

# MY SHORT-WAVE ADVENTURES (NEW FEATURE) By L. CHESTER

# Popular Wireless & TELEVISION TIMES

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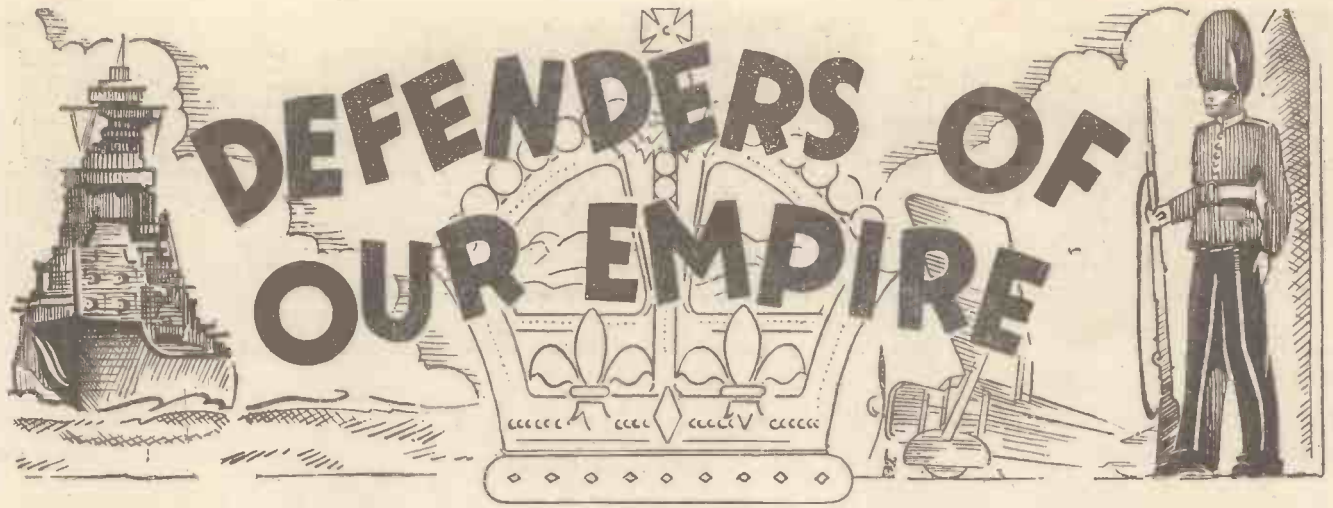
No. 779  
Vol. XXXI.  
May 8th, 1937



## "—AND IT COMES OUT HERE!"

Well, this is certainly one way of trying to find out how a set works. But we doubt the efficiency of the method ; it's hard on the set and success is problematical. A very much better way, and one we strongly recommend, is the perusal of an interesting article appearing in this issue and entitled :

## YOUR SET — HOW IT WORKS



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HEART BEATS  
STATION NOTES  
THINGS SAID

## RADIO NOTES & NEWS

GLIDER RADIO  
FRENCH PIRATES  
TALK ON LIFE

### Advertising Anaesthesia

AN artless and appealing letter on American radio which has just reached me contains—among other gems of unconscious sarcasm—the following sentence: “I got one of the American stations, too; but it was not one of their main stations, because the programme was mixed with announcements of washing powders and motor oils. Quite amusing at first, but impossible to listen to seriously.”

The amazing thing about our trans-herring-pond cousins is that they can listen seriously without noticing those advertisements, which pay for the programmes and save every listener from liability to licence fee. Your regular U.S. listener no more notices the radio puffs than he notices the advertisements in a book which interests him.

This is not because Nature has provided him with greater powers of discrimination than the European listener, but because the good dame has mercifully made him virtually insensible to the pain of listening to radio adverts. !

### Consultation by Radio

THIS week's slap on the back goes to station G 6 Q B, which is owned, operated, dusted and polished by the indefatigable Mr. L. H. Thomas of Thornton Heath.

In collaboration with Dr. C. Vaughan Henriques of the Medical School of King's College Hospital, heart-beats were transmitted from G 6 Q B to an amateur radio station in the U.S.A.; reception was so good that the sounds were easily recognisable, and a heart specialist listening in the U.S.A. would have had no difficulty in making a diagnosis from the symptoms made audible in this remarkable manner.

At the transmitter a special amplifier-modulator was used, modulating a 50-watt transmitter on 10 metres. The receiving station was W 1 D Q K, situated at North Troy, Vermont.

The experiment established that heart-beats can now be recorded, amplified and radioed to another continent if necessary. It also establishes Mr. Thomas as Britain's first radio-phonostethographist—though I should hate to have to say so after imbibing the hospitality of the Old Boys' Reunion !

### Station Information

THE station staff at Graz, Austria, have been putting up a better aerial, and raising the power of the transmitter which relays Vienna's programmes, on 338.6 metres.

\* \* \*

Midnight oil has been much in request at Radio-Roma, for the engineers have had

### MY WORD By THE EDITOR

#### THINGS TO COME

As all regular readers will have noticed, we have recently produced several special numbers and introduced a number of new features. Now I want to make it quite clear that this is not a transient “Spring Push” destined to fizzle out as the days lengthen.

It is just one further expression of “P.W.'s” policy of never “resting on its oars.” We have two more special numbers planned, and a host of ideas are under review.

You, the individual reader, may not think they are all good ideas. Well, when you find something in our pages which makes you grunt with annoyance or turn away disinterestedly, we hope you will forgive us and remember that we are at least doing our best for a huge team of subscribers of all ages and all types.

In any case, I am confident that we can hit your target dead-centre now and then. For instance, in a week or two's time—which, I think, is a good note to end on !

orders to raise the kilowattage to 100 as soon as possible. Tests are now being carried out.

\* \* \*

By the beginning of 1938 Turkey is to have two new stations on the air. One will be a 20-kilowatt, the other 120, and the £200,000 for these contracts have been awarded to the Marconi Company.

\* \* \*

Warsaw is going to put its power up to 150 kilowatts. The Polish authorities have other radio developments under consideration, including an ambitious scheme of new stations.

### P.O. Progress

HAIL to the P.O. engineers for the stout work they are doing with short-wave telephone services !

The success achieved across the Irish Channel, to which I have referred more than once, has been followed up by hot-stuff reliability results across the Bristol Channel, and by a nifty little service between Shaftesbury, Dorset and Guernsey.

Now they are wondering about the French service—why not a short-wave link between Dover and Calais ? The submarine cables at present in use are doing fine, but the alert P.O. laddies see no reason why a spot of competition should not be introduced. That's the spirit, boys !

### They Said It

“SO the B.B.C. hopes to televise the Coronation procession from Hyde Park Corner. Isn't it rather ironical that the very people most easily able to see the actual procession will be the only ones within range of the televised scene ?” Alan Hunter, in the “Manchester Evening News.”

\* \* \*

“You may call it (Daventry) our reply to Zeesen if you like to put it that way. Daventry can now be described as the largest station in the B.B.C. system. The three new high-power transmitters are fitted with reflectors which enable all the energy to be concentrated in one direction, and echo is eliminated.”—Sir Noel Ashbridge.

\* \* \*

“I am informed by the B.B.C. that they have given careful consideration to the suggestion that they should give an Esperanto broadcast from time to time, but . . . broadcasts in Esperanto would not appeal to a sufficiently large proportion of listeners to justify their inclusion in the programmes.”—Major Tryon, in the House of Commons.

(Continued overleaf.)

# Next Week: THE WORLD'S BIGGEST RELAY

## A B.B.C. CHANGE FROM LATIN TO ENGLISH

### Daylight Darkness.

**A**STRONOMERS are getting as dithery as such high-minded gentry can get over the record-breaking solar eclipse on June 8th.



Not for 1,200 years has the moon drawn the sun-blinds and put up the shutters with such thoroughness as she will on this occasion; and the unusually long period of eclipse has tempted the stargazers to arrange

for a minute-to-minute description of this miracle of the heavens. (As you know, such full-length descriptions are usually reserved for the fast-moving, high-stepping hoss, the ball game, or the pugilistic fisticuff.)

This is why the natives of a diminutive coral reef about 5,000 miles S.W. of San Francisco, where the eclipse will be at its maximum, have viewed with astonishment the arrival of one and a half tons of radio gear on the shores of their blue lagoon.

The intention of the authorities is to broadcast the eclipse to the whole world on short waves; the intention of the local niggers, however, is to wait until the armed guard takes his eyes off that gear, dart in, grab, and git! Those boys would pinch your birthmark if you didn't watch it!

### Glider Radio

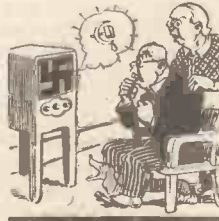
**C**ONGRATULATIONS to the high fliers of the Murphy Radio Sports Club, who have been carrying out some useful pioneering experiments with ultra-short-wave transmissions from a glider.

Using a wavelength of five metres the ground station got into touch with the glider in flight. On the word "Over," the ground station listened on the same wavelength, and was able to receive the glider's reply.

The next step is to try to keep in touch continuously by the use of different wavelengths for transmission and reception. Great stuff, boys. Keep it up!

### Berlin's Mystery Station

**A**GINGER cat, walking sedately down the aisle of a church during Morning Service, could not attract more astonishment than the message heard by German listeners recently. "This," said a voice, "is the radio of the German Communist Party installed in Berlin despite the Gestapo."



The said Gestapo, credited with having jammed the anti-Nazi broadcasts from Moscow, is now looking feverishly for this spot of radio trouble nearer home. The announcements were made on a wavelength just below thirty metres, and one view is that the mystery station's claim to be "in Berlin" is so much bluff.

### French Pirate Problem Solved

**I**T is now possible to record the news from France about those severe new penalties imposed upon radio pirates. You remember that I explained that the French Government forgave the stragglers in payment up to a certain date, after which they stung them double the fee, then the penalty was trebled, then quadrupled, and finally confiscation; and other shot-at-dawn tactics were applied.

Well, it worked. Just before the penalties came into force nearly half a million more Frenchmen took out licences—in fact, more licences were sold in the eight weeks immediately before the order came into force than in the whole preceding ten months!

At the beginning of March the French licence figures had risen to 3,759,690, which is a very remarkable total when we remember how far France lagged for years behind Britain and Germany.

### Couldn't Blow His Own Trumpet

**T**O be fired for being drunk, although you are perfectly sober and, in fact, a strict teetotaler, would probably embitter a lot of people. Yet that is what happened to Duncan Whyte of swing broadcast fame, says Geoffrey Edwards in the "News Chronicle."

Duncan came up against the east wind a few years ago, developed a cracked lip, and couldn't blow his trumpet. A little spirits of wine helped to dry it up, but he had to keep a small bottle handy and use it during performances.

Unfortunately, the manager spotted bottle and contents, and not unnaturally jumped to wrong conclusions—"A man who drinks between blows of a trumpet is no use to me." Despite protestations of innocence, Duncan had to go.

The worst of it was that he had been giving a really spirited performance, despite the bottle and cracked lip.

### Let's Talk of Life

**T**HE morning and afternoon broadcasts seldom excite much interest among my correspondents, probably because we all have to keep our nasal organs applied to the grindstone until "the blue of the night meets the gold of the day." But one recent day-time broadcast must have been exceptionally good, judging by the many appreciative references.

It was given in the series "Other Women's Lives," by the Countess Larra, and it was a plain talk of unemployment, illness, poverty, and finally of a job as cook, at £100 a year.

To my sorrow, I did not hear this talk, but it appears to have been the nearest example of a slice of real, raw life which the B.B.C. has ever served up. Let's hope for more tales of life—they are more telling than art.

### Live End—Dead End

**T**HIS new type of studio, evolved after long research abroad and now described in the 1937 "B.B.C. Annual," is a queer, fifty-fifty sort of affair. Where the orchestra sits the studio is free from acoustical treatment, having polished floor and reflective walls; but the other half of the studio, where the microphone is placed, is deadened and damped down with mineral wool, felt, cork, and other sound absorbers. The arrangement is called Live End—Dead End.



Owners of D.C. H.T. units will recognise how important Live End—Dead End differences are. And so will the sporty boys who have taken some famous dancer out to dinner. On the stage her twinkling feet are brilliant, sparkling, divine; but when she puts those wonderful feet and legs under the dinner table, and you have to make conversation with what is left—well, that's a perfect example of Live End—Dead End.

### Crafty Crack Back

**T**HE B.B.C.'s somewhat superior attitude to the Press occasionally goads the boys of Fleet Street to take a crack back at the B.B.C. There was a perfect example in an evening newspaper the other night, which certainly deserves to be recorded. Here it is:

"The B.B.C. for years have issued to the newspapers last-minute alterations in their radio programmes under the heading 'Corrigendum' (Latin for 'correction')."

"Now I see that their corrections are headed 'Correction' (English for 'Corrigendum')."

"Congratulations to the pueri (Latin for 'lads')."

### What of the Future?

**S**TIMULATING possibilities of the future was the subject of a recent lecture by Lord Gorell, author and publisher; and his imaginative outlook which has given to readers many a thrilling murder situation, found ample room to roam in radio matters.

"From telephone, telegraph, and television," Lord Gorell said, "it was but a step forward to sitting at home and saying, 'What restaurant shall I go to?' and then picking up an instrument to teletast or telemell."

'Tis a solemn thought, fellow Bistovians. Many who have no stomach for Bach or Wagner would honour a wireless set that could scent the surrounding air with the rich rump steak and the redolent, opulent onion. And what of our canine friends?



# BIG-SCREEN PICTURES

With the rapid progress of television comes the desire for larger pictures. But there are certain problems which must be overcome, several of which are interestingly discussed below

By J. C. JEVONS

SO far as clearness of definition is concerned, the performance of the cathode-ray receiver is beyond reproach, particularly now that interlaced scanning has removed the last trace of "flicker." But so long as the size of the picture is limited to an area roughly one foot square, we have not reached the stage when designers can rest on their laurels.

### The Ideal Picture Size

For the home a screen, say four feet by three, would spell perfection, provided a high level of definition could be maintained, but even this falls far short of the size that will be required when television reaches the cinema theatre. Large-screen demonstrations of television have, of course, already been given, but the equipment used for such performances is too elaborate for the home, besides being still more or less in the experimental stage.

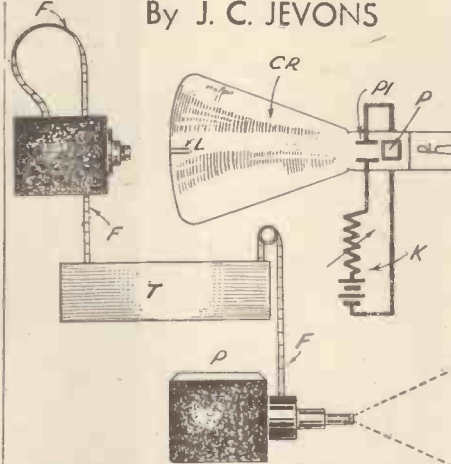
The size of picture that can be handled by a cathode-ray tube is at present restricted (a) by the fact that the fluorescent screen must be mounted inside the tube—which sets a fairly obvious limit, and (b) by the fact that the intensity of the fluorescent light emitted by the screen is too low to allow the picture to be magnified, at least to any extent, by means of lenses.

This points to what seems rather a vicious circle, because the cathode-ray receiver stands almost alone in its ability to handle the scanning frequencies used in modern high-definition work. In fact, the C.R. tube is the one thing which, more than another, has made the present programmes possible. And yet it appears to be hopelessly handicapped when we come to the question of size.

### A Heat-Controlled Screen

There are two possible remedies. The first is to find some substitute for the fluorescent screen, which will make it possible to produce a more brilliant picture inside the tube—one that can be magnified by lenses without losing any of the essential detail. The second is to find some way of projecting the picture outside, instead of inside, the glass bulb, so as to allow the area of the screen to be increased, without having to use a tube of impossible size.

The problem, in fact, has already been tackled on both these lines, but so far without much success. For instance, the ordinary fluorescent screen has been replaced by a sheet-metal electrode on which the highlights of the picture are made to appear white hot, the greys show at a low red heat, whilst the blacks are left cold. For this the thin sheet-metal screen is initially heated by a separate current to a point just below red-heat. The bombardment of the cathode-ray stream does the rest. It is claimed that the picture so produced is sufficiently bright to allow of considerable magnification without loss of detail.



How the image at the end of the cathode-ray tube may be magnified. A film is taken of the picture. This is put through the developing tank T, and afterwards passed into the projector P, which throws the enlarged image on to the screen S.

Alternatively, the fluorescent screen might be replaced by a "mosaic" electrode of small quartz crystals, which, under the impact of the cathode-ray stream, act as so many tiny light-valves to modulate the rays of light from a powerful lamp, in accordance with the received signals. The light, after passing through the control electrode, falls on to a viewing screen which is placed outside the C.R. tube and on the opposite side of it to the lamp. The size of the picture is then limited only by the amount of light available.

Another idea is to remove the fluorescent screen and make the cathode-ray stream strike against a small internal target, so that the impact produces X-rays. These are then passed outside the tube, through a pinhole camera, where they fall on to an external fluorescent screen. Since the fluorescent effect produced by X-rays is much more intense than can be created by the direct impact of electrons, the result again is a picture of increased brilliance.

### Light-Cell Difficulty

The cathode-ray tube has admittedly brought high-definition television within the range of practical politics, and although it is subject to certain limitations as regards picture size its other rivals seem to be equally handicapped. Most of them use a Kerr cell, or similar type of light-valve, to illuminate the received picture, and in all such cases far more light is absorbed in the cell than gets through to the viewing screen.

In this connection mention should perhaps be made of a recent development in which a piezo-electric crystal is used to set the liquid contained by the light-cell into rapid vibration. This creates waves of compression and rarefaction, and advantage is taken of their relative movement to feed each point on the screen with

successive spots of light, so that the overall illumination is increased. It is claimed that large pictures can be produced in this way by using a purely mechanical system of scanning. But we can only wait and see.

So far the most likely approach to large-scale pictures is offered by the so-called intermediate-film method. The idea is, of course, well known in connection with transmission, where it is common practice to "shoot" the scene first on a cinema-camera and then to scan the film immediately afterwards. But the use of the same procedure on the receiving side is less familiar.

### The System Used

The arrangement is illustrated in the drawing. The incoming signals are applied to a cathode-ray receiver CR in the ordinary way, except that only one pair of deflecting plates are used. These are marked P and are supplied with line-scanning voltages from a time-base, which is not shown in the drawing. The result is that successive lines of picture signals appear, one after the other, in exactly the same position, L, on the fluorescent screen, where they are photographed by the camera C. Meanwhile, the film F moves steadily downwards through the camera so as to displace the lines, one by one, thus forming them into the usual "frames." A variable voltage can be applied from a circuit K to a second pair of deflecting plates P1, so as to adjust the position of the line L up or down the fluorescent screen should this be necessary for phasing purposes.

The film so prepared is developed, washed, and partly dried in a tank T, from which it rapidly passes into a projector P, which throws the picture on to a viewing screen S.

## ALL ABOUT ELECTRICITY

HARDLY a month goes by without electricity playing a new part in our lives, directly or indirectly.

In his new book, *Electrical Inventions* (published by Thomas Nelson and Sons, Ltd., 2s. 6d.), Professor A. M. Low describes, in a most readable yet informative way, every important development in this amazing science.

In his opening pages, he explains the exact significance of those terms, *volts*, *amperes*, and *watts*, and then proceeds to describe many of the major electrical inventions and their application in various fields. For instance, whole chapters are devoted to radio and television. In another chapter the reader is taken over a generating station, and the intricacies of the distribution of electricity and the "Grid" scheme are fully covered.

The book is tastefully printed and includes many illustrations. F. C.

# RANDOM RADIO REFLECTIONS

By Victor King

THE LOUDSPEAKER NUISANCE :: UNIQUE OUTPUT SCHEME :: THE SECRET FORMULA REVEALED!

## THESE MADE ME LAUGH

B. B.C. commentator: "Baer hasn't enough power in his left hand to smash a wet paper bag." So long as Baer wallops wet paper bags and not my head, it's O.K. by me! P.S.—The only sporting trophy I possess is a "pot" for boxing.

S. P. T. (Dulwich), in a letter: "I do think you are a funny man." Ha! HA!!

S. P. T. (Dulwich), in the same letter: "Hands off our nation's respected Sunday! You will find any amount of so-called Brighter Stuff by turning your knob." Thanks, S. P. T., but what happens when I've got a stiff neck?

S. P. T. (Dulwich), still in the same letter: "We should like to know the religion, salary, credentials, nationality, names and addresses of ALL employed by the B.B.C. If there is nothing to be ashamed of, why all this secrecy?"

S. P. T., I think it's scandalous. And, you know, the same grave state of affairs is to be found in the Post Office. The only thing I know about the man who delivered your letter, S. P. T., is that our housemaid calls him Narthenbob, and that sounds dangerously foreign to me.

Howard Marshall, describing sporting event: "He seems very confident." Henry "Here's-To-The-Next-Time" Hall: "Hallo, Everywan." O! U!

Carroll Gibbons was the only one who didn't talk in a special Savoy Orpheans presentation. So you wouldn't talk, Carroll. Huh?

G. P. R. (Hull): "Is there any electrical means for neutralising the force of gravity?"

Yes; obtain a six-volt car battery and connect this to a rotary converter capable of developing about 400 volts A.C. Now place the hands gently on the output terminals of the converter. You will then, I think, fly through the air with the greatest of ease despite the gravitational pull of the earth.

A. D. (Plymouth): "What is a Secret Patent exactly, and why should the Government be allowed to have them?"

A Secret Patent, A. D., is an ordinary wavetramp until the Navy has been found out. And that's absolutely true. You ask the chaps down at the docks.

K. L. N. (London, N.E.): "Is it true what they say about television pictures being picked up in America? Or isn't it?"

Is it true what they say about Dixie? Or is it?

## LOUDSPEAKER

### INTERFERENCE

SOON young men will be buying bright new socks and ties, old men digging out their straw hats,—and windows opening. Summer is coming and bringing with it all the delights and attractions of warm weather and the wide open spaces.

But there is that usual little black cloud in the sky—the loudspeaker nuisance. It is a growing evil, unfortunately. More people are coming into the possession of powerful sets and more listeners will no doubt be goaded into retaliatory measures.

It is dreadful to contemplate the possible result of just one proud set owner letting his set go just to show the neighbours what a marvellous contraption he possesses.

Next door say to themselves, "To blazes with that racket—we'll show 'em." And up goes their wick and a second bellowing belches into the erstwhile peaceful summer afternoon or evening.

That new din penetrates the domain of some one a door or two farther up. They fling wide their windows and start pouring their full wattage into the open.

And so it might go on like a row of mines setting one another off.

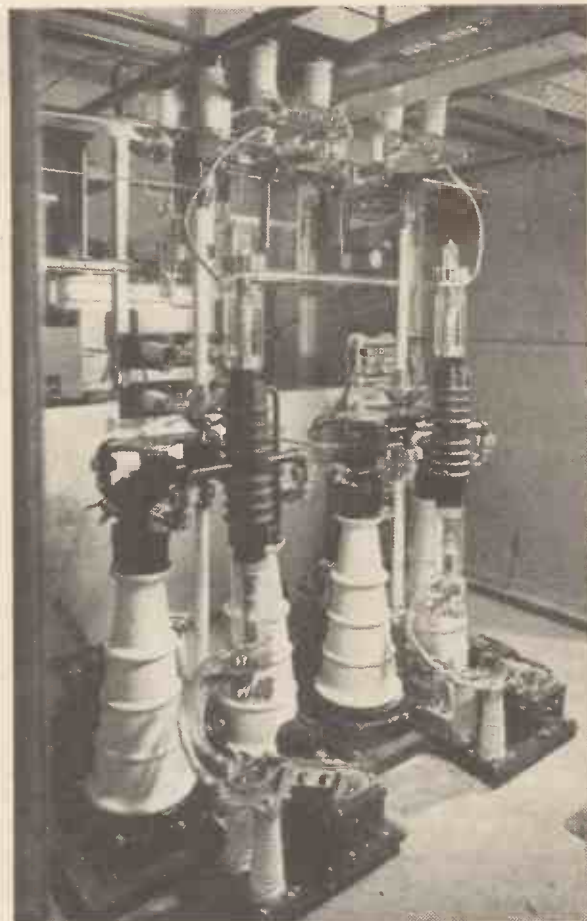
Some local authorities have adopted the by-law recommended by the Home Office to deal with loud speakers, but quite a large number have not. One of these days the B.B.C. may realise it has an obvious duty to the community in seeing that their programmes are not misused in such a manner. At present that august body runs its dance music late at night—just the stuff that attracts those people who try to get three watts out of five-hundred-milli-watt sets!

Yes, you're quite right. I have neighbours!

### MIXING OUTPUTS

SOME time ago I described how I had two sets linked to the same loudspeaker system at home. I now have three. The sets in question are a superhet all-waver, a radiogram, and a television outfit.

The sound outputs of all these are connected to various input terminals of a multi-ratio transformer, and the output of this goes to the switchboard connecting all the loudspeakers in the house.



The Empire short-wave station at Daventry has been undergoing considerable modification in order to place it in the forefront of the world's short-wavers. Here is the final stage of the modulator unit at Daventry, showing the mechanical water-interlocks which prevent the application of power to the valves until the cooling water is flowing.

With all the sets switched on it is possible to fade in the output of any one of them merely by operating its volume control. For example, one might be playing a record or receiving some broadcast stuff on the radiogram. While this is going on one can tune-in a station on the all-waver by means of visual tuning; and when it is set fade down the radiogram and fade in the all-waver.

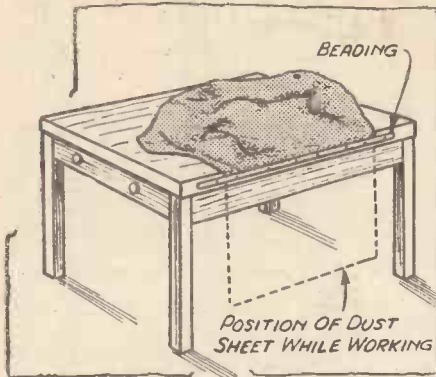
As there is only the one station on the television band, i.e. Alexandra Palace, the television set is, of course, always tuned-in and "ready for use."

An intriguing incidental of the scheme is that the set whose output is being pumped into the loudspeaker system will operate the loudspeakers built into the other sets unless these are switched off, so one can juggle away much to the mystification of one's friends.

The television programme can be made to pop out of the radiogram or the all-waver—or both—or Schenectady to push its programme from out of the television outfit the while a picture of Leslie Mitchell graces the screen.

You will gather that it would be very difficult to do me out of a spot of radio entertainment of some kind or another—when I am at home, and when I want it—which isn't always, by any means. Sometimes I find next door's radio quite adequate.

(Please turn to Cover iii.)



Keeps your set clean and free from that dirt which might cause trouble.

### AVOID THAT DUST

DUST often has no effect on a set, which makes many constructors careless about it. They leave a receiver standing without its cabinet until a thin film of grime covers it.

True, most of the dirt can be removed easily; but it's the little bit left that does the harm. This works its way into the components, and may cause the most obscure of troubles.

A dust-sheet fixed along the front edge of the bench or table on which you experiment will keep your apparatus spick and span. Hem the sheet round the edges, and use a length of beading to secure it.

When you are at work the dust-sheet hangs out of the way down in front of the table.

### CUTTING WITHOUT A HACKSAW

TO cut thick material with pincers is almost impossible in the ordinary way, because sufficient power cannot be supplied by the hand.

The necessary power is forthcoming, though, from a sharp blow with a hammer. The rod or bolt is first held at the point at which the cut is desired.

The pincers holding the material to be cut are then placed on a hard surface, such as a concrete floor, and hit with a hammer, as shown in the illustration. One sharp, powerful blow is all that is necessary. This method is, of course, only applicable to small brass bolts or rods such as are used in constructional work.

# PRACTICAL POINTERS

HINTS AND TIPS WHICH WILL SAVE YOU TIME, TROUBLE AND MONEY

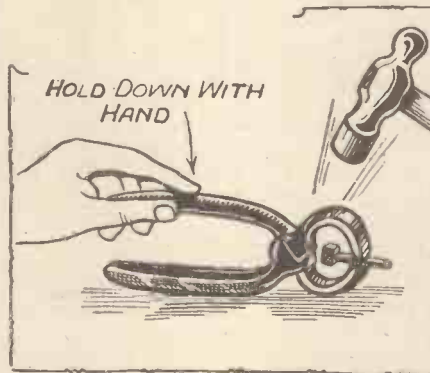
Steel bolts, unless very thin, require a different treatment. The ends of screwed rod should be trimmed up with a file after cutting.

### LOOSE LAMINATIONS

LOOSE laminations in an output filter choke or a smoothing choke are often responsible for strange noises emitted from a receiver—even with the loudspeaker disconnected these noises still continue.

In several types of choke the stalloy stampings are held together by the moulded case; with this type of choke loose laminations are difficult to cure, and should a replacement by a similar make and type fail to cure the trouble the only solution

### SHORTENING BOLTS



Try this if you haven't a hacksaw handy.

is to remove the complete choke from its case and construct angle pieces so that the laminations may be clamped together.

It has been found by experience that it is very unwise to attempt to force packing pieces between the core and the side of the case, for the moulding bulges and eventually breaks, and usually results in the breaking of internal connecting wires.

L.F. transformers may also occasionally be responsible for strange noises due to loose laminations, although this is not a

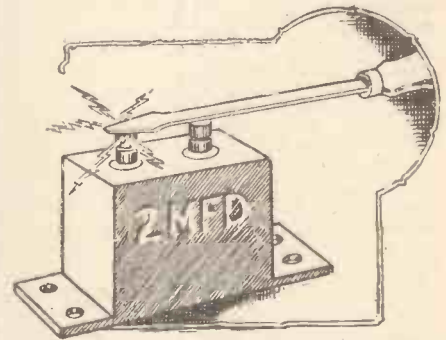
trouble that is likely to occur with the latest types of components now available, assuming a good make to be chosen.

### IS THE CONDENSER LEAKY?

WHEN building a radio receiver it is always advisable to test all large-capacity condensers before installing them in the set. This can be done very easily in the following manner:

Take the condenser to be tested and connect it directly between the positive and negative sockets of a 100-volt H.T. battery, or if you have a mains unit it will do just as well. After leaving the condenser connected for a few seconds, disconnect it and lay it aside for half an hour or so.

The actual test is to short the two terminals with a screwdriver after the allotted period, and note if there is a good, fat spark.



A good condenser will hold its charge for a long time and give a fat spark when the terminals are short-circuited.

### FITTING A FUSE

NOBODY wants to burn out a set of valves, but accidents will happen. If one is wise, precautions will be taken against this unpleasant occurrence by fitting a fuse to the receiver concerned.

That is, of course, if it does not already possess such a fitment.

(Continued overleaf.)

## SUGGESTIONS WHICH WILL HELP YOU TO GET BETTER RESULTS

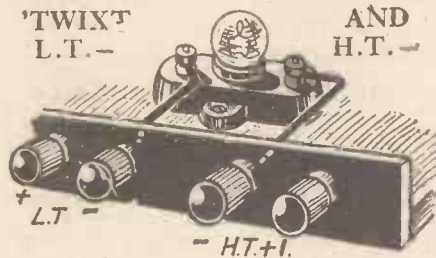
A collage of four panels providing practical tips:

- Panel 1 (Left):** Shows an aerial lead being inserted into a window. Text: 'AERIAL DOWN LEAD', 'LEAD-IN TO SET', 'LEAVE A LITTLE SLACK IN THE DOWN LEAD TO PREVENT RAIN FROM GETTING THROUGH THE LEAD-IN TUBE'.
- Panel 2 (Middle):** Shows a radio set with an aerial and a fixed condenser. Text: 'HOWLING CAN BE CAUSED BY RUNNING L.S. LEADS ALONG BEHIND THE SET', 'A SMALL FIXED CONDENSER IN SERIES WITH THE AERIAL HAS THE SAME SELECTIVITY-IMPROVING EFFECT AS SHORTENING THE AERIAL', 'AERIAL', 'FIXED CONDENSER'.
- Panel 3 (Right):** Shows a hand applying medical plaster to a lead end. Text: 'MEDICAL PLASTER', 'MEDICAL ADHESIVE PLASTER IS EXCELLENT FOR FINISHING OFF LEAD ENDS AND OTHER SUCH JOBS'.
- Panel 4 (Bottom Right):** Shows an L.F. transformer connected to a set. Text: 'L.F. TRANSFORMER 3 OR 4:1 RATIO', 'PRIMARY', 'TO SET', 'SECONDARY', 'MAKING RECORD RESULTS LOUDER WITHOUT A VALVE'.

## PRACTICAL POINTERS

(Continued from previous page.)

The fuse holder should be connected between the H.T.— and L.T.— terminals on the receiver as shown in the drawing, the short wire which normally connects these two terminals together being removed first of all.



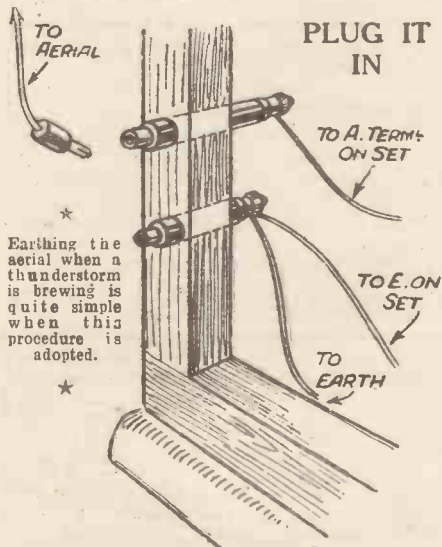
How a fuse is wired into a set.

Regarding the actual fuse, this should be rated so that it "blows" at about 100 milliamperes for the average set. Another method of fitting a fuse is to buy one of those useful components known as "Wanderfuses." These are used in place of the existing H.T.— wander-plug and inserted into the H.T. battery in the usual way.

## DOWN TO EARTH

An efficient method of earthing an aerial, and one which removes most of the usual snags associated with switches due to faulty contacts, is illustrated below. An ordinary lead-in tube is fitted in the normal manner, but the usual nut under which the aerial is clamped is removed, and instead a socket is fixed either by soldering or by drilling and tapping.

The set side of the lead-in tube is connected to the set in the normal manner. To the end of the aerial lead proper is connected a plug, which will fit into the socket already attached to the lead-in tube.



Earthing the aerial when a thunderstorm is brewing is quite simple when this procedure is adopted.

A further socket is now arranged in such a position that the aerial can either be plugged into the first socket or into the second. The second socket may be fixed to the window ledge or to the side of the door.

This second socket must be permanently connected to earth, the set E terminal may either be joined to this earth or to a separate one.

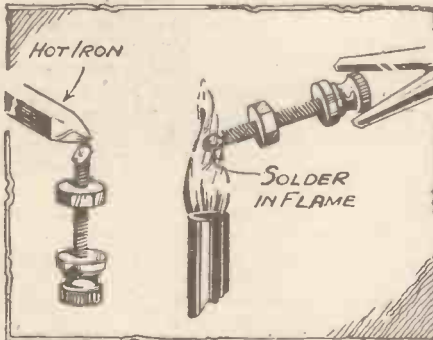
## REMOVING UNWANTED SOLDER

DIFFICULTY may be found in removing the nuts from terminals to which wires have been soldered.

If the terminal is held in a vice, and a very hot soldering iron is held on it, the solder will melt and the nut will be easily run off.

Alternatively, the terminal may be held in a gas flame with a pair of pliers. The latter method is only applicable to all-metal terminals.

### TWO METHODS



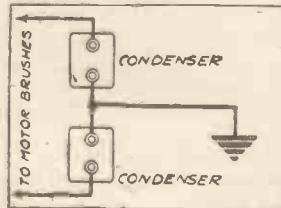
Two methods of removing unwanted solder. That on the left is suitable for terminals already in a set.

## ELECTRICAL INTERFERENCE

SO far as his actual radio set is concerned, the listener cannot do much to reduce many forms of electrical interference.

The remedies for it largely lie beyond his direct control. In our opinion, the authorities, local and national, are not helping as much as they might, although it is only fair to say that the G.P.O. Engineering Dept. is always willing to give all the help possible in tracing sources of interference.

This scheme is usually successful in curing interference from small motors, vacuum cleaners, etc. In the case of the latter it is joined across the mains input to the cleaner.



Broadcasting is surely one of our vital social services and, therefore, anything that tends to interfere with it should be energetically dealt with by our distended officialdom.

Those sparking, flashing tramway trolleys are not inevitable. It is possible to reduce the sparking so that it becomes almost negligible, and in some towns this has been done.

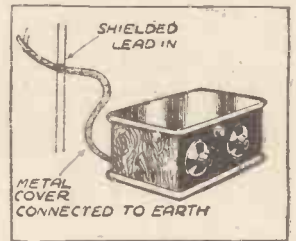
And there are quite simple cures for sparking lift-mechanism, electric motors and so on. But they will not be applied as vigorously as they should until the whole matter is taken firmly in hand by the authorities.

But there is at least one thing it is worth the listener's while to try, and that is a shielded lead-in anti-interference aerial. These often



Trams are an annoying source of crackles.

effect a cure. Interference due to domestic apparatus, small motors, H.F. in the mains, and so on, can be remedied by using two condensers connected in series across the source of trouble and earthing the centre point.



The use of an anti-interference aerial with a shielded lead-in often remedies interference.

★

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## A BATTERY CORD CLIP

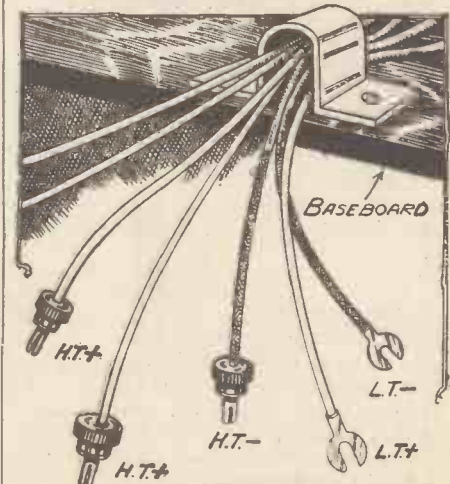
A BATTERY cord with connections direct to the various components—instead of a terminal strip—is certainly a trouble-saving device.

If you use your own flex leads as an improvised battery cord, it is as well to gather the leads together neatly at the back of the baseboard before running them to the batteries.

If you do not possess a proper clip for this purpose, the slot end of a brass bolt and socket (you can buy one for a penny or two) can be screwed to the baseboard and the leads passed through it. The size of the slot should be such that it just takes the bunched leads comfortably.

Before cutting the flex leads, decide whereabouts the various batteries are to be placed. The leads need not be longer than necessary then, which will help considerably in keeping the appearance of your installation tidy.

### KEEPS THEM TIDY



How a bolt socket may be used as a clamp for securing a group of battery leads.



# ON THE SHORT WAVES

## "PLEASE QSL"

Some topical comments on a subject which has been widely ventilated in our correspondence pages

By W. L. S.

MUCH though I hate people who harp on overworked subjects, I am reluctantly forced to do it myself. This QSL-cum-veri business, started by myself with the most innocent of intentions, has developed into a kind of Frankenstein's monster, and I have been asked by many readers to make yet another clear statement of the present position as I see it, particularly in view of our new certificate.

Well, just to start the ball rolling, here are two quotations from the current issue of "The Bulletin," the official organ of the R.S.G.B.

(1) "Mr. Salicath, L A I G, of Oslo, in a letter to the Editor, states that he positively refuses to answer European listeners' reports on his telephony transmissions. He mentions that his weekly mail contains upwards of 100 useless reports.

"Members will, we feel sure, appreciate that a Norwegian high-power phone-station operator who works Great Britain regularly does not need reports from non-transmitters."

(2) "From the American Radio Relay League: 'The QSL-forwarding system in this country, handled by volunteer workers in each of the District areas, is now badly clogged, by virtue of the large number of listener-cards sent to United States and Canadian amateurs by foreign listeners. Most of the amateurs in this country request that listener-cards should not be forwarded to them . . .'"

### The Basic Reasons

Pleasant reading, eh? Well, certain listeners have been asking for it for the past few years, and now they've got it, with a vengeance! The QSL-card business used to mean the sending of a report to a station that was asking for such, and that was in days when it was a bit of a feat to hear a United States amateur on phone.

Since then three things have happened: (a) conditions have improved incredibly; (b) practically all the amateur stations in the world, and especially in the U.S.A., have taken to using far higher power; and (c) the number of listeners has been multiplied by hundreds.

The result has been that anyone putting an outstandingly good phone transmission out on the air has been pestered by a fan-mail that would put some of the lesser-known Hollywood stars to shame. Furthermore, it has been mostly useless.

Take an imaginary American amateur, W 2 Z Y X. He gets into touch, on May 1st, at 18.30 B.S.T., on 14,200 kilocycles, with the British station G 2 X Y Z. The British station reports him as R 9, speech quality excellent, a little fading, and so on.

That's that, then. But the aftermath is a flock of cards, all informing him that he has been heard in Great Britain at that time.

Most of them don't give anything like the accurate data that G 2 X Y Z gave him, they leave out the date, the time, the wavelength, or they get some of them wrong.

The one thing they never leave out, though, is "Please QSL"—generally in large letters. In other words, instead of sending an intelligent report to someone who needs it, they have merely picked on the one station that any dud receiver ought to be able to pick up, and seized upon the opportunity of picking up, free, a small expanse of wallpaper.

Sorry if this is outspoken, but it's meant to be. Because this QSL racket has gone too far during the past year or so. The



## A SHORT-WAVE CONTEST YOU CAN ENTER

### Splendid Prizes for a Simple Competition

These grand prizes are to be won in a simple competition which is open to all "P.W." readers.

**FIRST PRIZE.**—A B.T.S. battery "Adaband," with which a set can be converted into a highly efficient superhet short-wave receiver.

**SECOND PRIZE.**—Peto-Scott "Bandspread" 3 Kit. A magnificent battery short-waver with a first-class performance.

**THIRD PRIZE.**—New Times Sales Combined Adaptor, Converter and Single-valve Short-wave Set. The newest and most versatile S.W. unit of the year.

All you have to do is to describe on a postcard the most interesting half an hour of listening on the short waves between May 1st and June 1st. You can include amateur or other transmissions as well as broadcasters, and remember this is not a literary contest.

For full details of the rules governing this simple competition see last week's "Popular Wireless." They will also be repeated in full next week.

two extracts from "The Bulletin" show that the hams are becoming fed-up. Writing as one myself, I can vouch for the quantities of entirely useless tripe that the average telephony transmitter gets whenever he comes on the air.

All this has been purely destructive. Now for a little constructive advice. When to QSL: when you think your report will be of some value to the other man. In other words, report to stations that you

find it difficult to receive—not to those that come in the loudest.

Exceptions are those who ask for reports. But there are generally plenty of weak ones who possibly don't realise that they are getting out at all. For instance, on a recent morning I found the 20-metre band crammed with Australians and New Zealanders. I called a few "on spec," and two of the Australians whom I worked told me that I was the first "G" station they had ever contacted.

These two would probably be glad of listeners' reports from this country, but unfortunately all the listeners are so busy tuning-in the strong stations that they don't come across the slightly weaker ones at all!

The position with short-wave broadcasting is different. It's nice to have a card from Australia, and V K 2 M E, up to now, has been tremendously obliging and has never failed to QSL, or so I am told.

### A Matter of Common Sense

Several of the better-known stations keep on sending veri's, although many of them insist upon the sending of an International Reply Coupon.

I have already said a good deal in these columns about the information that you should include on a QSL. It's purely a matter of common sense and I don't propose to repeat it here. The whole idea of a QSL is that you should tell a man how his transmission is coming over. This can be done by the RST scale (see last week), but it needs a word about conditions, and how his transmission compared with others from the same country, and so forth.

In answer to one or two puzzled readers, I may as well say that there are no restrictions and rules to be followed. Simply write to the owner of the station you hear—a letter, if you like—and if he values your report you will probably receive a card informing you that it checks up O.K.

You should not have any difficulty in collecting enough really worth-while QSL's to qualify for The "18" Club certificate, if you follow the spirit in which this chat has been written.

ON THE SHORT WAVES Page 2.

## POINTS *from the* POST-BAG

### W.L.S. Replies to Correspondents

G. W. G. (Ipswich), who used to be one of my most regular contributors, writes and says "My infrequent letters do not mean that I have been asleep. Being a service engineer, my own designing has improved by careful observation of commercial sets—profiting by other people's mistakes!"

He then gives me details of his new receiver, which he calls his "Anglo-Yank" set. It starts off with a stage of H.F. and an electron-coupled oscillator, using American pentodes, after which it becomes British.

He seems to have hit on an excellent chassis layout, which I am filing for "future reference." Incidentally, G. W. G. tells me that television reception is quite passable in Ipswich, and regular demonstrations are being given in Colchester.

#### A Useful Circuit

E. F. (Irvine, Ayrshire) is in dire trouble with a receiver. Unfortunately, I can't help him out, the said receiver being a fairly famous one which is "not my pigeon." In fact, I think he will have to put up with things as they are. He adds a most useful P.S., which makes me feel heartless about not being able to help him. It concerns a Morse oscillator for practice, which uses no H.T. He says it was described in "P.W." but I don't remember it, and will give a diagram of it next week.

By the way (this is occasioned by the next letter in the bag), will readers please cease from writing and asking for a complete list of components for every short-wave circuit I publish? If I give a diagram of a two-valver, that is explanation enough; use what components you have. There's nothing magic about this component business—it will work with Messrs. A's tuning condenser just as well as with Messrs. B's, provided that both Messrs. A and Messrs. B know how to make tuning condensers.

#### "Simplex" Two Coils

Readers who wrote to ask me for particulars of the coils used in the "Simplex" Two, after it was reprinted a few weeks ago, must have noticed that their requirements were dealt with in last week's issue. I hope they will take this as an intimation that I have received their letters, and it is now unnecessary to answer them.

V. S. (Kent) is becoming megacycle-conscious (that term had to come one day!), and asks for an easy method of conversion. To convert frequency in kilocycles to wavelength in metres, divide the frequency into 300,000, i.e. 3,000 kc. is 100 metres; 15,000 kc. is 20 metres. When dealing with megacycles the constant is 300. In other words, 15 metres is 20 megacycles; 20 metres is 15 megacycles, and so on.

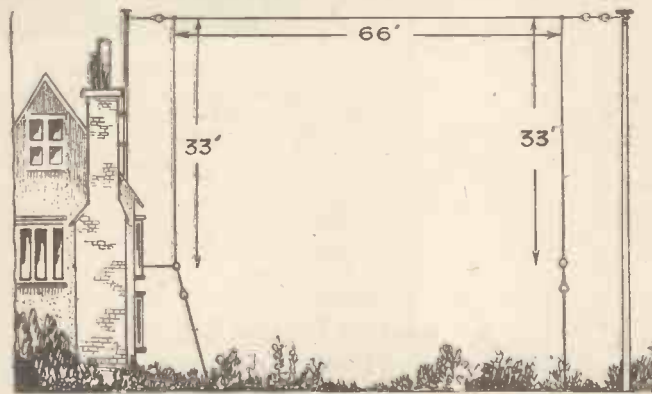
I don't doubt that we'll have you all talking in megacycles one of these days. It's much easier to do it, in the long run, but we're all so beastly conservative in these matters, however much we may see red in others!

L. E. S. (S.E.5) finds that an annoying hum, caused by a reading-lamp on his operating table, is completely absent when he uses a stage of tuned H.F., but is there in full force when he puts in a grid choke and makes a buffer stage of it. Yet another argument against that "buffer" business!

#### A Special Aerial System

L. E. S. includes a lot of news which you will find in the adjoining column. Quite a different L. E. S. (this one from Birmingham) sends in what he calls "a picture of my mad aerial system." As a matter of interest I have reproduced it on this page, because he finds that it gives him amazing results on 20 and 40 metres. The whole thing is about 40 metres long

### UNUSUAL, BUT EFFECTIVE



This aerial system used by L.E.S. (Birmingham) is claimed to give amazing results on 20 and 40 metres.

(132 feet)—10 metres up, 20 metres along, and 10 metres down at the far end!

I don't suppose many readers have got room for this, but I have reproduced it because I imagine that a half-scale version of it would give good results on 20 and 10 metres. Anyway, for those who like putting aerials up and pulling them down (or leaving them up, as the case may be!), I thought it would be a good scheme to try. Why it works so well I don't know. I have a theory, but you'd only laugh if I outlined it here.

B. C. C. (Sheffield) wants to know whether the "Simplex" Two is suitable for 10-metre work—and if so what size of coil to use. If he will read over the "Simplex" Three article which appeared last week, he can take it that the ultra-short-wave coil described for that set is also suitable for the "Simplex" Two.

#### Things Readers Want

W. S. (Birmingham) wants a "recipe" for a band-spreading condenser of about -000015. I am doing a series of "component" articles in the near future, and hope to deal with this particular subject next week.

A. H. B. (N.W.8) wants to know whether I intend to talk about portable short-wavers this summer. I made one last summer, but readers didn't show much interest. It's still up to date, so I might give more information about it shortly.

## Short-Wave News

L. E. S. (see previous column) sends in the following news from Japan:

The Broadcasting Corporation of Japan publishes a booklet in English, French, German and Japanese, which gives a large amount of information about its overseas broadcasts. The following will probably interest readers:

J V M (10,740 kc.) and J Z J (11,800 kc.) are beamed for Europe and broadcast daily from 19.30 to 20.30 G.M.T. J V N (10,660 kc.) and J Z J are beamed for the East Coast of America and broadcast for them from 21.00-22.00 G.M.T. every day.

J Z J "beams on" Hawaii and the West Coast of the U.S.A. from 05.00 to 06.00 G.M.T. J Z I (9,535 kc.) and J Z J transmit to the South Seas and East Indies from 14.00 to 15.00 G.M.T.

I have given frequencies only (perhaps it's the thin end of the wedge), but all the above wavelengths are between 28 and 32 metres. L. E. S. says that "criticism of programme material and technical observations are welcomed. Reports are to be sent to Overseas Section, Broadcasting Corporation of Japan, Atagoyama, Tokio, Japan."

#### New Spanish Station

One or two more points from the same reader: S M 5 S X has come back to the amateur bands again. New Spanish station, E A Q 2, in the 31-metre band, R 99. V U 2 C Q (India) and V S 6 A B (Hong Kong) both putting over excellent phone on 20 metres.

At the time of writing I find the 10-metre band absolutely dead, and I'm wondering whether it has really packed up for the summer or whether this is just a week-end of bad conditions. We haven't had one like it for a very long time, and it's possible that sun-spot activity is falling off for a while. Anyway, 20 metres is quite lively, so conditions can't really be bad.

Incidentally, if anyone is short of Australian phone stations, I advise them to listen in the early mornings on 20. It's not necessary to get up so early, now that British Summer Time is with us again. They seem to peak at about 8.30 a.m., B.S.T. Some of them are in the middle of the band, others at the low-frequency end, and I have heard as many as nine in one morning. V K 3 K X is usually the best.

I wonder what readers think of the great "Christian names" craze among the amateur transmitters nowadays? Listen to them on Sunday mornings on 40 metres—you'll very often hear a whole bunch of them working for twenty minutes without mentioning a call-sign. Something will be done about it from official quarters before long, no doubt. Meanwhile it's a bit hard on the listener who wants to know where "Clarence" and "Marmaduke" are, but can't find them in the call-book from the data supplied!

W. L. S.

TRYING OUT

# THE "SIMPLEX" THREE

By W.L.S.

*The following test report on this new short-waver, after a week's regular use by the designer, shows how easy it is to get all-world results on this simple receiver*

SINCE writing the first article about the "Simplex" Three I have been listening regularly on the set for a week—which is more than enough to find out all the good and bad points of any set. I imagined, last week, that this article would be full of little hints and tips to enable you to get the best out of the receiver—but I find that the only advice I can give you is to sit down and play with it!

I have made absolutely no adjustments of any kind; I have simply been content to tune round all the short-wave bands, keeping a careful watch on all stations received and making a detailed log. The controls tell their own story as you operate them, and there's no point in trying to give a detailed description of the best way of handling the set—that's a thing you will find out for yourself within a few hours.

### The Set's Capabilities

Now I don't want this to be a kind of "swank-parade," because, after all, I designed the set and readers are the ones to say what they think of it. But the following should give an idea of its capabilities: In three days I logged all continents, on phone, nine times—enough for the old Verified All-Continents Certificate with three gold seals. In addition I heard, on phone, fourteen of the zones into which the world has been divided for the new "18" Club.

So this one simple set has already pulled in, for me, one of the new certificates and two gold seals! And this was on a daily average of less than two hours' listening.

To hear all continents nine times is a bit of an achievement, but it was made possible by the way the Australian amateurs come through on 20-metre phone at about 8 a.m. Seven of them went towards it. There was no difficulty with South America, in view of the spate of transmissions from Barranquilla, Caracas, Bogota and the other Colombians and Venezuelans. One Brazilian amateur—PY2AC—on 10 metres went towards it, however. Several South African amateurs on 10 metres, three Egyptians on 20 metres, Nairobi and a Tunisian station made up the African contingent. Asia was represented by JZJ, JVN, three Dutch East Indies stations and amateurs in Hong Kong and India.

### Correct Operation

But enough for what the set will do. The question is—will *your* "Simplex" Three do all this? Well, I can't guarantee anything until I know what you are like as an operator, which, believe me, is still one of the main points about short-wave reception.

If you make your set as an exact replica of the original "Simplex" Three, there's no doubt that it's capable of doing all this—if you are! And to make sure of yourself you will have to get absolutely

used to slow and careful tuning, and make a habit of listening to any station you come across, however weak it is.

As I said last week, you can leave the reaction control entirely alone for quite long periods. Tune on the right-hand dial, and bring the left-hand dial (the H.F. tuning condenser) into tune afterwards. You will find that as it comes dead in tune it will just stop the set oscillating—if you have set the reaction condenser in a suitable position first of all.

Other members of the "P.W." staff have seen the set in operation, and they will bear me out when I say that this is by far the easiest and most efficient method of tuning. The mere fact that your reaction control comes right ensures that your H.F. circuit is in tune.

Selectivity is one of the strong points of the "Simplex" Three. The "Simplex" Two was a good old set, and many hundreds

★.....★

**WHAT IT HAS DONE**

Received all continents on phone nine times in three days.

Picked up stations in fourteen of the eighteen zones of The "18" Club.

Separated W2XAF on 31 metres from its immediate neighbours.

★.....★

of readers are still satisfied with it; but the Three has it completely beaten when selectivity enters into the question.

It will separate W2XAF on 31 metres from its immediate neighbours, although they are only 5 kc. away from him. Obviously one needs full use of reaction to do this—but one generally uses that on a "straight" short-wave receiver, anyway.

On the 15-megacycle (19-metre) band I logged DJR (15,340), W2XAD (15,330), Podebrady (15,320), GSP (15,310) and DJQ (15,280) all accurately enough to be able to tune to them again. Admittedly the whole bunch came within 5 divisions on the dial—but you could run round from one to another and know which one you were listening to. This also shows that selectivity is pretty high.

The amateur bands are easy enough to



The completed "Simplex" Three, which was fully described in last week's "P.W."

tune, considering how narrow they are. Admittedly a band-spreading condenser would make things easier still, but the set is a "Simplex," and the name isn't just chosen because it sounds pretty—it's meant to be the simplest set of the kind that will do a particular job and do it well.

Later on I'll have to talk about adding a band-spreader to the detector tuning, for the benefit of those whose chief interest in life is the amateur bands.

One other point to watch is the neutralising condenser coupling the first two valves: It needs to be nearly all out for the ultra-short waves (anything below about 12 metres), but for the longer wavelengths you can boost up sensitivity by screwing it about half-way in. For 50 metres, in fact, you can have it all in, but the gain hardly makes the continual alteration worth while.

If you use the set with a very small aerial, the coupling provided by the first coils may not be quite tight enough, and you will be well advised to try the aerial straight on the grid terminal of the first valve holder—or on to the fixed plates of the H.F. tuning condenser. This, however, only refers to something *really* short. For normal outside aerials the arrangement as it stands is excellent, and contributes more than a little to the selectivity of the set.

### Battery Voltages

I used a 120-volt H.T. battery for all the tests, with the screen of the first valve taken to the 60-volt tapping. The grid-bias battery gives 1½ volts negative to the first valve and 4½ to the output valve.

The total H.T. consumption under these conditions is very low—in fact, the set's requirements for L.T. and H.T. are extremely modest, considering what it will do.

Other externals which should, perhaps, be mentioned are the 'phones and the earth connection—the former as important as the latter is trivial, for at no time did I find the slightest difference in the performance of the set with or without an earth connection. You will certainly do well to invest in a good pair of sensitive modern headphones.

## THE DIAL REVOLVES

By LESLIE W. ORTON

## THE LATEST NEWS ABOUT 10-METRE STATIONS

IN reply to my recent S O S for information appertaining to certain stations (what a mouthful!) three readers, G. W. E. (New Malden), J. M. R. S. (London), and J. B. H. (Blackpool) rushed forward to the rescue like a flash of lightning.

W 9 X J L relays W E B C on 9.49 metres and is supposed to be situated at Superior, Wisconsin. W 3 X F A is a 100-watt station operated by the Jersey City police and, lastly but not least, W 2 X E M is a Newark police-station.

And here is some more dope—say, you 10-metre hounds are in luck this week, aren't you? W 1 X K A is a mobile transmitter operated by the Westinghouse people. It operates around Boston and is reported to be on the air daily from 2 to 5 p.m.

The popular Milwaukee Journal station W 9 X A Z (Zee to them!) frequently relays news reports from W T M J around 3 p.m.

Several readers report reception of W 3 X E Y on 9.49 metres. They add that he is generally heterodyned by the hundred-and-one other stations on his frequency—we can quite believe it!

## Knock-Knock

"Knock knock."

"Who's there?"

"Japan."

"Japan who?"

"Japan to know where P Z H is?"

What a terrible knock-knock!

You all know what knock-knocks are, but seriously do you know where P Z H is? And incidentally, have you ever heard him? P Z H is not, as you may imagine, in the Dutch East Indies, but in Dutch Guiana. It operates daily on 42.88 metres—try for him around 9 to 10 a.m., or from 10 p.m. on Mondays, Wednesdays and Fridays. He is a broadcaster, and you may be lucky enough to add a rare catch to your log.

## Down Under

Here is news which will probably bring you from "down under" the blankets a little earlier than usual. V K 2 M E, Sydney, is coming in well around 6 a.m. Later in the morning V K 3 L R, Lyndhurst, has been picked up at moderate strength. V K 3 M E, the bad boy, is in disgrace. I haven't heard him for some time now. An unexpected catch the other day has, however, consoled me. I picked up a test programme from V K 6 M E at Perth. I'm as proud as Punch of this catch.

## Would You Believe It?

Dramatically and unexpectedly a new broadcaster has made his appearance on approximately 29.8 metres. He is a real thriller. Claiming to be in Berlin, playing the "Internationale," making unkind remarks about the German Government and concluding with "To-morrow night we will be on the air again—unless—!" He is giving listeners in Britain, America, and even far-away New Zealand the thrill of their lives. And boy! oh, boy! aren't the German police anxious to interview the owner of this pirate station! I shouldn't like to be in his shoes, if caught!



The principal short-wave broadcasters in Australia. How many of them have you heard?

If you wish to hear him—and I bet you do!—search around 28 and 31 metres between 9 and 9.55 p.m. G.M.T. Occasionally this station adds insult to injury by operating simultaneously upon the two wavelengths just mentioned!

## Where Are They?

One has to hand it to the American "hams"—they get across the "Ditch" in fine style. During the week I have added many new stations to my list, including C O 2 K C, W 4 Q A, W 4 A C, W 3 A L, W 3 A P O, W 2 B L, W 8 L S E and W 1 H A K.

Have you noticed the tremendous lot of unusual calls used by amateurs on this band? South American stations in particular make me wild! They appear to be very lax in giving calls, and I have heard Buenos Aires and other stations working regularly, yet, according to my Radio Amateur Call

Book, giving incorrect calls! Among recent mystery stations picked up are A U 2 B A, V Y 2 E A (not Y V), I U 8 F, etc.

Although annoying, these mystery stations certainly add a zest to searching on the 20-metre band.

## Power

Marconi, they say, has evolved a means of transmitting electric power by wireless. To hear I 2 R O, Rome, coming in one might be excused for thinking that they were trying to drive our sets by radio!

Other European stations that are providing almost as powerful signals are C T 1 A A, E A Q 1 and E A Q 2, and the Czechoslovakian and German stations.

Nevertheless, the Americans manage to get through their powerful neighbours, and my log of Americans is quite large. W 2 X A F, W 1 X K, W 3 X A U, W 1 X A L, W 3 X A L, W 8 X K, C O C Q and C O C H have been the "stars." W 2 X E was heard faintly on the 19-metre band, but has been seldom heard of late.

## Excitement

If you are at work in the afternoons I advise you to try to bribe your boss to give you a few hours off (what a hope!) for I assure you that reception below 25 metres is thoroughly exciting then!

The other day I tuned-in Addis Ababa on approximately 17 metres, a musical programme from Saigon on about 23 metres, and many distant telephone stations. One of them was particularly powerful. Calling G C B 2 he used a call that sounded like T N J.

W 3 X A L and W 9 X A Z concluded the afternoon's entertainment, and I left the set feeling quite thrilled!

## SHORT-WAVE STATION IDENTIFICATION

## IN THE ISLE OF HAITI

THE mountainous Isle of Haiti is split "vertically" into the Republics of Santo Domingo and Haiti. The former, of cosmopolitan population, has a multitude of "mushroom" Spanish-speaking stations, but the latter is not nearly so prolific, and it should be noted that the language of the Haiti Republic is Creole French. The time used in Santo Domingo causes considerable confusion to the average listener and, therefore, I would like to point out that it is 5 hours and 40 minutes behind B.S.T., and that station announcements are usually made at 10, 25, 40 and 55 minutes past the hour by B.S.T.

At the time of writing H I N (48.05 m.) is the "star" performer of the Santo Domingo Republic. The English announcement, "You are listening to short-wave station H I N in Trujillo City," coupled (sometimes) to a single-note chime, are the simplest aids to identification. Incidentally, this station sends out a particularly attractive QSL-card.

H I Z (47.5 m.), also of Trujillo, uses four chimes at 15-minute intervals, and occasionally the slogan "La Voz de Muchachos." English announcements are very infrequent, and H I Z has been very inconspicuous lately. H I J is often incorporated in the call and,

apparently, is the medium-wave station from which H I Z derives its programmes.

H I T (45.25 m.), Trujillo, usually announces in English as "Short-wave station H I T, T as in Texas, the Voice of R.C.A. Victor in Trujillo City, in the Republic of Dominicana," and sometimes a bugle call heralds this announcement. Reports are often acknowledged in English over the air.

H I G (47.77 m.), Trujillo, announces in Spanish as "H I G (ahtchay-ee-hey) en Ciudad Trujillo, Republica Dominicana," and infrequently as "H I G—G as in Germany." No slogan is employed.

H I L (46.13 m.), Trujillo, often plays the "Stars and Stripes" and follows with the announcement, "Estacion Radiodifusora H I L (ahtchay-ee-ellay) en Ciudad Trujillo." No slogan or identification signal appears to be used.

H I H (44.31 m.), San Pedro de Macoris, gives the Spanish call "H I H (ahtchay-ee-ahtchay), La Voz de Higuamo, en San Pedro de Macoris." Power, 150 watts. English announcements are given irregularly.

H I I S (46.73 m.), Santiago, uses a three-chime signal and the slogan, "La Voz de" (Please turn to page 216.)

MY SHORT-WAVE ADVENTURES

By L. CHESTER

# REMOVING HAND-CAPACITY EFFECTS

JUDGING by the chats I have been over-hearing between short-wave "hams," it will not be long before you are calling me Lionel. On my one-valver I hear Christian names being banded across continents, not to mention oceans. A cheery lot, you short-wave hams. I suppose we mere listeners are the eggs?

But don't let me avoid the issue, which is the "clean-up" of my "howling" success of a set. I was so pleased about getting Tokio first go, that I must have given you the impression everything in the garden was lovely.

Actually, only the aerial and earth—both, admittedly, in the garden, were that. The set hooked on to these collectors of the world's whisperers was—and, I am sorry to say, still is, far from being lovely.

Chapter Two of this saga is a rather sorry interlude of trial and error—with the accent on the error. As I say, everything seemed to shriek at me when I went near the set. I simply could not touch the controls without causing trouble.

The reaction was especially tricky. You remember I was using a .0002-mfd. Polar condenser—nice little job, and I'm not blaming it for what happened. I found even when the plates were completely enmeshed there was no oscillation at all at quite large sections of the tuning band. This was especially true of the 12- to 22-metre coil.

It seemed as though my hand was definitely offensive to the reaction condenser, because I noticed when I withdrew my hand the seemingly dead set burst into life. After a few futile efforts at creeping up unawares, as it were, I realised that it was my hand that was stopping the condenser doing its job in some way.

So what? Decided on extending the drive of that condenser. But after messing around—not being very mechanical—thought it best to remove the condenser altogether and replace with my spare .00016-mfd. Polar type E, same as for tuning.

or far from the set made no difference then to the degree of oscillation; but there were still some dud gaps around the band that no amount of twiddling seemed to eliminate.

I took off the earth lead, thinking that might be so inefficient that it damped down the reaction. No difference! I used the earth alone. Still no reaction at certain points, but much less reaction capacity needed to produce oscillation.

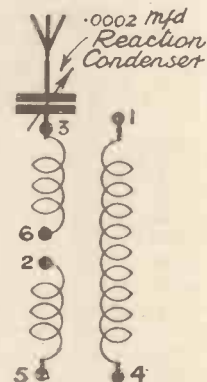


Fig. 1. The reaction condenser was used as a series aerial condenser.

Looked at my circuit again, so apparently simple and efficient. Realised that my aerial was connected direct to the end of the aerial coil. Noted, too, that the aerial winding was wound very close to the tuning winding on my B.T.S. coils. Remembered something about series aerial condensers—

and quickly inserted my .0002-mfd. reaction condenser then lying idle on the table. (See Fig. 1.)

This, I must tell you, made a tremendous difference at once. I cured nearly all the dead spots even on the smallest coils, which was quite gratifying. More still, I unexpectedly smoothed the "sliding-in" process of oscillation, which was far less of a "plonk" than before.

Made a note in my log book that a series aerial condenser was definitely a good thing. You know, one cannot help feeling that when an apparent barrier like a condenser is put between the aerial wire and the coil there must be a great loss of energy. Perhaps I simply cannot visualise how these short waves jump across without effort.

Anyway, I argued that even if there was some loss of energy across that condenser, the fact that my reaction was so much more gently applied must make up for it. I certainly did not find that my Tokio and Schenectady signals lost any volume—and they were much easier to tune-in and to hold on to.

Even so, the reaction was much smoother at the higher readings of the condenser than at the lower. Decided to go on trying to tame this reaction—but exactly how I could not see. Another poring over my circuit showed me that my grid leak was connected to the positive low-tension battery point. This, I assumed, meant a positive bias on the grid of the detector. Was it, I wondered, too positive?

Anyway, it was simple enough to unhook the grid leak wire from the terminal of the valve holder and to put it on the "outside" terminal of the grid condenser, as at Fig. 2. This, I saw, would have the effect of connecting my grid to the negative of the low-tension accumulator through the tuning winding.

It was a shot in the dark of course. So much of my work will be, I fear. Still, the result was to me most illuminating. I found

reaction silkily smooth all round the band, so smoothly "sliding-in" that I could hardly tell when the set was oscillating except for the "chirps" of Morse.

Then I swung around for signals. They were there, right enough, but only at what I estimated by ear to be about half the previous volume. I had a feeling there must be a happy mean between a condition of strong signals and fierce reaction and a condition of weak signals and smooth reaction. How to achieve that mean beat me.

I wanted to try other values of grid leak, thinking this was the solution, but after doing the rounds of all the shops in my district I simply could not find anyone with leaks above 2 megohms—the value I already had. Ordered a stock of 3's, 4's and 5's and am still waiting. Will report on that later.

I returned to my set, still critical of the general "nerviness" of the operation. For instance, when I turned my head to one side, the reaction setting seemed to be affected. So did the tuning. First, hand-capacity. Now, head capacity!

I argued this way: My head is connected—I hope—to my body, which is sitting on a chair touching the ground. The signals going through the phones are wireless signals, trying to get to earth. Do they go through my head—and does the route vary when I move it?

## IT DID NOT WORK!

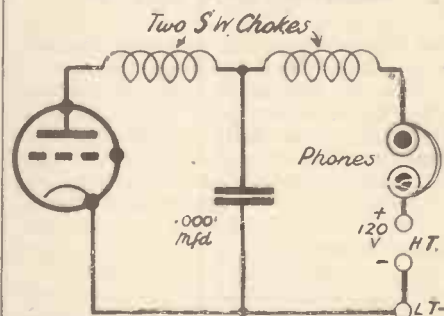


Fig. 3. This double-choke scheme was expected to stop hand-capacity, but it completely upset reaction control.

Another look at my circuit added to the mystery of this effect, for I could see that the high-frequency currents had plenty of chance to go to earth through the reaction condenser and winding. Also, I had gathered from my elementary studies of the subject that after detection I was dealing with low, not high, frequencies, which ought not to be so "touchy."

It seemed to me that high frequency must be wandering through those phones—and taking the chance to dodge through my head to earth. In no other way could I account for the fact that when I moved my head, reaction changed. Could it be, I asked myself, that at low settings of the reaction condenser there was not enough inducement for all the high-frequency energy to go to earth?

Whatever the reason, there it was. I again looked hard at my circuit. If high-frequency is getting into my phones, I said, (Please turn to page 206.)

## IMPROVING REACTION

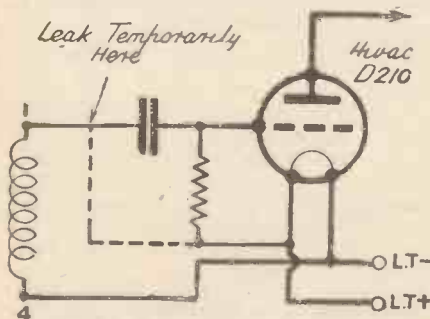


Fig. 2. Altering the position of the grid leak gave smoother reaction but less sensitivity.

My reasoning was probably faulty, but I felt that the loss of the extra capacity might well be offset by the gain in remoteness of control—for the tuning really was delightfully free from what I have since learnt is a bugbear called hand-capacity.

Well, chaps, I found the screaming was reduced remarkably. My operation near

DEREK McCULLOCH REVEALS SOME OF THE SECRETS OF—

# THE CHILDREN'S HOUR

"Modern children can't be treated as namby-pambies," says "Mac."

**M**AKE a selection from several thousands of scripts, engage a number of celebrated actors and actresses and several popular "talkers," add copious helpings of music, a dash of drama, a touch of comedy; savour with wisdom and nonsense, blend with a nice discretion, serve as a "nightcap" to several million young listeners.

That, at least, is a haphazard recipe for the B.B.C. Children's Hour or, as it might aptly be called, "Hour for Children." Proof of the programme is in the mail-bag.

The daily task of planning the Hour is one of the most important and exacting in broadcasting as it is to-day; a task which requires a keen knowledge of the mind of the child as well as the subtle ability to impart knowledge as entertainment.

## Where "Mac" Does His Work

There is an office high above Portland Place, just behind Broadcasting House, where that job is done, the den of Derek McCulloch, "Mac" to the children. It is a pleasant room, bright with sunshine, and about it are photographs of children. That bright-eyed little lady in the bathing costume is "Mac's" five-year-old daughter Judith, one of his most helpful critics.

And Mac occasionally glanced towards her as he told some stories of the Children's Hour, and how it has been organised during the more recent of the eleven years that he has been associated with it.

"First of all, you must not imagine that the children have just what we grown-ups decide to give them," he said; "they have what they themselves say they like best.

"Twice a year we have a Request Week, when children are asked to write to us telling us what items they prefer. Result: Between 7,000 and 8,000 letters. Of 8,000 letters, which followed our last Request Week, 6,000 asked for 'Toy Town,' Nearly 6,000 voted for the 'Zoo Man' (David Seth-Smith); 5,000 were demands for more talks by Commander Stephen King-Hall; then there were 3,500 requests for plays; and 2,500 children showed a very definite liking for the Star-Gazer (Lieut.-Commander Gould). These figures indicate fairly the trend of requests since 1934, and there is without doubt a surprising and widespread liking for all of our talkers.

## Children To-day are Different

"I suppose it is really natural that children of this generation should be very different from the youngsters of 20, 30 or 40 years ago. After all, their mothers changed a lot in their generation. Nowadays you simply cannot treat children as namby-pambies. If you ask the average ten-year-old to-day: 'Would you like Nunky Davie to play with you?' the reply, if the child is reasonably polite, would be: 'Oh, yes,

thank you.' But the child is probably thinking in an exasperated way: 'Well, I suppose I'd better.' In these days of model aeroplanes and cinemas and radio, so very different from the dolls and toys of 1907—I don't see how you can expect children to enjoy the old-fashioned forms of amusement. Even young children now begin asking awkward questions about fairy tales; after all, some of them, like a number of nursery rhymes, are pretty terrifying if you think about them, telling about dreadful things that happened to people who were not really bad at all. Only the other day my small daughter heard a rhyme about:

*'There I met an old man  
Who wouldn't say his prayers;  
So I took him by the left leg  
And threw him down the stairs.'*

or something like that.

"She said: 'Surely you mustn't throw anyone downstairs?' I said: 'That is only how the old rhyme goes.'

"A little later the child was saying to the maid: 'Look out, I am going to throw you downstairs and break your neck.'

"It's wrong to think that the average child wants to hear a certain story or play or piece of music only once, and our day-to-day mail contains many requests for the early repetition of a particular item. For young children especially, you can afford repetition even two or three times; in fact, it is often expected.

## Avoiding "Talking Down"

"It is tremendously important that nothing should be said or done during the programme which even slightly insults the intelligence of the children or makes them feel that they know far less than the talker. I don't think many children like being told: 'Of course, you don't know, but—' On the other hand, if you say: 'Of course, you already know such-and-such a thing, but it is interesting to realise that—' and then proceed to tell them all about the subject, you let them learn rather than try to teach them.

"Girls, I think, always like the things that boys enjoy. Really they don't like it to be said that they have inferior intelligence. They like plays about boys, but they don't want plays about the girls of St. Jupiter's.

"Four-year-olds and their little playmates must not be forgotten, and we find that they thoroughly enjoy musical rhymes



## FOR RADIOGRAM ENTHUSIASTS

Lilli Palmer, who stars in "The Great Barrier," recording at the H.M.V. studios two numbers from the films "Head Over Heels" and "Good-Morning, Boys." The songs are "Head Over Heels in Love" and "Baby, Watcha Gonna Do To-night" (H.M.V. B8544.)

because, though they cannot understand them, they can sing or dance or probably act while the music goes on. They seem generally to like rhythm. At the same time, though they are not aware of it, they are acquiring a musical taste which we hope, in later years, will end in the appreciation of really good music.

## Grown-up Critics

"Grown-up critics of the Children's Hour—a number of them, by the way, are not parents—frequently forget that the programme is intended for children. Frankly, we are not concerned with what certain adults think is good for children. That doesn't cut any ice. They have to begin thinking through the mind of a child before they can attempt seriously to criticise. I believe that many parents do enjoy the Hour themselves and find in it a useful way to comradeship with their children."

And here are one or two little-known facts about the Hour:

Mac is sorry that he ever started being "Larry the Lamb," with the sheep-like, bleating voice. "It really is rather trying after a time," he said, with a wry smile.

The Hour is rehearsed fully several times before it is broadcast.

## Young Broadcasters Welcome

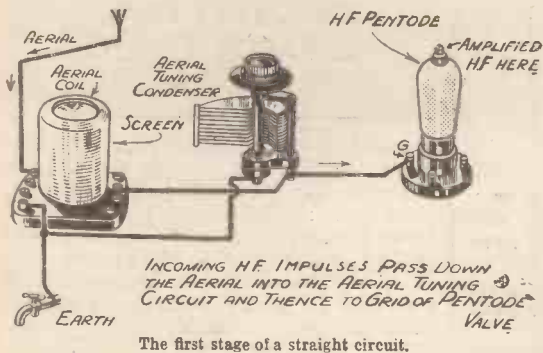
Studio BB, from which the programme invariably comes, is three floors below ground in the centre of Broadcasting House.

Two microphones are usually used.

Mac is always glad to meet a boy or girl who has the personality and material for an original broadcast. Most children, he finds, either recite the same poem or play the same piece of music. No one under twelve need apply!

# YOUR SET— HOW IT WORKS

SOME INTERESTING FACTS ABOUT THE "STRAIGHT" SET, FOR THE NON-TECHNICAL LISTENER



A FEW weeks ago we published an article under this title in which we discussed in a simple non-technical fashion the whys and wherefores of the all-mains superhet.

This article evidently met with some measure of success, since we were asked by a number of P.W.-ites "to come again." Well, we have done our best, and this week we want to talk about a different kind of set—that which is called a "straight" set—a class of design which has achieved remarkable popularity with the battery user on account of the excellent all-round reception which it gives, combined with its economical running costs.

In writing in a non-technical manner one is compelled to explain things somewhat superficially and possibly a little loosely (from the technical viewpoint) at times. The more technical reader will, we feel sure, forgive us for this, as he will appreciate that the points which are obvious to him are wrapped in obscurity in so far as his less technical brethren are concerned.

## A Popular Type of Circuit

Probably the most popular type of straight circuit is the three-valve arrangement in which you have the respective valves working as high-frequency amplifier, detector, and low-frequency amplifier, in that sequence.

You may have three valves altogether, or you may have four—say two stages of high-frequency amplification, detector, and one stage of L.F. amplification; or, alternatively, one stage of H.F. amplification, a detector, and two stages of low-frequency amplification. Or, you could go a step further and have two stages of high-frequency, a detector and two stages of low-frequency, although we may say that this last combination is not often seen these days.

For explanatory purposes we intend to confine ourselves to the three-valve arrangement, which is, of course, fundamentally the same as the four- or five-valve circuit, and far more common.

The first stage in a straight circuit is known as the high-frequency amplifier—more often called the H.F. stage. This consists of the tuning coil in the aerial circuit, normally called the aerial coil; a tuning condenser—invariably one having a capacity of .0005 mfd.—and a valve which, in these days, is very frequently a pentode. But it can also be a screen-grid valve. This aerial coil is joined to your aerial and earth and also to the aerial tuning condenser.

Now the whole time your set is switched on it is picking up programmes from all over Europe, and in fact at certain times of the day or night from all over the world, although the set may not be sufficiently

sensitive or of a suitable design to make them audible.

Obviously you want only one of these programmes at a time, and it is the job of this aerial coil and tuning condenser to pick out the programmes you want.

The programmes are picked up by the aerial in the form of high-frequency impulses, or oscillations. Actually this is another way of speaking of vibrations. Each station sends out on a certain wavelength, and this wavelength is equivalent to so many vibrations per second. Now the

arrive at the next stage, namely the detector stage.

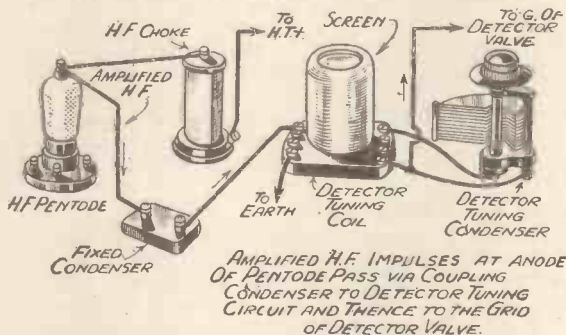
In this part of the circuit there is another tuning coil and condenser, and the reason for this is to increase the overall selectivity of the set. You could design a set with just one tuning circuit in the H.F. stage, but this would not be so efficient because with one tuning circuit, that is one coil and condenser, you cannot separate the wanted station from those you don't want so thoroughly as you can when you have two tuning circuits, and this question of separating one station from another is a very important one these days owing to the very large number of programmes—and high-powered ones at that—which are on the air.

Obviously if you have your desired stations always accompanied by a background of another station, then you cannot get full enjoyment from your set.

Two tuning circuits greatly improve matters—three would be even better, but then this is getting rather complicated, although in some sets you may have more than three separate tuning stages.

If you will refer to the second diagram you will notice two components, namely an H.F. choke and fixed condenser, and you will see from the arrows that the amplified H.F. travels to the detector tuning coil by way of the fixed condenser.

## THE SECOND TUNING CIRCUIT



How the magnified impulses representing the wanted programmes are passed on to the detector valve.

number of these vibrations per second is called the frequency—for example the frequency of the London National is equal to 1,149 kilocycles, in other words 1,149,000 complete vibrations per second. When you adjust your tuning condenser to the wavelength of the station you wish to receive, the tuning condenser and coil, because they possess what is called capacity and inductance, move in sympathy with the vibrations from the desired station and ignore those from other stations, which are, of course, slightly different.

This is the principle of tuning. And it must be understood that when we speak of vibrations we do so in the electrical and not in the mechanical sense.

Having selected our particular wavelength or frequency, or to put it in a more non-technical fashion the desired station, we pass on to the grid of the H.F. amplifying valve. This, as its name implies, is there solely to increase the strength of the incoming programme. It is just a magnifier and nothing else.

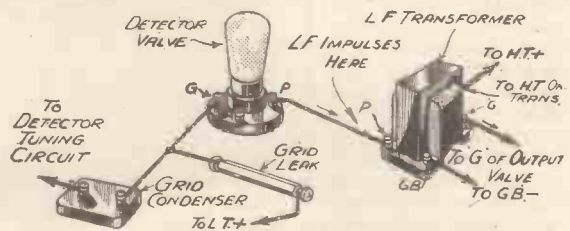
## The Detector Stage

After stepping up the strength of our desired programme by passing it through a stage of high-frequency amplification we

## What the Choke Does

The purpose of the H.F. choke is to prevent any of the amplified H.F. from passing along the lead to the H.T. supply (the H.T. is merely to make the valve function

## MAKING THE PROGRAMME AUDIBLE



After rectification, the impulses (which then take another form) are stepped up in strength by a transformer.

properly). Naturally we want all the H.F. to flow into the detector tuning circuit so that none is wasted; the H.F. choke acts as a barrier to the H.F. impulses, so that they are left with the alternative path into

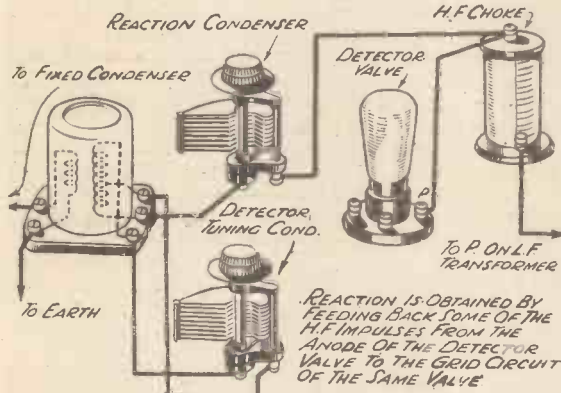
(Continued overleaf.)

## YOUR SET— HOW IT WORKS

(Continued from previous page.)

the detector tuning coil. The fixed condenser is merely to stop any of the H.T. current from flowing into the detector tuning coil and so to earth. If this were to occur the H.T. supply would be short circuited, and therefore damaged. But H.T. current, because it is direct current, will not flow through a condenser, although the

### IMPROVING THE RANGE



Greatly improved reception of weak programmes is obtained by using reaction.

H.F. impulses are offered free passage by this component.

When our amplified H.F. reaches the detector tuning coil and condenser it undergoes a further sorting out, so that when it leaves this circuit it is separated more cleanly from neighbouring stations than previously.

The detector tuning condenser is, of course, tuned to the wavelength of the desired station in just the same way as the aerial tuning condenser, and in many sets these two condensers are ganged together, the moving vanes being attached to a common spindle so that they work from one control knob simultaneously. This is just a dodge to eliminate one control and thus simplify the tuning operation.

### Making the Programme Audible

Next, our programme in the form of H.F. impulses is applied to the detector valve. Now the purpose of this valve is to change the form of the H.F. impulses so that they are able to be heard as audible sounds in the loudspeaker. Vibrations of a million or more per second are much too rapid for a comparatively slow-moving piece of mechanism such as the cone of a speaker. Hence the need for the process of rectification by the detector.

This rectification of the amplified H.F. impulses provides another form of current called low frequency or L.F. and this is what we get when the operation of detection has been carried out.

In a later article we hope to explain, simply, just what happens inside the various valves in a circuit, but for the moment we must take this for granted, otherwise our explanation will tend to become somewhat confused with technicalities.

Now in addition to changing the form of the current from H.F. to L.F. the detector valve also amplifies. Naturally you want to get absolutely the maximum magnifi-

cation out of your set and so these amplified L.F. impulses are passed through an L.F. transformer, which again steps them up in strength. After which they arrive at the final valve in the set, called the output valve.

### The Output Stage

This valve can be a power valve, or a pentode, and its purpose is to amplify still further the programme which we have tuned in. The programme now having undergone an enormous magnification is ready for applying to the loudspeaker.

By now you will see that the circuit does two things: (a) it magnifies the very weak impulses picked up by the aerial until they attain sufficient strength to operate a loudspeaker diaphragm, and (b) it separates the desired station from neighbouring stations which would otherwise cause interference.

If we had inefficient tuning circuits or no tuning circuits at all, we should get just a jumble of programmes in the loudspeaker. In the same way if our amplifying stages were poorly designed and therefore relatively inefficient it might not be possible for us to magnify the programme to a sufficient strength to work the loudspeaker properly.

### Using Reaction

Now most straight receivers are provided with an additional tuning control known as reaction. Reaction is extremely valuable because it enables us to increase the selectivity or station separating powers of a circuit and also to increase the overall magnification.

All that we do is to feed back some of the H.F. which is present in the detector circuit, after it has passed through the detector valve, into the tuning coil which is connected in the grid circuit of the detector. This increases the strength of the impulses in the detector tuning circuit and so produces higher overall amplification. Moreover, by lowering the resistance of the detector tuning circuit reaction provides better selectivity.

The last valve in our set is termed a "power" valve. This is because the current in its anode circuit is very much higher than that in the anode circuit of the valve in the H.F. or detector stage. Also the loudspeaker draws off power from this valve, whereas the couplings between H.F. valve and detector, and detector and power valve, only require to pass on voltage to the next link in the chain.

Quite often the transformer between detector and L.F. valve is replaced by a resistance and condenser combination. This pass on the low-frequency variations in much the same way as our H.F. choke and condenser passes on H.F. variations, in the case of the H.F. valve, the resistance replacing the choke.

## REMOVING HAND-CAPACITY EFFECTS

(Continued from page 203.)

it must be stopped. Why doesn't that short-wave choke in series with the anode of the valve and the phones do just that?

Then I really did do something. I broke the lead between choke and phones and put in another short-wave choke—two in series. Then, at the junction, I connected one side of a .0001-mfd. condenser, the other side going to earth.

### Peculiar Things Happened

See my idea? If high-frequency got by the first choke it would prefer to go to earth through the .0001-mfd. fixed condenser than push its way through a second choke. And so, I felt, I should be free of trouble in my phones. See Fig. 3 for the effort.

I hope you see the joke, because at the moment I can't. Most peculiar things happened. Sometimes the set would not stop oscillating, whatever I did to reaction. Then it would not oscillate at all! And for no reason apparently.

I was very disappointed, reluctantly concluding my way with high-frequency was all wrong, reverted to normal connections. And that's roughly what I am doing all the time—changing things for the worse and hastily going back to the original circuit. But I'm learning all the time by these mistakes.

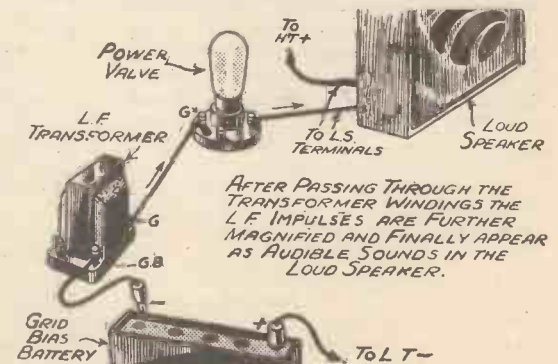
One other little change I made—the Hivac D.210 removed and an H.210 put in its place. Result: no difference in signal strength and appreciably fiercer reaction. Needless to say, the D.210 is now back!

### Stable Reaction Needed

It does seem to emerge from these rather trifling efforts of mine that the whole secret of success—I mean the sort of success one can nail down and repeat whenever one wants to—is in getting really stable reaction all round the tuning band no matter which coil is used.

I am therefore concentrating on two things—eliminating blind spots and maintaining smooth reaction, all the time without any appreciable changes in the settings of tuning and reaction by the presence of my body. I won't be happy until I've done these things. Any advice, anyone, on how?

### THE FINAL AMPLIFYING VALVE



The output valve is the final stage in the amplifying chain, and it is the valve which is called upon to supply power to the loudspeaker.

A. J. R.



# TELEVISION TOPICS—Collected by A. S. Clark

## NEW MARCONIPHONE INSTRUMENT

A REALLY complete radio and record entertainer is provided in the new Marconiphone instrument model 703. It is described as a de-luxe Television and All-Wave Radio Receiver and Automatic Record-Changing Gramophone.

As you will gather, it incorporates all forms of ether and record entertainment in one cabinet. The means for world-wide radio reception, television pictures and long record programmes are enclosed within the dimensions of 38½ ins. high, 47½ ins. wide and 21½ ins. deep.

The sound receiver is a five-valve super-het covering four wavebands, including 16.7 to 53 and 46 to 140 metres. By means of a fifth position on the wave-change switch the input of the receiver is joined up to the second stage of the vision receiver to take up the sound accompanying the picture transmissions.

### T. R. F. Circuits Used

The automatic record-changer enables eight 10-inch or 12-inch records to be played straight off. Alternatively, any of the records may be rejected or repeated at will.

The vision receiver is of especial interest in that it is of the straight variety. There are six valves working in tuned-radio-frequency amplifier circuits. These provide an amplification of some 40,000 times the original input.

Following these amplifiers is a diode rectifier which feeds the vision signals to the cathode-ray tube and also supplies the synchronising pulses to the scanning circuits. The latter employ oscillating valves to provide the saw-toothed currents.

A concealed light is provided to illuminate the television controls and is controlled by a push-button switch. There are five main controls and additional preset controls.

The preset controls are on a covered panel and only require setting when the receiver is first installed. They are mainly concerned with the size and shape of the picture.

The remaining five controls—which can be left set if desired over very long periods—consist of line-hold control, frame-hold control, sensitivity control, brightness control and contrast control. The last two are the ones mainly employed and adjust the appearance of the picture to individual likes. They can very roughly be considered as parallel with the volume and tone controls of an ordinary sound receiver.

### Two Aerials Employed

The size of the picture is 10 in. by 8 in., and is viewed in the mirror in the lid of the cabinet. The picture has a slightly bluish tinge but appears black and white when viewed in a darkened room, though complete darkness is by no means required for comfortable looking.

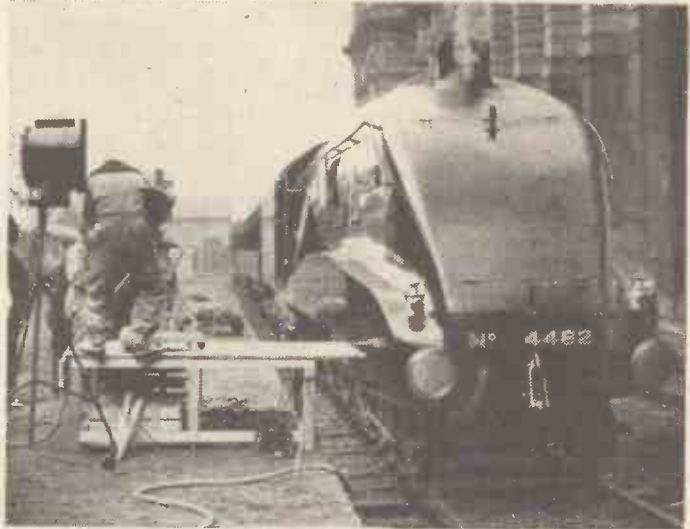
Two aerials are used. One, for the ordinary sound reception, may be the existing aerial, and the other is a special dipole television aerial. The latter aerial

is included with the receiver, aerial and receiver being installed free of charge.

The usual items such as provision for extra speaker, automatic volume control, and so on, are incorporated. The consumption on radio—that is, normal broadcasting—is 90 watts. On gramophone it is 120, while the television position of the control switch represents a consumption of 270 watts.

The cabinet, in walnut finish, is of the usual Marconiphone magnificence. The lid is raised half-way for television viewing and completely to operate the automatic record changer. Finally, to facilitate moving, the whole receiver is mounted on four concealed castors.

The instrument works from A.C. mains whose voltage may be between 200 and 250. The frequency range covered is from 50–60 cycles. A non-directional speaker is fitted.



Outside scenes from the grounds of the Alexandra Palace have provided some good television O.B.'s, including some interesting railway views. Above: one of the L.N.E.R. streamlined locomotives is seen under the eye of the television camera on the platform.

## FILLING A GAP

SELDOM do we have the pleasure of reviewing a work which fills a gap so definitely as "The Low Voltage Cathode Ray Tube and Its Application," by G. Parr, of the Radio Division of the Edison Swan Electric Co. Right away let us explain that the term "low-voltage" in the title is used to distinguish from tubes using voltages of the order of 60,000 volts.

The types covered by this work are those used in oscillograph testing work and in television receivers.

The book is not a general sort of description in what is usually termed "popular" language. It is intended for the student and serious experimenter. At the same time it is not one of those terribly advanced works which delight in page after page of "maths." and abstract considerations to the exclusion of important practical data. No, the ideal balance between explanation of theory and advice on practical work is just what makes this new publication so valuable.

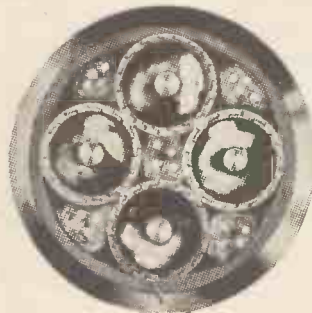
### Applications of the Tube

There is one long chapter on television work, but the greater part of the application details concern the use of the tube for circuit investigation. But every bit of it is helpful to the television experimenter who will find that a cathode-ray oscilloscope can be extremely valuable in getting a cathode-ray television outfit constructed and operating correctly.

From the student's point of view we cannot refrain from mentioning the comprehensive bibliography of seventeen pages that is included.

The book itself contains but few pages short of 200, and is printed on really good paper. It is excellent value at 10s. 6d., and is published by Messrs. Chapman and Hall, 11, Henrietta Street, Covent Garden, London, W.C.2.

## THE CO-AXIAL CABLE



The photograph above shows a cross-section of the special G.P.O. cable such as that which has been run up to Birmingham and which is expected to make possible the starting of a television station in that town. The reproduction is actually full size.

It will be seen that the cable is really four co-axial cables in one. It is capable of dealing with 320 two-way telephone conversations at a time, but it is not clear how the four sections would be arranged to deal with the wide-frequency range of a single television transmission.

As a matter of fact, technical details are kept very secret. It is not even divulged how the centre cores are spaced from the outer "tubes."

At frequent intervals in the cable, amplifiers are inserted. These are to make up for line losses and to introduce any correction required.

The cable has, of course, mainly been laid for purposes of telephone communication.

# TELEVISION TOPICS—Continued

## "TELEFRAMES" Items of general interest

### BIGGER PICTURES

**S**COPHONY have recently demonstrated 240-line television reception on screens 2 feet by 22 inches, and 5 feet by 4 feet. The first one was about the size of the picture they intend to use on their commercial model for receiving the Alexandra Palace transmissions. Preparation of commercial models has been retarded until recently because of the use of two standards of definition. We hope to see some exciting things presently from this system.

### TELEVISION COMMENTARY

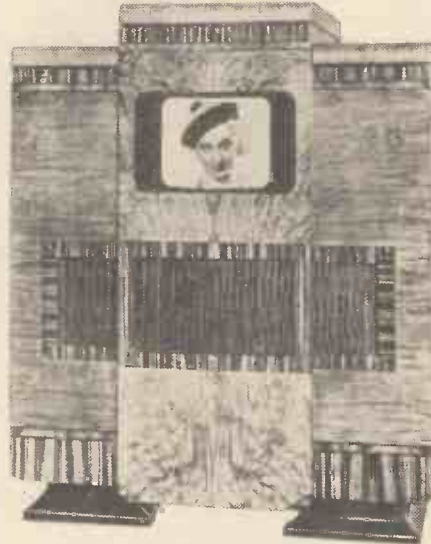
Commentaries that go with outside television broadcasts will vary somewhat from ordinary O.B. commentaries. The commentary in the case of a normal sound O.B. is to describe what is happening and to draw a picture in words.

With television it will be more a question of explaining the significance of what is seen in relation to the parts that the television camera does not take in, and to amplify what is seen. The commentator will thus have to be rather slick and become expert in deciding just what the television screen is showing in order to keep "in phase" with it, as it were.

### A NEW INTIMACY

We are indebted to the "World Film News" for the following quotation which hints that in craving for bigger screens we may be overlooking one of the essential

### A SUPER INSTRUMENT



This is a photograph of the new H.M.V. television all-wave auto-radiogram described last week. It costs 120 guineas.

appeals of television. It certainly provides food for thought.

"The teacher of gardening with his black-board illustrates a directness of appeal which is altogether extraordinary. He is a new phenomenon. He works in a new plane of communication: closer than the commentator of the films, closer even than the commentator of the lecture room. The focus of the screen and the darkness of television bring him, we are even willing to believe, closer than a neighbour. We can, at least, answer our neighbour back, but here the speaker can fix us with the glittering eye of the ancient mariner and control us completely."

### AMERICA STILL WAITS

In America the question "What is holding up television?" is being persistently asked, and no one is getting a satisfactory answer.

It is suggested by some that engineers are waiting for it to be perfected. But improvements over the last six months have been so slight that the wait, if due to this cause, will be a very long one. Anyway, it is agreed that results are already good enough for most people to be satisfied.

Another suggested reason for the hold-up is difficulty in agreement between the various bodies concerned over the allotment of wavelengths for television. Then, again, it is suggested that big firms are waiting until they have a complete stranglehold on patents.

The latest statement is that television will not be made available to the public in 1937 and perhaps not during 1938! The Americans will have to do very big things when they do start to make up for lost television prestige.

## TELEVISION FOR BEGINNERS

G. Stevens explains how the beam of a cathode-ray tube is focused electrically

**N**OW we can see what happens to the beam all the way up the tube as it leaves the cathode and finishes on the screen.

First of all, the electrons are emitted from the cathode in the form of a fine spray, diverging out like a cone from the tip (Fig. 1). The first thing to do is to compress this spray so that the majority, if not all, of the electrons will pass through the fine hole in the first anode. This is the main accelerating electrode which gives the electrons their initial velocity to carry them on to the focusing anodes.

### Guiding the Electrons

The compression of the spray of electrons is done by the grid which has a negative bias of just the right amount. If a negative electric field surrounds the cathode, the electrons on the edge of the spray will be repelled and will tend to turn inwards towards the main body, which is what we want. If we overdo the negative bias it will neutralise the attractive force of the first anode and no electrons will pass through the hole. This bias will then be the "cut-off" value, i.e. the beam will disappear and the screen will be dark.

Now suppose we have a more

or less compact jet of electrons coming through the hole in the anode. As soon as they are through they will diverge again, because of the repulsion among themselves. This is where the second anode comes in.

It is mounted a little way above the first, so that the difference of potential between the two forms a field through which the electron passes. The shape of the field, that is the direction in which the lines of force run, is governed by the relation between the two potentials, and we adjust these

(hence their name, "equipotential lines"). They have been put in to show the similarity between the action of the electrostatic field and the action of a lens on a beam of light, which was explained last time. You will see the optical equivalent of the electron lens in Fig. 2, and notice how the curvature of the equipotential lines resembles the curvature of a glass surface.

### Achieving Focusing

Looking at Fig. 1 again, the shape of the curves depends on the relation between the two potentials, and if we alter the shape the electrons will be guided more gently or more abruptly back to the centre. This means that the beam will be focused either beyond or before the screen surface, which will give a blurred spot.

This is to cut off the extreme diverging electrons and produce a better focus.

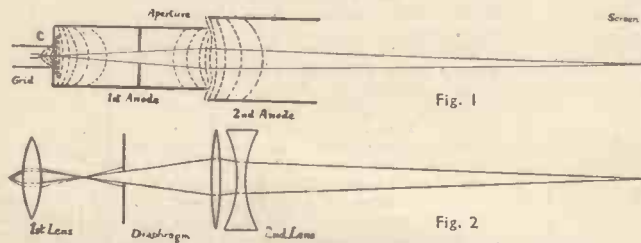
You probably know that if you attempt to focus a widely diverging beam of light through a lens, the outer rays do not come to the same point on the axis as the inner ones. This is called the "spherical aberration of the lens," and we get the same thing in electron lenses. In fact, the electron lens suffers from all the troubles that the optical system suffers from, and it is a bit of a job to get the lens to behave as nicely as an optical lens.

### Protecting the Cathode

The majority of electrostatically focused tubes have three anodes instead of two. The principle is the same, however, except that we focus the beam in two stages instead of one. It is the same thing as using two thinner lenses instead of one fat lens, and produces a better effect. Another advantage of using three anodes is that the first anode voltage can be reduced, because we have two further points at which the beam is accelerated.

This lessens the risk of damage to the cathode by a high voltage electrode immediately above it, and prolongs the life of the tube. In practice the potential of the first and third anodes is fixed, and that of the second one varied to alter the focus.

Knowing what we do about electrons, we can see next time what effect the deflecting plates have on the beam as it passes through them.



These two diagrams show the similarity between focusing of electrons and light rays.

so that the electron is guided back towards the centre of the tube.

The lines shown in the diagram are not the field lines, but lines joining parts of the system at which the potential is the same

So there is only one value of second anode voltage which will give a sharp-focused spot on the screen. Another point which you will notice is the insertion of a diaphragm between the lenses.

FROM OUR READERS

# PROGRAMME DEDICATED TO "P.W." READER

An Amusing Story of How a Reader was Mistaken for His Namesake

The Editor, POPULAR WIRELESS.

Dear Sir,—My name is the same as that of an eminent English playwright, and more than once it has been the unwitting cause of "fame" being thrust upon me. Here is an instance of radio playing its part:—

About eighteen months ago I wrote for a "veri" to a now-defunct South American radio station. Some weeks later I received a very effusive letter from the station chief thanking me for taking such an interest in his humble station.

He enclosed some cuttings from the local evening newspaper which he hoped would interest me. And did they! For there, with both sides reproduced in facsimile, was my postcard, together with a photo of "myself" complete with white beard and twinkling blue eyes and prefaced by several complimentary remarks about my literary abilities!

Amused at this confusion of personalities, I was prompted to send a Christmas card to the station chief anonymously. He evidently spotted the postmark, for in January I received a package via air-mail containing a beautifully illustrated guide to the city of X. On the flyleaf was inscribed "Homage to the great English writer. (signed) The Mayor." (!)

Inside was another letter from the station chief, informing me that the station had decided to dedicate a special "programme of broadcast" to me. I was to send him a short message in English which would later be read "over the air" and I was to be informed by cablegram of the day and time when the broadcast would take place!

I was properly in the mire up to my neck now so, in desperation, I wrote to the eminent writer himself and asked his advice. He told me to "lie low." So I did.

BERNARD SHAW.

28, Carter Knowle Rd., Millhouses, Sheffield 7.

## CABINET ILLUMINATION

The Editor, "Popular Wireless."

Dear Sir,—I enclose a photo of a wireless cabinet which I designed and made as a radio organ.

The sides of the cabinet are made of unbreakable "glass" which can be bent to any shape, and also can be cut with scissors. This lets the illumination through quite clearly from two sets of coloured light, which give a pleasing appearance when listening-in.

If the "glass" has a thin coat of paint first before fixing it will stop the framework from showing through when the lumination is switched off. The size of cabinet is 3 ft. 8 in. high and 2 ft. 10 in. wide. Any type of receiver can be used.

H. BURGE.

101, Sompting Road, Broadwater, Worthing.

## LUXEMBOURG INTERFERENCE

The Editor, POPULAR WIRELESS.

Dear Sir:—In the POPULAR WIRELESS of April 10th, 1937, a letter appeared in which a reader of your paper who was also a listener to Radio Luxembourg complained of interference while listening to this station.

I also had a great deal of interference while listening to this station, so I wrote to Wireless Publicity Ltd., and I enclose the actual letter I received from them.

I hope this letter may be of some use to you and the readers of POPULAR WIRELESS AND TELEVISION TIMES. Thanking you and the staff of POPULAR WIRELESS for the latest information about television and wishing you every success.

C. A. RUECROFT.

128, Meldon Street, off Elswick Road, Newcastle-on-Tyne 4.

## WHO WANTS A GUINEA ?

Most of you, probably! Well, you all stand an equal chance of winning the guinea awarded each week to the sender of the best letter, in the opinion of the Editor. Neither literary merit nor length is a criterion of success; no radio subject is barred. This week the prize goes to Mr. Bernard Shaw.

## RADIO LUXEMBOURG

Dear Sir,—We thank you for your letter with reference to the interferences you have lately been experiencing when listening to our broadcasts. Both station technicians and ourselves are fully aware of, and very concerned with, the above question and, far from ignoring the matter, are making every effort to reduce these interferences. It may interest you to know that two experts have been sent from Luxembourg to London in order to ascertain first-hand the districts which are most affected, and we hope within a very short time to find a solution and show a considerable improvement in reception.

Meanwhile, it has been suggested by Luxembourg that the use of a directional frame aerial would probably overcome some of your difficulties.

In conclusion, may we again assure you that no effort is being spared to minimise these interferences, which are apparent more at this time of the year than at any other period, and to say how very much we appreciate the great interest you are taking in our endeavours to give you first-class entertainment.

WIRELESS PUBLICITY LIMITED.  
(H. N. KEMPLEN).

Transmission Control Dept., London, W.C.2.

## A PARALLEL CASE

The Editor, "Popular Wireless."

Dear Sir,—I am using a selective 4-valve battery set which separates Deutschlandsender from Droitwich, but as dusk falls it is impossible to get Luxembourg without another station as a background, and sometimes interference similar to motorboating. I think it is caused by Leningrad, which is on the same wavelength.

I find similar conditions on Hilversum (long waves) and in this case there is the powerful Rumanian station on the same wavelength.

H. S. SWINDEN.  
44½, Percy Street,  
Newcastle-on-Tyne 2.

## IN SUPPORT

The Editor, POPULAR WIRELESS.

Dear Sir,—Regarding T. M. P.'s letter in "P.W." of April 10th, I can support him, at least from 7 p.m. on Sundays.

A station, unrecognisable, comes in and completely spoils the Luxembourg programme very soon after the Fu-Manchu broadcast.

E. WEBSTER.

"Iona," Upper Canichers,  
Guernsey, C.I.

## WHEN IT STARTED

The Editor, "Popular Wireless."

Dear Sir,—I am writing to tell you I get the same trouble with Luxembourg as T. M. P. of Kingston. It gets worse towards night, and is just like motorboating along with another station butting in. I have just moved here from a place 50 miles away. Where I came from all the sets did the same thing, also I have handled four sets here at Alnmouth and they also do the same thing. As far as I can remember, Luxembourg went like this about September 1936; before that it was one of my best stations.

F. W. NELSON.

Grange Cottage, Alnmouth, Northumberland.

## NOTICED ON TWO STATIONS

The Editor, POPULAR WIRELESS.

Dear Sir,—For some months past Leningrad 100 kw. has been on the same wavelength as Luxembourg, and as soon as dusk approaches makes itself heard to such an extent as to practically ruin the Luxembourg programme.

In addition, I find that in this locality Luxembourg fades badly after dark and is, on account of this, coupled with the strong interference of Leningrad, a thoroughly unreliable station at night-time.

Hilversum on the long waves is similarly affected by Brasov, Rumania, although in this case there is no fading, but after dark a very pronounced low hum destroys the programme value entirely until after about 10 o'clock, when the interfering station closes down.

Best wishes to POPULAR WIRELESS, from a reader of about eight years.

A. S. FRANCIS.

7, Denmark Villas, Hove, Sussex.

## WHAT DO YOU THINK ?

The Editor, "Popular Wireless."

Dear Sir,—May I suggest a column in "P.W."

being set aside for "Scottish S.W. News," which, I think, is becoming more essential every day. This column could be contributed by one or two listeners in Scotland who could give a short, but accurate, account of the week's reception, which I am sure would be of value to most readers.

I won't say more, but will trust you to give what is required.

R. MACGREGOR.

12, Glamis Road,  
Forfar, Scotland.

[We appreciate that short-wave reception in Scotland may prove considerably different from that in the south, and shall welcome the opinions and suggestions of readers concerning a Scottish feature such as Mr. Macgregor suggests.—Ed.]

## THE DIAL REVOLVES

The Editor, POPULAR WIRELESS.

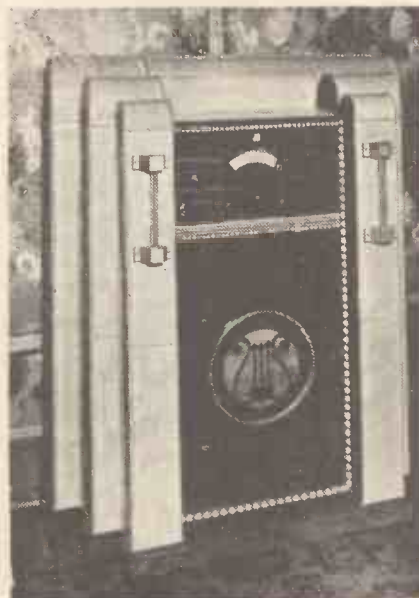
Dear Sir,—I have read "The Dial Revolves," by Leslie W. Orton, with great interest. May it long continue to appear in your columns.

The articles are both useful and interesting, and I might add amusing. I enjoy this feature very much. Wishing your paper all the best.

A. E. JEFFERY.

7, Upper Tooting Park, S.W.17.  
(Continued overleaf.)

## AN "ORGAN" CONSOLE



This attractive receiver design is described in Mr. H. Burge's letter on this page.

## FROM OUR READERS—Continued

## AND AGAIN

The Editor, "Popular Wireless."

Dear Sir,—Once again "Popular Wireless" leads.

I am writing to say how much I enjoy your new feature, "The Dial Revolves," and to express my thanks to you for introducing the same.

With best wishes to your paper.

G. H. BERESFORD.

27, Stoney Lane, Quinton, Birmingham.

## TOKIO CONFIRMATION

The Editor, POPULAR WIRELESS.

Dear Sir,—Re Mr. Preston's letter and Tokio. I picked up this station three nights running on a six-valve super. My aerial was also down and was tied about 10 feet up the pole. The announcer spoke in English and gave out the times of the next broadcast. This was about a month ago; since then I have not been able to log her. Can anybody tell me if Johannesburg is received in this country and when is the best time to receive her. I have not heard her since about the middle of December, when I picked up her experimental transmissions on the 49-metre band.

F. A. STEWARD.

8, Daisy Bank, Bath.

## AND ANOTHER

The Editor, "Popular Wireless."

Dear Sir,—As a regular reader of "P.W.," I should like to answer Mr. Preston's letter re Japan. I was having a hunt around on March 18th, and dropped across Tokio, Japan calling. This was J W M on 27.9 m. 10,700 kc. and J Z J on 25.40 m. 11,800 kc. The first part of the programme was the Emperor and Empress of Japan leaving Japan for King George's Coronation—after which was given a concert including Songs of the Border, Cottage in the Valley and A Picture-Lover's Vows or Bows.

G. H. MOSS.

"Avalon," 25, County Road, March, Cambs.

## WE WISH WE COULD

The Editor, POPULAR WIRELESS.

Dear Sir,—I have taken the opportunity of answering the S O S of Mr. Thomas, of Barry, Glamorgan.

This is the first time I have ever had any correspondence with fellow readers, also the first time I have written to you.

My reason for doing so now is because I have seen so many instances of readers getting what they require through the medium of "P.W." and I wanted to suggest a sale or exchange of components between readers.

There must be dozens of constructors who have many spare components that they would like to dispose of, but, like me, are loath to be entirely at a loss.

I have enclosed a list of my components which I should very much like to sell or exchange for short-wave stuff.

At present I do not possess any one article of short-wave components, being the very satisfied user of the S.T.600 battery radiogram, but—well, need I mention the urge of the fan for something different?

Well, sir, whether I am doing right or wrong, I know not, but I do know that other men have placed themselves under your tender care and have not been sorry.

Your hitherto silent, but regular reader will now close, hoping for the best—and ready to give it.

JAMES HUSSEY.

14, Inglewood Road, Sparkhill, Birmingham 11.

[We have considered Mr. Hussey's suggestion carefully from all points of view and regret that, however desirable it may be, we cannot at present see any hope of acting on it. The space required to run such a scheme would be far too great.—ED.]

## A CURTAIN-ROD ADAPTATION

The Editor, "Popular Wireless."

Dear Sir,—The enclosed sketch may prove of interest to your readers. Possessing an S.T.800,

the provision of a good earth became essential, in order to obtain the full advantage of the set. After much earnest consideration I decided on the following arrangement.

The set is arranged on a shelf which also accommodates two eliminators and an S.T.700. Along the back of the shelf runs a busbar on to which the sets and eliminators are earthed. This continues through the wall, runs 4 ft. to the ground and then about 4 ft. into the earth. This bar is ordinary brass curtain rail costing 3d. a foot.

My previous earth consisted of a multi-strand insulated copper wire running along the same path and soldered on to an 18-in. solid copper earth rod.

I find that with this earth arrangement the performance of the set on all wavebands is enormously enhanced.

Wishing you and your journal every success.

A. L. LIDDELL (B.Sc.).

50, Harcourt Street, Newark.

## RE QSL DISCUSSION

The Editor, POPULAR WIRELESS.

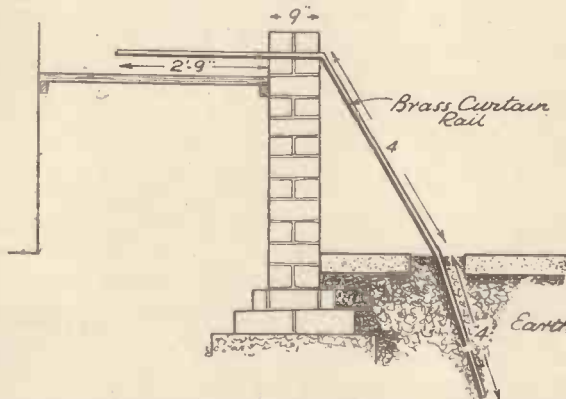
Dear Sir,—No matter how good a report is, it will all depend upon the spirit or disposition of the transmitter concerned.

Wishing your journal the success it deserves.

JOHN PLASKETT, JNR.

31, Yeoward Villas, Workington, Cumberland.

## A ONE-PIECE EARTH



This sketch shows the ingenious curtain-rod earthing system devised by Mr. A. L. Liddell.

## GOOD GOING

The Editor, "Popular Wireless."

Dear Sir,—My method of reporting may be different to many other listeners. I always refrain from reporting to W1, W2, and W3 District Stations (East Coast North American Stations) unless reports are specially asked for; secondly, I never send reports to stations in this country unless I hear them on 10 metres, when I consider it well worth sending a report.

I consider that I have had great success and can claim to have obtained the "P.W." DX All-Continents Certificate, and received QSL's from 37 countries out of a total number of 73 QSL's.

LEONARD C. B. BLANCHARD.  
B.S.W.L. 206.

122, St. Andrews Road, Coulsdon, Surrey.

## A GOOD IDEA

The Editor, POPULAR WIRELESS.

Dear Sir,—My own method of reporting to stations is by means of a graph (showing signal strength, fading, QRM, weather, etc., plotted against time), covering reception conditions over a period. Such reports prove of scientific value to the stations concerned and a high percentage of replies can be obtained.

Wishing "P.W." every success.

K. W. KING.

Cestuna, 67, Park View, New Malden, Surrey.

## STATION IDENTIFICATION

The Editor, "Popular Wireless."

Dear Sir,—I notice in "Popular Wireless" for April 24th, a very pleasing announcement to the effect that Mr. F. A. Beane is to contribute a series of articles on "Short-Wave Station Identification."

As no doubt you are aware, Mr. Beane is the editor of "The British Short-Wave League Review," so, having experience of his literary contributions, hope that you will have plenty of space for him.

I feel certain that "Popular Wireless" will be the richer for this very promising feature. It should prove of particular interest to those who are just beginning their Short-Wave careers, too. Thanking you, etc.

GEORGE T. MORLEY.

Norfolk House, Frenches Road, Redhill, Surrey.

## PAYING FOR TELEVISION

The Editor, POPULAR WIRELESS.

Dear Sir,—The one concrete fact that emerges from the spate of comment and criticism about the B.B.C.'s television policy, is that poor old Mr. Listener is again booked—supposing the Government fails to respond to the appeal for additional funds—to stand the financial racket, evidently either by additional taxation or economy cuts on the sound programmes.

Television is undoubtedly the coming universal home entertainment, and its normal progress to this position should not be interfered with by any lack of necessary funds—especially when we consider that the listening public already pays around four million pounds a year in radio licence fees.

To say that an increase in licence payment would meet with public disapproval is putting it mildly; apart from the shout of protest that would surely go up to the heavens, there would undoubtedly be a big drop in licence revenue through many listeners dumping their radios rather than pay the increased fee; and the struggling Television Director would be as hard up as ever.

However, in our own interests, television must not be held up at this stage, and the money required for its expansion seemingly can only be obtained by squeezing the sound-programmes' resources.

I, for one, am quite willing that television should progress at the expense of sound broadcasting to some reasonable extent (for the sooner we can all look in, the better), and I am not sure that the average listener would agree that there was any great deterioration in the sound programmes if the following suggestion was accepted, and presentation planned with a sound mixture of common sense and artistic imagination.

Every day and on every wave we get, from ten to six, a continual fare of light, chamber and symphonic music, ground out at so much a yard by costly orchestras, which are mostly maintained by listeners' hard-earned money. Just one of these orchestras costs, I understand, well over one hundred thousand pounds a year!

My suggestion is that these musical periods should be given over to synthetic (got that one from the Drama Director!) concerts by means of gramophone records. Every piece of music that was ever played, and every orchestra that ever played the piece, have been recorded at some time or another, and I have yet to hear the orchestra or band that doesn't sound the better for coming over via a gramophone record.

Well, that is where we should lose (?) with my scheme—recordings instead of actual orchestras.

The television critics agree that the Alexandra Palace programmes are better than the older established sound, even without the additional attraction of vision.

So, if the money saved by disbanding the costly permanent orchestras could be diverted to television to provide a continuous first-rate programme, from 6 p.m. to midnight, the sound to be broadcast by all B.B.C. short, medium, and long wave transmitters, television would come along with leaps and bounds, and the "sound only" listener would, in my opinion, be getting better value than he does now for his ten bob.

Yours truly,

A. E. ROSE.

75, Breedon Street, Long Eaton, Notts.

# THE MARCONIPHONE ALL-WAVE RADIOGRAM, MODEL 567

A Well-Designed, Moderately Priced Receiver for Operation on A.C. Mains

A SIX-VALVE all-wave radiogram for 22 guineas! This is the latest Marconiphone contribution to the commercial set market. The model 567, as it is called, does not follow the usual accepted practice of grouping the controls around the gramophone turntable under the lid of the cabinet. Instead, the tuning scale and various radio controls are arranged on the front of the instrument so that one can listen to broadcasting without having to raise the lid whenever one desires to alter the adjustment, or to tune-in another programme.

This, in the minds of many people, will be considered a definite advantage.

The cabinet work and general design reach a very high standard, and as an article of furniture purely, the set is a definite asset to any room, and should satisfy the most critical housewife.

A friend of mine, on seeing and hearing the set, was astonished to learn the price. "I thought it was at least a fifty-guinea job," he remarked—and meant it.

And now for a few technicalities. The model 567 uses a superhet circuit consisting of a pre-amplifying H.F. stage, feeding into the usual frequency changer, which in turn is coupled by way of an iron-core I.F. transformer to an H.F. pentode acting as an intermediate frequency amplifier. This stage is again coupled by means of a second iron-cored transformer to a double-diode-triode, which in addition to acting as a detector, provides A.V.C. supply for the previous three valves.

Finally, resistance-capacity coupling passes the impulses in the triode portion of the double-diode-triode, and feeds them to a pentode output stage.

When the set is working on gramophone the gramophone pick-up is connected into the triode portion of the double-diode-triode.

On the front of the cabinet there are four controls, which are grouped together below the tuning scale. On the left is a combined mains switch and volume control which, incidentally, is operative on both radio and gramophone.

In the centre are the tuning and tone control knobs; the tone control having three positions, and also acting on both radio and gramophone. On the extreme right is the wavechange control knob. The tuning knob incorporates a slow-motion control, having a reduction ratio of 120:1, and this is extremely valuable on the short-waves.

The tuning scale is marked both in wavelengths and station names, and on the short-wave portion those sections of the wavebands which contain the principal short-wave stations of the world are indicated by thick red lines—a feature which saves the listener from wasting time tuning over portions of the short-wave range which are not of great interest from the entertainment standpoint.

The model 567 sent in by the makers has

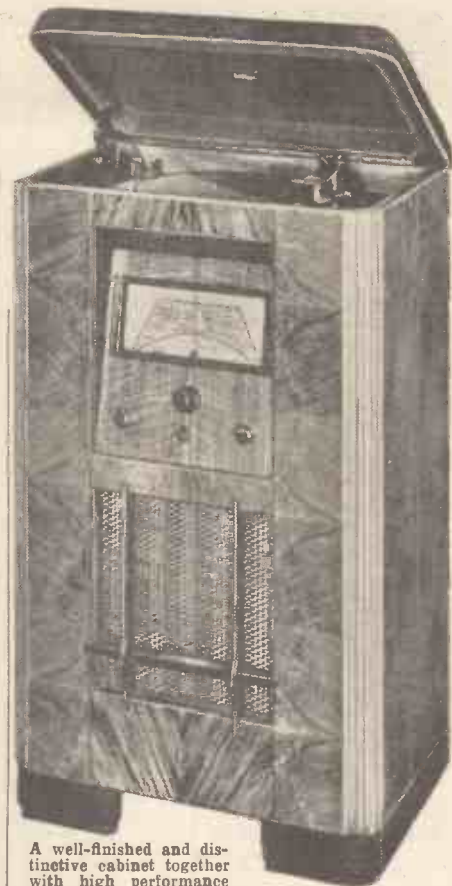
been in regular use for several weeks and has acquitted itself extremely well.\* As one would expect, the sensitivity is of a high order, and in consequence there is no difficulty whatever in bringing in programmes on the medium and long waves from all over Europe. Likewise, the station-separating qualities are equally good, and on the medium waves it is possible to pick out the desired programme free from all interference from neighbouring stations. Deutchlandsender on the long waves suffers slightly from side-band splash from Droitwich.

Reproduction is above the average, this being helped in no small measure by the elliptical moving-coil speaker

fitted. In this speaker the cone is corrugated at its outer edge to ensure free movement, and the stiffening of the cone is increased towards the centre to improve the high-note response.

With the tone control set at normal, that is fully clockwise, the high-note response is excellent, a fact that is at once apparent on speech, which comes over with marked crispness and clarity.

Turning now to the short-wave side, we may say that at no time during the period of test did we have any difficulty in tuning-



A well-finished and distinctive cabinet together with high performance are features of the model 567.

in such stations as W 2 X A D, W 2 X A F, W 1 X A L, W 8 X K, and others of the more powerful Americans. Then, also, there was war news from Madrid, as well as propaganda from Rome, all of which was given in English. Nor must we forget Moscow, who was also received in English.

On several occasions American amateurs were heard, and it is at once evident, after a short experience of the short-wave capabilities, that the efficiency on this waveband is at least the equal of that of the normal broadcast bands. Those who are keen to log short-wave programmes from the far corners of the world will find the short-wave side of this receiver very satisfying indeed.

### Removing Heterodyne Whistles

We found the tone control useful in suppressing heterodyne whistles and excessive needle scratch when using worn gramophone records.

On the gramophone side, the pick-up does its work very well indeed, and there is ample range of volume available.

Summing up, we should say that the model 567 is in every way a very likeable set, and without doubt first-rate value for money.

\* Test conditions: Location, S.E. London. Normal earth to water-pipe; indoor loft aerial, height about 25 feet, lead-in close to walls. Mains 200 volts 50 cycles.

### TECHNICAL SPECIFICATION

**CIRCUIT.**—H.F. Pentode pre-amplifier followed by X 42 frequency-changer coupled to a further H.F. Pentode for intermediate frequency amplification. Double-diode-triode provides rectification and A.V.C. supply. Resistance-capacity network feeds L.F. to output pentode. U 12 valve provides full-wave mains rectification.

**CONTROLS.**—Mains switch and volume control (combined); Tuning control with slow-motion gearing; Three-position tone adjustment; Wavechange switch.

**TUNING SCALE.**—Illuminated full-vision type.

**WAVELENGTH RANGES.**—Long waves, 725-2,000 metres. Medium waves, 195-580 metres. Short waves, 16.5-52 metres.

**GRAMOPHONE MOTOR.**—Induction type with hand-operated and automatic brake mechanism.

**UNDISTORTED OUTPUT.**—3 watts approx.

**VOLTAGE RANGE.**—195-255 volts A.C. 50-60 cycles.

**MAINS CONSUMPTION.**—Radio, 85 watts. Gramophone, 100 watts. Extra loudspeaker sockets are provided and a switch is fitted for cutting out the internal or extra speakers.

**PRICE** 22 guineas. Hire-purchase terms available over 12, 18 or 24 months.



How the controls are arranged.

NEXT WEEK  
SPECIAL CORONATION  
NUMBER

# WHERE THE ELECTRONS COME FROM

## ANOTHER SNORTER

C. M. (Grays).—*Will you please explain (terrible phrase to one in my position) where any current leaves the H.T. battery to cause it to wear out, as I understood the anode current of the valve is really the electrons being attracted to the anode and flowing through H.T. battery back to filament.*

*Also am I right in thinking that the potential of the electron current is greater than H.T. battery to enable it to oppose and flow through the battery? Also in a valve rectifier is the H.T. output really the electrons from the filament or does it come from the transformer?*

Phew! Off comes my coat and here goes: In the first place, C.M., you have got the idea right up to a point, but your conception of (the valve does not go far enough. Electrons do come off the filament and go round through the H.T. battery back to the filament. But look at the valve as a resistance whose value drops as the electrons flow through it, and you will see that the H.T. battery is permitted to discharge itself through the valve while the electron current is flowing.

When there is no filament current and no electron current, due to the heated filament, no H.T. current flows. But when the filament is hot and electrons boil off, then the H.T. potential not only pulls them across to the anode, but in doing so gives rise to a path for current flow from itself.

Thus we have electrons from the filament flowing across the valve, and also current from the H.T. battery "leaking" across the valve.

Now you must remember that the electron current from any battery is out of the NEGATIVE end and back round outside to the POSITIVE end. Thus the electron flow from the valve does not OPPOSE the H.T. battery at all, as you imagined. The electrons from the filament and those from the battery are flowing in the same direction.

It is very confusing to consider electricity to flow from positive to negative as per the old theory. The theory of positive and negative was evolved before the electron was discovered. Since then it has been shown that electrons (which are particles of negative electricity) flow from negative to positive. That is why they flow in the valve from the filament to the positive H.T.

In a valve rectifier the same is happening as in a battery valve. There is the alternate electron flow as you suggest, but there is also the applied H.T. from the transformer, and this flows through the valve, as does the current from the H.T. battery in the battery set.

That is why the transformer does take H.T. current from the mains—it passes it through the valve along with the electron flow of the valve itself. You must regard the valve as a sort of trigger device which on the commencement of electron flow releases extra energy from the H.T. supply, the energy released being proportional to the drop of resistance in the valve due to electron flow, which in turn is dependent on the voltage of the H.T. and on the nature and heat of the cathode or filament. It is also dependent in the case of the triode, tetrode, pentode, etc., valves, on the grid, which controls the flow of electrons through the valve and thus controls its resistance. In other words, controls the amount of H.T. current that will flow through.

Just a simple sum to drive home the meaning. You have a 100-volt battery. You have a 100-ohm resistance. The battery will force through that resistance 1 ampere of current. Now, by means of a grid control (assume the resistance is a valve), increase that resistance to 200 ohms due to the electron flow (which forms the path for the current) being decreased. You will then have a battery current of only half an ampere.

The resistance of a valve is a matter of thousands of ohms when an electron current is flowing, so the H.T. current is only a matter of milliamps. But remember that you have the D.C. from the battery flowing through as well as the electrons boiled off from the filament.

One final thought which may help you. Look upon the H.T. battery as pushing the electrons through the valve from the negative end rather than pulling them from the positive.

## MANY THANKS

I have received the following from K. S. (S.E.11). "Many thanks for your lucid explanation of electrolytic condensers. Everything is now quite clear, thank you." I attempted an explanation in "P.W." of March 20th. Thank you, K. S.—if it is not meant as sarcasm. I was afraid the "explanation" was not as clear as it might be.

Please don't think me up any more teasers like that. Meanwhile, as they say, you're welcome.

## SOS

Will anyone help Mr. J. Vecqueray, of 18, Coney Green Drive, Northfield, Birmingham? He wants the blue print of the S.T.600 and the wiring instructions. Usual procedure, please. Drop him a post card and offer your services before sending anything along. Thank you!

## OOH, THAT HISS!

H. P. T. (Newquay).—*I have a three-valve set worked from batteries and using one H.F. stage. Recently it has developed a nasty, almost continuous hiss. What is likely to be the matter?*

It is impossible to tell you exactly what component is likely to be the culprit without seeing the circuit, but I should certainly suspect the valves as a start. Pull out the H.F. valve and listen. If the hiss stops it is likely to be caused either by that valve or its contacts, or by some resistance in the H.F. anode circuit. Do the same with the detector, but if the hiss still persists with H.F. and detector valves out, you may be pretty sure it is due to something in the last valve circuit, or to the batteries.

It is best to try the set without aerial and without earth as a preliminary test just to see if the noise is coming into the set from either of these.

In a battery set I think that the hiss is more likely to come from a faulty component, noisy resistance, especially in a decoupling or anode circuit, a leaky condenser, or the batteries than from

the valves. Noise in valves is more prone to occur when mains types are being used when leakage across cathode and heater sometimes takes place with noisy results.

## GANGED CONDENSERS

D. W. B. (Peckham).—*I have built a three-valve with ganged tuning. The condenser has two trimmers, but I am doubtful how to trim them. The set is of the usual type, S.G., detector and reaction, and L.F.*

I presume that the condenser is calibrated in wavelengths, so the first thing to do is to get it set on the dial to some easily received station. Then turn the trimmers until you find that you have to tune the condenser to approximately the correct wavelength marking in order to get full strength.

Then tune-in to some distant station whose wavelength you know, keep trimming the condenser which tunes the detector and apply reaction, gradually working the tuning control until you get the reading dead right. Then adjust the aerial condenser trimmer. Choose a station of medium strength for this and then search about for another really weak transmission. This should preferably be about the middle of the scale and of known wavelength, for you are now going to get the condenser exactly right in the middle of the scale so that it should be about right at the ends.

Set the reaction fairly close to oscillating point and tune-in the station. If the condenser scale does not read correctly alter the reaction (detector condenser) trimmer until the scale reads exactly right. Then trim the aerial section of the condenser, leaving the detector trimmer alone.

You will note that the final adjustment of the trimming has been done with the reaction fully applied. That is because the application of reaction is bound to throw the tuning out slightly, and as reaction is applied on weak stations it is obviously best to have the trimming exact for weak stations than for the stronger ones. The result of this trimming method is that the weaker the station and the more the reaction applied the closer does the condenser get to accurate tuning. If the condenser was trimmed without the reaction being applied we should have the reverse effect happening—the condenser getting more and more out of correct trim as the station got weaker and more reaction was applied.

Obviously, when tuned to a strong station this detector section of the condenser will not be correctly in tune. That is not so serious a matter as allowing the condenser to be out of tune in one section on distant transmissions. The local stations will "spread" sufficiently to come through loudly even though the detector section is out of trim, and the flattening effect of the detector valve further assists matters. This flattening effect is removed when reaction is applied on distant transmissions, of course, and tuning under those conditions is very much sharper.

Many people consider that the aerial section of a gang condenser is the more important because the signal is at its weakest in the first tuned circuit. It is forgotten, however, that the aerial damping makes the aerial section of the tuning comparatively flat. But the more important point in a circuit with reaction is the change in tuning that reaction inevitably produces. It is to counteract the change in tuning that the trimming of the detector section is carried out when reaction is applied to its furthest amount.

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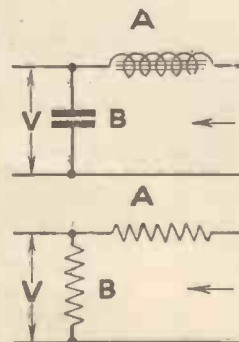
All Editorial communications should be addressed to the Editor, "Popular Wireless", Tallis House, Tallis Street, London, E.C.4.

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 the Trader would be well advised to obtain permission of the patentees to use the patents before doing so.

## TECHNICALITIES EXPLAINED—No. 50

### The L.F. Choke



The word choke means exactly what it seems to mean. It is a serious obstruction to the passage of current through it. But the current must be A.C. or intermittent D.C. The choke operates by virtue of its inductance and D.C. is not affected by it. The way a choke operates is shown in the diagrams. The choke must be used with a condenser or it is ineffectual. A common type of circuit is shown at the top. A is the choke and B is the bypass condenser. A.C. is fed along the two leads from the right. The choke A acts as a very high resistance to the A.C. (see lower diagram), while the condenser B acts as a very low resistance. This fact gives us a potentiometer scheme where the A.C. but not where the D.C. is concerned. That is because the choke does not act as a resistance for D.C. while the condenser acts as an infinite resistance to D.C.

The effect of a potentiometer where the one resistance is very high and the other very low is that across the low resistance very little voltage is obtained. That is exactly what happens in this case, and a very low voltage of A.C. is obtained across the condenser, which is exactly what we require.

# SEEN ON THE AIR

News and views on the television programmes  
by our special radio-screen correspondent

L. MARSLAND GANDER

**T**ELEVISION the Coronation procession will, in my opinion, be the most significant event in B.B.C. technical history since broadcasting began. This may sound an exaggeration, but I hope to justify the statement.

Television will, for the first time, give the public something which they cannot have through any other medium. It will bring to their homes moving pictures of a great national event at the moment of its occurrence. All the pomp and glory of the Coronation procession will be seen on television screens north, south, east and west, miles away from the straining crowds. This will be no edited cinema film, but reality.

Broadcasting was a sensational success when it first fluttered shy wings in 1921-22, because it was without a rival as a disseminator of news and entertainment received simultaneously in the home. Now television can make the same boast. Music-hall turns may be seen better on the stage; films better in a cinema. Nothing but television can bring straight to suburban drawing-rooms the Coronation pageantry, horse and foot, the bands and martial glamour, pictures of our newly crowned King and Queen receiving the homage of their loyal people.

But I say again, the pity is that the B.B.C. have to tackle the biggest task in fifteen years with apparatus to be used in public for the first time. Lack of experience with the outside television gear has made it impossible to "tell the world" confidently that the Coronation procession will be televised and seen clearly on the receiver screen. One week before Coronation Day the three vans will be delivered. Had it been possible to use them for two or three preliminary "telecasts" the experience would have been invaluable. Dealers and manufacturers could have joined in a big publicity campaign with the confident announcement that viewers need not spend large sums on seats along the processional route or struggle in the seething crowds, but see everything in the comfort of their homes.

### An Ideal Position

Apsley Gate, Hyde Park Corner, is an ideal position for the television cameras. They will be within a few feet of the procession as it passes through the arch. The sun (if any) will be in the right quarter and will not shine direct in the lenses.

I have now obtained full details of the final arrangements, somewhat amplifying previous published accounts. A platform is to be built both on the north and south sides of the central arch, with a very narrow connecting "bridge" running through close against the side of the arch. These platforms will be constructed inside the railings so that the three cameras will be protected against the crowd, and also from the potential camera "crasher" of the "Can you see me, mother?" type.

The three vans will be situated in a special enclosure near the park-keeper's lodge about forty feet away. These, rather like Green Line coaches in appearance, will carry the mobile control-room (containing 8½ tons of apparatus), the power plant, and the ultra-short-wave transmitter.

Co-axial cable connecting Apsley Gate with Broadcasting House and Alexandra Palace has already had its electrical tests. More than probably some rehearsal will take place of views transmitted from the Park. The ultra-short-wave transmitter will be a standby. Two-microphones will be used by Mr. Frederick Grisewood, the commentator. The broadcast begins at 2 p.m.

### Tests Over Eight Miles

Mr. Gerald Cock will also be there and may assist with the commentary, but Mr. Grisewood will be in charge, and it will be his task to give "clear, verbal cues" to the cameramen. Though, in this country, pictures have never before been publicly broadcast after transmission over seven or eight miles of land-line there is no reason to anticipate failure on this account. I understand that Post Office engineers were satisfied by actual demonstration at Hayes given by the Marconi-E.M.I. Company that television pictures could be clearly seen after travelling over eight miles of cable.

The B.B.C. has now revealed the route of the permanent co-axial cable round central London. It opens up the possibility that the King will in future be seen as well as heard when he broadcasts to the nation. This was clearly in the minds of the Post Office and B.B.C. engineers in taking the cable to Buckingham Palace.

The actual route is Broadcasting House to Marble Arch, Hyde Park Corner, Piccadilly Circus, Trafalgar Square, Whitehall, Houses of Parliament, Westminster Abbey, Buckingham Palace, and Victoria. These arrangements make it obvious that we may expect the transmission of such events as the Armistice Day ceremony at the Cenotaph, Trooping the Colour, national services from Westminster Abbey, the changing of the Guard at Buckingham Palace, celebrities arriving at Victoria Station, scenes in Downing Street on Budget Day, etc.

In a hackneyed, but inevitable phrase, television enters upon a new era; it leaves the confines of the studio to fulfil its true function.

Mr. John Masefield, the Poet Laureate, is coming to the studio on Coronation Day to be televised while broadcasting his Coronation Ode. Another capture for Coronation television is Mr. Frank O. Salisbury, who is to paint a picture of the scene in Westminster Abbey. He will probably show sketches for the picture.

One of the most interesting programmes during the week I have under review was the first experiment in televising a bridge

(Continued overleaf.)

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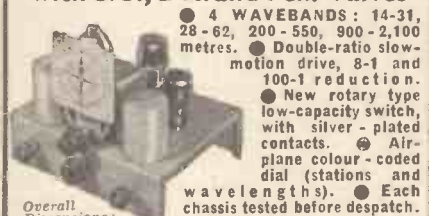
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#### with S.G., Det. and Pen. Valves



Overall Dimensions: 9" high; 11½" wide; 9" deep.

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**SEEN ON THE AIR**

(Continued from previous page.)

match. With shame I confess that I am not a bridge enthusiast, yet I watched with attention. Though the hands were those played in an Anglo-American match some years ago, the four experts in the studio were supposed not to have seen them before. Certainly, though the game ended in a grand slam for Mrs. Gordon Evers and Miss Kathleen Salmons, the bidding and play had every appearance of spontaneity.

All the cards were shown, enlarged, on a blackboard. The chief difficulty was, however, distinguishing between hearts and spades, and perhaps the best plan would have been to show the red cards with the hearts and diamonds marked in outline only. This suggestion (not original) I commend to the attention of the producer.

I liked Moore O'Ferrall's production of extracts from "Twelfth Night," and commend his choice of extracts, which made both a change and also a continuous story.

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**TECHNICAL JOTTINGS**

*Varied aspects of radio discussed from a general standpoint*

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

**Developments in Amplification**

IT is curious what a change has taken place in the past few years in the ways of using low-frequency and high-frequency amplification in a radio receiver. I suppose eight or ten years ago we used to go in much more for low-frequency amplification rather than high, and it was no uncommon thing for amateurs to make up sets with two, three, or even four stages of low-frequency amplification, with perhaps only one stage of H.F. amplification before the detector, or none at all.

**Choice of Valves**

In these days we would regard this as all very clumsy, and it seems hard to believe how we ever did such things even years ago. But I think the chief reason was that the low-frequency amplifying valve, being perhaps of a somewhat simpler character, developed before the high-frequency amplifier, and so in the early days of broadcast reception we had really a better choice of low-frequency than of high-frequency valves. There was not very much available in those days in the way of H.F. amplifiers,

so we did what little we could in the way of increasing sensitivity and then piled it up with low-frequency amplification after the detector.

**The Screen-Grid Principle**

I just forget how long this state of affairs continued, but it is now several years since the screen-grid principle was introduced and we began to get something that could really be called high-frequency amplification. Along with all this went, of course, the development in the art of screening, which was rendered necessary by the increased sensitivity and consequent liability to interaction between different parts of the set and instability.

I said a moment ago that we had cut down the low-frequency stages and increased the H.F. amplification because of developments in high-frequency amplifiers. But it is only fair to state that along with developments in H.F. valves have gone also great developments in low-frequency amplifiers, so that what we used to do with two or three stages of L.F. amplification years ago we can now do—and much better—with a

(Continued on next page.)

**Tungram Valves specified**

**FOR THE "POPULAR WIRELESS" "SIMPLEX" 3**

Tungram Valves H.P. 210 are specified in the "Popular Wireless" "Simplex" 3, details and specifications of which were given in the last issue.

It is significant that, where a High Frequency Pentode Valve of exceptional quality is required, it is Tungram that is specified.

This is only one of the exceptional range of Tungram Valves which includes British made American types and large output valves.

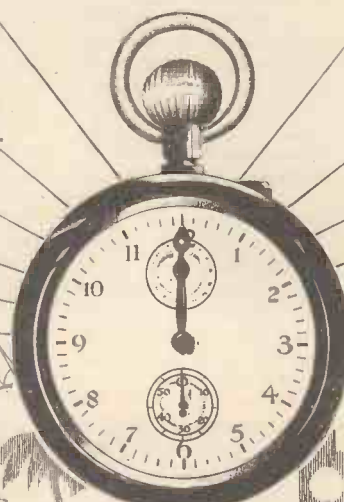
**TUNGSRAM**  
Barium VALVES

Manufactured in Tottenham, London.

**THE VALVE WITH THE NAME BEHIND IT!**

The Tungram Electric Lamp Works (Great Britain) Ltd., 82, Theobalds Road, London. Phone: Holborn 3563.

**THE TIMES THEY KEEP WHEN IT'S NOON G.M.T.**

BARCELONA	PARIS	BUCHAREST	BERLIN	LISBON
Noon	Noon	2 p.m.	1 p.m.	Noon
NEW YORK				REYKJAVIK
7 a.m.				11 a.m.
SYDNEY				WARSAW
10 p.m.				1 p.m.
VIENNA				MADRID
1 p.m.				Noon
STOCKHOLM				PRAGUE
1 p.m.				1 p.m.
OSLO				ROME
1 p.m.				1 p.m.
LENINGRAD	ISTANBUL			
2 p.m.	2 p.m.			
TORONTO	HELSINKI			
7 a.m.	2 p.m.			



## TECHNICAL JOTTINGS

(Continued from previous page.)

single pentode low-frequency stage, or perhaps with one low-frequency and power-valve output.

### The "General Purpose" Valve

Perhaps to make the story complete I should make some reference to the improvements in detectors, the present-day diode detector being a very great advance on the old-fashioned "general purpose" three-electrode valve which usually did duty in this position.

Nowadays, with a single suitable stage of H.F. amplification, a good detector and a pentode output working under proper conditions, you can get pretty well everything that is required by the ordinary listener. If you go as far as a couple of stages of H.F. you can get a very great deal more, and it is only a minority of listeners who really ever require anything more than a four-valve set of this type. I am not referring at the moment to the superhet receivers which are now so very popular, but I am speaking of the equivalent in terms of a more or less straight circuit.

### Diode Detection

Diode detection, by the way, is probably the most perfect type of detection, so far as quality is concerned, and if this is preceded by one or two stages of H.F. amplification, so that sufficient signal energy is delivered to the detector to enable it to function efficiently, you will have gone a long way on the road towards really good quality. Remember that every stage of a circuit is a possible source of distortion, and if you want to maintain the best possible quality, it is most important that each stage should be doing its job properly, and should not be called upon to do anything more than its proper job. One of the greatest causes of distortion is the overloading of one or more of the amplifying stages. If, for example, you are using a three-valve set of the type mentioned above and it does not give you all you want, it is far better to turn it into a set with an additional stage rather than to try to push the last ounce out of each of the H.F. and L.F. stages.

### The Output Stage

For the output stage there is now a considerable variety of valves which can be used, giving undistorted outputs of half a watt up to as much as five watts. But for ordinary home purposes you are never really likely to want anything more than about half a watt to one watt. A point to remember in this connection is that the rated output wattage of a valve as specified by the makers represents really its *maximum*, and in practice it is always well, if you want to preserve good quality, to keep on the conservative side of this figure.

### Input Voltage

The low-frequency grid input voltage which is necessary for loading a valve fully is usually stated in the specification supplied with the valve, and if you want to get the best results it is important to see that the previous stages of the circuit will safely supply sufficient audio-frequency voltage.

### Voltage Amplification

The voltage amplification is, of course, divided between the different H.F. stages and the detector, and perhaps the first low-frequency stage before the output stage. In the case where a couple of high-frequency amplifiers are used, or intermediate-frequency amplifiers in a superhet, you will get a good deal of voltage amplification. This may be still further increased when a three-electrode valve or a pentode is used for the detector stage, so that in these circumstances you will quite probably get the necessary voltage for the operation of a fairly powerful output stage.

### Don't Use Too Large a Valve

It is obvious that you will run into trouble if you use an output valve which cannot cope with the load which is supplied to it by the preceding stages. But what is not so obvious is that you can equally well run into trouble with an output stage which is specified for a much *greater* output than that required. Due to its lower amplification the previous stages may be overworked before the desired volume is obtained. People sometimes think that although a valve can be too *small* for the energy fed into it, it can hardly go wrong by being too *large*. You will see from the foregoing remarks that it is sometimes just as bad to use too large a valve as too small.

### Radio Progress in the U.S.A.

We think radio is going ahead by leaps and bounds in this country, but what do you think of the following figures from the United States? For 1936, close on 1,500,000 sets were sold in homes which had not previously had radio, the total number of receiving sets in the United States being thereby increased to about 25,000,000. Of this number it is estimated that about 17 or 18 million are obsolete or rapidly becoming so, and therefore the American manufacturer is rubbing his hands in the expectation that the market for that number of sets is now beginning to sprout. During 1936, over 7,000,000 sets were manufactured, and close on 100,000,000 receiving valves of various sorts were produced. During the same year the turnover in sponsored advertising programmes was over 100,000,000 dollars, compared with about 95,000,000 dollars for the previous year.

### Overhauling a Speaker

I said something in these Notes a few weeks ago about overhauling the moving-coil loudspeaker and, in particular, about cleaning away any particles of grit or adhering iron filings between the moving coil and the pole-pieces of the magnet. The remounting of the diaphragm, after having dismantled the speaker, is a rather ticklish job, and it is very important to get the diaphragm and coil properly centred.

### An Ingenious Method

In this connection a contributor to a well-known French radio contemporary recently described a rather novel method of centring the speech coil in dynamic speakers. According to this method you first of all disconnect the speaker from the set, so far as the speech input connections to the valve are concerned, leaving the

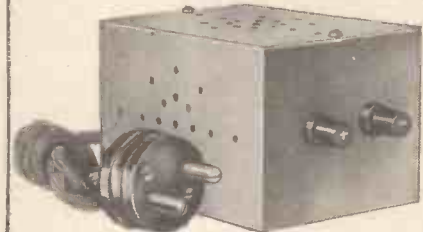
(Continued on next page.)

## CHARGE YOUR OWN BATTERY

This remarkable midget battery charger incorporates all metal parts, and will charge a 2-volt battery at  $\frac{1}{4}$  amp., for less than  $\frac{1}{4}$ d. per week. Simply connect the accumulator to the output terminals, and insert the mains adaptor into the nearest light or power point. No replacements—shockproof and guaranteed for 12 months.

Measures  $3\frac{1}{2} \times 2\frac{1}{2} \times 2\frac{1}{2}$ "  
Weight approximately 1 lb.

PRICE **12/6**



Write to-day for a copy of list P.988 describing this "Tom Thumb" Battery Charger.

F. C. HEYBERD & CO. 10, FINSBURY STREET, LONDON, E.C.2.

## THE S.T.800 IS STILL THE BEST BATTERY ALL-WAVE RECEIVER

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AS SPECIFIED BY THE DESIGNER, MR. JOHN SCOTT-TAGGART

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KIT "A" WITHOUT VALVES.	6/3	KIT "B" WITH VALVES.	8/-
Cash Price or C.O.D. £3.10.0 or 6/3 down and 11 monthly payments of 6/6.	DOWN	Cash Price or C.O.D. £4.16.0 or 8/- down and 11 monthly payments of 8/10.	DOWN

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W.B. STENTORIAN SPEAKERS 2/6 37s. 42/- Cash or C.O.D., or 2/6 with order and 11 monthly payments of 4/-.

CASH OR C.O.D. ORDERS DEALT WITH BY RETURN OF POST.

Established 1925. We pay all C.O.D. charges.

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### PUBLIC ADDRESS.

We can supply from stock a range of Portable and Fixed D.O. and A.O. Amplifiers for Dance Band, P.A. and Talkies, from 5 watts to 100 watts at bargain prices. All new 1936 models.

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

**ELECTRADIX RADIOS,**  
218, UPPER THAMES ST., LONDON, E.C.4.  
Telephone: Central 4611

## TECHNICAL JOTTINGS

(Continued from previous page.)

field winding joined up for excitation exactly as before. The loudspeaker's speech coupling transformer is then fed with A.C. from the electric light line through two suitable electric lamps in series. This causes the speech coil to vibrate violently, and if the centring screws are loosened and everything left free the coil will automatically centre itself. The centring screws are then tightened while the A.C. is still on, so as to lock the diaphragm and speech coil in correct position.

I have not tried out this method myself, so that I cannot give it a personal recommendation, but it sounds the sort of thing that wants doing with a good deal of care and circumspection.

### The Invisible Beam

We are continually hearing of new uses for radio amplifying circuits and also for photo-electric cells. During the War, as many of you will remember, there were innumerable ideas put forward for detecting and destroying enemy submarines. Most of these, although perhaps good on paper, were quite impracticable. Nevertheless, out of the great mass of ideas and suggestions contributed, a number have been made use of in the intervening years. I noticed the other day some reference to a scheme for exploding a torpedo when actually underneath an enemy craft. I think the scheme was to fire off the torpedo towards the enemy ship and then to follow it with a kind of searchlight beam of invisible—presumably infra-red—light, the effect of this being to keep a photo-electric cell relay arrangement in the torpedo out of action. When the torpedo passes underneath the enemy vessel the latter casts a shadow, so preventing the beam from operating on the photo-electric cell, and the latter, being then de-energised, releases the relay and fires the torpedo.

As a suggestion for the use of two relatively new devices, the photo-electric cell and the infra-red invisible beam, this idea is interesting, but I should think it would want a lot of time spent on it before it became a practical method for use in naval warfare.

## IN THE ISLE OF HAITI

(Continued from page 202.)

Hispaniola. English announcements are fairly frequent. Power said to be 20 watts.

H 11 J (51.15 m.), San Pedro de Macoris, says in English, "This is short-wave station H 11 J in San Pedro de Macoris, operating on 5,865 kc." Power, 100 watts; formerly 40.

H 14 D (45.77 m.), Trujillo, employs the slogan, "La Voz de Quisqueya."

H 15 N (48.8 m.), Santiago, uses long sequence of chimes, possibly 20, slogan "La Voz del Almacén Dominicano," and often begins its programmes with the "Merry Widow" waltz.

H 18 A (46.3 m.), Trujillo, announces in English; slogan, "La Fa-Doc en el Aire," coupled to the wail of a siren, chimes or a bugle call. All have been heard at different times.

### Stations of Haiti Republic

Haiti can only boast of H H 2 S and H H 3 W that are really well heard in this country, and of the two I always find the former the more consistent. H H 2 S (50.85 m.), Port-au-Prince is very simple to identify, as practi-

cally all announcements are made in French, and a 4-chime signal is used. H H 3 W (31.18 m.), also of Port-au-Prince, announces in French, English and Spanish at regular intervals, and, like H H 2 S, employs a 4-chime signal, while in addition it sometimes indulges in the noise of a train, or a bugle call.

In conclusion, I would like to point out that C E B now employs a 4-chime signal in addition to its slogan "Radio Service Onda Corta de Santiago de Chile"; that C O C Q appears to be announcing as "C O C Q, La Fabrica de la RCA Victor" now, and that C O C X was heard using a chime; 3 cuckoo calls; man's laughter and mention of "Casa Lopez"; 4 chimes; bugle call; the "Wedding March"; car engine; noise of a train; and the slogans "La Corona" and "La Voz del Radio Philco," on a recent occasion, so please forgive me, dear reader, if I omit one characteristic or deviate from any current feature of identification.

## OUR CLUB CORNER

Secretaries of short-wave, television and other clubs and societies are invited to send in reports for publication.

### BIDEFORD AND DISTRICT SHORT-WAVE SOCIETY

In view of the interest being shown in Amateur Transmission, it has recently been decided that alternate meetings, which are held fortnightly, should be devoted to this subject.

A large attendance of members witnessed the first transmitting demonstration by the chairman on April 5th last, when a transportable low-power mains set produced satisfactory contacts with four amateur stations in the 1.7 mc. band.

The club now possesses its own very efficient short-wave receiving apparatus, consisting of a battery-operated 3-stage receiver and 2-valve mains amplifier, which are installed at the club-rooms.

Interested prospective members are invited to apply to the secretary, Mr. E. K. Jensen, 5, Furzebeam Terrace, East-the-Water, Bideford, for particulars. The subscription has been fixed at 1s. per fortnight.

## AN INEXPENSIVE CHARGER

Details of a recent addition to the Heyberd range.

EVERY WEEK or every fortnight something like four million L.T. batteries are taken to the local garage, electrician, or to some other destination for charging. I may be somewhat out with my four million, but it cannot be far wrong. The figure runs into millions, anyway, and that is sufficient to drive home my point.

Millions of accumulators. Millions of tired backs, of impatient listeners, and of sixpences or so! Think of it! And perhaps you who read this now are one of those fellows who lug their accumulators about every week.

But whether you are on A.C. or D.C. you can quite well charge your batteries at home. There are umpteen gadgets on the market enabling you to do so at practically negligible cost. For A.C.

### A COMPACT UNIT



Neat simplicity characterise the Tom Thumb charger.

## GOLDERS GREEN AND HENDON RADIO AND SCIENTIFIC SOCIETY

The Golders Green and Hendon Radio and Scientific Society recently visited the Television demonstration theatre of Messrs. Marconiphone Company.

Mr. A. S. Radford first dealt briefly and clearly with the subject from the optical point of view. The interlaced system of scanning and Emiscope tube were fully explained.

Six stages of T.R.F. are used, having a gain between 40,000/100,000 times rectified to give a variable voltage between 0/10 volts D.C.

The meeting closed with a full demonstration on three different models all working at the same time. The pictures were remarkably bright, steady and clear, and it was noted that the apparatus required very little attention and that local interference was much more noticeable on the sound side than in the pictures.

On Sunday, May 23rd, in the country round St. Albans, the Coronation Direction Finding Competition on 80 metres will be organised by the society directed by Lieut.-Col. H. Ashley Scarlett, D.S.O. This annual event is open to all interested in radio. After tea a conference is to be held, to which radio enthusiasts are invited as well as those participating in the competition.

On June 2nd and July 11th 5-metre field days will be held to test out apparatus, and a 5-metre competition will be organised on September 12th.

Full details of the above may be obtained on sending a stamped and addressed envelope to the secretary, 60, Pattison Road, N.W.2.

## IMPORTANT NOTICE

Next week's "POPULAR WIRELESS" will be on sale Tuesday, May 11th. One day earlier than usual.

people there are so many chargers available that it is very difficult indeed to make a choice at all.

Firms like F. C. Heyberd & Co., of 10, Finsbury Street, London, E.C.2, specialise in battery chargers of all sorts and sizes. You can get a big one that will tackle a car accumulator and think nothing of it; it will enable you to charge your neighbours' batteries until they wake up to the fact that they will do better to charge their own at home.

But the charger that takes my eyes is a new one that has just been introduced, and costs only 12s. 6d.

It is a trickle charger, and delivers .5 amp. at 2 volts. It is therefore designed solely for wireless batteries, and is a job which can be recommended to any radio user who has A.C. mains and wants to charge his own battery.

### Remarkably Small in Size

The size is remarkable, for the whole thing measures 3½ in. long by 2½ in. wide and 2½ in. high. It will tuck away in any old corner. You could put it in the radio cabinet quite well as long as you did not so arrange things that the battery was also in the cabinet when charging. If you did you might get trouble from the acid fumes.

The charger is called the Tom Thumb, and deserves its name. In fitting it up it is easy to arrange a switch so that the battery can be put on charge when required, say for a night or two, or even more if required, every week. The current taken from the mains is negligible, and the use of the Tom Thumb will certainly save endless shillings otherwise spent at the charging station.

A metal rectifier is used, and the whole thing is, of course, silent and works without getting hot. It is well worth while looking further into the matter where that charger is concerned. I have had one on test, and it has certainly done everything that was claimed for it. Incidentally, if you want to know what it will cost you to charge your battery, the charger takes one unit of electricity for every 200 hours. Thus, if your current is 1d. a unit it will cost you about that sum for 200 hours' use of your set, provided you use a two- or three-valve taking approximately .5 amp. of filament current. Not exactly ruinous, is it? And is it cheaper than taking the battery down to the charging station and forking out your bawbee every now and then? I'll say it is!

**RANDOM RADIO REFLECTIONS**

(Continued from page 196.)

**HOW TO MAKE GOLD**

**D**REAM of alchemists of all ages! And plenty of others, too; to be able to make gold. But the world doesn't want more gold. There are thousands of millions of pounds-worth of the stuff poked away in the vaults of banks. Doing nothing except to figure on paper as a backing for paper money.

And South Africa and Australia and Canada are increasing their outputs of gold, and the U.S.S.R. is pulling it up out of the earth by the ton—to stuff into banks.

The U.S. have so much of the yellow metal that they've had to erect a special building to hold it. Oh yes, there's a regiment of soldiers on guard and a few score machine guns!

But you and I wouldn't mind a bar or two of bullion, would we? Though it wouldn't be much good to us if everyone else also had a bar or two. So don't let too many other people into the secret I am now about to disclose.

It is the secret of making gold; no less. Invented by a French scientist, M. Jollive Castelet, and improved by me, Maestro-Metallurgist Victor King.

Hold your breaths, boys, here it is!

Take (1) two grammes of arsenic sulphurate, (2) five grammes of pure silver, (3) one gramme of pure tin, (4) two grammes of pure sulphurate of antimony, (5) half a gramme of sodium chloride.

Heat this mixture for three hours at a temperature of 1,350deg. Centigrade, and after that let it cool down gradually to 20deg.

Your gold is now ready to be served. But you'll have to look for it, as there'll be only about one part in five hundred of pure gold.

It's quite true. Oh, by the way, one of my most important improvements to the formula is the addition of No. 5 ingredient. You may recognise it as a pinch of salt.

**THE "ABERDEEN ANIMALS"**

**I** AM taken to task. Miss Hazel Dobbie (aged 8) of Union Terrace, Aberdeen, says:

"In POPULAR WIRELESS you write that no child will listen for half an hour to the children's hour. If you listen to the Aberdeen animals you will be very pleased to listen for a whole hour."

And that, my brothers, is that!

No qualifications for Hazel. She knows what she likes and is obviously very certain that she knows what other people ought to like. I guess the B.B.C. will be after her.

But, as a matter of fact, I think I might listen to the "Aberdeen Animals" for a whole hour. I didn't know anything about them until, spurred by Hazel's reprimand, I made some inquiries. I learn that said "animals" comprise four human impersonators who contribute a quite informal programme.

Clearly, the Gielgud virus hasn't completely penetrated Scotland—yet. Long may Brer Rabbit, Mistress Mouse, Howard Hare and Squirrel continue to hold the Aberdeen fort against the formal uplift of the Big House.

**MISCELLANEOUS ADVERTISEMENTS**

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The Proprietors have the right to refuse or withdraw advertisements at their discretion.

Postal orders in payment for advertisements should be made payable to The Amalgamated Press, Ltd., and crossed.

All communications should be addressed to Advertisement Department, "Popular Wireless," John Carpenter House, John Carpenter Street, London, E.C.4.

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**SOUTHERN RADIO'S WIRELESS BARGAINS**

All Goods Guaranteed and sent Post Paid.

**RECEIVERS.**

**LUCILLE.** 5-valve American Midget Sets. Complete with 5 Valves. Moving-Coil Speaker. Ready for use on any mains 100/250 volts A.C./D.C. Long and Medium Waves, £3 15s. od. New in sealed cartons.

**RECORD CHANGERS.**—Garrard Model R.C.4, plays automatically and changes eight 10-in. or 12-in. Records of any kind. New, in sealed cartons, £6.

**SPEAKERS.—CELESTION** Soundex permanent magnet, 10/-. TELSEN permanent magnet, with 10-ratio Transformers to suit any Receiver, 12/6. Telsen Loud-Speaker Units, 2/6. All Brand New and Boxed.

**COILS.**—Telsen Iron Core, W.349 (Midget size), 4/-. Type W.478 (Twin), 9/- pair. Type W.477 (triple), 16/- per set. Type W.476 (triple Superhet, Selector and Oscillator), 16/- per set. All ganged coils complete on base with switch. Telsen L.F. Transformer Coils. 110 kc., 5/-. Telsen Dual Range Coils, with aerial series condenser incorporated type W.76, 4/-. **AMERICAN VALVES.** A full range of valves for all American receivers, 6/- each.

**MISCELLANEOUS BARGAINS.**—All brand new in original sealed cartons: Telsen A.C./D.C. Multimeters test anything radio or electrical, 8/6. Telsen 2-range Voltmeters, 3/-; 3-range meters, including milliamps, 4/-. Ace (P.O.) Microphones, with transformer ready for use with any receiver, 4/6. Bell Transformers, 200/250 volts input, 3, 5, and 8 volts output, 3/6; Morse Signal Units, incorporating buzzer, tapper and flash with international code, complete with batteries and bulbs, 3/9 each. Lightweight headphones, double pole, 4,000 ohms, each earpiece, 3/- pair.

**REGENTONE ELIMINATORS A.C.**, 200/250 volts, type W.5a, with trickle charger, 37/6.

**SOUTHERN RADIO.** Branches at 271-275, High Road, Willesden Green, N.W.10; 46, Lisle Street, London; W.C.2. All mail orders to 323, Euston Road, London, N.W.1.

**SOUTHERN RADIO**, 323, Euston Road, London, N.W.1 (Near Warren St. Tube). Phone: Euston 3775.

**HEADPHONES.** Guaranteed. Brown, Sterling, B.T.H., Nesper, Brandes, etc. 2,000 ohms, 2/6. 4,000 ohms, 5/- Postage 6d.

**SPECIAL.** Ericsson, 4,000 ohms, as new, 7/6. Telefunken, adjustable, lightweight, 7/6.

**CRYSTAL SETS.** Burne-Jones. Complete. Guaranteed. 5/6. Ditto, double circuit, 8/-. Sensitive permanent detectors, 1/6. Crystal detectors, complete parts, 1/-. Crystal with whisker, 6d. Postage 1½d. Post Radio, 183, Caledonian Road, London, N.1.

**CONVERSION UNITS** for operating D.C. Receivers from A.C. mains. Improved type, 120-watt output at £2/10/0. Send for our comprehensive list of Speakers, Resistances and other components.

**WARD**, 46, Farringdon Street, London, E.C.4. Tele.: HOLborn 9703.

**S.T. 800** Specified Kits, including valves and dial, £4. A.C. S.T.800 Kits "A," £8. Specified S.T.700 Kits "B," £2 15/- 0. Serwell Wireless Supplies, 64, Prestbury Road, London, E.7.

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**ROLA SPEAKERS, BRAND NEW, BOXED.** 8 in. 1,000 ohms with matching transformer, 6/6. Postage 6d. Linecords 2/-.  
Power Transformer, 6.3V. 2½ amp., 5V. 3 amp., 350-0-350, 100 Ma., 8/6, Postage 6d.—Radiographic Ltd., 66, Osborne Street, Glasgow, C.1. Bell. 848.

**SHORT WAVES**

**AMERICAN RECEPTION** on your own receiver with the RIDGO short wave unit, from 9/6 complete, send for illustrated lists.—Radio Industries, Birch Street, Hanley, Staffs.

**MISCELLANEOUS**

**A.C.-D.C.** One- & Three-phase motors. All voltages, from 14/9. Lists free. Repair Specialists. Easco, 18pni, Brixton Road, S.W.9.

**GRAMOPHONE Attachments** for Radio, electric motors, 25/-; Pick-ups, 9/6; Portable Gramophones 12/-; spring motors, 4/6; dozen, 36/-, 100, £12/10, 1,000 £100; walnut pedestal Anexagram, £5. Sound-boxes, tonearms, horns, cabinets, needles, gears, springs, accessories cheapest. Lower prices for quantity buyers. Catalogues free.—Regentpop, 120, Old Street, London, E.C.1.

**WANTED.** Modern used Short-Wave Sets, parts, Eliminators, Speakers, Meters, Motors, and Pick-ups, etc. Bring or send. Spot cash paid. University Radio Ltd., 82, Hampstead Road, Euston, London, N.W.1.

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**CORONATION SONG BOOK**

The perfect musical souvenir. Contains all the national favourites that British people love to hear: full words and music of 46 grand old traditional English, Scottish, Welsh and Irish airs, together with an impressive Ceremonial March, specially composed for the occasion by A. Morris-Gilbert.

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- Home, Sweet Home
- Land of My Fathers
- Londonderry Air
- The Maple Leaf For Ever
- March of the Men of Harlech
- Meeting of the Waters



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