the-scenes" view, large numbers of the new "Long Three" receivers referred to in the previous column are seen being stacked up at the H.M.V. factories ready for delivery.

NEWS has just reached us of an entirely new departure by Ferranti—a departure that marks still another milestone in the history of this famous firm's achievements.

Ferranti's have long been famed for the high standard of excellence of their many receivers, and readers will welcome the news that they are now about to market an attractive car-radio installation.

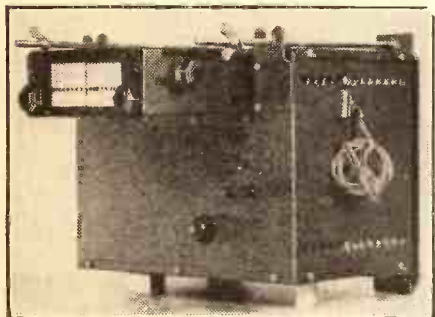
The Ferranti "Motorset"—as it is to be called—is a 5-valve superhet of advanced design, and it operates entirely from the car-lighting battery. The receiver is completely self-contained, with its speaker in one steel cabinet which is finished in black enamel. It is designed for fitting below the dashboard, and the mounting arrangements are so very simple that the set can be removed from the car, if desired, in less than half a minute.

A Completely New System.

The circuit of this new set—a patented Ferranti scheme—employs five valves, and a double-vibrator mechanical rectifier which performs the multiple function of converting the battery voltage to A.C., enabling it to be stepped up and then rectified to D.C. for operating the receiver.

The set incorporates all the latest refinements, outstanding of which, perhaps, is the provision of fully delayed automatic volume control, and it is capable of providing an undistorted output of 2½ watts.

Up to the time of going to press the price had not been definitely fixed.



The new Ferranti "Motorset," an advanced car-radio installation incorporating all the latest modern refinements, including fully delayed automatic volume control.

THE CAT THAT SPILT THE ACID!

The Story of an Accident that Affected the World, told by the Press Department of E. K. Cole, Ltd.

ONCE upon a time there was a chemist who had a cat which split a bottle of acid on some cheese.

Next morning the chemist found on his table a hard substance which he eventually called casein. What he called the cat is not recorded, but this is the legendary story of the birth of the plastics industry.

Unknown Benefactors.

Nobody knows the name of either the cat or the chemist, but that night in the laboratory started one of the most revolutionary industrial developments of the century.

Everywhere you go, everything you see and everything you do has been affected by that simple accident.

This article is being written with a vulcanite pen on a bakelite table-top. The bakelite-capped inkpot rests in a celluloid stand lying between a moulded telephone and a moulded ashtray.

Plastics are everywhere!

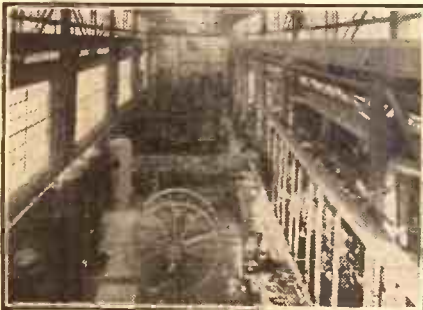
Ekco Model 85 has a bakelite cabinet which is probably one of the world's largest mouldings.

Before the first moulding of this cabinet could be made a 20-ton block of chromium steel had to be cut to form the die.

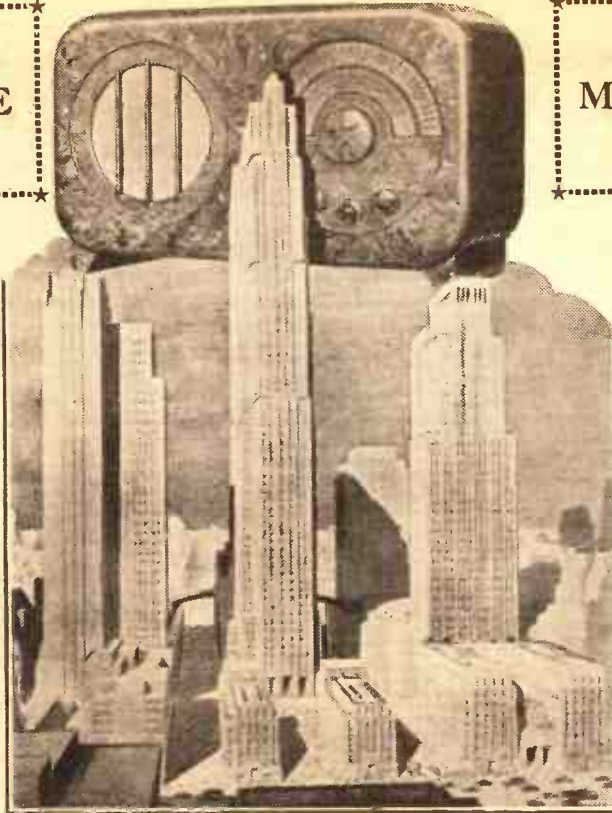
After the drawings had been approved and the die cut, Ekco started to produce the cabinets in their 35-foot-high presses. Two thousand tons pressure is needed to work these presses, and the foundations consist of a block of solid concrete embedded 15 feet deep in the ground.

The dies are heated by electricity, and once they reach the required temperature they are not allowed to cool for months on end. From the time the first cabinet was moulded the presses have never been idle. Even while you are reading this, cabinets are being made, every one exactly the same down to the last thousandth of an inch as the one which houses the "P.W." test set.

And all this has developed from the accidental spilling of some acid by a cat!



Some idea of the extensiveness of the Ekco moulding shop will be obtained from this view.



This composite picture of the Ekco Model AC85—the instrument which is the subject of our Triple Test this week—looks very nice, don't you think? But it happens to have been prepared not solely for ornamental purposes, but to draw attention to the fact that in our practical tests of the instrument no less than ten American stations were received on the medium waveband!

OUR MUSIC CRITIC ON THE AC85

A SMALL radio receiver and quality of reproduction have not often gone together, but the AC85 has achieved the combination remarkably well. Brilliance of high notes, with a welcome "stringiness" of violins, is obtained, and the bass end of the musical register is wonderfully portrayed for a set of its size.

So often good bass response means boominess when the receiver design is small, but in this receiver no trace of boom is noticeable and the overall balance is very pleasing.

Brass Well Reproduced.

Using a pick-up with the set I listened to a number of records, and was particularly pleased with the way brass was reproduced. One record in particular came through exceptionally well—that of the Gaumont-British Orchestra playing a selection of "Chu Chin Chow" on a Columbia. That of Helène Ludolph—on H.M.V.—singing Handel's "Care Selve" with organ accompaniment, also was reproduced very well, showing that as a musical instrument, apart from its radio performance, the AC85 receiver is in a high class.

Finally I listened by radio to one of the B.B.C. Promenade Concerts, using the AC85, and found the degree of reality achieved quite impressive.



... Climax Radio Electric, Ltd., are shortly to market an all-wave superhet covering the wavebands from 13-80, 200-550 and 900-2,000 metres at a price comparable with those of ordinary 5-valve superhets to-day.

... This new Climax super is to incorporate an entirely new visual-tuning indicator which is in no way similar to any of the existing schemes for tuning in programmes "by sight." (See note on page 99.)

... As a result of a tremendously increased demand, Ekco's have started work on a big extension to their factory at Southend which, when completed, will add a further 10,000 square feet to the existing manufacturing space.

A SIX-VALVE SUPERHET PORTABLE

... The Ferranti Portable, a completely self-contained 6-valve superhet at 16 guineas, is a remarkably efficient instrument, and that it created tremendous interest at the recent radio exhibitions.

... The price of the new Ferranti "Motor-set," although not yet definitely fixed, will probably be in the neighbourhood of 18 guineas, which, of course, includes everything. (See details on page 99.)

... The H.M.V. Show Train, which has been touring the country since April, and which,

since then, has covered over three thousand miles, has proved such a source of attraction that it is to continue touring until the end of October.

... R.I. have just released an entirely new receiver in their well-known "Ritz" range which employs a 13-stage superheterodyne circuit, and which is capable of delivering an undistorted output of 5 watts.

... The Marconiphone Model 286 "Lucerne Special" radiogram has just been modified by the addition of delayed automatic volume control, and that the improved model, to be known as the Q286, is to retail at 22 guineas.

... The coloured cabinet idea for Ekco Model AD65 receivers, to which I referred last week, is to be extended to cover also the new Model 85, and that the extra charge in all cases for coloured cabinets is 2 guineas.

... An entirely new radiogramophone is to be added almost immediately to the range of receivers manufactured by Murphy Radio, and that supplies are likely to be available during the early part of this month.



A glimpse of the vast power house which supplies the Hayes factories of "His Master's Voice."

TECHNICAL TESTS

NUMBER TWO.

THE NEW EKCO MODEL A C 85.

It seems to be the modern tendency for practically all commercial-set designers to go all out for sensitivity. It may be assumed that this is due first to the fact that few are the sets that will sell these days unless they are capable of providing a reasonable number of distant programmes, but more probably because of the healthy competition which prevails between the various manufacturers.

But in the attainment of a really high degree of sensitivity there are many pitfalls into which all but the reputable firms are apt to step, for it is unfortunately a fact that high sensitivity more often than not means high noise level unless suitable precautions are taken in the design to guard against that eventuality.

It is easy—ridiculously easy—to design a set with a phenomenally high degree of sensitivity, but as to whether, in practice, it would ever be possible to listen—by which we mean to enjoy—distant programmes on it is another matter entirely.

And whereas nobody as yet has succeeded, nor for that matter is likely to succeed, in finding a method of eliminating atmospheric disturbance, there are certain ways and means of abating the nuisance, at least to some extent; and that is one of the reasons why it is safe to predict that the new Ekco Model A C 85 will enjoy tremendous popularity.

In the design of this remarkable superhet (and as a result of our tests the adjective is certainly justified) there is an ingenious scheme which is termed "station pre-selection and automatic noise suppression."

A Salient Feature.

We are not concerned at the moment with what it is so much as with what it does. And what is there that it doesn't do? As a general rule our technical tests are prefaced by our findings with the synthetic transmitter and output-measuring equipment in the lab., and in this respect the A C 85 has certainly been put through its paces. But more of that anon.

In the meantime it is desirable in this case that we should tell you something of our practical tests first, for the very simple reason that the noise-suppression feature is one of the most salient points of the design, and not even "P.W." can produce synthetic "X's" to do justice to the real thing!

Either by good or bad fortune, whichever way you prefer to look at it, the evening chosen for our practical tests was one of the worst from the point of view of atmospheric interference that we have experienced for some time, and had the Ekco scheme been only partially successful we should have had every reason for making allowances, and even for acclaiming it as successful on the score that it afforded some relief.

"Came Through With Flying Colours."

But we have got a very different story to tell—a story which establishes beyond all doubt the advantages of a noise-suppression scheme properly and efficiently applied.

For, despite the fact that the evening in question was so very bad, the Ekco A C 85, and more particularly its station pre-selection and noise-suppression feature, came through with flying colours. It was, in fact, in some respects a revelation.

The practical interpretation of the station pre-selection idea consists of a tiny knob

which is to be found on the front of the instrument, and which is engraved at equidistance with the markings "All stations," "Medium" and "Strong."

With the adjustment in the "All-stations" position, the set behaves much the same as any ordinary set of similar type, except that it outshines most on the score of sensitivity. In this connection it is of interest to mention that on medium waves alone well over 60 stations were logged, and most of them were identified in quite a short space of time.

But as soon as the adjustment is set at "Medium," all stations below a predetermined programme-value level are automatically rejected and, most amazing of all, every trace of between-station atmospheric interference vanishes almost as if by magic!

The level below which stations are to be rejected is determined by the position of the tiny adjustment knob, which is continuously variable from "All stations" through "Medium" to "Strong," in which position, incidentally, all but the very strongest programmes are automatically silenced.

Apart from the highly desirable attainment of inter-station interference elimination, this idea of Ekco's ensures programme constancy from all manner of distant stations which ordinarily are inclined to be erratic. If, with the adjustment in a certain position, a station is sufficiently strong to overcome the "rejection" effect (an effect that is obtained by the clever utilisation of valve-biasing characteristics), then, by virtue of the automatic volume control incorporated, the programme will be "held" at full strength as long as the station transmits.

No Half-Measures.

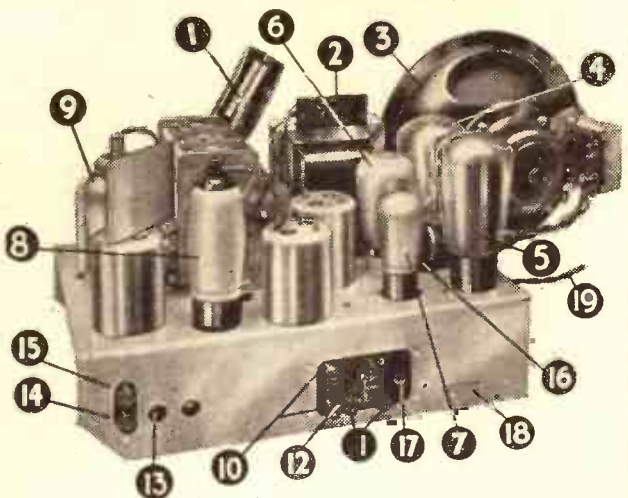
There is no fading; there are no half-measures. Either the station is there at strength and constancy sufficient to provide a genuine programme service, or else the set says "No" to it and you do not hear it—at least, not until you readjust the pre-selector device to "All stations."

That will give you some idea of what may be expected by all who choose the Ekco Model 85, for these observations are based not upon the details contained in the catalogue, but upon our actual findings on an evening which, as we have previously indicated, it would be difficult to equal from the point of view of static interference.

In passing from a description of

(Continued on next page.)

THE A C 85 CHASSIS EXPLAINED



- | | |
|------------------------------------|--------------------------------|
| 1. Pilot light. | 10. Pick-up sockets. |
| 2. Mains-voltage adjustment panel. | 11. External speaker sockets. |
| 3. Loudspeaker mounted in cabinet. | 12. Tone-control sockets. |
| 4. Rectifier valve. | 13. Second-channel adjustment. |
| 5. Pentode output valve. | 14. Earth socket. |
| 6. L.F. amplifier valve. | 15. Aerial socket. |
| 7. 2nd detector valve. | 16. Speaker plug. |
| 8. I.F. amplifier valve. | 17. Internal speaker switch. |
| 9. Detector-oscillator valve. | 18. Serial number. |
| | 19. Mains lead. |

TECHNICAL SPECIFICATION

GENERAL DESCRIPTION: Six-valve (including rectifier) table-model superhet for operation on A.C. mains, 200-250 volts. Standard cabinet is walnut-finished bakelite, but it can be supplied in black with chromium-plated fittings for half a guinea extra, or in onyx green, pearl ivory or French grey, also with chromium-plated fittings, for two guineas extra.

CIRCUIT ARRANGEMENT: Modern superhet employing the following valve sequence: V1, combined first detector and oscillator; V2, intermediate-frequency amplifier; V3, second

detector and A.V.C.; V4, L.F. amplifier; V5, pentode output (Mazda A.C./Pen.); and V6, rectifier.

CONTROLS: One main tuning which actuates light-beam and shadow across opened-out dial giving station names and wavelengths; combined on-off switch and volume control (left); wavechange and gramophone switch (right), and station pre-selector and automatic noise-suppressing adjustment (centre). Provision for tone controlling is provided at the back, as are also sockets for extra L.S., pick-up, and aerial and earth.

SPECIAL FEATURES: (1) Station pre-selection and automatic noise suppression. (2) Ease of operation (consequent upon above). (3) Lowness of cost in consideration of excellence of performance. (4) Provision of station names and wavelengths for easy identification of distant programmes.

MAKERS: E. K. Cole, Ltd., Ekco Works, Southend-on-Sea, Essex.

CASH PRICE AND HIRE-PURCHASE TERMS: 12½ guineas, or 13 monthly payments of £1.2s. 6d.

THE "MAN IN THE STREET"—TEST No. 2

EKCO SAY:

IN the corner the Ekco All-Electric Consolette Receiver stood ready.

The hastily erected aerial had been joined to it, the mains plug lay ready to be pushed into the electric light socket, and we were waiting for the postman.

He was to be given every freedom to try this new set. And as we waited for him I wondered how "Model AC85" would strike a complete stranger.

Would he be chiefly impressed by its imposing externals? Or would he be an experienced listener, able to appreciate all the finer points?

We were faking a chance with a total stranger—he might be either a novice or a hot-stuff hyper-critic. And then the door-bell rang. We should soon know!

There were no preliminaries to be gone through, except name and address. Mr. H. W. Hones, 17, Silverdale, London, S.E.26. Occupation, postman.

Mr. Hones sat down and looked the set straight in the face, like a prosecuting counsel. The many names of foreign stations on the big illuminated dial failed to impress him in the slightest.

"I can get you plenty of foreign stations on my 3-valve set at home," he said uncompromisingly.

He concentrated his attention on the controls, with the unmistakable air of a man who knows exactly what controls are for.

"I see. One for tuning—no reaction—and on-off switch alters volume as well," he mused. But the station pre-selector was, naturally, a new one on him,* so I explained the idea.

If you set it to "Strong" you get only the very powerful programmes, on an absolutely silent background. Or you can make it "All Stations," very lively and sensitive, to satisfy the desire for long-distance reception.

"I am going to try on 'Strong' first," said Mr. Hones.

He tuned in eight or nine stations, mostly B.B.C., listening intently to the quality, and tuning back to make comparisons. And finally he expressed himself as more than satisfied.

"A Very Appreciable Point."

"It's not only the quality. I admit that's just about perfect," he said. "But what I like is that slice of silence you get between the different programmes. Not a sound till the next station comes in full strength. That's a very appreciable point."

I noticed, however, that Mr. Hones seemed very anxious to get back to the tuning.

"Try it as a long-distance set," I suggested.

A bloodhound on the trail could not have shown greater eagerness. He snapped the pre-selector to "All Stations," shot the tuning condenser round to minimum, and started to tune up the medium waveband with quite astonishing thoroughness. This was meant to him!

Every station was listened to and commented on. And before he had done he secured *stationing of them on the medium waveband alone*. All in one straight "tune-up" from the bottom to top of dial!

When he got up to 253 metres and heard a Russian choir at full strength, he sat back in great content.

"Kharkov, Russia. Well, that's wonderful!" he admitted. "And you can enjoy it like a local station."

He did, for a moment, and then: "Let's see who this next one is."

Thoroughly happy, he was taking the opportunity to settle many a long-distance point that had puzzled him in the past.

Could Stalino (Russia) be heard with Midland Regional going at full blast on the next wavelength? Was that Kosice just below London National? and so on. (Incidentally, he got those stations so well that we leaned back together and enjoyed them.)

"You know," he said earnestly, "on an S.G. you'd have three controls to handle, going from one station to another like that. Not one—three!"

"And what's more," he added, gazing admiringly at the station selector, "it leaves a slice of silence in between them." Quite unable to resist it, he ran round the tuning once again, firing over his shoulder at me: "And that's another thing. No fading. You can hear every word they say."

"It would make them sit up!"

With the evident enjoyment of the real enthusiast he paraded the other talent of Europe for my edification—Russians, Poles, Czechoslovaks, stentorian Swiss—in clear-cut profusion. But the snag was that our time was getting on apace.

"I've got to be up at five in the morning," said Mr. Hones, reluctantly packing up, "but it's been worth a late night. I only wish I'd had some of the chaps at the office here with me. That set would make them sit up!"

I could see that he was thinking partly of the

Ask the postman
what he thinks of the new

magnificent quality and of the extraordinary value one gets for the twelve and a half guineas in this set, but chiefly of the way in which it plucked the programme from any of the stations of Europe—easily, clearly, strongly. And with a slice of silence between them all.

Just as he was going he noticed that not only had we used a temporary aerial, but for convenience we had been doing without any "earth."

"That shows you. What a set!" said Mr. Hones. "If anybody asks me what kind to buy I shall know what to tell him now."

SO "P.W."
DOES!

Mr. H. W. Hones, of 17, Silverdale, London, S.E.26, the postman who—at the invitation of "P.W."—was asked to test the new Ekco Model AC85, is here seen operating the controls. He logged 69 stations on medium waves alone.

And as he was shown out I heard him, still marvelling: "Sixty-nine on medium waves. . ."

P. R. B.

* NOTE.—This type of control was introduced to the public only a few weeks ago.—ED.

WHAT IS A
MOVING COIL?

THE term "moving-coil loudspeaker" appears in practically all the descriptions of modern radio receivers. And it can be taken as indicating that the loudspeaker used in a set is at least up to date in regard to the principle by which it operates.

But nothing more should be read into it than that. There are degrees of goodness in moving-coil loudspeakers just as there are in anything else.

To say that a loudspeaker is a "moving coil" does not necessarily imply that it is, comparatively speaking, either good or bad, but merely that it ought to be good if properly designed and made.

From which it can be inferred that there are some moving-coil loudspeakers which are not as efficient as others, and a few which are quite poor.

The moving-coil principle is an easy one to understand, but to make our explanation clear we must briefly review the other principles as well.

These others can, for our purposes, be lumped together as "moving-iron" loud-speakers. These all work on the basis of a straightforward electro-magnetic action.

You know that your set hands over to its loudspeaker an electrical current which rises and falls in strength at a rapid speed. This is the electrical pattern, as it were, of the air vibrations of the speech and music.

Well, in the electro-magnetic type of loud-speaker these electrical vibrations are led to an electro-magnet, the magnetic power of which increases and decreases as the current rises and falls.

The Principle of Alteration.

There is a small piece of iron in close proximity to the magnet, and this is vibrated because of the magnet's varying influence on it. The diaphragm of the loud-speaker is joined at its centre to the piece of iron, and therefore this, too, vibrates and so causes the air round it to vibrate. These air vibrations are the sound waves you hear.

In the moving-coil loudspeaker the small piece of iron is replaced by a small coil of wire, and the electrical currents from the radio set are passed through this.

The coil is right between the poles of a magnet which might be either an electro-magnet or a permanent magnet. And just as the armature of an electric motor wants to move the moment current passes through it, so does this coil—hence the term moving coil.

The strength of its attempted movement depends upon the strength of the current passing through it; and as it is anchored only to the diaphragm of the loudspeaker, you will appreciate that the diaphragm moves or vibrates in accordance with the current fluctuations.

TECHNICAL TESTS:

THE NEW EKCO MODEL
A.C.85

(Continued from previous page.)

the practical to the meter tests, we feel that we need say no more in acclamation of the sensitivity of this particular set beyond the fact that our aerial tests were concluded between 3 and 4.15 in the morning, during which time ten American stations were received on the medium waveband, among which five were definitely identified by call sign as WCAU (Philadelphia, Pa., on 256.3 metres), CFCN (Calgary, Canada, on 290 metres), KDKA (Pittsburg, Pa., on 305.9 metres), WABC (New York City, on 348.6 metres) and WBAF (Fort Worth, Texas, on 373 metres).

With our laboratory synthetic transmitter in operation, and with the AC85 "in the box" (our own name for the screened cabinet into which the set and the output-measuring instruments are placed during our tests), the results were almost equally illuminating.

With the lab. transmitter adjusted to the channel adjacent to that of the London Regional programme, and with the radiation fixed to provide a received field strength of almost 1½ volts (the reading for the London Regional on our particular aerial arrangement), it was found possible, by means of the pre-selection adjustment, to locate a setting at which the two programmes were practically clear of one another!

Nothing more exacting in the way of a selectivity test could possibly be applied; and although, in practice, conditions such as these would never be encountered, the fact that the Ekco A.C.85 was almost equal to the task of separating them proves beyond all doubt that it possesses a degree of selectivity more than adequate for modern conditions. This test, incidentally, was applied at representative settings throughout the tuning range of the instrument with equally positive results.

Really Excellent Quality.

From our quality test with standard-frequency records which followed, we can dispense with this aspect of the set in very few words. We need say no more than that it is capable of reproducing all the frequencies employed in broadcasting without noticeable "cut-off" or "peak-ness," and at a maximum volume that is more than adequate for normal domestic requirements.

All told, this new set of Ekco's is a very creditable achievement—certainly one of the most outstanding designs of the present season.



Emphatically the set to build The "RAIDER" THE SENSATION OF 1935 RADIO

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
- NEW** 2 in 1 Valves
- NEW** type Speaker
- STEEL CHASSIS CONSTRUCTION**

Build the RAIDER and get a better Set than factory built —at less cost.

Fully described in issue No. 1 of RADIO CONTACT with which is presented

FREE full-sized BLUE PRINT and working instructions.

RADIO CONTACT is the Radio Magazine with a fresh outlook, a shilling Magazine for 3d.

Full of interesting matter for Radio enthusiasts, including:—

Description of wonderful new BATTERY VALVES. Hosts of Ideas for old sets and new. Detailed instructions for building three brilliant circuits, including the RAIDER. CONTACT World-wide Station Finder, etc.

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Grandfather's Whiskers is a most amusing and intriguing game that will thrill everyone. Any number of players can take part—no skill, no intricate rules to remember, nothing but clean, exciting fun.

The pack comprises 48 cards with brightly coloured pictures on the front which can be made into more than 1,000 uproariously funny figures. The backs of the cards form a series of six Jig Type Puzzles—simple ones for the children and more perplexing ones for grown-ups. You simply must join in the search for Grandfather's Whiskers this winter. The children will enjoy the fun as much as you.

Made by John Waddington, Ltd., Makers of the World's Finest Playing Cards.

The Greatest and Most Amusing Card Game Ever Devised



ON SALE EVERYWHERE

ON THE SHORT WAVES—Page 2.



JUDGING from the appearance of the post-basket, "potted replies" must be the order of the day once more. Here goes!

J. W. M. (Lyme Regis), to whom I must apologise for long delay, owing to a secretarial mishap, wants to get in touch with a short-wave enthusiast in that part of the country. Will anyone who feels that the cap fits please get in touch with Mr. J. W. Mawdsley, Higher Rocombe, Uplyme, Lyme Regis?

The Superhet Adaptor.

A. G. W. (Guildford) sends me a circuit of a superhet adaptor, and wants to know why I never refer to similar schemes. Pardon me, A. G. W.! I have done. But, frankly, I'm not keen on superhet adaptors for several reasons; I will include one on the first page of this section very shortly, though, for the benefit of those who are.

R. H., 'way out in Portuguese West Africa, wants to make what he calls a "thoroughbred W. L. S. hook-up," consisting of the Pen.-Det. plus the S.G. unit shown in the issue for May 26th. Sounds very good to me, R. H. As for coil sizes, I think they will already have been settled in the Short-Wave Section for March 24th, if you have that issue handy.

The next letter, from A. B. R. (Preston), reminds me, too, that I referred to coils in the issue of August 25th. A. B. R. heartily approves of "valve-base" coils, not only on the score of compactness, but also because of their efficiency.

A Faulty Pen.?

H. E. (Llanelly) has made the Pen.-Det., and finds that the Pen. won't Det. With a triode as detector the set is perfect, but the pentode just laughs at him. May I suggest

(a) dud pentode; (b) dud resistance for controlling the priming-grid voltage; (c) dud condenser by-passing same? Otherwise there just can't be a reason why the pentode doesn't work.

A. W., my never-failing correspondent from South Africa, sends an interesting letter. He decides definitely, after weighing up the pros and cons of resistance and transformer coupling, that the best thing every time is a combination of the two.

If you've read the previous page you will see that great minds think alike. And I do

solemnly swear that I had written the said page before I even opened A. W.'s letter!

Poor A. W. is keen on Morse, which he finds he can send, but can't copy! Common failing, that. Stick to it, and everything will turn out all right.

That Peculiar Relay

H. J. B. (Manchester) has been playing around with circuits, and pours out his troubles to me. The particular racket this time is a short-wave adaptor, and results seem to show that it is all right.

V. I. E. (Liverpool) is another who has fallen in love with valve-base coils. He has made a nice little set using A.C. all through, and a very ingenious method of fine reaction control, which I will go into next week.

J. H. S. (Glasgow) wants me to issue a "questionnaire" or "plebiscite" on this novice-versus-advanced-reader business. I wonder! I really think readers will have to go on taking just what I give 'em.

J. H. S. claims a record, by the way—that of receiving our friend H A T 2 (43 metres) on a crystal set tuned in the broadcast band! That's what I call spreading.

A. W. M. (Derby) gave me advance news of a broadcast on September 13th of European programmes, relayed from the American network. I have since had no fewer than ten letters from readers, reporting that same broadcast and asking whether they were mad or what was happening.

Apparently what happened was this: The American stations broadcast a quick



READERS, both in this country and in South Africa, report a Spanish-speaking station "within a hair-breadth" of G S B—on about 31.6 metres. According to my latest lists, the only "possible" is Y V 3 R C, Caracas, Venezuela, on 31.55.

The new Javanese station, P K I W K, working on 49.5 metres, is situated in Bandoeng, and may be heard between 11.30 p.m. and 1 a.m. most nights.

The East is Going Ahead.

Another interesting transmission from the East is that of Bombay, V U B, on 31.36 metres, to be heard on Wednesdays and Saturdays round about 7.30 p.m.

As readers will gather from the above items, the East is definitely going ahead with short waves. Furthermore, conditions for those parts of the world appear to be rather good just at present.

According to papers forwarded to me by A. W. (Cape Town), South Africa approves of the Empire transmission on 25 metres,

which is much better received than the 19-metre transmission ever was. One wonders, though, whether this may not be due simply to the fact that skip-distance is more favourable for 25 than 19 metres at this particular time of year.

"Down Under."

Our Australian contemporary, "Wireless Weekly," has ceased publication as

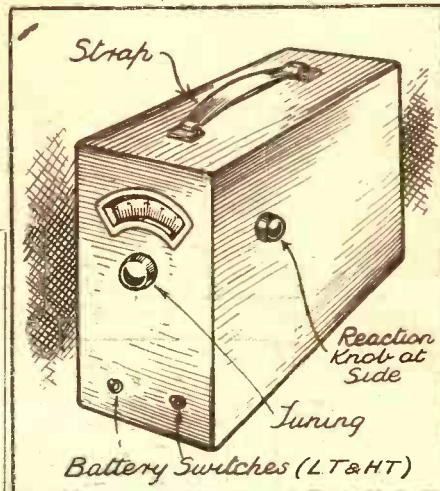
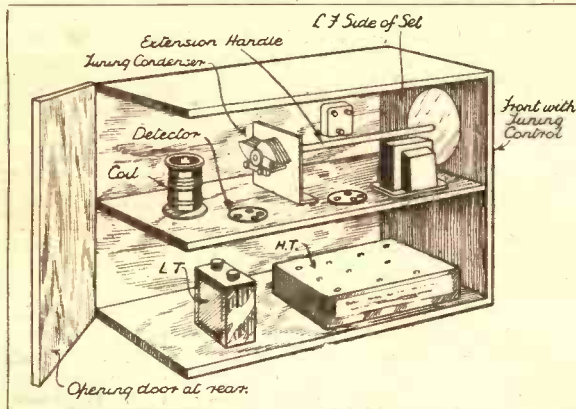
a separate paper, and now takes the form of a radio supplement to "The Bulletin." One has only to read some of the notes to realise that they take far more interest in short waves than we do over here.

Quotation from one of the said radio sections: "FY A, Pontoise, to use a slang phrase, put it all over the B.B.C. last winter, but it looks as if England will hold her own this year." Sounds as if Empire broadcasting were turning into a competition!

Rumours are about to the effect that regulations governing short-wave broadcast are to be tightened up a bit. No one seemed to mind when low-power stations strayed off wave and got themselves "hashed up" by commercial telegraphy. Now, however, the commercial telegraphy is occasionally hashed up by powerful broadcasting stations!

A SHORT-WAVE PORTABLE RECEIVER

The diagram below shows how the inside of a short-wave portable set might be arranged. Note how space is saved by placing L.F. components beside the extension handle, and that the back of the case opens to allow access to the batteries, and to permit the coil to be changed.



How the portable set appears from outside is illustrated above. The reaction control is conveniently placed on the side.

sequence of relays, one from New York, one from London, one from Honolulu, and finally one from "Little America," 'way down by the South Pole. A. W. M. also reports good reception of a broadcast from one of the Rocky Point stations on about 33 metres.

The two sketches shown herewith convey my suggestions for a convenient layout for a short-wave portable. They are self-explanatory, so I won't say any more about them here. But I will say that a short-wave portable is a very fascinating and useful piece of gear to possess.

THIS SEAL



...AND WHAT IT MEANS TO YOU!

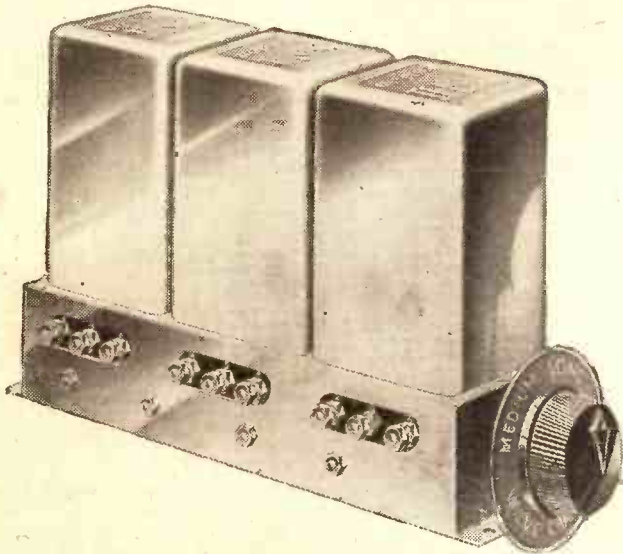
It means that the component inside the carton which bears this seal has been designed and manufactured to the highest standards of efficiency by a production technique evolved only after long and extensive research, and from materials controlled at every stage for quality and accuracy of dimension. It 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.

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"THE STUFF OF RADIO"

The Broadcast Play comes in for more criticism than any other branch of radio entertainment. Here is a review of a book written by one of the most advanced of radio dramatic producers; a book that will stimulate not a little controversy among those that read it.

I HAVE been reading an odd book*: a very odd book indeed. It should be read, for it explains many things about broadcasting which must have given the average listener a good deal of cause to wonder at one time and another.

In this book you find one of the main reasons, set out by one of its regular practitioners, why the radio play is, and not unreasonably, regarded with a good deal of suspicion by the average practical person. British broadcasting—its pundits go on shouting it very loud and clear—is a Service. It exists primarily and fundamentally to supply demand.

Where Was the Demand?

What demand has been supplied by pseudo-dramatic experiments of the types demonstrated by Mr. Sieveking in "The Stuff of Radio"? They have fallen to earth, presumably; but even the author knows not where! And we may be inclined to wonder, in our more unkind moments—after reading, for example, his experiment in new dramatic typography—why a self-confessed literary experimentalist should have been allowed so much etheric space in which to flap large but inadequately fledged opinions.

The book is stimulating enough. But it stimulates an increasing exasperation. A brain is at work, ingenuity is paraded, wide reading and general knowledge are displayed: the latter, perhaps, too consciously for the reader's complete comfort. The letter "I" recurs steadily, flashing past in sequence something like telegraph

*"The Stuff of Radio," by Lance Sieveking. (Cassell, 8s. 6d.)

poles seen from a train. And the reader cannot help asking himself whether Mr. Sieveking is really interested in radio after all, except as a medium for the exploitation of Mr. Sieveking.

A Yearning For Fresh Fields.

There is present an ominous yearning, which crops up again and again in the text, for an opportunity to experiment in the wider fields of cinema and television. And, worst of all, there is revealed a studied determination to establish radio production and radio writing as a Mystery of Mumbo Jumbo: an occupation reserved for the Select Few.

IN THE CONTROL ROOM



A photograph of a modern radio control room—in Berlin—where eight simultaneous programmes can be handled at once. In the foreground is one of the engineers in his soundproof cabin, while facing the camera is the main control engineer who checks up all the programmes.

THERE are some very interesting remarks regarding Intermediate-Frequency Transformers in the Colvern publication which deals with "Ferrocart" components.

This is what is said: "Only by the use of band-pass filters in the intermediate-frequency amplifier can both high quality and selectivity be obtained with the superheterodyne.

"For optimum quality, moreover, it is essential that the filter coupling be variable; in the 'Ferrocart' Intermediates the coupling is variable over a range sufficient to cover the requirements of any receiver.

"The two coils comprising the band-pass are mounted at the correct distance apart, so that



The "Ferrocart" intermediate transformers, made for 110 kc. and possessing adjustable band-width separation.

they just give a single-peaked resonance curve; the additional coupling is in the form of a small pre-set condenser across the high potential ends, and which, when screwed up finger-tight, gives about 6 kc. peak separation.

"This method of varying the coupling has the advantage that the coils are fixed relative to the screen, and their inductance, and there-

MODERN "SUPER" PARTS Details of the latest Colvern Components.

fore the tuning, is not affected by adjusting the coupling. Also, the adjustment can be carried out whilst actually listening to a transmission, as it is not necessary to remove the screen.

"Different receivers have different values of stray capacities, and it is therefore essential that the tuning be adjustable to cover these variations; the adjustment, however, must be limited in range, as with single-dial control it is most important that the intermediate-frequency amplifier be tuned to exactly 110 kc."

Successfully Solved Problems.

We quote from the Colvern publication at length, for no words of ours could express as concisely some of the practical problems confronting the designer of intermediates, and convey as clearly the successful manner in which they are solved in these very efficient "Ferrocart" Superhet Transformers.

"P.W." readers will, of course, be familiar with the "Ferrocart" principle, and will

The famous Dramatic Control Panel ceases, in the author's eyes, to be a piece of ingenious though unwieldy machinery—a necessary evil—and becomes an "organ" to be "played." Mr. Sieveking forgets that if a radio play is not distinctly heard and easily followed, the listener is hardly likely to be consoled by a mental picture of its producer, even complete with white tie and tail coat, playing one, two or even three panels, separately or simultaneously. He will not care. For he will not listen.

In Advance of His Time?

It may be that Mr. Sieveking is in advance of his time. He deals, fairly brusquely, with such modest rivals as Mr. du Garde Peach, Mr. Val Gielgud and Mr. Tyrone Guthrie, dismissing their theories and disregarding their practice, though it is doubtful if any one of the plays in his volume will stand comparison with "The Path of Glory," "Red Tabs" or "The Flowers Are Not For You To Pick." But, then, Mr. Sieveking is so intent on looking forward—to "Smellies," "Feelies" and Television Dramatic Control Panels—that he cannot, perhaps, be expected to concentrate his attention on such mundane details of the present as clarity of plot and simplicity of presentation. He revels in the complex. He delights in the obscure. When he is *naïve*—and there is much *naïveté* in his book—he is revealed as rather nice. When he is coy, as he is more than once, he is not so nice.

The Best Part of the Book.

The long preface is by far the best part of the book. Much of it is amusing. Most of it is well written. It tells the reader no end about Mr. Sieveking, if by comparison little about radio. And though Mr. Sieveking is exasperating he is also interesting, if only as a study in the acutely egocentric.

The plays that make up the rest of the volume are less satisfactory. They are clumsily printed and set out, which seems odd in an enthusiast for typographical experiments. They give the impression rather of laboratory work, and with the exception of "The Wings

(Continued on page 117.)

realise that by applying the special iron-core scheme to Intermediates both compactness and high efficiency are achieved.

We have recently had occasion to test and use Colvern "Ferrocart" Intermediate-Frequency Transformers, and can unhesitatingly confirm the claims made for them. They are excellent in every way. Probably no other concern in the world has contributed more to the development of coils than Colvern, and in this particular instance we have an expression of their mastery of this branch of the art applied to up-to-the-minute super-practices.

There are two types of these Colvern Intermediates, the type F.C.110 and the type F.C.110-B, in which both the primary and the secondary are centre tapped for use with a full-wave detector.

A recent "Ferrocart" type G three-coil assembly, complete with radiogram switch and on-off control.



Our other photograph shows a ganged "Ferrocart" coil assembly, type G. This has an on-off switch mounted at the rear, which is operated by the wavechange radiogram switch from the front.

"POWER" WAVES AND RAYS

ACCORDING to a recent report from New York, Dr. Nikola Tesla, the famous electrical wizard, claims to have solved the problem of transmitting power by wireless. No precise details are given, apart from the inventor's laconic statement that his new system is capable of "transmitting energy, practically without loss, to any distance."

So, one might say, is any broadcast transmitter. But Dr. Tesla is presumably speaking of energy which arrives at its destination in kilowatts—that is, in sufficient bulk to drive a useful machine.

Now one has to admit, quite candidly, that it is dangerous in these days to put a limit to the march of science, and to say bluntly that the idea of distributing power by radiation is a mere will-o'-the-wisp. But, at the same time, one is entitled to keep in mind the failure of previous attempts in the same direction, and therefore to treat any such claim with reserve—and even scepticism—until more detailed information is forthcoming.

Dr. Tesla is a scientist of considerable repute. He is perhaps best known for his work in producing high-frequency currents at enormous voltages by means of the Tesla coil. But he has shown his inventive skill in other directions. One is the design of a steam turbine which is driven through a series of smooth discs instead of by the usual radial vanes; whilst another is an ingenious type of speedometer for motor-cars which is operated by the viscosity or "drag" of the air trapped between two hollow cups.

Other Problems.

But most inventors have their failures as well as their successes. Dr. Tesla, for example, has tackled the problem of the helicopter—an aeroplane which will rise vertically from the ground and "hover" in the air—but in this case has had to confess to defeat.

Also—and this is more to the point—he has already proposed an ambitious scheme for "broadcasting power" which, although based upon an ingenious theory, could not stand up to the test of practical application.

He called it the Tesla "World Oscillator." Broadly speaking, the idea was to erect an immense transmitting aerial at a suitable spot and then to supply it with power at a particular frequency—which was calculated to set the layer of ether immediately surrounding the earth into sustained oscillation.

The transmission of energy in vast quantities by radio, and the subsequent driving of trains, ships, and motor-cars or aeroplanes from the same source, has been the dream of scientists for years now. Many attempts to accomplish this dispensation of power have ended in failure; some of the methods of approach and the results achieved—if any—are discussed in this interesting article.

By J. C. JEVONS.

It is well known that most of the energy of a high-frequency current lies, not inside, but outside the conductor, the wire itself acting more as a focus or guide for the external field than as a true carrier for the current. It is quite different with a direct current, because here the action of the conductor can be compared to that of a pipe through which the bulk of the energy flows.

The Earth as a Conductor.

Dr. Tesla's notion was to treat the entire earth as a conductor, and to feed it with high-frequency current so that the bulk of the energy flow would be distributed over its entire surface. He carefully calculated the capacity and the inductance

Given this state of affairs, anyone who wished to be supplied with sufficient power, say to light his house or to drive an electric motor, would simply erect an aerial at the desired spot and draw off the energy induced into it by the earth wave. Meanwhile, fresh energy would be constantly pumped into the main transmitter in order to make good the "local" consumption.

So far, so good; but the inventor apparently overlooked the fact that, even assuming such a system of world waves could be set up, they would induce currents in every conductor they came across. The resulting waste would obviously be so enormous—and possibly dangerous—as to condemn the whole idea.

The fact that the "World Oscillator" proved impracticable does not, of course, mean that the problem cannot possibly be solved. At the same time, most competent engineers are extremely doubtful whether any scheme for radiating "power" through the ether can ever hope to compete in efficiency and economy with the use of cables.

Perhaps the most promising line of approach is the use of "beam" wireless, because here the whole of the radiated energy is concentrated in a definite direction, so that losses are comparatively slight—at least over short distances.

Distant Control.

The use of ultra-short-wave "beams" in particular offers the possibility, not so much of transmitting power in bulk as of controlling motors and machines from a distance with a definite degree of accuracy and "secrecy." The latter is an important factor, because, although there are many known schemes for controlling and steering aeroplanes, submarines and similar craft by wireless, most of them are open to the objection that the control can

SEEING IS BELIEVING

A visitor to an H.M.V. demonstration of the new pick-up response tester, which enables the performance of the instrument at all frequencies to be visualised by the path traced on a transparent screen by a spot of light from a galvanometer.



of the earth, and then deduced the frequency necessary to set the whole system oscillating as a tuned circuit.

He argued that, as soon as the main oscillator was brought into action, the layer of ether surrounding the earth would be powerfully energised. Waves leaving the transmitter in one direction would travel half-way round the world, until they met and merged with those coming from the other direction, thus gradually setting up a permanent system of standing waves.

easily be frustrated or "jammed" by an enemy. This definitely becomes more difficult when the control is effected by a highly concentrated beam of micro-waves.

Recent developments in the same direction also suggest that we may see a revival of the so-called "death ray"—of which so much was heard and so little known during the later stages of the Great War. So far as we know at present, the "lethal" properties of short waves seem to be confined to certain microbes and bacteria.

A SPECIAL television section, patronised by and with the active participation of the German Post Office, has for many years past been a regular feature of Berlin wireless exhibitions. Though invariably attracting large crowds of would-be lookers-in, it was not until last year's show that the quality and definition of television pictures really succeeded in appealing to the unbiased observer. Marked progress was again achieved this year, for what had previously been shown between wire-connected transmitters and receivers—viz. pictures of fair size and with the approximate definition of home cinema reels—could now be demonstrated with wireless transmission.

A Separate Hall.

Some idea of the progress that has been made will be gathered from the fact that one of the halls of the exhibition was given up almost entirely to television this year. Here, quite a number of firms were showing their apparatus and giving—for several hours a day—regular demonstrations. The activities of two firms—the Fernseh-A.G. and Telefunken—were sufficiently advanced to enable them to run actual television theatres consisting of raised platforms with rising rows of seats, from which visitors could view at a distance their large-size screen projections of tele-talkies.

One of the big firms specialising in television, the Loewe Company, has perfected what they term a "People's Televisor," which has now been handed over to the German Post Office to enable them to submit it to stringent tests. Four of these receivers were shown side by side at the recent exhibition for the purpose of demonstrating the ease with which they can be synchronised. They were all receiving the same picture, and on an improved type of screen giving a pleasant sepia effect.

Use of Cathode-ray Tubes.

From the outset the Loewe Company has concentrated on the use of the cathode-ray tube for the reception of television pictures. The tube now developed by them is said to possess the features of long life, ease of synchronisation, excellent definition and perfect modulation. In the set which has been developed by this company, picture and sound transmissions are received by the same set, certain of the valves being used simultaneously for both purposes and also for reproducing the synchronising impulses. Synchronisation is effected from the transmitter, so that the "looker-in" is not called upon to do any complicated tuning.

The television receiver developed by Telefunken, like all the remaining German types of apparatus, is designed for the present standard system of 180 lines and 25 frames per second. The wireless part comprises separate visual and acoustic receivers. The visual (picture) receiver has been designed on the superhet principle and comprises a preliminary H.F. stage, a combined oscillator and first detector,

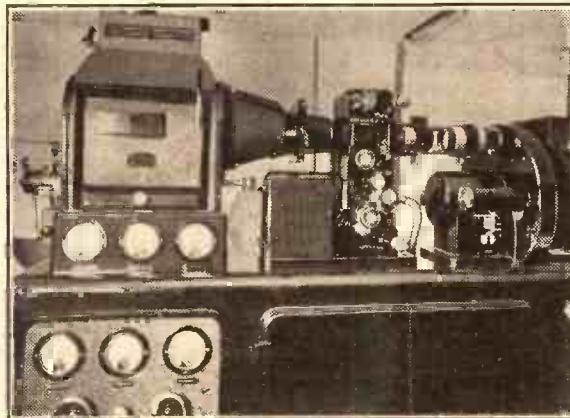
A SPECIAL ARTICLE

ON

GERMANY'S TELEVISION

in which recent advances are described, and details of many modern television receivers given

By Dr. ALFRED GRADENWITZ.



The tele-cinema transmitter for 180-line television supplied by Fernseh-A.G. to the German Post Office.

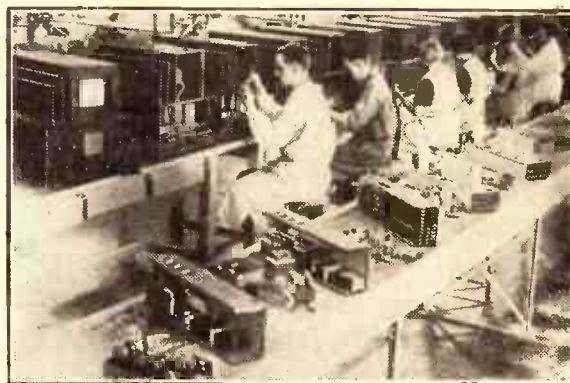
and a 4-stage intermediate-frequency amplifier.

Care has been taken by the use of strongly damped intermediate circuits to ensure that the whole of the frequency band to be received—viz. about a million cycles—is rendered uniformly, which, of course, is of paramount importance for securing good definition of television pictures.

The acoustic (sound) receiver of this particular outfit consists of a 3-valve reflex set, and although both receivers are worked from the same aerial, provision has been made in the design for the prevention of mutual interference.

On the "vision" side the signals, after passing through the receiver, strike a special

PLENTY OF RECEIVERS



Mass production of televiewers is in progress at the Loewe works, a corner of which can be seen in this photograph.

device termed an "electric shunt," whence they are directed, on the one hand, towards the cathode-ray tube and, on the other, towards the time base. This has the effect of moving the luminous point from left to right and from the top down-

wards, while altering the luminosity of the point of light in accordance with the variable intensity of succeeding television signals.

The time base comprises what is termed a "saw-tooth" oscillation circuit, the purpose of which is rapidly to withdraw the luminous point from the right to the left margin of the picture, thus enabling a new line to be reproduced. A similar "saw-tooth" oscillation circuit has been provided for moving the luminous point from the bottom line to the top, so that the reproduction of another picture frame may be started on. An accurate coincidence of succeeding pictures is secured by synchronising impulses from the transmitter.

A Complete Installation.

Manfred von Ardenne, who was responsible as far back as 1930 for a cathode-ray television receiver, also exhibited a complete installation for receiving picture and sound transmissions from the Berlin ultra-short-wave television transmitter. He has developed a new type of high-vacuum cathode-ray tube which gives bright and well-modulated pictures, 18 by 24 cms. in size.

The most comprehensive exhibit was that of the Fernseh-A.G., which, like almost all other German firms, has definitely adopted the cathode-ray tube at the receiving end. This company has supplied the greater part of the television equipment of both the German Post Office and the German Broadcasting Corporation, all of which was demonstrated in actual operation at the show which has just concluded.

One particularly interesting aspect of German television progress is the tele-cinema transmitter and light-spot scanner, which has been developed for the transmission of films. High-definition pictures are possible with this equipment, which is designed for 180-line scanning.

The transmitters are fitted with Nipkow discs, rotating in a vacuum at a speed of 6,000 revolutions per minute, the disc of the light-spot scanner being 75 centimetres in diameter and, accordingly, having a peripheral speed of roughly 250 metres per second. A new type of high-power arc lamp, having a current consumption of 150 amperes, serves to light this transmitter.

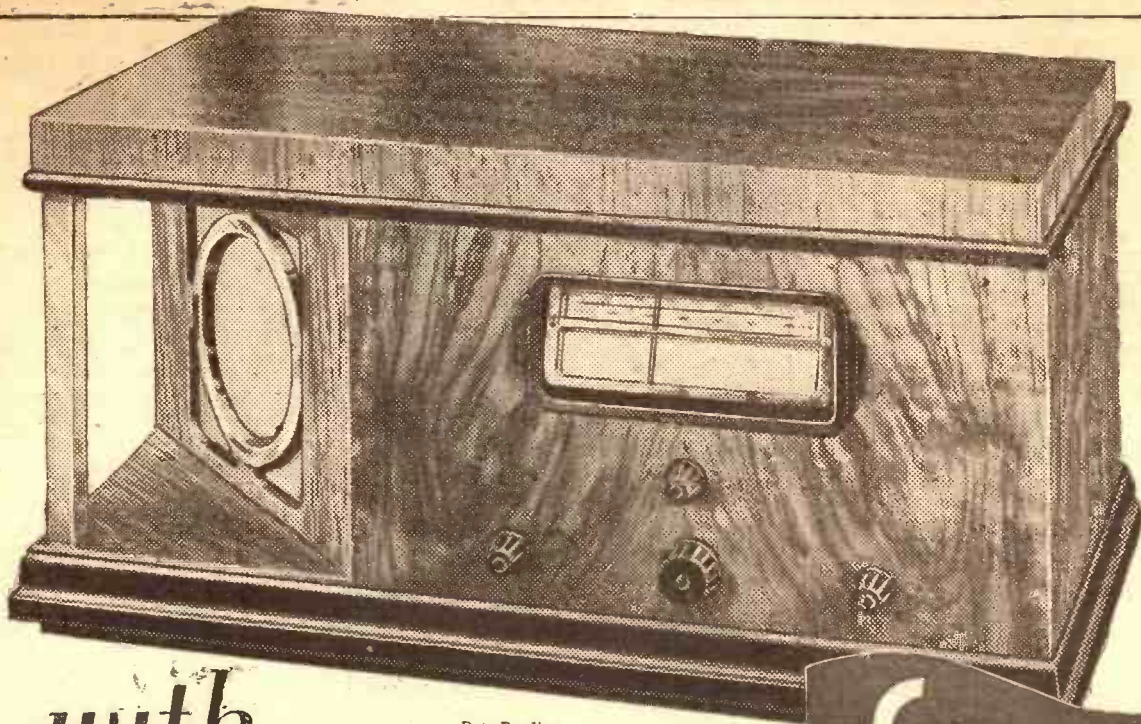
For Standard Films.

A special switching arrangement in connection with the tele-cinema transmitter enables standard films up to 1,500 metres in length (roughly, a 50-minute programme) to be projected, as well as (for experimental purposes) endless film loops.

The much-talked-about German television car, which has been developed for televising the events of the day, is particularly interesting. The equipment has been designed on the intermediate-film principle, by means of which a moving-picture film having been taken by a talkie camera is developed, fixed and rinsed immediately in a minimum of time. Actually about 75 seconds is allowed to

(Continued on page 118.)

THIS IS THE ONLY RECEIVER



with

Pat. Pending

£14-14
CASH PRICE

SPECTRUM TUNING-TILTING DIAL and this

Masterpiece of Cabinet Craftsmanship!

NO other receiver in the world gives such utterly perfect performance, such purity of tone PLUS . . . these 3 VITAL EXTRAS.

"SPECTRUM TUNING," the simplest and only certain station identification yet devised. The TILTING DIAL is the only one in the world. It gives perfect readings at a glance from any tuning position. No peering and no stooping.

The "ATLAS" CABINET is the supreme triumph of the designer's and craftsman's art—a perfect blend of richly grained walnut, ebony and chromium—and an asset to any room.

No wonder the "ATLAS 7-5-8" was the sensation of Olympia. Remember that these features are exclusive to "ATLAS." That is why you must INSIST on "ATLAS." Ask your dealer for a FREE demonstration today.

Exclusive to the **ATLAS**

POST THIS COUPON NOW

Messrs. H. Clarke & Co. (M/cr.) Ltd. Patricroft, Manchester.

Please send me full details of the wonderful new "ATLAS 7-5-8" Set—the Super Superhet.

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"7-5-8" SUPER-SUPERHET

H. Clarke & Co. (M/cr.) Ltd., Patricroft, Manchester. London: Bush House, W.C.2. Glasgow: G.E.S. Co. Ltd., 38 Oswald Street. I.F.S. Distributors: R. Marks Ltd., 27 Upper Liffey Street, Dublin.

SPECIFICATION 7 stages, 5 valves, 8 functions. For A.C. mains. Moving Coil Speaker, Band-Pass Tuning, Full Automatic Volume Control, Tone-Control, Noise Suppressor, Self-contained Aerial, Sockets for Pick-Up and Extra Speaker. Guaranteed for 12 months. H.P. Terms 32/6d. deposit and 12 monthly payments of 25/- each. CASH £14. 14s. od. Prices do not apply to I.F.S.

1010

THERE will be a running commentary on the Royal Wedding at the Abbey on November 29th. Although formal permission has not yet been granted, it clearly will not be withheld when film rights are already secured. This should be another "peak" for world broadcasting.

B.B.C. and Television.

In anticipation of the Report of Lord Seltsdon's Committee, already exclusively forecast in this column, the B.B.C. is planning to set up an enlarged Department for Television. Hitherto, television has been handled by a section of the Dramatic Department of the Entertainment Branch.

Under the new arrangements television will become a separate department of the Entertainment Branch; but it is still undecided who will be in charge of it. Captain Eustace Robb, formerly of the Coldstream Guards, who has been in charge of the work so far, is naturally a favourite for the new job; but it remains for Mr. Val Gielgud to make up his mind on the problem.

Music Goes Up.

As I forecast some weeks ago, music has "gone up" in the hierarchy at Broadcasting House. Dr. Adrian Boult, the Director of Music, has now the status of a "Branch Chief," which means that he has direct access to the heads of the business and must be directly consulted about all music matters in broadcasting. This is a decided advance. It remains now to promote Mr. Gielgud and Mr. Maschwitz as well.

Plans for Political Talks.

Mr. George Lansbury, Leader of the Opposition, spent a good part of an afternoon at Broadcasting House the other day. The purpose of the visit was to make representations with regard to certain B.B.C. plans for political broadcasting this winter. India, unemployment and the causes of war were the three subjects in which Mr. Lansbury was principally interested.

Most of the negotiation from the B.B.C. end is done by Colonel Dawnay, who was appointed primarily to keep the political situation in hand. Those who look to Colonel Dawnay to "swing" B.B.C. politics will be mistaken and disappointed. His present attitude is one of scrupulous fairness, and the National Government has as much reason to be dissatisfied as the Opposition.

An Invitation from India.

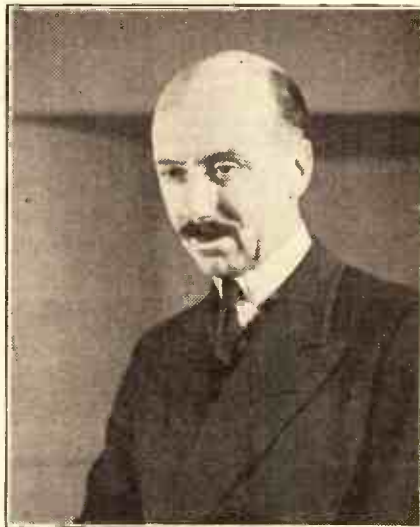
The B.B.C. is about to be invited by the Government of India to send out a "high official" for five years to organise broadcasting there. The job is likely to be a real "plum," carrying a salary of the order of £4,000 a year. Difficulty will be experienced in meeting the demand. None of those normally eligible will be available, Colonel Dawnay and Mr. Gladstone Murray being too deeply immersed in home business and Mr. Cecil Graves about to visit South Africa to attend the Imperial Press Conference.

I understand the B.B.C. is looking round for recruits for this kind of job. There will

be further demands of the kind from other parts of the Empire and the world.

"Songs from the Films."

No. 2 of the new series of "Songs from the Films" will be broadcast Regionally



PERSONALITIES OF THE AIR:
(1) Dr. Adrian Boult, the well-known B.B.C. Director of Music.

on October 12th in the evening and at a matinée on the following day. John Watt will be both compère and producer.

fallen more and more on the general staffs at the Regions, thus leaving the Regional Directors free to undertake the more representative side of B.B.C. activities that their positions demand.

Accordingly, while Mr. Liveing will confine himself mainly to matters of policy in his talk on October 8th, Mr. Harding will show how such policy is to be carried out. Nowadays Mr. Harding makes very few appearances before the microphone, with which he was once so familiar as an announcer in London.

Catholic Relay from "B.A."

An important broadcast to Roman Catholic listeners in particular will be the relay from Buenos Aires on Friday, October 12th, of a description by Father Martindale of the Eucharistic Congress which is to take place in the Argentine capital.

Father Martindale is noted for his inspiring addresses, which have been a feature of the religious broadcasts for some years.

Two Flying Plays.

While "Sam" Bulloch is producing a play at Broadcasting House for National listeners on Thursday, October 18th, Lance Sieveking, with whom Bulloch has "swopped" jobs at Belfast for three months, will be putting the finishing touches to the presentation of Val Gielgud's play, "Friday Morning," for Northern Ireland listeners on the following evening.

Both plays are associated with flying.

"Delayed Drop," by Alan Byrne, for National

BROADCASTING THE ROYAL WEDDING

THE LATEST NEWS FROM THE "BIG HOUSE"

North Regional Chiefs on the Air.

I do not remember the chief official of a Region and his programme director coming before the microphone together, such as Mr. "Ted" Liveing, the North Regional Director, and Mr. E. A. Harding will do on Monday, October 8th, to tell listeners of their plans for the winter.

At one time it was sufficient for the Station Director, and later for the Regional Director, to do these jobs of seasonal programme descriptions; but since the re-organisation of staff duties the actual work of making programme arrangements has

LISTEN TO THESE NEXT WEEK

Concerts: A relay of the orchestra from the Grand Hotel, Eastbourne. The soloist will be Esther Coleman, contralto. (*National, Sunday, October 7th.*)

The opening concert of the Torquay Musical Festival, relayed from the Pavilion, Torquay. The Torquay Municipal Orchestra (specially augmented) will be conducted by Sir Henry Wood. (*West Regional, Wednesday, October 10th.*)

Play: An Eden Phillpott's play entitled "Old Bannerman," with Cyril Maude in the title rôle. This is a West Indian story of sixty years ago, and the scene is a small tramp steamer plying in the West Indies. (*London Regional, Monday, October 8th.*)

Variety: A relay from the Theatre Royal, Peterborough. The turns will include Derickson and Brown in some entirely new songs; Johnnie Walker and his Mascot Midget; and Barry O'Brien, the Irish Ventriloquist. (*Midland Regional, Wednesday, October 10th.*)

listeners on October 18th, has its action in and over a flying club in Great Britain, while in "Friday Morning" (from Belfast on October 19th) the author uses the spoken thoughts of a group of ordinary people, travelling in a passenger plane, to disclose their reactions when it becomes apparent that a crash is imminent. The ending, however, is not as tragic as it first promises to be.

"Wonder Bar."

Denis Freeman usually finds something bright for his shows, and no doubt his adaptation of "Wonder Bar" will have this attribute when it is broadcast to National and Regional listeners on Monday and Wednesday, October 15th and 17th respectively.

"Wonder Bar" is a musical play by André Charlot, and it had successful stage runs in Berlin and London, and also as a screen play. Wonder was the name of a man who ran a cabaret show, and the piece proceeds in the usual happy-go-lucky style, with no one having a care in the world. But behind the scenes there is tragedy.

Lord Snell to Broadcast.

The third international conference of the Youth Hostel Associations takes place in London in mid-October, and arrangements have been made for London Regional listeners to hear Lord Snell's speech of welcome to the delegates, which is to be relayed from the County Hall of the L.C.C. on Wednesday, October 17th. Lord Snell is of course, Chairman of the L.C.C. **O.H.M.**

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Smoothing Out HUM

THE possible causes of mains hums are, of course, manifold, and I do not intend to deal with them here; most of them are known and catalogued, and for the remainder there is only one cure—experiment, and still more experiment.

The quality—or lack of it—of the smoothing choke used in the H.T. unit, however, has a direct bearing on the amount of hum current that gets through to the speaker, and unless we know just how to choose the right choke we may very easily suffer from severe hum without ever suspecting that particular component.

How often have I been told: "Oh, I'm using one of So-and-so's chokes, so it must be all right!"

Quite! The chances are that it is, but was it intended for the job you are asking it to do?

MILLIAMP VARIATIONS

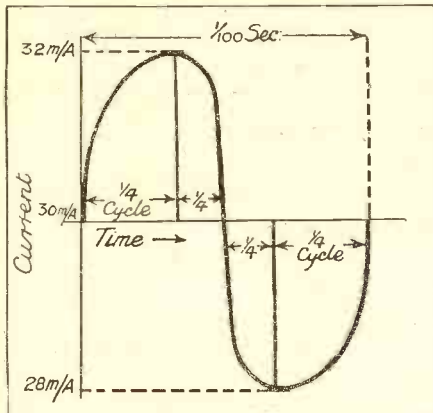


Fig. 1.—This sketch illustrates the rise and fall of current due to the A.C. hum superimposed on the steady D.C. supply from the mains-power pack.

Briefly, this is how a choke smooths out H.T. supply.

Suppose our receiver is taking 30 milliamps H.T. from the unit. The current flowing on the mains side of the choke will be 30 ma. unsmoothed D.C.—it will, in other words, have an average value of 30 milliamps, but will ripple up and down according to the frequency of the mains supply (if on A.C.) or to the "roughness" of the supply (if on D.C.).

A Full-Wave Example.

The current may, therefore, be expressed as 30 ma., plus or minus (say) 2 ma., i.e. at one instant it may be 28 milliamps and at the next 32 milliamps.

For the sake of simplicity we will suppose we are working off 50-cycle A.C. mains and are using full-wave rectification.

These fluctuations will, in this case, pass from 28 ma. to 32 ma. and back to 28 ma. every 1/100 second.

We can thus see that we have 4 milliamps of hum current to dispose of before we feed

our 30-ma. H.T. to the set. This 4 milliamps is obviously A.C. at 100 cycles per second.

Now, a smoothing choke consists of a great length of wire wound round a soft metal core. As you know, when a current

One of the most troublesome of faults in mains receivers is "hum," and probably more otherwise excellent receivers have been scrapped owing to this unwanted background noise than for any other reason. In this article by Bernard Barnard the problem of smoothing out the interference is discussed.

passes through the wire, the iron becomes magnetised; and, as you also know, any change in the strength or direction of that current will cause a corresponding and proportional change in the strength or polarity of the magnetism in the iron core.

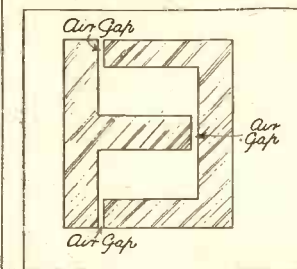
But do you recall that the converse to this is equally true—that, if a coil of wire is in a magnetic field and the "magnetism" changes its strength, a proportional current will be induced in the coil?

How The Choke Works.

Let us see what happens when our choke is placed in circuit with the 28/32-milliamp current. Fig. 1 shows a diagram of how the current rises and falls.

At the start the current is 30 milliamps; the iron is magnetised.

After the first 1/4 cycle the current has risen to 32 ma., and the magnetism has consequently increased in proportion.



THE CORE

Fig. 3.—The method of obtaining constant inductance by means of the air gap in the core of an L.F. choke.

In the next 1/4 cycle it has fallen to 30 ma. again and back to 28 ma. after still further 1/4 cycle.

The magnetism in the iron falls sympathetically, and consequently induces a proportional current in the wire in opposition to the fall.

Follow the next 1/4 cycle: the current is rising, and the rise expends itself in remagnetising the core.

Thus the 4-ma. A.C. is used up; one half of it is used to increase the magnetism in the core and the other half is cancelled out a split second later by that same increase of magnetism.

Our 28/32 milliamps is therefore "smoothed," and only an average value of about 30 milliamps gets through the choke to feed the set.

Now for some more practical considerations.

The first is that the smoothing effect of an ordinary choke depends to a very great extent upon the amount of steady current flowing through its windings.

Fig. 2 shows a typical choke curve such as you will find on the maker's instruction leaflet. This immediately indicates that the inductance (or smoothing effect) grows less as we increase the steady current.

The Question of Saturation.

In other words, the magnetism generated in the core will increase as the current is increased up to a certain value, but after this it will no longer respond proportionately.

Suppose, in our above-quoted example, this maximum current for the choke is 30 milliamps. Then, when the current rises to 32 ma., there will be no smoothing effect, since no appreciable additional magnetism will be added to the core.

The iron is said to have become "saturated" when this point is reached, and, in our case, the "saturation current" is 30 milliamps.

If, then, we require a choke with an inductance of 30 henries for a certain job we must make certain that it will maintain this inductance when the maximum current of the circuit is passing through it.

The next point that arises is how we are to determine the necessary inductance for a choke for a certain job of smoothing.

THE CURRENT CURVE

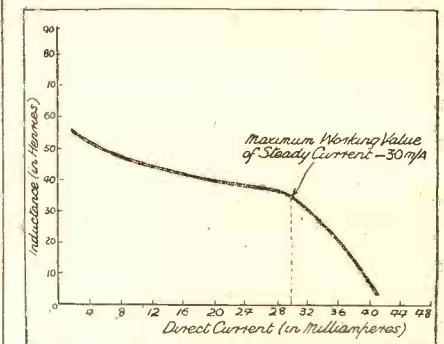


Fig. 2.—A typical inductance-current curve such as is supplied by the makers of smoothing chokes.

This involves consideration of the frequency of the hum current.

In our case we saw that it was 4 volts A.C. at 100 cycles.

The inductance of a choke increases as the frequency increases, and therefore the more rapid the fluctuations are the smaller the choke we can use to smooth them out.

(Continued on next page.)

SMOOTHING OUT HUM

(Continued from previous page.)

The frequency of the hum current derived from A.C. mains is easily determined.

If a half-wave rectifier is used the hum-current frequency will be equal to the mains frequency; but with full-wave rectification (and this is almost always used in modern circuits) the hum frequency is double that of the supply.

Twenty-five henries is a good average value for smoothing out 50-cycle ripple (i.e. half-wave rectification of 50-cycle mains); with full-wave a little over half this value will suffice—that is, 12 to 15 henries, and for 25-cycle mains 25 or 50 henries, according as to whether the full- or half-wave system is used.

In D.C. mains units the ripple is usually over 100 cycles; but as this is often a fluctuating frequency it is as well to use a fairly high-inductance choke of 25 henries or over.

A Typical Case.

Suppose, therefore, that we want to construct an A.C. mains unit to feed a receiver taking 30-milliamps maximum H.T., and that we have 50-cycle supply mains.

We shall use full-wave rectification.

The hum frequency will be 100 cycles per second, and therefore a choke of 15 henries will be ample.

When we go to buy this choke, however, we must make sure that our choice will have an inductance of 15 henries at 30 milliamps, and we must study the instruction leaflet accordingly.

There is one type of smoothing choke, however, whose inductance is largely independent of the current passing through it. This is known as the "gapped-core choke," and is extremely useful for high-power work involving the smoothing of currents of 100 milliamps and over.

The core laminations are arranged as in Fig. 3, and, as the name suggests, a small air gap is maintained between the two sections of the core.

More Wire is Needed.

This gap reduces the efficiency of the core to a certain extent and makes it necessary to increase the number of turns of wire on the coil; also, since these turns will have to carry such large currents, the wire has to be of fairly heavy gauge. Consequently, these special chokes are bulky and expensive.

The last consideration is the D.C. resistance of the choke; since a large amount of thin wire constitutes the coil, this must be fairly high, and a good deal of H.T. volts will be lost across it. The value of D.C. resistance for a 15-henry choke might be, say, 400 ohms.

This will mean (if the total H.T. consumption is 30 milliamps) that $400 \times .03$ amps. = 12 volts will be lost.

Thus, if our last receiver valve requires 200 volts on the anode, we must deliver $200 + 12$ volts to the choke.

We thus see that unless the full importance of the smoothing choke is appreciated, it is possible to waste much time by looking for a hum in entirely the wrong quarter.

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TIMING THE VARIETY SHOWS

(Continued from page 96.)

been a scream! Apart from Stainless, not one of the characters concerned was a broadcaster. Learned counsel required all the 30 minutes to warm up to the job (I mean as entertainers, not as lawyers). And they were warming up to it when the fade-out came. Real good fun was thus sacrificed on the one wave to Beethoven, and on the other to a rather ordinary Variety bill.

I welcome the return to the programme of the regular weekly talks on the Theatre, Science, Current Fiction, etc. Always short, they are never exacting. I find they are always informative enough to make good conversational matter afterwards. I shall be pleased when all the short talks are in full swing again. Perhaps it isn't a bad idea to drop them for a season. They come out all the fresher in the autumn.

"Golden Dragon City"—Lord Dunsany's new radio play—struck me as being rather a fragment of a larger play than a complete play in itself. It seemed to me to be a promising Act I precipitating the big events of Acts 2 and 3. I heard it described as "imagination that led to nowhere." I am inclined to agree with this opinion. There was no characterisation. Any three people could have played Mrs. Lumley, Lily and Bill.

Mrs. Lumley was quite indifferent to her suddenly becoming the owner of a city. Her scullery was much more interesting to her. Personally, I don't blame her. Lily and Bill, with varying degrees of excitement and in simple language, recounted what they saw going on in this city of their imagination. And that was all there was in it.

Now had this extraordinary vision of a city reacted on the three characters so that we saw the creation, development and culmination of a situation, then "Golden Dragon City" might have been a play. But we saw no such thing.

Only the vision was described, and there it stopped. This isn't *my* conception of a play.

Now "The Skin Game," with its strong characterisation and vigorous narrative, is. As usual, I followed from the book. I always do when I can. It reduces the strain. One noticed the clever cutting, perhaps a little too drastic this time in view of the 15 minutes to spare at the end. The production was well speeded up, though some may have thought it went too briskly. Anyhow, this is erring on the right side.

Premier honours went to Edward Chapman for his splendid performance as Mr. Hornblower. The character is perhaps a little over-drawn, but Mr. Chapman's interpretation was quite in accordance with the book. Joyce Kennedy (as Chloe) was a good second with her first-class character acting.

Helen Vayne (as Jill) had fewer opportunities compared with the film version. One hardly realised she had a soft spot for Rolf (Hornblower's younger son). Charles (Chloe's husband) might have been a Hillier instead of a Hornblower. I thought he was wrongly cast. All the minor parts were well done. Practically no effects were used throughout. Indeed, none was necessary, thanks to the dialogue and the skilful adaptation of it to the needs of the mike.

Once again the Saturday evening sports talk calls for favourable comment. This time it is Mr. L. G. Braund on the cricket umpire's lot. Mr. Braund did well to resuscitate an almost forgotten rule. Probably few club cricketers had ever heard of it. Reminiscences are always worth relating, and Mr. Braund's would rank with the best.

The best talk of the week was, undoubtedly, Lt.-Col. C. L. Malone's on "Aboard a Wind-jammer." Lt.-Col. Malone was lucky to have such a subject to talk about. Everybody loves sea stories, especially when, as in the case of the Panier, risks and hazards are in abundance. Col. Malone possesses great powers of description, a clear and pleasing voice.

C. B.

AN ENTERTAINING PUZZLE-GAME

A GAME or novelty has to appeal to all ages if it is to be a national craze.

Previously the object has been achieved by designing down to the kiddies and trusting that a strain of youthfulness in their parents will make them, too, interested.

But in "Grandfather's Whiskers," which is now being sold all over the country, there are solid attractions for all ages. For the first time a single novelty has been made to include complete entertainment for the whole family, singly or together, from baby to grandparents.

Endless Fun for All Ages.

This extraordinarily ingenious puzzle-game comprises a pack of forty-eight cards. On the faces of these cards there are brightly coloured pictures representing detached heads and bodies.

These are very funny drawings, and the most bizarre and incongruous figures are made when these numerous "heads" and "tails" are haphazardly matched. Over one thousand combinations are possible, and the kiddies can amuse themselves for hours making them.

The pictures are also used for an excitingly novel and amusing party game for both kiddies and grown-ups, and in this Grandfather and his Whiskers prominently figure.

(Continued on next page.)

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AN ENTERTAINING PUZZLE GAME

(Continued from previous page.)

The reverse sides of the cards contain a quite new kind of puzzle of the jig type, which jig-saw enthusiasts particularly will find amusing.

There are no less than six different puzzles, and the first one is so simple to solve that the youngest child ought successfully to be able to tackle it. The succeeding puzzles become more and more difficult, and numbers four, five and six will try the skill of the most expert solutionists.

In connection with these fascinating puzzles it is said that "millions will be searching for Grandfather and his Whiskers this winter," and this seems to be quite certain, for puzzles which perplex and amuse are extremely few and far between.

"Grandfather's Whiskers," therefore, has all the elements of a really national craze, though perhaps, in view of the lasting interests of its various features, "craze" is the wrong word to use. Anyway, it is certain to attain immense popularity, and almost as certainly a permanency such that children of to-day will be buying "Grandfather's Whiskers" for themselves and their children in the years to come.

The full pack of forty-eight beautifully printed cards costs only one shilling and represents most excellent value for money.

"THE STUFF OF RADIO"

(Continued from page 108.)

of the Morning"—a good title for an excellent idea—they lack that fundamental of drama, a good story. We feel that Mr. Sieveking might learn quite a good deal in this line from such humble radio artisans as Mr. Peach and Mr. Philip Wade.

At one point a page of a typical script of the author's is reproduced. It is a jumble of lines, of notes, of curls and squiggles. It looks like a jig-saw puzzle seen in a nightmare. It is, in brief, a mess. But, murmurs the simple-minded reader or listener, giving full weight to the angle of the picturesque, is it quite necessary? Couldn't it have been done another simpler way? Was Mr. Sieveking—the ghastly and uncharitable thought creeps in—giving himself pleasure, instead of concentrating his attention on the problem of giving me pleasure? And perusal of Mr. Sieveking's book provides the inevitable answer.

Too Much Blather About "Art."

There has been, as far as radio and all its stuff is concerned, far too much blather containing the word "art." Even Mr. Sieveking admits handsomely the essential evanescence of radio programmes, including, even more handsomely, his own productions. There is at bottom no more "art" needed in radio than in journalism. There is, or should be, much craft, ingenuity, good taste, topicality, vigour, variety.

But producers—and even big executives—must keep their sense of proportion. They exist for one purpose only: to convey to their public what will please a sufficient proportion of that public. If they do this they are doing their jobs and earning their salaries. If not, they are doing neither

one nor the other. And not all the ingenious machinery of Broadcasting House, not all its administrative and architectural perfections, not even its producers' most brilliant essays in the imaginative, the artistic, the fantastic, can save the B.B.C. from the charge of abuse of its privileged position and waste of the money of licence holders if it ignores that cruelly bed-rock fact.

A. C. L.

PERMEABILITY TUNING

USING modern iron-cored coils of expert and efficient design and modern precision-made variable condensers, tuning circuits of a pretty satisfactory nature can be devised.

But there are always those inherent failings of lack of uniformity of quality and of selectivity to annoy the engineer, even if the ordinary listener does not notice their effect in his set.

However, the engineer knows only too well how much easier it would be to produce better sets still if there were a ready alternative to the conventional method of tuning which did not possess these faults.

They evince themselves as a tendency for the selectivity of the set to fall off at the minimum settings of the condenser, and that undesirable condition is often accentuated in practice because of the number of required stations which seem to group themselves in that quarter!

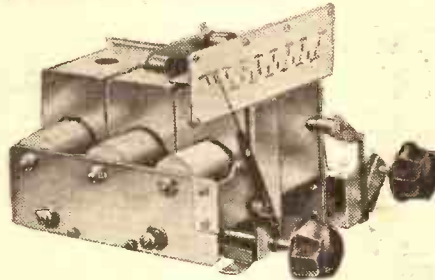
Accompanying this effect is an increasing loss of high notes towards the higher condenser settings.

A Most Uniform Performance.

But there is an alternative to condenser tuning, and that is permeability tuning, with which it is possible to obtain a most uniform performance over a whole waveband, together with a high degree of efficiency.

This method is very simple to explain. Instead of the wavelength of a tuning circuit being adjusted by means of a variable condenser in combination with a coil of fixed inductance, the inductance of the coil is varied by sliding an iron core in and out of it.

In this case it is the capacity which is fixed. It is to be found in the self-capacity of the coil and its associated wiring, or there may, in addition, be a fixed condenser.



The three-gang model of the Varley Permeability Tuner.

Recent work on iron-cored coils and the research that has been applied to the development of low-loss powdered iron have had the incidental result of bringing permeability tuning right into the field of practical politics.

No longer is permeability tuning the engineer's dream of "what might be," but is actually here for all to use. The photo illustrates the Varley Three-gang Permeability Tuner. Something of the possibilities of this important innovation can be gathered from the fact that this compact assembly actually replaces a set of three-ganged coils and a triple-gang tuning condenser.

So here is simplification, together with improved results, and we would advise all constructors to make themselves au fait with the development by securing literature about it from Varley, Bloomfield Road, Woolwich, London, S.E.18.

PETO-SCOTT

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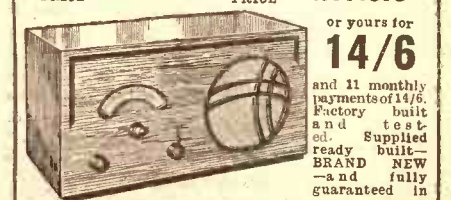
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"ACE" 3 Valve Kit A	2	7	6
3 Valve Kit C	5	17	6
3 Valve Set (Factory assembled and tested)	7	17	6
"ACE" 4 Valve SuperHet Kit A	4	5	0
4 Valve SuperHet Kit C	9	2	6
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(Factory assembled and tested and including all Ever Ready Batteries)			
"ACE" 4 Valve Seven-Stage SuperHet Kit A	3	19	6
4 Valve Seven-Stage SuperHet Kit C	8	8	0
4 Valve Seven-Stage SuperHet Set	10	17	6
(Factory assembled and tested and including all Ever Ready Batteries)			

NOTE. Kit A consists of all necessary components only; Kit C includes in addition Valves, Moving Coil Speaker and Cabinet, and in the case of battery sets, H.T., L.T., and G.B. batteries. The Set is the same as Kit C constructed and aerial tested by us and ready for immediate working. Prices include free delivery cash with order or C.O.D.

THE NEW ACE DE LUXE KITS

include Blue Prints and full constructional details, and consist of brand new components as used by the largest commercial set manufacturers. They must not be confused with kits composed of secondhand, surplus or obsolete stocks. We use the very latest types of valves and components. We guarantee De Luxe results with wonderful tone, volume and range. Blue Prints of any of the above sets can be supplied separately. Price 1/6d. or set of four for 5/- post free.

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GERMANY'S TELEVISION

(Continued from page 110.)

elapse between the recording and the reproduction of the picture on the television screen. With this particular system the "sound," of course, is recorded simultaneously, thus ensuring absolute synchronism with the picture.

There has been a noticeable improvement this year in the large-size projection type of television receiver, and 180-line scanning

cinema projector, which throws the televised picture on to a movie screen, roughly 3 yards by 4 yards, which is practically normal size.

When the film has passed through the projector the emulsion is washed off the film loop in a special bath, after which the blank film is dried and once more coated with a sensitive layer. About one minute is allowed to pass between reception and the large-size reproduction on the screen.

The Tekade mirror-screw type of television receiver was again in evidence and this particular "90-line" outfit is

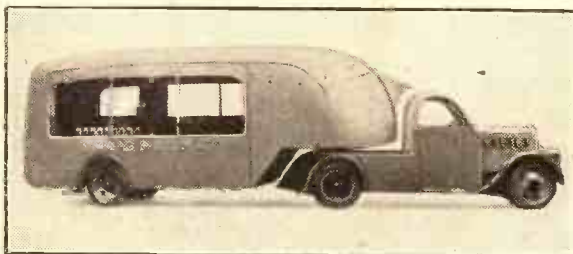
said, under certain conditions, to enable television transmissions to be made on 200 metres. But although the results generally are quite brilliant, the usual mirror-screw drawback of "picture splitting" when viewed from the side has not been overcome.

A Matter of Opinion.

While some workers in the television field are of the opinion that television broadcasting has progressed sufficiently for the establishment of a regular service, the

bulk of opinion is more conservative. The general view is that there are still many economical as well as technical problems to be solved, and that the greatest difficulty of all at the moment is that the prices of television receivers are so very high. Moreover, the present standard of 25 frames a second is not considered adequate for the complete elimination of flicker, and that, of course, is a most important matter if television programmes are to constitute an important part of home entertainment.

TELEVISION ON WHEELS



This unusual stream-lined six-wheeler is the special television transmitting car used by the Loewe Company.

has been adopted instead of the 120-line of 12 months ago. It is worked on the continuous intermediate film process developed by the Fernseh-A.G. An endless loop of blank film, having been coated with a sensitive layer and dried immediately afterwards is used to record photographically the received television pictures by means of a modulated source of light, e.g. a Kerr cell.

The exposed film goes through developing and fixing stages, and after being rinsed very rapidly is turned over to a standard

RADIO AND SAFETY AT SEA

(Continued from page 95.)

radio with a submarine sound-signalling apparatus. Sound travels through water at the speed of about a mile a second. A wireless message passes through the ether at the speed of light. From the difference between the reception of the wireless signal and the time taken for the sound signal sent out simultaneously to reach the vessel the navigator can reckon his exact distance from the beacon.

When we consider the effect of unknown tides and currents at sea, combined with the drift caused by wind, the boon to the navigator of being able to tell his position off the shore at any time is obvious.

Weather Reports are Invaluable.

Another valuable use of wireless is the sending of weather reports. Some of the most violent storms are limited in extent. It is possible to avoid the turbulent storm centre by steering round it, provided the track of the hurricane is known. We used to have all kinds of complicated methods of calculating the track of storms by observation of the shifting direction of the wind. Sometimes they worked, but sometimes they did not. If a mistake was made the ship was caught in the centre of a hurricane, and anything might happen to her.

To-day, with modern meteorological methods combined with radio, the crippling

of a well-found large ship by a hurricane should be practically impossible. Cardington station actually sends out weather charts by wireless which can be interpreted by the operator to show accurately the state of the elements ahead.

I mentioned above the danger of collision in fog. This will always be a problem for the seaman, and the larger the ships the more difficult it is for them to avoid collision once they come within too close distance of each other. We used to rely on the sounding of steam sirens, but it is very baffling in a fog to calculate the direction of a heard sound.

Reducing the Fog Danger.

It is one of the most nerve-racking experiences I know to be on board one ship in a pea-soup fog and feel one's way past another by trying to exchange steam-siren signals. But now modern vessels themselves are fitted with directional wireless, and as the radio passes through the ether the fog does not affect it.

Two or more ships at sea in each other's neighbourhood and fitted with short-wave wireless and directional-finding apparatus can plot their relative positions one from the other with uncanny exactitude.

These wonderful inventions are not yet perfect, nor are they well enough known, but the accidents to British vessels are being reduced every year and travel is becoming safer. Our splendid ships and crews should reap their reward in the continued confidence and faith of the travelling public.

SPEAKING FOR ITSELF

Some further observations concerning the remarkable sensitivity of the season's latest loudspeakers.

By G. T. KELSEY.

IT isn't often that a complaint can be looked upon as a sort of unsolicited testimonial, and yet a no more striking compliment could have been paid to the sensitivity of R. & A.'s latest speaker—the "Multimu"—than to quote an entirely unrehearsed, and in some respects amusing, incident which occurred at one of the recent exhibitions.

So strong was the output from a "Multimu" located on the stand of Messrs. Reproducers & Amplifiers that, by comparison with the "exhibition average," it was automatically assumed by many people that some form of local amplification must be taking place, especially so as the "offending" exhibit was shown on a stand of its own in which a local amplifier could quite easily have been concealed.

Well, rumour travelled round (as it usually does!) that Messrs. R. & A. were using a local amplifier, until finally it came to the ears of the "powers that be." As a result, B.B.C. engineers visited their stand and demanded to inspect the line supplying all their exhibits! So thorough was the examination and so convinced, apparently, were the "inspectors" that some form of local "boosting" was going on that the plinths were removed from the floor fixings and inspected internally, whilst the offending "Multimu" was directly connected with the B.B.C. line at the point where it reached the stand.

Of course, no such amplifier could be found, for the very simple reason that it just did not exist. What the engineers said concerning the remarkable sensitivity of the "Multimu" is not made clear in the report as it has reached me; but, whatever they said, the incident itself is evidence of the fact that R. & A. have certainly succeeded in producing a speaker that is capable of speaking for itself! Funny, isn't it, how people are apt to discredit an achievement which, in this case, certainly reflects to the credit of the makers?

A Personal Note.

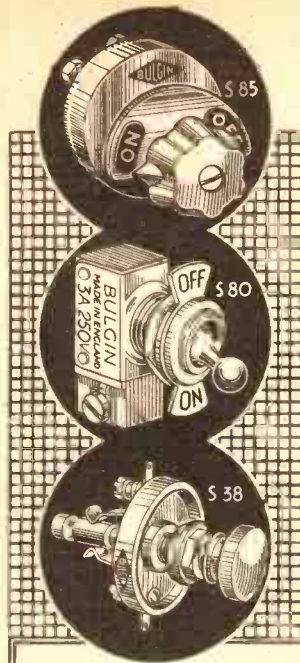
Breaking away for one brief moment from matters strictly business, I am confident that my readers will share my regrets on hearing that Lord Hirst—the "electric personality" that guides the destinies of the mighty G.E.C. organisation—has recently had to undergo a very serious operation.

At the time of going to press I learn that he is making very satisfactory progress, and I feel sure that "P.W." readers will be anxious for me to convey to him our sincere good wishes for his speedy recovery to normal health. Let us hope it may not be long ere he is back at the post in which he is held in such high esteem.

Two New Valves by Cossor.

Good news comes from Cossor this week in the form of an announcement concerning the immediate release of two new valves. The first, which is to be known as the 210 P.G., is a battery vari-mu pentagrid which requires only 1 amp for filament heating. It is designed for use as a frequency changer in superhet circuits, and its filament rating is 2 volts. The price, incidentally, is fixed at 18s. 6d.

The second newcomer is a high-frequency pentode for universal mains operation. It is to be known as the type 13 S.P.A., and it requires a heater voltage of 13. The price in this case is 17s. 6d.



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TOGGLE QUICK-MAKE-AND-BREAK SWITCHES

The smallest reliable mains switch yet made, as supplied to all the leading manufacturers. Nickel plated finish. S.80, "On-Off," 1/6. S.81, S.P.C.O., 1/9.

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RADIOTORIAL QUESTIONS AND ANSWERS

MODERNISING THE "MAGIC."

W. D. (Hertford).—"I still have the good old 'Magic III' in working order, but I want to try one of the new iron-cored coils (Micrion) in it, instead of the old plug-ins.

"What will be the connections for coil and wavechange switch, allowing for as little change as possible in the wiring?"

"Will a filament on-off switch do?"

Yes, for this coil you only need a straight make-or-break action, so an ordinary filament switch will do. You can mount it on the panel under the differential condenser. To try the coil with the minimum of rewiring proceed as follows:

Take off the leads from the differential reaction condenser. Mount the new coil unit between aerial terminal and V1, after removing the plug-in coil holders.

Replace the '00005-mfd. condenser C3 by a "preset" of '0003-mfd. capacity (or thereabouts). The new connections to the coil will be: Terminal A to that side of the new aerial condenser C3 which formerly went to the tap on the L1 coil.

Terminal S to one side of the new wavechange switch. The other side of this switch goes to the adjacent filament socket of V1, and so to earth.

Terminal E on the coil goes to the set's earth terminal.

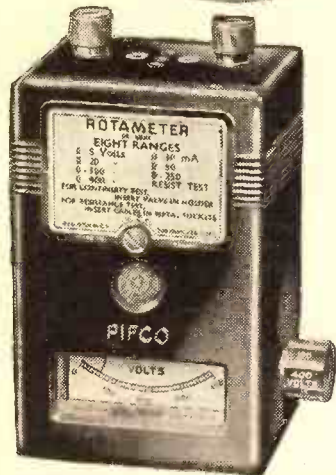
Terminal G on the coil goes to the fixed vanes of tuning condenser and to the '0003 mfd. (C4).

Terminal RE on the coil goes to its E terminal,



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

There's no doubt about a Pifco ROTAMETER. It traces faults in no time—any kind of radio fault. There are 9 distinct meters in one handy-sized polished bakelite case. The new De-Luxe model moving-coil ROTAMETER has a resistance of 200,000 ohms ensuring absolute accuracy, whilst the scale reading for voltage tests goes up to 400 volts. With these ranges available there is no test you cannot make with a Pifco ROTAMETER.



9 SEPARATE METERS IN ONE ROTAMETER-DE-LUXE

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| 1. 0-5 volts. | 5. 0-10 milliamperes. |
| 2. 0-20 volts. | 6. 0-50 milliamperes. |
| 3. 0-100 volts. | 7. 0-250 milliamperes. |
| 4. 0-400 volts. | 8. Resist./valve test. |
| | 9. Plug-in test for valves. |

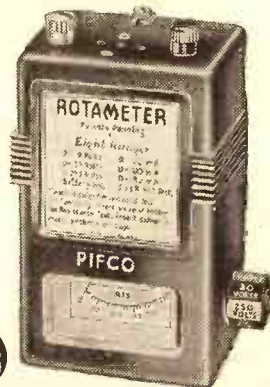
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ROTAMETER

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|--|---|---|
| 1. 0-8 volts. For low-tension voltage test. | 6. 0-100 M.A. | } For testing current taken by total valves in set. |
| 2. 0-30 volts. For grid-bias voltage test. | 7. 0-250 M.A. | |
| 3. 0-250 volts. For high-tension voltage test. | 8. FILAMENT AND RESISTANCE TEST (4,000 ohms). For D.C. and rectified A.C. | |
| 4. BATTERY TEST. | 9. Plug-in test for valves. | |
| 5. 0-20 M.A. For individual valve test. | | |

Ask your dealer to show you one now or write for the new Pifco Testmeter Folder, describing all instruments, to PIFCO LTD., SHUDEHILL, MANCHESTER or 150, Charing Cross Road, W.C.2.

29/6



PIFCO

ROTAMETERS

PIFCO ON THE SPOT WILL TRACE YOUR TROUBLES LIKE A SHOT

and also to the F1 vanes of the differential reaction condenser.

Terminal RA on the coil goes to the F2 vanes of the same (reaction) condenser.

Finally, the "arm" of the differential reaction condenser is joined to the plate terminal of the valve holder and to the bottom of the H.F. choke.

This completes the alterations. But as the makers of the coil recommend a '0003-mfd. reaction condenser for use with it, you may find it will not make the set oscillate sufficiently with the smaller condenser that was fitted in the original "Magic III."

So should there be insufficient reaction it will be necessary to replace the present differential condensers with one having a maximum capacity of '0003 mfd.

"THE WONDROUS 4-VALVE AIRSPRITE."

E. G. C. (Bournemouth).—"As one of the constructors of the 'Airsprite' 4-valve battery set, I would like to say a few words in adequate praise of this remarkable set.

"The claim made by the inventor, 'foreigners like locals' sums up in three words the stupendous property of this set. (The 3-valve 'Airsprite' receivers were, in advance, already wonderful sets.)

"I would like to see the 4-valve set more often referred to by the designers, as I venture the opinion that no subsequent design of radio receiver can give anything superior in quality of foreign or home reception, nor indeed equal to it. Nevertheless, would it be suitable now to change to iron-core coils?"

"I am not a believer in the sets that claim to get 50 or more foreign stations with results critically acceptable to musical experts, and I doubt that such a set has 'arrived' yet, but certain it is that the 'Airsprite 4' receives at least 20 foreign stations on the M.W. and L.W. wavebands exactly as if they were the 'local' or Daventry at its best.

"This is the more remarkable as only air-core tuning coils are used, and an indoor aerial suffices to obtain such results. Thus the sensitivity and selectivity of the set are outstanding.

"In regard to the equally important questions of H.T. economy, when the Westector economiser circuit is used the above results are obtainable with a mA. reading, on a switch-over milliammeter on the panel, not exceeding 10 mA., and mostly averaging about 7 mA. And this with four valves!

"I adopted the R. & A. 'Challenger' moving-coil loudspeaker, and the perfect quality and volume obtainable on the above data are as described.

"Moreover, H.T. + 2 can be used as low as 84 v., with H.T. + 1 at 60. The entire set, with batteries, accessory equipment and loudspeaker, were assembled in a single cabinet with no instability or other unfavourable effects.

"In conclusion, may I congratulate the inventor and POPULAR WIRELESS on what is, so far, I consider, an *un*-superseded and wondrous radio reception set?"

Although iron-cored coils often effect a great improvement in a set's performance, in this particular instance we do not recommend you to change over.

The set is already doing remarkably well, and your coils are well suited to the present aerial arrangements. If it were altered you might run into instability, or other little difficulty, and, frankly, we do not think you could better the present outfit.

"ROUGH NOISES" WITH A Q.P.P. 4-VALVER.

J. H. (Muirhead, Chryston).—"Noting the good advice you have given other readers of 'P.W.', I should be very much obliged if you could help me out of my difficulty.

"The set is a 4-valve Q.P.P. Recently a background of rough noises appeared which got so bad that I took the valves to a dealer, who tested them and found one of the last ones to be deficient. I fitted a new valve in and received the very same results.

"I then turned on the reaction until the set was oscillating, removed the other power valve, and after a few seconds it became all right. The set was then switched off and the

(Continued on next page.)

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from previous page.)

third valve replaced again. When it was switched on it played as never before.

"The tone and volume were excellent. But when a quiet passage occurs in the music or after a short interval in the programme, it goes off the deep end until the reaction is turned on, which clears the trouble away. If it has been standing off for some time the reaction has to be turned on to oscillating point and the third valve (one of the power valves) removed.

"If it has only been switched off for a short period, oscillating the set clears the air."

We think the "rough noises" are more likely to be due to parasitic oscillations—which are very prone to give trouble in Q.P.P. working—than to defects in the valves or parts used.

A common method of preventing the trouble is to insert a high value of resistance in the grid-bias lead which goes to the centre terminal of the Q.P.P. transformer.

Is there such a resistance in your set? And, if so, is it of high enough value? And in good working order?

The fact that you can so often put the trouble right by causing the set to oscillate suggests that all may not be well in the detector stage.

We should overhaul this, too, altering the values of grid leak and grid condenser a little, if necessary, and providing for variation of the detector's H.T. voltage.

WHEN TO LISTEN FOR VATICAN CITY.

R. C. (Edgware).—"I wish to try for Vatican City on short waves.

"What are the hours he can be heard, and the wavelength? If there is any call-sign,

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

All inquiries concerning advertising rates, etc., to be addressed to the Advertisement Offices, John Carpenter House, John Carpenter Street, London, E.C.4.

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

The Editor will be pleased to consider articles and photographs dealing with all radio subjects, but cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS. not accepted for publication. A stamped, addressed envelope must be sent with every article.

.....
etc., by which he can be identified I should be pleased to have the information."

Vatican City's call-sign is HVJ, and he uses two different wavelengths, viz. 50.26 and 19.84 metres.

A daily transmission is made from 8 to 8.15 p.m. on the 50.26-metres wavelength. And a Sunday transmission from 11 to 11.30 a.m.

On 19.84 metres there is a daily transmission from 11 to 11.15 a.m.

The station has a man announcer, and the ticking of a clock is used as interval signal.

EXPERIMENTING WITH A TRANSMITTER.

A. E. (Dulwich, London, S.E.15).—"I wish to make a small and inexpensive transmitting set for experimental purposes.

"I should like it for both speech and Morse. Could you recommend a circuit or book?"

Before starting transmission you must get the necessary licence from the Postmaster-General. And the best way to obtain that is to graduate as a "British Receiving Station" first.

This can be done by joining the Radio Society of Great Britain, who will gladly supply you with all particulars, circuits, etc., if you apply to them at 53, Victoria Street, London, S.W.1.

THE OUTPUT STAGE OF THE S.T.500.

E. T. G. (Rainham, Essex).—"Having already got a big power valve on hand, I thought perhaps I could use this for the S.T.500 instead of Class B valve.

"Would it be possible, to save the expense?"

No. We cannot recommend alteration of the set to enable a power valve to be used in the output stage.

TUNING FOR CAIRO, BUT GOT OSLO ON MEDIUM WAVES.

C. D. (Reigate).—"I thought I would have a try for the new Cairo station, which I hear is working on the wavelength above Prague's.

"At first all I could get there was a mush, but eventually it came clear, and my patience was rewarded by hearing not Cairo, but Oslo!

"Is this a harmonic, or what? I am quite sure of the programme, because I am a keen long-distance searcher, and I would know that Oslo announcer's voice anywhere.

"Or was I picking up low-powered relay, do you think?"

Cairo shares his wavelength (483.9 metres) with Brussels No. 1, but just below this pair, on 476.9 metres, there is the new Norwegian station, Trondelag.

Its power is 20 kilowatts, and it has been getting over quite well to British aerials, so there is

no doubt it was this station that you heard. It relays the Oslo programmes.

Incidentally, it, too, shares a wavelength, the other station being Barcarena, Lisbon. So possibly the "mush" you heard at first was the combined programmes of these two stations.

R1 TO R9.

"LOGBOOK" (Aberdeen).—"What is the correct meaning of 'R1', 'R2', 'R3', etc., as applied to the strength of a station heard?"

"I know you have given this information before in 'P.W.', but look as I will through my back numbers I cannot find it."

The recognised R Scale is the following:

- R1.—Faint, barely readable.
- R2.—Weak, just readable.
- R3.—Weak, but Morse can be copied.
- R4.—Fair, easily readable.
- R5.—Moderately strong.
- R6.—Good signals.
- R7.—Good strong signals.
- R8.—Very strong signals.
- R9.—Extremely strong.

Incidentally, you should note that the R Scale is properly used to express the *intelligibility* rather than the *strength* of a station. (Strength is sufficiently well expressed by the QSA code.)

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WITH ORDER	Blue Spot Star Moving-Coil Speaker.
6/5	Cash Price £3/10/0, or 6/5 with order, and 11 monthly payments of 6/5.
2/6	Blue Spot Star Minor. Cash Price £1/15/0, or 2/6 with order, and 9 monthly payments of 4/-.
4/6	Rola 'FRY' P.M. Moving-Coil Speaker, with universal transformer. Cash Price £2/9/6, or 4/6 with order and 10 monthly payments of 5/-.

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9/-	Graham Farish Mystic O Kit, with Valves, Cabinet and W.B. Stentorian Baby Speaker. Cash Price £5/4/6, or 9/- with order and 11 monthly payments of 9/9.
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5/6	Graham Farish Sky Raider, less Valves. Cash Price £3/5/2, or 5/6 with order and 11 monthly payments of 6/-.

H.T. ELIMINATORS and H.T. ACCUMULATORS	
6/-	Atlas T10/30 H.T. Eliminator and Trickle Charger combined. Cash Price £3/9/6, or 6/- with order and 11 monthly payments of 6/4.
5/-	Atlas CA25 H.T. Eliminator. Cash Price £2/19/6, or 5/- with order and 11 monthly payments of 5/3.
5/-	Ekco K10/20 H.T. Eliminator, with Trickle Charger. Cash Price £2/12/6, or 5/- with order and 10 monthly payments of 5/3.
6/-	Exide H.T. Accumulators, 2 W.H.60, 120-v., 5,000 m.a., in wooden crates. Cash Price £4/13/0, or 6/- with order, and 11 monthly payments of 8/6.

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RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from previous page.)

BETTER WITH A BROKEN AERIAL !

T. N. (Stansted).—"During house-painting the aerial lead got broken on a level with the bed-room window. It is insulated flex wire, so a temporary 'repair' was made by twisting the ends of the broken wire together.

"I find that reception is improved and tuning much sharper, although the actual wire is still broken, and the upper end of the aerial is separated by the thickness of the insulation from the lower end. Why is that?"

The broken ends of flexible wire, being twisted together and separated only by thin insulation, are acting like a small condenser joined in series with your aerial. Such a condenser often "sharpens tuning" on a simple set, and this is the effect you are experiencing.

THE TRIMMING THROWS OUT THE WAVELENGTH.

C. W. W. (West Bromwich).—"There is one little point about trimming to which I have never seen any reference made in 'P.W.', though it must have happened to other readers beside myself.

"The tuning scale is very clearly marked in wavelengths. After I had got the trimming perfect, I noticed that the effect had been to throw out the scale slightly, whereas before trimming it really did show the exact wavelength being received.

"Is there any way of getting over this? It is not, of course, a big error or an important matter. But if it can be righted I should like to try."

If you like to try retrimming you may be able to overcome the small discrepancy; but be sure that the first circuit you adjust is the detector's.

Get the dial reading exactly right for that stage, and then by trimming the other stages you should be able to retain this accuracy of the dial, and yet bring all the circuits into exact trim.

SUN-RAY LAMP INTERFERENCE.

R. P. (Landsdowne Square, W.C.1).—"There is a nursing home near my house, and since they have installed a sun-ray treatment lamp I often get a loud, harsh roar which blots out the B.B.C. completely.

"Is it the lamp? And, if so, what can be done?"

Probably it is; and you can verify that if you can have it switched on and off whilst listening, to see if the noise corresponds exactly with the switching.

If so, the treatment lies with the lamp itself, and not in doctoring the set. Probably the makers of the lamp will be able to say exactly what steps should be taken to quieten it.

THIS WEEK'S HINTS AERIAL SAFETY

To withstand the autumn gales, stays should be strong and firmly fixed.

Don't trust stakes—they pull up when the soil gets soft. The better way is to fix the stay firmly round a buried "foot," consisting of a metal bar or stout piece of wood, buried a few feet under the soil.

Now is the time for the final overhaul of the aerial wire itself. Are the joints clean? Is the switch in good order and making good connection? Would a cover over it help to keep out the weather?

Satisfy yourself on these points, and your aerial will then satisfy you.

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P. W. 11

SOME TIPS ON TUNING

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

FLAT tuning may be due to a number of causes. It may not necessarily be due to faulty design of the tuning circuit, for even a properly designed circuit may be incorrectly used and so give rise to flat tuning.

Let us consider the aerial circuit. Here we may have the aerial connected to the end of the grid coil instead of a tapping. Or, if a tapping is used, it may not be low enough—that is, there may be too many turns between the tapping and earth. A preset condenser connected in the aerial circuit will get over this trouble very simply. This it does by reducing the coupling between the aerial and the tuned circuit.

An Important Point.

Another important point to watch is the size of the screen, if a screen is used, and also the position of the screen in relation to the coil. As I have mentioned before, the screen acts by absorbing energy, and whilst a certain amount of absorption is permissible, this must not be allowed to become too great. If it does, the result will certainly be to broaden the tuning, by increasing the damping. The screen used should be of sufficient size to give ample clearance around the coil.

If a grid leak is connected across the whole of the tuning coil, this will affect the tuning, too. Remember that a detector of the grid-leak type passes current in the grid circuit, and this acts as a load on the tuned circuit.

The Load on the Tuned Circuit.

This can be got over, however, by connecting the grid condenser to a tapping on the coil, which reduces the effective load. Selectivity is of paramount importance these days, and the above points should be attended to if you are troubled with broad tuning. In the old days we didn't worry too much about flat tuning, but in these days a broadly tuned set is well-nigh hopeless.

Selectivity and A.V.C.

Talking about selectivity, I may mention that when you first commence to operate a set fitted with automatic volume control you are apt to get the idea that the set is broad-tuned and that the selectivity is bad. Stations which should not spread over more than perhaps one degree on the dial extend over several times that amount.

This effect, however, is due to the action of the automatic volume control. If you think about it for a moment you will see that with an ordinary set, a fairly selective one, when you detune from the best position for a given station, the signal goes down to negligible loudness, whereas when you have a set fitted with A.V.C. the effect of the latter is to keep up the strength of signals to something like a constant level. This it does by increasing the sensitivity of the

(Continued on next page.)

SOME TIPS ON TUNING

(Continued from previous page.)

high-frequency amplifying valves, so amplifying the signal to a greater extent.

Visual Tuning.

When the tuning is turned a little bit away from the actual best position for the wavelength in question you will get a certain amount of distortion, owing to the circuit not responding evenly to the two sidebands.

This type of distortion can be avoided in various ways, the best being some form of "visible tuning." Suppose, for instance, you put a milliammeter in the circuit of the variable-mu valve, then this will serve as a suitable indicator, because it will give its lowest reading when the circuit is in tune and higher readings as the circuit goes out of tune. This peculiarity is due to the fact that when the circuit is exactly in tune the automatic volume control grid bias is at its maximum.

Another method is to fit a signal light, operated by the variable-mu anode current. When the set is tuned to exact resonance this light increases, up to a maximum, but it remains "off" at other positions of the tuning control.

The Question of Mush.

Automatic volume control, by the way, is not all beer and skittles, as many of you who have tried it will know. Its main

the iron has, of course, a direct effect upon the inductance of the coil.

You may at first think that this is simply another way of changing the wavelength of the circuit, which can as well be done by varying a coil or a condenser. But it is more than that: it varies the inductance—and therefore the wavelength—in a special way.

Constant Stage Gain.

When you use the ordinary form of tuning circuit, consisting of coil and variable condenser, this does not give a constant rate of variation (so to speak) over the whole of the waveband. If this rate of variation could be made constant, the stage gain of the associated tuning circuit would remain sensibly constant also. Further than this, the tuning circuits would have a constant effect on the low-frequency response; this would mean that the question of tone compensation would be very much simplified, since the amount of compensation required would be independent of the wavelength.

High-Frequency Resistance.

We are familiar enough with the iron-cored type of high-frequency coil, in which powdered iron is used in the core so as to increase the inductance for a given size of coil, and so make it possible to cut down the amount of wire used and also the high-frequency resistance. When such a core is furthermore made movable, it gives us all the advantages enumerated above; the inductance of the coil will, of course, increase as it is pushed further into the iron

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drawback is that it tends to bring in a good deal of mush, owing to the very fact that it is so sensitive on weak signals. Moreover, a variable-mu valve, working full out, will itself often produce a certain amount of "hiss."

This drawback can be overcome by the use of what is sometimes called a "quiet A.V.C." valve. This works on the low-frequency side of the set, and has the rather ingenious effect of suppressing all signals which fall below a certain minimum strength. In this way most of the mush and between-station noise is got rid of.

The additional valve for this purpose is generally an ordinary pentode. The use of this quiet A.V.C. is, perhaps, a little more trouble, but it certainly pays for itself.

Varying the Inductance.

The new permeability tuning—of which further details appear on page 117—is rapidly finding its way into convenient form for practical use. In one market form the coil is wound on a tapered former, and this is adapted to pass into the annular space between an iron core and a surrounding iron shell—somewhat on the lines of a moving-coil speaker. The alteration of the amount of coil within the "embrace" of

"surround," and will be at a maximum when it is fully in.

A unit of this kind can be had not only for ordinary "straight" working, but also for superhet use. A wavechange switch can be incorporated for medium and long waves. Those of you who are interested in all this should look into the question of the new Varley permeability tuner.

Using a Frame Aerial.

If you use a portable set with a frame aerial, whether the frame is enclosed within the cabinet or not, you will have noticed that the "directional" effect of the frame is often very unreliable. In many portable sets this property of the frame is used for purposes of selectivity, on the basis that the aerial will be most sensitive to a station towards which it is pointing.

The direction in which the waves arrive at the set—which is all that matters, so far as the frame is concerned—may be very different from the direction or "bearing" of the station in question. All kinds of things can intervene and interfere with the direction of travel of the waves before they reach your set. The steel girders of a building, for example, play havoc with

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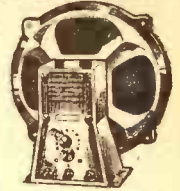
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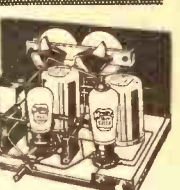


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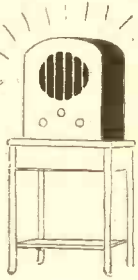
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SOME TIPS ON TUNING

(Continued from previous page.)

directional effects—not to mention signal strength—and nearby outside aerials will act in a similar way.

Often enough, several stations will seem to come in from the same direction, although their actual bearings may be very divergent, owing to the waves being "attracted," as it were, by some local aerial or other metal conductor. The direction of arrival of the waves, in fact, becomes practically from the local "condensing" aerial.

Not Easy to Remedy.

This is not usually a matter of any great importance to the listener, so far as the actual question of direction is concerned, but it does become an important matter if it robs him of the chance of getting selectivity by rotating the frame. If several stations are crowding together into one directional channel it is obviously impossible to gain any advantage from the directional properties of the frame aerial, so far as separating the stations in question is concerned. Unfortunately, I don't know what there is you can do about it, except to use the set in a different place or remove the offending conductor.

Talking about frames, by the way, another point is that if you connect an aerial or earth to a frame you very largely destroy its directional properties and you also flatten the tuning. In a portable set it often happens that not a great deal of selectivity is provided in the circuits themselves, reliance being placed, as mentioned above, upon the selectivity obtainable from the frame. If, therefore, you connect aerial or earth to the frame, you may be left with precious little selectivity, although on the other hand you will almost certainly get greatly increased signal strength.

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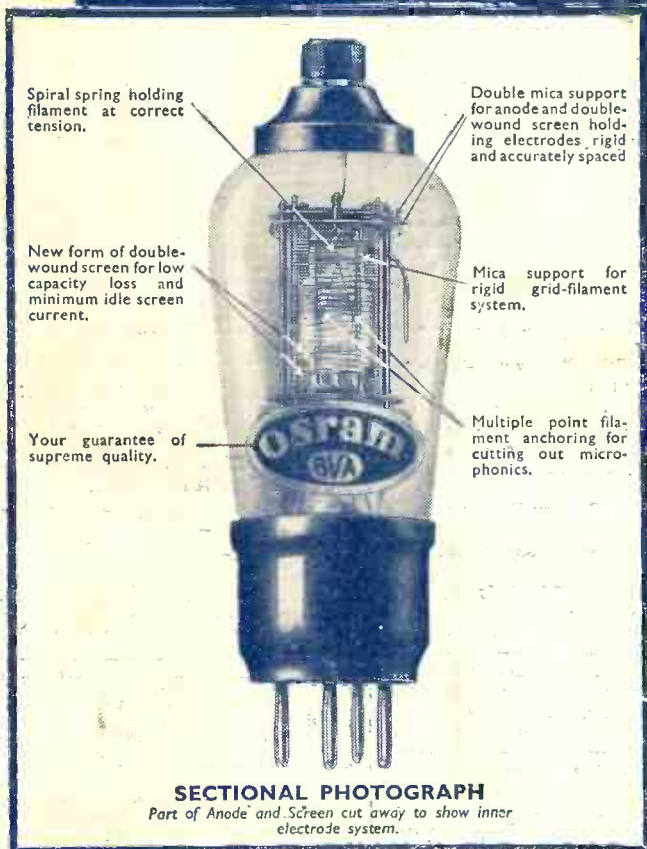
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