

A BOOK AND A BLUEPRINT FOR EVERY READER

# MODERN WIRELESS

1/4

VOL. XVIII No 71

NOV. 1932

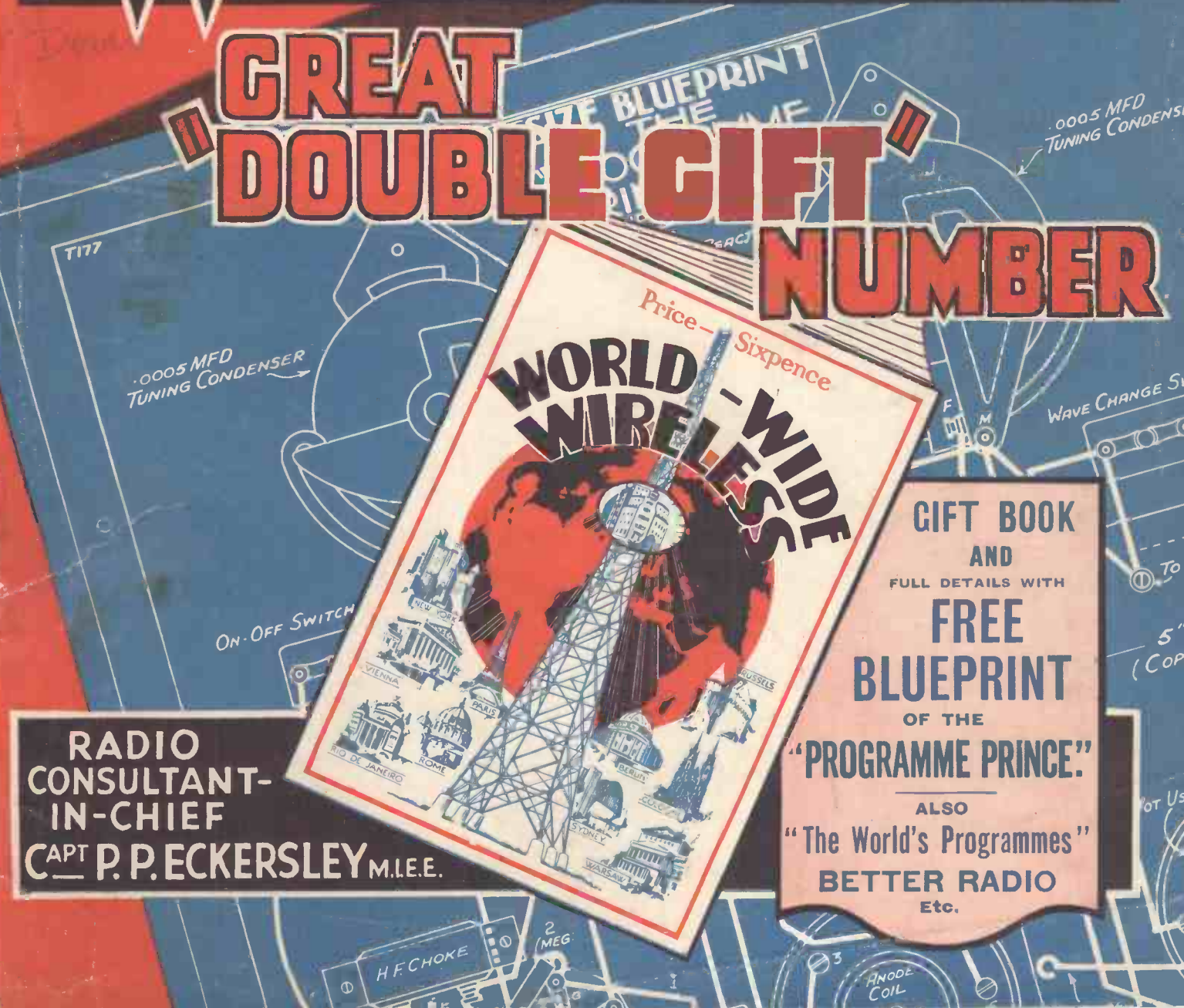
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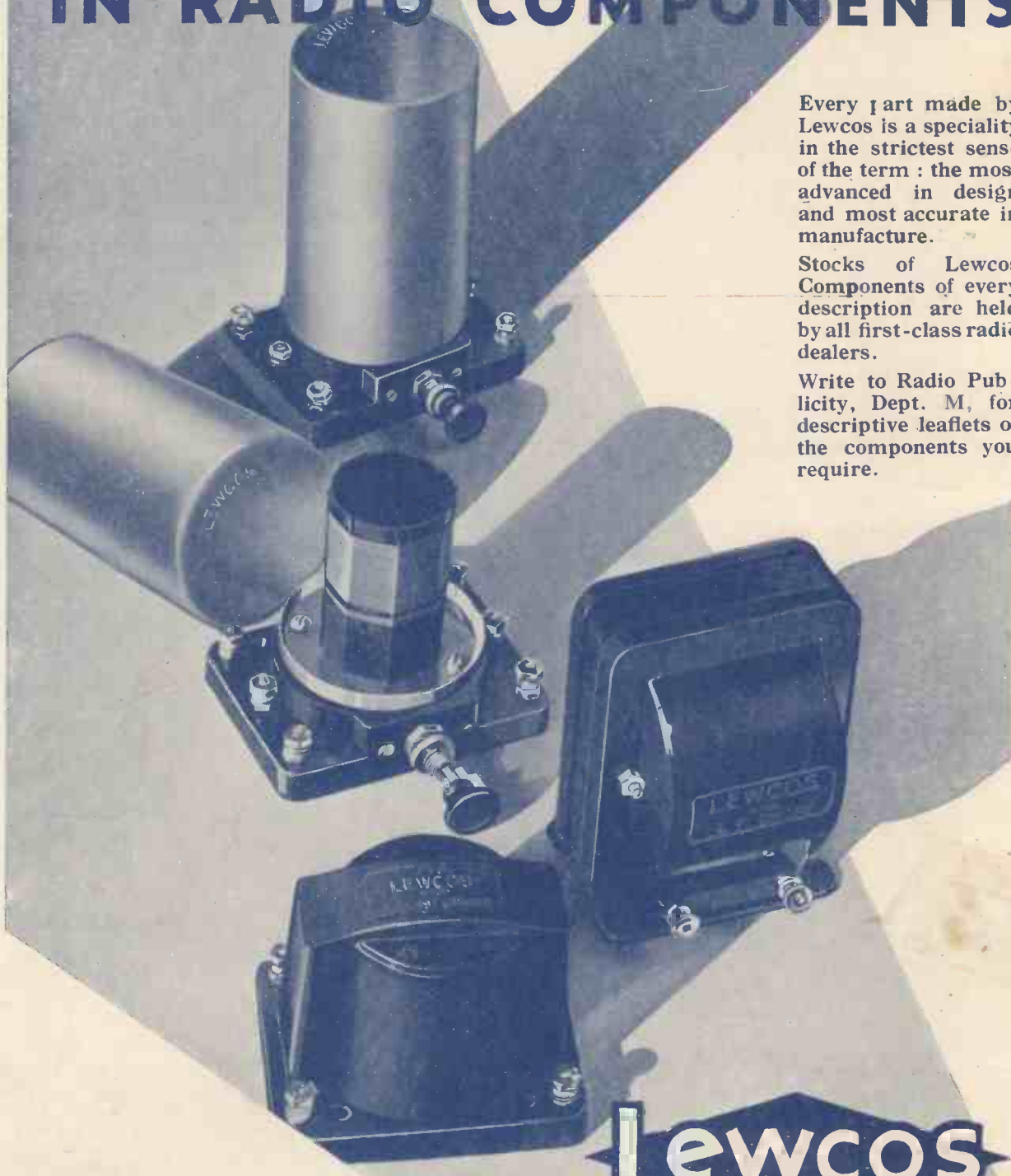
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THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED, CHURCH ROAD, LEYTON, LONDON. E.10

# CONTENTS

Vol. XVIII. No. 71. MODERN WIRELESS. NOVEMBER, 1932.

	Page		Page
Editorial	417	On the Short Waves	471
In the Commentator's Hut	418	Sport for All (Cartoon)	474
Those Background Noises	420	A Radio Reckoner	475
Better Radio	421	Round the Turntable	478
The "Lissenola" Two-Valve Receiver	424	My Broadcasting Diary	479
Circuits for Short-Wavers	425	Making Simple Measurements	482
<b>FOR THE CONSTRUCTOR</b>	427	Quality Detectors	483
Our Blueprint Set	428	Spotlights on the Programmes	488
The M.W. "Programme Prince"	429	Edinburgh's Broadcasting House	492
Construct Your Own Cabinet	438	At Your Service	496
The "Diode" for Super-Hets	439	Recent Record Releases	500
Radiogram Pointers	440	In Passing	502
A Two-Valve Amplifier	441	Critics of the Microphone	503
The Amplifier in Use	444	Trouble Tracking	508
Questions Answered	447	Changing to A.C. Valves	510
On the Test Bench	448	Radio Notes and News of the Month	512
The "Ekco" M23 A.C. Receiver	450	Cutting Out the Bias Battery	516
The Osram "Thirty-Three" Music Magnet	470	Reception Wrinkles	519
		Micro-Mesh Valves	520

**SPECIAL SUPPLEMENT, "THE WORLD'S PROGRAMMES," PAGES 451-469.**  
(See page 451 for Contents.)

*As some of the arrangements and specialties described in this Journal may be the subject of Letters Patent the amateur and trader would be well advised to obtain permission of the patentee to use the patents before doing so.*

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## WORLD-WIDE WIRELESS

by the aid of

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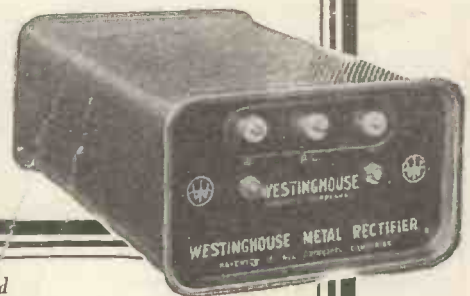
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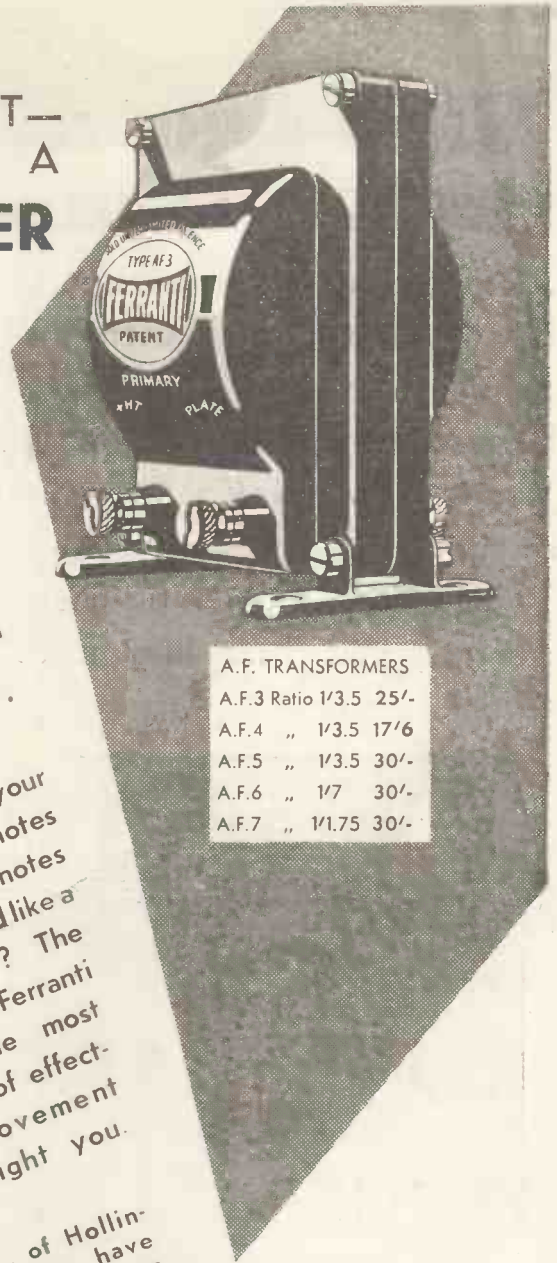
# TO YOU

THE COST OF A BETTER SET—  
MAY ONLY BE THE PRICE OF A  
**FERRANTI TRANSFORMER**

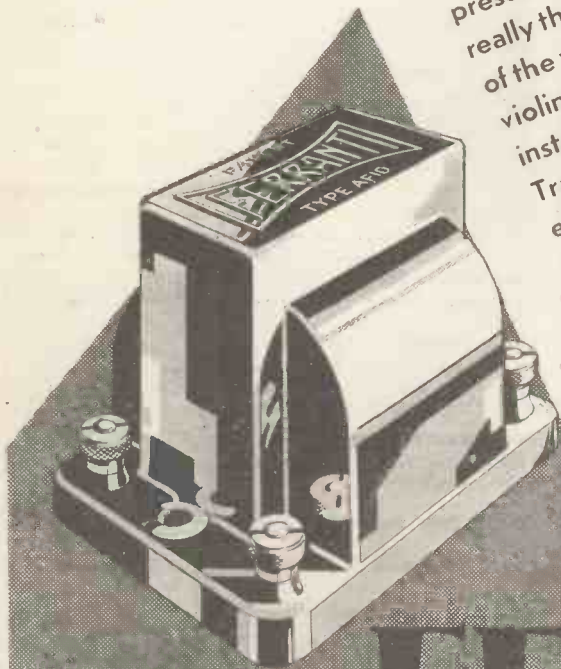
It is easy to spend many pounds on a set giving poorer quality of reproduction than you would get from your own by simply installing a Ferranti Transformer.

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... gives one such a range of choice—broadcasts from all over the place, or records according to fancy. I'm no highbrow—I just like what I like. But I want it *done well*. And this H.M.V. is a corker for reproduction, no mistake. Think I'll try it over on the table by the window, and hear how it sounds from there."



Transportable Radio-Gram — the only 2 in 1 instrument of its kind. All-Electric, Marconi Valves fitted as standard, 25 guineas.

## NOW— I'm longing to hear these new records

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Artur Schnabel (Photo, Otto Kurt Vogelsang, Berlin)

—and Ray Noble himself in a Sure-fire Winner. Watch the Navy—When the band goes marching by. Ray Noble and His New Mayfair Orchestra B6236, 2/6

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Gracie Fields (Photo, Mitchell, N.Y.)

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Gigli (Photo, Del Cupolo, N.Y.)

# "His Master's Voice"

## True to Life — Radio and Records

ALL INSTRUMENTS OBTAINABLE BY HIRE PURCHASE



Vol. XVIII. No. 71.

BRITAIN'S LEADING RADIO MAGAZINE.

NOVEMBER, 1932.

*Our Free Book—The "Programme Prince"—A Shilling Blue-Print Given Away, Too!—  
The Post Office and the "War" on Pirates.*

**T**HIS issue of MODERN WIRELESS may legitimately be described as a veritable encyclopædia of information for all radio enthusiasts. To begin with, we present to our readers a sixpenny book free—entitled "World-Wide Radio."

This book has been written with the idea of providing a permanent complement to the World's Programme section, which has proved so popular in MODERN WIRELESS. But, of course, a brief glance at the booklet will show that it is complete in itself and is, in fact, an invaluable handbook of reference.

Together with the first published details of the MODERN WIRELESS "Programme Prince" receiver, we also present a 1s. blue print free. Constructional details of this first-class product of the MODERN WIRELESS Research Department are dealt with in a special section of this magazine.

Constructors will note that they have thus all available information of the receiver compactly and pictorially presented in the most pleasing editorial fashion. The "Programme Prince" is a receiver which is distinctly of the type simple to construct.

It is inexpensive and, plus the qualities of compactness and ease of operation, is a set which you will find will give first-rate performance.

Another constructional feature to which we would draw your attention deals with the building of a very efficient two-valve amplifier.

### *'Ware the Bogus Inspector*

**I**T is already reported that the Post Office offensive against wireless pirates which began a few days ago has been very successful and that over 100,000 new licences have been taken out in the London area.

According to a Post Office official, the G.P.O. detectives have the names and addresses of many pirates. Honest owners, said the official, have nothing to fear.

Many of them will, of course, be asked by officials to show their sets and their licences, as they are obliged to do by the Wireless Telegraph Act. Last year some people had their sets stolen by bogus officials, and I should like to emphasise that nobody should allow an inspector to enter his house or see his set unless he can produce a Pass Card from the P.M.G.

### *Problem of the Unpaid Licence*

**A**s several correspondents to the "Daily Telegraph" and other papers point out, however, the most the G.P.O.'s marvellous detective van apparatus can do is to point out the place where a set exists. Surely the G.P.O. are not claiming that the apparatus can detect whether the licence has been paid or not!

Certain it is that enquiry will have to be made at particular houses marked down on the G.P.O. detective list, and the odds are that the greater part of the working day of one of these detectives will be spent in haphazardly making enquiries on the off-chance of being lucky and picking up a pirate.

Of course, a good deal of this G.P.O. publicity is in the boggy line, but nevertheless it is justified in view of the serious problem of the unpaid wireless licence. Nothing could be meaner than the attitude of those pirates who, either through carelessness or deliberate indifference, fail to pay their yearly 10s.

### *Making the Dealer Responsible?*

**I**N fact, the whole problem of the wireless pirate is raised again in the question of how best to deal with it. One suggestion made recently was that radio licences should be produced on demand, as motor licences.

Another suggestion made was that no wireless set should be sold unless the potential purchaser, on entering the wireless shop, can produce his licence; just as no potential purchaser of a revolver is supposed to be able to buy a weapon without first producing a Scotland Yard permit. But the problem boils down to this in the end: that the only way of being absolutely certain whether a wireless set is licensed or not is to start a house-to-house inspection; and, of course, such a method is impossible in practice. Thousands of inspectors would be required, and they would certainly be kept busy day in and day out for heavens knows how long.

One practical suggestion is that a tax should be levied on the sale of each valve. Of course, even this scheme has its drawbacks, but of all the proposals put forward to make certain that users of a wireless set pay a reasonable fee for the service, this strikes us as being one which has the germ of the most practical idea in it.



# IN THE COMMENTATOR'S

An amusing account of the strange troubles of Outside Broadcast Commentators, described by our Special Correspondent.

THIS is the simple tale of a commentator's hut, looking like a large Tate sugar-box, which started life in the basement of Savoy Hill!

The Outside Broadcasts' commentators had made occasional complaints that they were not adequately housed while broadcasting, and that what they wanted was a commentator's hut which would not let in stray sounds and (just as important) the rain, and which would not demand a Hercules to move it about or shift it off the B.B.C. "O.B." van.

### The First Hut Appears

After the usual Governmental period of thinking this over, and the transference of inter-departmental pink papers with reference numbers embracing most of the letters of the alphabet, the new commentator's hut started to come into being, and within a week or two it stood resplendent in the basement of Savoy Hill all ready to be rushed out on an Outside Broadcast job.

Rushed out it soon was. It was used for Rugger broadcasts, and similar things where the weather was not all that it might be.

Its pristine neatness vanished. The boards warped and let in stray sounds. The roof leaked and let in the rain. The glass window jammed, would not shut, and let in a draught.

Soon there were more pink inter-departmental forms fitting about in the B.B.C. engineering sanctums, and the need for a new and super-special kind of commentator's hut was impressed on the "brass-hats."

Now this new hut was *un fait accompli*. It was the product of a Savoy Hill engineer who was also a keen motorist, and it had a motor-car windscreen and sliding glass windows at the side of the hut very much like those of a saloon car.

### OXFORD v. CAMBRIDGE



The B.B.C. "O.B." van shown above is always ready to take the road when running commentaries are required. (Right) The launch "Magician," which is used by the commentators when they broadcast the Boat Race.



(Above) Mr. H. M. Abrahams, the old Blue, broadcasting a commentary on the Oxford v. Cambridge relay races at Oxford. Note the swinging windows and the suspended microphone of this "old-type" hut.



# HUT "GIVING A RUNNING COMMENTARY IS A HUNDRED PER CENT WHOLE TIME JOB"

The commentators have had trouble in keeping turned always towards the microphone. It is rather difficult when following a Rigger match not to turn the head while watching the flight of the ball, and this means that certain words are heard loudly while the commentator is facing the microphone, while others fade as he turns sideways.

## Two Microphones Tried

At a Schneider Trophy race broadcast some time back they got over this trouble partly by having two microphones, one at each side of the commentator's window. When looking straight forward, therefore, remarks were picked up equally by both "mikes," while as the commentator turned from side to side the volume of one microphone increased, while that of the other correspondingly decreased. It prevented fading, but was not ideal. Now they have a new idea. For the first time the microphones are put almost flat on the reading desk, and there are two of them. Little cork-faced desks hold the announcer's plans and notes.

The microphones are slightly sunk. There is an arrangement, too, whereby they can be slung upon cables above the announcer's head if necessary.

Amplifier gear is never put in the commentator's hut, because giving a running commentary is a hundred per cent whole-time job. The engineers keep the portable three-valve amplifier which immediately follows the microphone within a few yards of the hut. This has a transformer-coupled arrangement feeding back to two pairs of headphones for the men giving the commentary.

As you know, one man is generally appointed to give the

## SOUND-PROOFED WITH PADDING



The commentator's hut is quite a small affair, and is taken from place to place on an O.B. lorry. The inside of the hut is lined with felt to keep out all extraneous noises

actual running account of the match or race, while the other (often a member of the B.B.C. staff) backs him up

## BROADCASTING THE NIGHTINGALE



This photograph shows B.B.C. engineers testing out the apparatus used for broadcasting the nightingale from a Berkshire wood.

with technical details of the players' positions, and gives the leader the opportunity to introduce historical facts.

## Inadvertent Advertising

The most difficult thing is for the first commentator to follow the second man through the 'phones. The result is that the commentators often work without 'phones, until a frantic signal comes through from one of the volume-control engineers telling them to put the 'phones on again and hear how loudly they are "blasting."

There is an elaborate code of signals between the engineers and the men at the microphones, not only for technical reasons, but because the engineers often act as unofficial censors of the commentator's remarks.

At one Boat Race, for example, a keen commentator was trying to give listeners an idea of the amount of debris floating on the river and said: "Here is a — ginger-beer bottle cork," the dash representing the name of a well-known maker of mineral waters.

That same commentator was unlucky enough to have had a gramophone record made of his remarks, and for several weeks he was plagued by hints of an advertising conspiracy!



# THOSE BACKGROUND NOISES

Of course, I cannot tell you how to cut out the noise of the studio "claque," as this is one of the things decreed good for us. But in the average set there are a good many incidental sounds whose origin does not lie at the transmitting end of the station being received.

Apart from those generated in the set, it must be remembered that a modern set is so sensitive that a lot of "mush" and "X's" can easily be picked up, and there are many other kinds of interference likely to cause trouble.

### Using a Filter

As long as you have tuning circuits sufficiently selective for the power of the set and for modern conditions prevailing in the ether, you cannot do much more in this respect. Results should, however, be satisfactory, as with unselective sets the greatest background noise is due to the carrier of the neighbouring station or to the "swamp" effect of the local.

Having got this to our satisfaction, there is still the whistle caused by the heterodyning of the carriers of two adjacent stations. If you try to prevent this in the high-frequency stage by excessively sharp tuning, you will spoil the quality of stations such as the local, which is not generally interfered with.

In the circumstances the best thing to do is to use a "heterodyne" or "whistle" filter which can be connected in the L.F. stages when required, and is quite cheap to buy. "Scratch" filters, such as are used for eliminating scratch when reproducing gramophone records, will generally also be found suitable.

### Watch for Corrosion

But don't put all noise down to outside interference, as crackles, buzzes, squeals, growls, grunts and hisses can all be internally introduced by the set.

By H. A. RAMPTON.

*What can you hear on your set in the intervals of a programme? Nothing? Lucky man, because nothing spoils a good orchestra so much as a noisy background.*

The aerial and earth should be examined for loose joints, especially those likely to have been weakened by the swaying of the wires. Suspicion should also fall on the flex leads to loud speaker and to batteries. It should be verified that the flexes are securely fixed to their respective plugs or terminals. Watch out for corrosion of the connections to the L.T. accumulator.

The aerial and earth wires should be removed from the receiver to find whether extraneous noises cease, and subsequent tests should be made with them disconnected.

Grid-bias and H.T. batteries often produce crackles, and the best plan is to renew them. If, however, the

### INSIDE THE SET?



Very often what is supposed to be outside interference is caused by a bad joint somewhere inside the set, so make sure that all connections are mechanically and electrically sound.

H.T. battery is fairly new, matters may be partially remedied by connecting a condenser of about 2 mfd. between each positive tapping and the negative end.

### Substituting Components

In the set itself the obvious thing to look for is bad connections and loose joints in components, excessive dust between the plates of the variable condenser, or broken wires in the tuning coils due to rough handling. Don't forget that if the coils are wired with cotton- or silk-covered wire the disconnection may not be visible.

A broken-down H.F. choke or L.F. transformer primary will give rise to similar symptoms. In the case of components, the easiest method of discovering the offender is that of substituting another component. The search may be narrowed down considerably by the simple process of eliminating each valve in turn. All you have to do is, starting at the aerial end, to withdraw the valves from their sockets.

A grid leak past its prime is a frequent offender in this respect. Continuous noises in an R.C. unit may be due to the coupling condenser having partially broken down.

### Bad Contacts

Apart from the clicks caused by the switching on and off of house lights, bad contacts in the switches or in the house wiring (more often the switches) will cause noises. This is not only on mains sets; it is also very likely to occur on those that are battery driven, especially if they are fairly sensitive.

With a battery set you can find out if the mains are responsible by switching off at the main power switch.

But if you have a mains set the best thing is to try somebody else's set, on your mains supply, or to try your own on theirs.



A special section for all listeners. It includes numerous practical hints and tips for maintaining a radio receiver in good order, and describes how time, trouble, and money can be saved in use and operation.

**FOREWORD**

Quite a number of readers have written urging us to enlarge this section. Later on, if we continue to arouse the enthusiastic appreciation which greeted our first excursions, we may be able to do so. In the meantime, it is worth noting that "Better Radio" contains approximately as much in mere text as six ordinary pages of MODERN WIRELESS, while it is our hope that we manage to crowd more actual information than is to be found in the whole of a magazine!

Anyway, that is what we are trying to do, and if readers do not greatly benefit from each and every instalment, then it won't be the fault of—The Compilers of "Better Radio."

This practice, adhering to one brand, is to be commended. There is as yet only the beginnings of a standardisation of type descriptions, and the enthusiast who rambles through the list specifications of the five hundred or so different varieties available is likely to be confused by similarities which are similarities only of list classification.

The assistant gave him a replacement, but we noted that the doubtful specimen was neatly tucked into its packing and laid suspiciously near a pile of others displayed for sale.

We have often wondered whether it was tried on someone else without any attempt being made to check its efficiency!

On another occasion we saw a valve

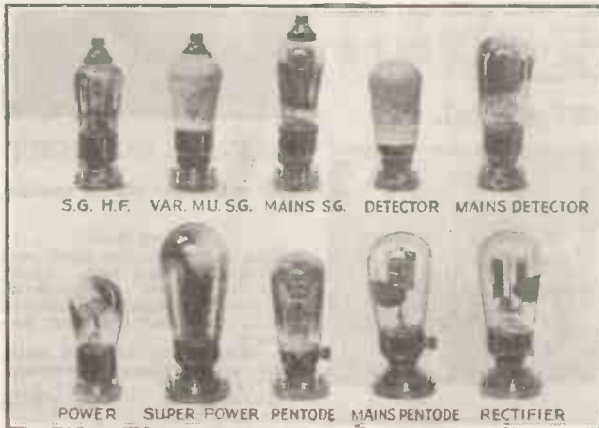
However careless shop assistants may be in cases, valve cartons are designed to afford some measure of protection as well as being mere coverings.

We do not think any harm could be done to a modern valve by dropping it on to the floor in its carton. We have sent valves through the post without additional packing and they have survived the experience!

And do you remember that aeroplane stunt some time ago? One of our leading manufacturers had a bunch of its valves thrown out of an aeroplane.

Most of them survived quite unharmed. What better proof than that of the robustness of the modern valve, and the protection afforded by its carton, could be given?

**VITAL LINKS IN THE CHAIN**



Types of valves which are to be found in modern sets.

**VALVES FOR YOUR SET**

We are often asked if there is any technical objection against the mixing of makes of valves in any one particular set.

There is not. Arising out of this question is the further one as to whether valve manufacturers tend to specialise in types of valves.

That is to say, although most of them have complete ranges for all purposes, are, for example, the S.G.'s of so-and-so outstanding productions, the mains types of pentode of this-or-that firm, to be preferred to all others, and so on.

**Peaks of Achievement**

It is unfair to generalise in such a matter, but we can at least say that, on the whole, if there are peaks of achievement in the outputs of most of the valve factories, they are not so vastly higher (in quality) than the others of their respective families that the ordinary listener need worry about them.

If he confines his choice to the catalogue of one reputable maker he is not likely to miss much.

Indeed, unless he is careful he may find himself in possession of quite unsuitable types.

The greatest argument against the purchase of unbranded foreign valves is that they are seldom sold in sealed cartons.

We were once standing in a suburban radio-cum-ironmongery shop when a customer returned a valve which he stated was a complete "dud."

dropped on to the floor. It was in its carton and the name thereon was one that is well known to the British public.

We can well imagine that a customer witnessing such an incident might have uneasy feelings about paying hard cash for a valve which might or might not have been similarly treated.

There need be no cause for alarm.

**THE POWER YOU USE**

It is impossible to obtain good bass unless you employ adequate power. Far more power is used in developing bass response than is required for the high notes.

This is why the smaller kinds of battery set usually sound thin and reedy as compared with the larger mains outfits.

This, then, is an argument in favour of using a mains unit quite apart from the economy of the procedure.

If the mains are available one should strive to build or buy a complete mains set as a matter of course, for big power then becomes fairly easy to obtain.

**Restricted Output**

Should there be no mains, the only thing to do is to make the most of batteries.

As a generality it can be said that the listener should economise as far as he can at every preceding point, so that the maximum current is available for the power valve.

Dry H.T. batteries have restricted outputs, and it is not wise to make

**FOUR USEFUL TIPS FOR USERS OF RADIO-GRAMOPHONES**

**CONSTANT SPEED**

PIECE OF STAMP EDGING

RECORD SHOULD REVOLVE 78 TIMES PER MINUTE

**WHEN FITTING A PICK-UP (1)**

WRONG

KEEP THE PICK-UP PROPERLY TRACKED

**WHEN FITTING A PICK-UP (2)**

OBTAIN CORRECT NEEDLE ANGLE (ABOUT 60°)

**CLEAN RECORDS**

LIGHTLY WIPE RECORDS WITH SOFT DUSTER EVERY TIME

# A Radio Story in a Few Words and Six Pictures

them deliver more than their rated maxima.

The H.T. current consumption of an S.G. valve can be reduced by providing it with up to 1½ volts of negative grid bias, and the effect of lowering its anode and screening voltages can be tried.

But such things as this must be done carefully, or there will be economy only at the cost of efficiency.

the tuning is changed. So he takes the aerial off. The noises are still as loud, although the broadcasting has all but disappeared.

He has now checked the above point and also derived the information that it isn't an aerial pick-up of some very broadly tuned interference. (Being an experienced radio man he knows that atmospheric disturbances are liable to cause all kinds of queer other sounds.)

So he now makes sure that the mains connection between his mains set and the power point is in good order. Perhaps he even hopes that the interference is a warning that it isn't, for a faulty mains connection is not likely to be difficult to put right.

He tries the power plug to see that it is fitting snugly and making good contact, as he

doubtless has had experience of mains plugs being accidentally kicked or pulled loose from their sockets.

Before he goes any further he will switch off and withdraw the plug. He is then free to check his connections and ascertain whether or not they are good and tight.

Wire is apt to crystallise, get brittle and fracture after a time, and once one or two strands of a flexible lead break off, the connection is almost certainly going to loosen.

Sparking and arcing may follow. This would cause noises.

Having examined the lead at the plug end, our expert listener will quickly inspect it at the other end,

In passing it should be noted that a slight "bridged earth" will do no harm. It is very frequently encountered, and evinces itself in the form of a hum rather than as a crackle. Many sets which are otherwise rather noisy can be made quite silent if no ordinary earth is used.

Seldom are the reception results affected, especially in the case of D.C. sets, because the mains themselves will act as an earth.

Our expert eventually discovers that the interference is caused by a faulty electric light switch. There is an arcing due to a faulty contact.

The moral of this "story" is that a mains set is in effect a part of the domestic supply system and that

## IT'S THAT SWITCH CAUSING THE TROUBLE!



An ordinary wall switch for the lights is sparking.

Long loudspeaker leads should always be avoided.

Sometimes, however, the choke or transformer happens to be of the "uncased" type, with its windings and core exposed. If this is the case a cure may generally be effected by tightening up the nuts on the bolts which hold the laminations of the core together.

### Occasional Hum

With D.C. mains it is sometimes noticed that there is a tendency for hum to increase at various odd times. Very often, listening after midnight or on Sunday mornings is accompanied by more hum than is experienced at normal times.

This is generally due to the generating station supplying the low demand of the moment by means of an auxiliary generator which does not give a very "smooth" output.

## WOOD IS QUITE GOOD!

IN many instances there is no technical advantage in using ebonite for the panel of a receiver. Wood is a good substitute, and is cheaper and easier to handle.

But it should be good plywood or warped may cause trouble. Plywood faced with walnut or mahogany which can be sandpapered and polished, is the best material from the point of view of appearance.

It used to be considered necessary always to bake and then shellac the wood used for a wireless set panel.

## IT EQUALS EBONITE



A successful home-built set which uses a wooden panel. Wood is every bit as good as ebonite for the majority of receivers.

The idea was that the baking would drive out all the moisture present, and the shellac prevent any further moisture getting in.

It was said that if this were not done the moisture would cause leakages.

## THE WAY TO LOSE YOUR BASS!



You will not hear your set to its best advantage if you sit with your back to the loudspeaker and this is behind a lot of intervening furniture.

It must be remembered that cumulative effects are particularly prevalent in radio. And you can quite easily bring a fault into prominence by doing something which by itself could in no way appreciably affect results.

With modern battery valves the question of over-running the L.T. scarcely arises. Most battery valves only consume 1 amp., so that a three-valve set will not take more than ½ amp. from the L.T. accumulator.

The main thing is to choose your L.T. accumulator so that the need for re-charging does not occur too often.

## CUTTING OUT NOISES

THE six numbered illustrations which appear on this page illustrate the manner in which an expert would go about the solution of the particular problem illustrated.

He first hears a crackling, "zizzing" noise breaking through and tending almost to drown the programme. But his first thought is not: "Now what's gone wrong with my set?"

It might have nothing to do with the set at all. Therefore, he tunes in another station in order to ascertain if the interference is general.

### Transmission at Fault?

If he had found that all the other programmes available were quite normal, then he would conclude that the transmission was at fault, and that there was nothing to be done about it except either grin and bear it or listen to another station.

However, in our "story" the noises are heard just as loudly when

## WHAT A ROW!



## TRY AERIAL OFF



## REGIONAL, TOO!

although it is rarely that trouble is experienced there. Then he will replace the plug and switch on again.

### "Bridged Earth"

The reason why he next removes the earth lead is to make sure that there isn't what is sometimes called a "bridged earth."

This is caused by a leakage from the mains through some part of the set to the natural earth, i.e. a water-pipe or buried earth connection if such is used.

## TRY EARTH OFF



## MAINS PLUG RIGHT?

faults in this may affect it considerably.

### Battery Sets

Some of the troubles experienced are difficult to deal with. Switch clicks, for instance. Many listeners may have been puzzled and annoyed by these particularly if they are flat-dwellers.

A faulty electric wire can create havoc with programme reception.

Refrigerator motors will at times make a terrible noise in the loudspeaker, but they can be silenced by connecting interference units across their brushes.

These units are quite inexpensive and are easy to instal.

But what about a battery set which suddenly starts to hum badly?

In most cases it will be found that this is due to a broken or faulty grid circuit. You can look first at the grid-bias batteries for this. An exhausted grid-bias battery or a bad G.B. connection will tend to send up the resistance of the appropriate grid circuit until it is in effect "open" and broken.

A mains unit may give perfectly satisfactory service on one set and yet "hum" severely with another.

# Another Instalment of "Better Radio" Next Month

As a further precaution ebonite bushes were advised.

But modern sets are designed so that as much as possible of that part of it which comes into contact, or even close proximity, with the panel is at "earth potential."

And when this is done it wouldn't matter what panel material was used so long as it were a fairly good insulator, and wood certainly is that.

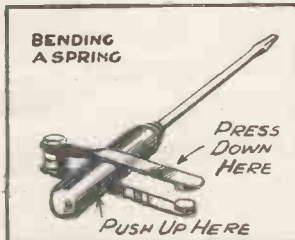
## SWITCH TROUBLES

It is curious that ninety per cent of the people who try to bring switch contacts closer together go quite the wrong way about it.

But when is it necessary to do such a thing? Well, sometimes it must be apparent to the least technically minded of listeners that a switch is giving trouble. And, unfortunately, switches often do that.

Perhaps it is the on-off switch. When it is pulled out to switch the set on there is a grating, the set goes for a moment and then stops.

### THE RIGHT WAY



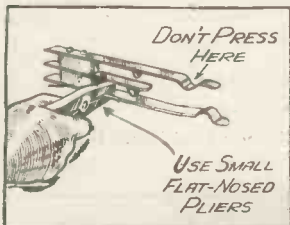
How to bring switch contacts closer together.

It can be kept working when the switch is held in a certain way, but even then only for fractions of a second. The odds are that the switch is faulty.

Examining it reveals the fact that the contacts between the plunger and a kind of spring only just touch.

Most people will try to rectify this by pushing the contact spring down

### USING PLIERS



Your switch may not be exactly like this, but the principle will apply just as strongly.

towards the plunger. But the result is probably that the gap is widened!

The right way to go about the job is to bend the spring down a trifle as close as possible to the point of anchoring. But don't try to bend it merely by applying pressure with the fingers.

### Adjusting Contacts

Some object, such as a small screw-driver, should be pushed beneath the spring close to its anchorage end. And if this object is pressed up at the same time as the end of the spring is gently pressed down, any degree of bending at the right place will be possible.

When it is desired to bring two

spring or lead contacts into closer proximity with each other, a small pair of flat-nosed pliers should be used, although the above scheme can be applied if care is taken that only the one spring is bent at a time.

We do not advise readers to attempt to adjust multi-contact switches or switches used in mains power circuits if they are not perfectly certain of their mechanical ability.

### Self-Cleaning

Radio-gram switches are frequent sources of trouble—or used to be. Sometimes the radio programme will break through while records are being played because the radio-gram switch is of the high-capacity type.

In many circuits it is desirable that the radio-gram switch should have a very low capacity indeed, or it becomes necessary to throw the set out of tune every time it is switched over to records.

There would be much less switch trouble if all switches were of the snap type and all had self-cleaning contacts. The latter is most important. The contacts are self-cleaning if they tend to rub as the switch is operated. If they merely press together, there is no chance of oxidation or dust being rubbed away.

But the rubbing need only be fairly slight. If it is just visible, then it will probably be sufficient.

Care should, however, be taken to see that, as well as self-cleaning its contacts, the switch actually does complete the circuit.

Many of the push-pull types are excellent from the point of view of possessing rubbing contacts.

Often, though, the final "on" position is unsatisfactory. But this can generally be remedied by bending the contacts in the manner already described.

## DIAGRAM DEVELOPMENTS

It is interesting to note that there have been relatively few changes in diagram technique since the beginning of broadcasting. And most of the changes which have taken place are on account of totally new components.

If a receiver not using any of them were designed, its theoretical circuit would be no different in general form from similar ones of ten years ago.

But the receiver which did not use one or other of the new devices would receive but a cold welcome from modern constructors!

An interesting illustration on this page shows the majority of the new

components and their theoretical symbols. Probably the most revolutionary from a practical view point are the valves having additional grids, for the S.G. in particular has swept the ordinary H.F. valve into obscurity.

## TIPS FOR CONSTRUCTORS

WHEN mounting components on a metal baseboard there are several important things to remember. In the first place, great

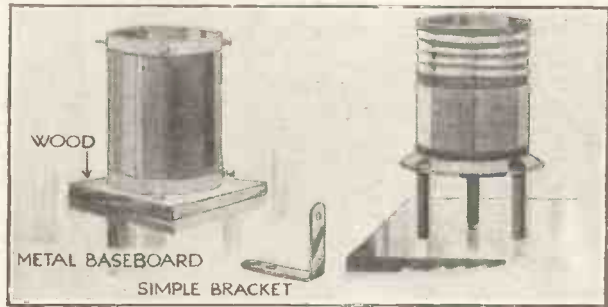
care must be taken that no short-circuiting occurs.

Some valve holders have their terminals passing right through to the base and projecting slightly. If the bottom of these terminals were all to touch the metal baseboard the H.T. and L.T. would both be shorted. In other valve holders the sockets are pushed below the baseline when a valve is inserted, and this is equally dangerous when a metal baseboard is used.

### Simple Bracket

It should be endeavoured to raise the coil at least two inches from the metal. This can be done by using long, thin screws and ebonite tubing. This is not an ideal method, but greatly preferable to having the coil close to the metal.

## FIXING BASEBOARD FITMENTS



care must be taken that no short-circuiting occurs.

Some valve holders have their terminals passing right through to the base and projecting slightly. If the bottom of these terminals were all to touch the metal baseboard the H.T. and L.T. would both be shorted. In other valve holders the sockets are pushed below the baseline when a valve is inserted, and this is equally dangerous when a metal baseboard is used.

### Avoiding Shorts

There are two ways of countering this. A sub-baseboard of wood can be made. This is merely a piece of wood screwed to the baseboard. The valve holder is then screwed down to the wood.

Alternatively, a piece of stout brown paper can be cut and this interposed between the two.

But brown paper will not suffice if there are seriously projecting terminals, for it is quickly cut through.

Another metal baseboard point to watch is to see that coils are not brought too close to it. That is, if they are unscreened coils.

It is not sufficient merely to place a piece of 1/8 in. or 1/4 in. wood between

the coil and the metal as shown in the first of our sketches.

Wood is an insulator, but it does not prevent a magnetic field from being radiated by a coil. In addition to a loss of efficiency the metal will affect the tuning range of the coil if it is brought right into its magnetic field.

It would be better to use a screened coil, in which case it could be mounted directly on to the baseboard. Sometimes it is desired to mount small panel components, such as solid-dielectric condensers, on the baseboard.

This can easily be done if a simple right-angled bracket of stout aluminium or brass is made. If the component has a rather stiff action it may be necessary to have a wider base for the bracket, so that an additional screw can be driven in at a point an inch or so to the side of the others.

This will make the bracket rigid against rocking movements and slipping pressure.

By the way, do not forget that it is often better to screw upwards from the bottom of the baseboard when fixing sub-baseboards and wooden fitments.

## THE END OF THE PROGRAMME

DON'T switch your set off the moment the announcer has said his "Good-night, everybody, goo-ood-night." Sometimes piquant little conversations are to be heard between engineers, or a whispered remark in the studio may come through.

More rarely still a sudden announcement is made.

### Hearing America

But apart from all this, the end of the British programme is your opportunity to see if there are any foreigners coming through so close to the "local" in wavelength that they are not to be received on your set in the ordinary way.

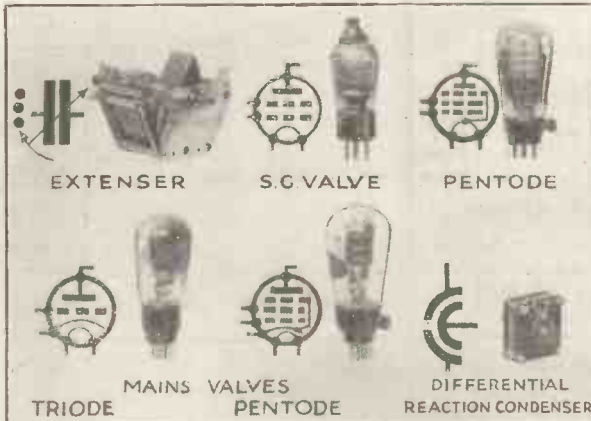
Then, again, you might have the good fortune to hear an American. The U.S. stations will be getting into full stride just as our programmes are closing down.

And the time will be propitious for their easy reception just then, too.

American stations working on ordinary wavelengths can be tuned in on two- and three-valve receivers when the conditions are right.

Finally, don't forget the on-off switch. It is all too easy to forget to flip that over when there is no local broadcasting blaring in to remind you that the set is switched on.

## NEW SYMBOLS FOR NEW COMPONENTS



New radio devices and the symbols that are used to denote them in theoretical diagrams.



The neat appearance of the cabinet is largely due to the fact that the controls are placed at the side.

# THE "LISSENOLA" TWO-VALVE RECEIVER

*A review of a compact, self-contained battery set selling at a very moderate price.*

It is surprising the results that can be achieved with a two-valve set of the detector and L.F. type when a reasonably efficient outdoor aerial is available.

A set of this class will bring in, in addition to the two locals, at least half-a-dozen other stations at quite good strength on the speaker, but it is unfair to expect it to give the results of a powerful S.G. receiver, or to "Tour Europe" on a relatively inefficient indoor aerial.

### Reaction Must Be Smooth

A "two" is largely dependent upon the use of reaction for its long-distance properties, and it is essential that the reaction control should be smooth. Another factor that is of considerable assistance in obtaining loudspeaker power with a minimum number of valves is the pentode,

which owing to its high magnification makes it equivalent to one and a half ordinary valves.

In the MODERN WIRELESS test department we handle large numbers of sets, and we are thus able to tell immediately whether the particular receiver on test at any given time comes up to the standards we set for that class of circuit.

### No Wave-Change Switch

Our recent tests with the Lissenola two-valve battery-operated receiver, which retails at 4 guineas complete, revealed a design in which an excellent selectivity-volume compromise had been effected. The circuit itself is quite straightforward, but it owes much of its efficiency to the proportioning of the coil windings, and the position of the tapping point.

The aerial input passes through a fixed condenser on to a tapping on the grid winding, and instead of employing a wave-change switch the

makers have provided two neat little sockets on the side of the cabinet, into which a plug can be inserted according to whether medium or long-wave stations are desired.

On the side of the cabinet also are the tuning and reaction controls, together with the on-off switch.

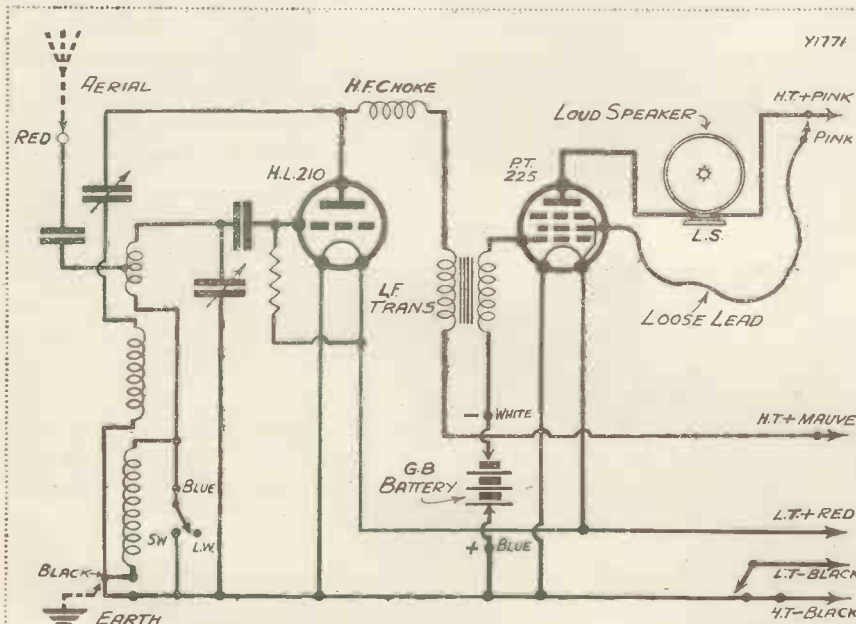
The reaction is progressively smooth and the detector valve needs a voltage of approximately 80 for the best results.

The detector stage is followed by a transformer-coupled pentode output, the well-known Lissen P.T.225 being used in this position.

### Easily Separated

Using our standard outdoor aerial test in Tallis House, we were able to tune in the Brookmans "twins" at a volume adequate for normal domestic purposes, and these two transmissions could be separated with ease. Although one does not expect

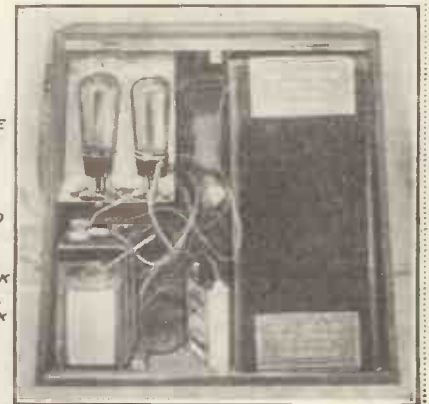
*(Continued on page 519.)*



The circuit of the "Lissenola" Two is simple and effective. The photograph on the right shows how the space has been cleverly apportioned so as to leave room for the batteries.

### Technical Specification

- Number of Valves : Two.
- Circuit : Det. and Pentode.
- Controls : Tuning control, plug for wave-change, reaction control, and "on off" switch.
- Price : Four guineas.
- Makers : Lissen, Ltd., Worples Road, Isleworth, Middlesex.



# CIRCUITS FOR SHORT-WAVERS

BY W.L.S.

As a result of a fortnight's hectic work on a receiver for 5-metre experiments, I have been trying out many circuits that I would otherwise have "passed over."

One or two of them were mere attempts to be "funny" on my part, some were developed from well-known transmitting circuits, and the remainder were just a matter of ordinary commonsense.

Two of them in particular have behaved so excellently that I have put them both into commission for ordinary short-wave work with very good results.

## It Looks Queer

That shown in Fig. 1 comes direct from the transmitting circuit known both as the "Balanced Colpitt's" and the "Hoffman." Although it looks queer when drawn "right way up," it may be redrawn as in Fig. 2, when it appears in the guise of a very pretty "bridge."

During some recent researches into reception on five metres our short-wave expert had occasion to experiment with some unusual circuits. Some of these have proved useful for ordinary short-waves and details of them are passed on for the benefit of short-wave enthusiasts.

The grid leak, it will be seen, is in series with the grid coil, the grid condenser being dispensed with altogether.  $C_1$  and  $C_2$  together represent the tuning condenser, which is of the series-gap type, the spindle being connected to the filament and earth.

As a matter of fact, this connection does not seem to be essential, and if it is left out there is really no necessity to use a series-gap condenser.

Study Fig. 2 carefully and reflect on the beautiful symmetry of the circuit. It is, by the way, a good exercise to draw other well-known

circuits in this way and see what they look like.

$C_3$  is the reaction condenser, but it may be a fixed condenser of .0001 if reaction is controlled by a variable resistance in series with the H.T. In either case, the chief beauty of the circuit is the remarkable constancy of reaction. "Aerial dead-spots" were the only things that made it necessary to touch the reaction control at all, even for 5-metre work.

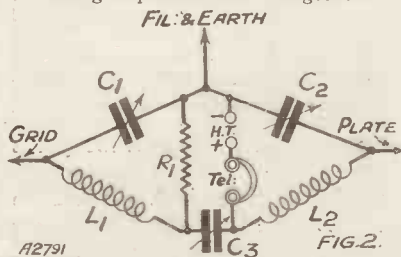
## Back from the Panel

Before leaving this circuit it should be mentioned that unless a series-gap type or some other double condenser is used it will be necessary to mount it back from the panel, as the spindle will not be at earth potential and tuning will present considerable difficulty.

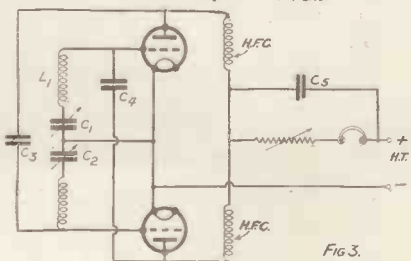
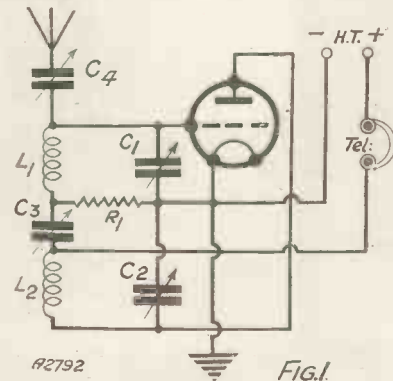
I am at present making a receiver using this circuit for ordinary short-wave work (18 to 60 metres), and,

## THE "HOFFMAN" CIRCUIT

The circuit to the right (Fig. 1) is known both as the "Balanced Colpitt's" and the "Hoffman." The grid leak is in series with the grid coil, the grid condenser being dispensed with altogether.



This bridge circuit (Fig. 2) is the same scheme as shown in Fig. 1. This method of drawing the circuit reflects its beautiful symmetry, and is not so queer-looking as the more conventional drawing.



## FOR SUPER-REGENERATION

Super-regenerative circuits show up to advantage on extremely high frequencies. A circuit of this type is indicated in Fig. 4 below, and it will be seen that an ordinary detector scheme is used with a "super" valve joined up to its anode circuit.

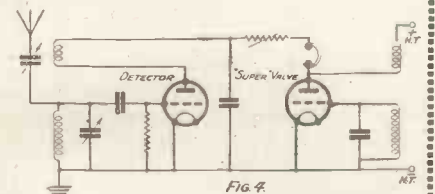


Fig. 3 on the left is a circuit which W.L.S. confesses has always been a fad of his. It employs two valves in push-pull for detection, and is a really worth-while scheme.

## In and Out of Oscillation 100,000 Times Per Second

judging by the preliminary experiments with the set in the "lash-up" stage, great things may be expected from it.

### Rather More Exciting

Fig. 3 shows a circuit of a rather more exciting character. Push-pull detection has always been a fad of mine, although I have never got myself to admit that it has been worth while until I struck this particular circuit a little while ago. It is, I believe, a modified form of a Telefunken transmitting circuit.

If you study it carefully you will see that the grid coil is connected between the two grids, and split in the centre. Here the variable condenser is inserted for series tuning. This principle of using a relatively large variable condenser in series with the valve capacities is admirable for 5-metre work, although I expect one would have to use parallel tuning for the longer waves.

Series tuning, naturally, allows one to use a very large coil, and the favourable L/C ratio obtained makes for high efficiency.

Reaction is obtained by coupling the plate of each valve across to the grid of the other one through fixed condensers. It is controlled in this circuit by a variable resistance in series with the 'phones; and both are by-passed by a fixed condenser.

### It Might Not Pay

For 5-metre work the slight extra complications introduced by the push-pull arrangement are certainly worth while, judging from results; but for anything higher than 10 metres I rather doubt whether it would pay.

Reaction could, of course, be controlled by making the condensers  $C_3$  and  $C_4$  variable; but this would make the layout rather intricate and introduce a lot of variables into the circuit.

The great craze when 5-metre work was first taken up in this country was the super-regenerative receiver.

The trouble with this on the "longer short waves" was that the ratio between the "supering" frequency and the frequency of the required signal limited the amount of amplification possible.

A "super" working at a frequency of 100 or 150 kc. seems to be suitable; it is very easy indeed to arrange and to operate, and amplification is

tremendous. But five metres corresponds to a frequency of 60,000 kc., and that is a different tale.

I have a sneaking feeling myself that the noise that one receives with this type of circuit may make it impossible to find really weak stations that might be heard all right with an ordinary two-valver; but for telephony and fairly strong stations, the "super" certainly is very good.

### Stuck in My Mind

A rather far-fetched explanation that I once heard has stuck in my mind ever since, and I will retail it for the benefit of "M.W." readers who are new to the theory of super-regenerators.

We all know (or should know) that it is impossible to operate an ordinary reacting detector at its most sensitive point. However smooth our reaction control may be, we go from the state of oscillation to the state of

second, we should increase the sensitivity of our receiver enormously.

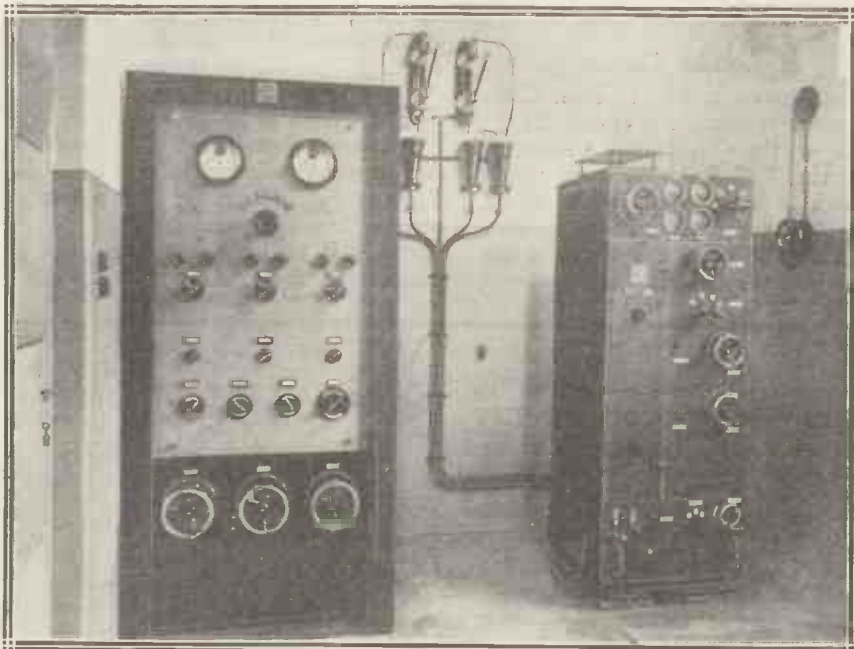
### Heath Robinsonish!

Since the electric motor method has a suggestion of Mr. Heath Robinson about it, we arrange another valve to oscillate at, say, 100 kc., and we feed this oscillating current in series with the H.T. supply in such a way that our receiver actually does go in and out of oscillation 100,000 times per second.

The requirements for doing this are simply an extra valve, two largish coils, and a fixed condenser across one of them. This is just wired in the main receiver so that its anode coil is in series with the H.T. supply; and when the receiver is adjusted to be just on the point of oscillation, the "super" valve will increase and decrease the H.T. supply to the detector in such a way that it is jerked rapidly in and out of oscillation.

Fig. 4 shows the circuit arrange-

### SHORT WAVES VERSUS HUNGARIAN CRIMINALS



The short-wave installation employed by the Royal Hungarian Police. On the left is the control panel, and on the right the actual transmitter, while between the two panels can be seen the high-tension switch.

non-oscillation somewhat abruptly. "Ploppy" receivers fairly leap over the gap; still better ones traverse it far too quickly to be operated right on the most sensitive point.

Now if we could arrange an electric motor to "waggle" our reaction control just over that spot, so that we were crossing and recrossing that point several thousand times per

ment of such a receiver. It will be seen that the standard detector circuit remains absolutely unaltered except for the insertion, in series with the H.T. supply, of the anode coil of the "super" valve.

Since work is still going ahead with these and other circuits, there may be some interesting news of a more practical nature at a later date.



# For the Constructor

A Special Section Devoted to the Interests of Set-Builders

**A  
TWO-  
VALVE  
AMPLIFIER**

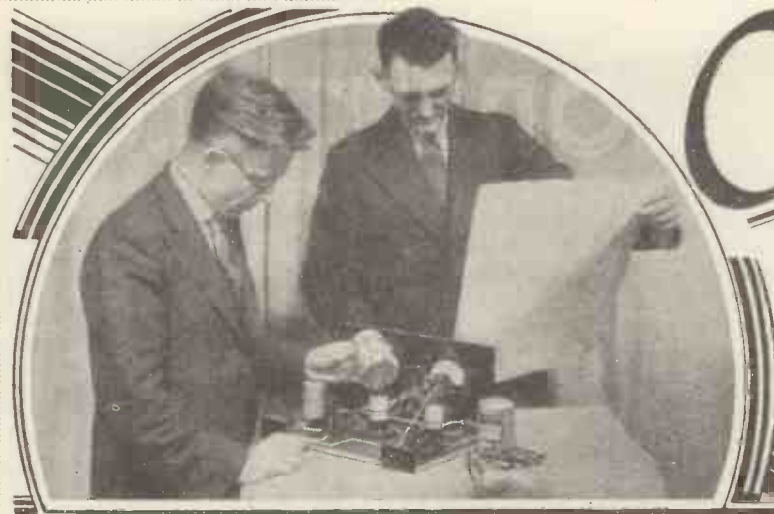
**RADIOGRAM  
POINTERS**



**Construct  
Your Own  
Cabinet**

*The*  
**DIODE**  
*for*  
**Super-Hets**

*Featuring*  
**THE M.W.**  
**"PROGRAMME PRINCE"**  
*With a Full-Size 1'-Blue Print Free*



# Our BLUE PRINT SET

**E**ASY operation is as important as efficiency of design in the construction of a radio receiver. Many a perfectly good set has been spoiled by being difficult to work, since the excellent properties possessed by the receiver have not been fully used.

Naturally, the ease or otherwise of handling a set depends to a large extent upon the particular person operating it. An expert who has been more or less continuously working radio receivers will be able to get the last ounce out of intricate sets

that defy the skill of the ordinary listener beyond measure.

Simplicity in design as well as in mere construction was kept in the forefront when the circuit and layout of the "Programme Prince" were discussed. The result is that it is one of the simplest sets imaginable, both from the constructional and the operating points of view.

### Not Complicated

Two dials for tuning, conveniently placed with reaction control between, constitute the real "controls," while

the wave-change and "on-off" switches complete the panel components. Not complicated, is it?

And yet the set is capable of pulling in a remarkable number of programmes, and could well be called the "Programme Puller" as an apt alternative name.

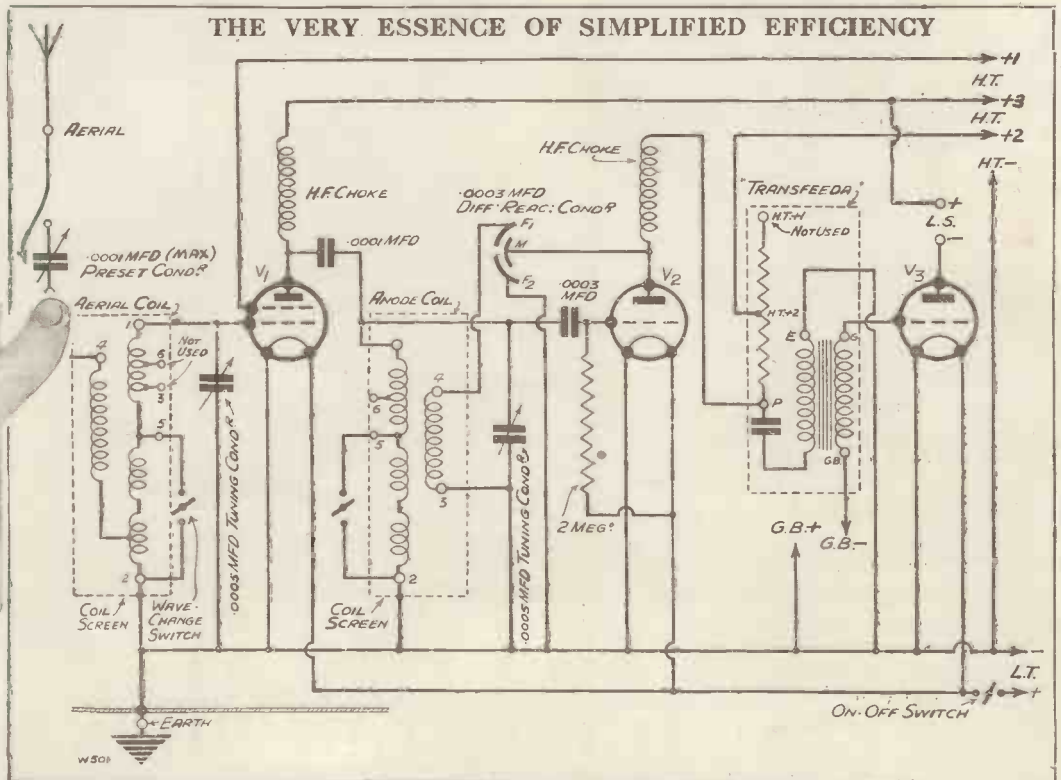
The appearance of the panel, too, is pleasing, while in these days of light pockets the economy of running will be appreciated by home-constructors. The set takes a matter of 10 to 12 milliamps., or less, dependent upon the type of valves.

### PRINCELY POINTERS

- Simple Design
- Easy Construction
- Wonderful Range
- Parallel-Fed L.F. Stage
- Double Waveband Tuning
- Adjustable Selectivity
- Full Power



### THE VERY ESSENCE OF SIMPLIFIED EFFICIENCY



The combination of real simplicity and true efficiency has been carried out very successfully in the "Programme Prince" circuit, which makes it an ideal design for all users, whether they are expert tuners or quite new to radio.

# The M.W. "Programme Prince"

Circuit  
Details  
Discussed



S.G. Stage  
Leaky-Grid  
Detector  
Shunt-Fed  
Transformer-  
Coupled L.F.

ALMOST ever since broadcasting really got under way in this country the three-valve receiver has maintained a definite lead in the race for popularity among listeners.

In the old days the three valves were grouped in a detector and two low-frequency amplifier circuit, but since the coming of the screened-grid valve the disposition of the circuit has changed, and nowadays we have almost invariably one S.G. followed by detector and high-magnification low-frequency stages.

## Astonishing Clarity

This type of circuit, thanks to the high efficiency of modern valves, will do practically all that can possibly be required in average reception. Whether of battery or mains type, the three-valver will enable a large number of programmes to be pulled in at good loudspeaker strength, and with a clarity that is astonishing.

## Adjustable Condenser

In the particular circuit employed in the "Programme Prince" everything has been made as simple as possible; there is no ganged tuning to match, and no complicated selectivity device to adjust. Two plain tuned circuits, with the aerial coupled to the first through an adjustable condenser, are used; the second circuit being of the plain shunt-fed, tuned-anode type, with the tuning condenser at earth potential to obviate hand capacity effects.

Selectivity is adjusted by means of the series aerial condenser, and enables a progressively variable adjustment to be made. Alternatively this condenser can be cut right out

of circuit, and the aerial taken direct to the coil, in which state of affairs the maximum strength of reception will be achieved with the minimum of selectivity.

## No Core Saturation

The detector operates on the usual leaky-grid method, and is coupled to the output valve by means of a shunt-fed transformer. This is made up in unit form with resistances and condenser incorporated with the transformer in one container, the particular model utilised being known as a Transfeeda.

This unit enables a particularly good low-frequency characteristic to be obtained, and completely obviates any possibility of core saturation in the transformer, even if the user of the set decides to employ a large power valve and a mains unit.

The Transfeeda provides an alternative tap so that the component can be matched to the detector valve with some accuracy.

## The Canned Coil

It will be noted from the theoretical diagram, as well as the blue-print, that there is no screen between the anode and grid circuits of the screened-grid valve. Till recently it has been our practice to fit a vertical screen between the two sections and to pass the S.G. valve through this screen. The coming of the canned coil, however, made this procedure unnecessary as a rule, and it will be seen that in this set it has been omitted.

Separate high-tension voltage taps are provided for the screen of the S.G. valve, and for the detector, while the output valve and the anode of the screened-grid valve are taken to the same tap on the H.T. battery.

## THE MAIN FEATURES of this fine set

### Selectivity

A particularly easy control of selectivity is provided by means of a clip contact and series aerial condenser.

### Screening

There is no special or auxiliary screening, the "canned" coils providing all that is necessary for complete circuit separation.

### Control

The set is unusually easy to operate, being fitted with slow-motion tuning dials and accessibly placed reaction.

### Construction

The whole operation should take but a few hours as there is no soldering required, all the connections being taken either to terminals or to screws and washers fitted to the baseboard.

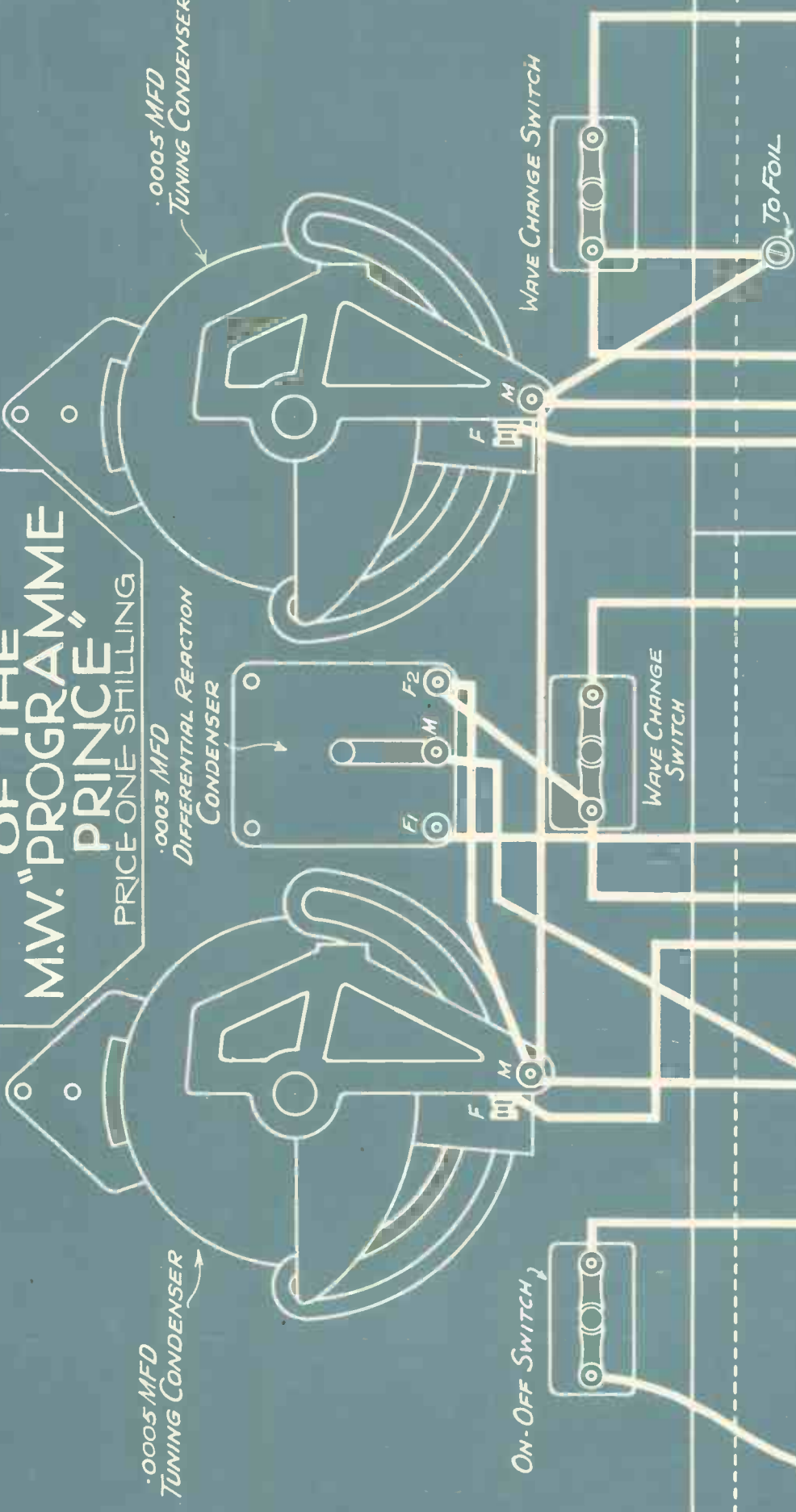
# FULL SIZE BLUEPRINT OF THE M.W. "PROGRAME" PRICE ONE SHILLING

T177

.0005 MFD  
TUNING CONDENSER

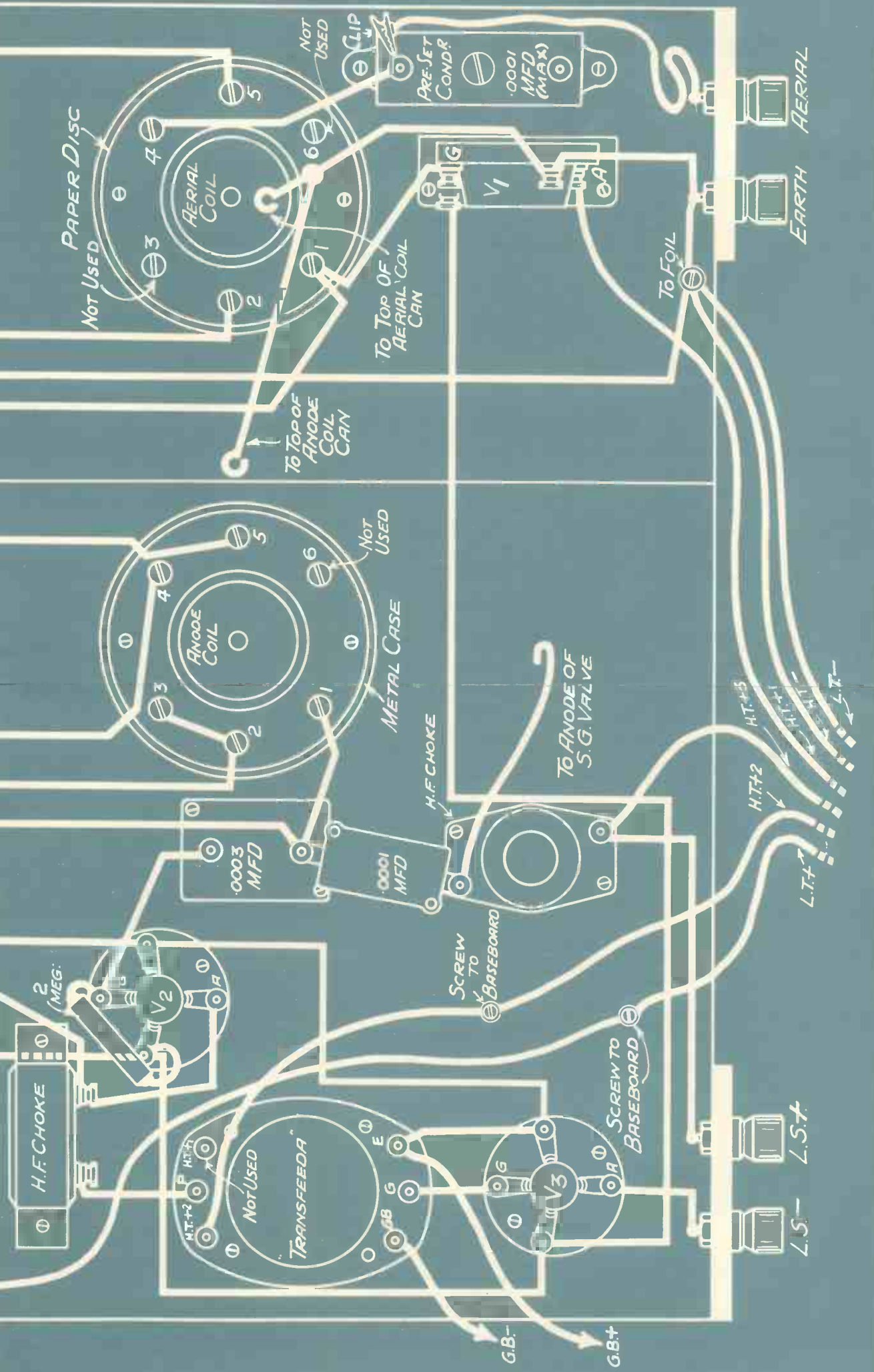
.0003 MFD  
DIFFERENTIAL REACTION  
CONDENSER

.0005 MFD  
TUNING CONDENSER



To Foil

5"  
(COPPER FOIL)



# What the Set Will Do —

**B**EFORE building any receiver it is only natural to ask what it will do. Will it get foreign stations, or is it only useful for the reception of the local transmissions?

Upon the answer depends whether the receiver will be built by any particular person, for most of us have fairly clear views as to what we want to receive on the radio, and how loud we want to get it.

It is, however, difficult to explain exactly what any particular set will or will not do, because so much depends on the local conditions in which the receiver is to be used, and upon the skill or otherwise of the operator.

## Handling the Receiver

We have said earlier that the "Programme Prince" is not a difficult set to operate, and that it has been designed with ease of handling as one of its chief characteristics. Therefore, the skill or otherwise of the operator will not make so much difference as it might do, though naturally some sort of skill or familiarity with radio set operation is essential before the most can be got out of even the simplest of sets.

## PRINCELY PERFORMANCE

How to handle the set in order to get the best out of it will be explained later, and it is not for us now to discuss the operation of the receiver. We are concerned with the results that anyone who has mastered the simple operating details can achieve, provided that he has fairly average local conditions under which to work.

Normally the set should be capable of picking up at least twenty stations on the medium-wave broadcast band, and a matter of four or five on the long waves. These will vary considerably with local conditions, for the long waves are often tricky customers to receive.

After dark a surprising number of medium-wave transmissions should be tuned in, from Fécamp up to, say, Brussels at the other end of the tuning scale.

It will depend to a certain extent upon the distance the set is from one of the powerful British transmitters, for in order to get free of these it is usually necessary to reduce the capacity of the series aerial condenser to lowish limits.

## A Dual Rôle

This has the effect of increasing the selectivity to a large extent, but at the same time it inevitably decreases the normal sensitivity of the receiver. We say normal because the sensitivity can be made up again to a great degree by the judicious use of reaction, and this procedure

(cutting down the aerial capacity and increasing the reaction) is one of the easiest methods of

obtaining selectivity and sensitivity without introducing complicated circuits.

The very increase of reaction causes the tuning of the grid circuit of the detector to be sharpened up, and therefore carries out a dual rôle—of increasing sensitivity and selectivity at the same time.

## Most of the Stations

The set as built in its original form gets in most of the stations on the medium band, and the whole lot on the long waves.

Naturally, the strength of the reception will to some extent depend on the sensitivity of the loudspeaker, for some speakers are very insensitive and others are remarkably sensitive. All our tests with the set have been carried out with a moving-coil speaker of the permanent-magnet type and of moderate sensitivity.

With this speaker in use the set has collected most of the European stations that are worth hearing, and a great many others that are never worth getting because of the everlasting heterodyne that spoils their programmes.

This heterodyne can be reduced by increasing selectivity, and increasing reaction, but it cannot be removed entirely except by a properly tuned filter.

It is a state of our modern broadcast conditions that is an ever-present reproach on the poor radio spirit that exists between the nations.

## Regardless of Confusion

All are struggling to be heard, and if one can drown his neighbour for some time (till that neighbour increases power and drowns him), then he is happy, regardless of the confusion in the ether that is being caused.

In average hands, however, the "Programme Prince" will provide radio entertainment for many hours per day if required, for if the British stations are not on it is pretty certain that some foreigner or other will be available.



### THAT'S A LONG WAY OFF!

You will find the set tends to enlarge your geographical knowledge, for the range of reception is enormous, and the simplicity of handling ensures a good bag at almost any time.

# -and What is In It

## ALL STANDARD COMPONENTS

THE answer to the question "What is in it?" can be put quite simply and with perfect truth—"nothing much." The set is so easy to build that there are very few components required. The list contains everything necessary, but perhaps it is as well to discuss one or two of the parts separately.

The condensers are quite normal .0005-mfd. condensers, with slow-motion drives. These latter are separate in the case of the set shown here, but they may equally well be incorporated in the design of the component.

### Maximum Amplification

The coils are of the auto-coupled input variety, the aerial input being retained as indicated by the designers, and the anode input in the second coil being taken direct to the top of the coil. This gives the maximum amplification.

A small pre-set condenser is used in series with the aerial input lead so that the selectivity of the first tuned circuit can be made reasonably high. The cans of the coils are not earthed to the windings when the

former as the coupling device between the detector and the output valve.

In its essence it is a transformer, but instead of the windings being in the anode circuit of the detector they are shunt-fed with the low-frequency impulses, the high-tension current to the anode being passed through a resistance.

The unit is screened and the screen is earthed by means of the terminal marked E. Two H.T. terminals are provided, allowing different values of resistance to be placed in the anode of the detector valve. This enables the anode impedance to be varied and also gives the opportunity to resistance-decouple the detector stage if this is desired without having to add a resistance.

### Scissor Shorts

In this case the decoupling is not necessary, and so this was not made use of. Another point is that the usual array of terminals at

be stated. Take the case of the Transfeeda. This is not in itself so different from all other ideas that there is no possible alternative or substitute. There are others, but their terminal disposition and the labelling make it difficult to carry out the wiring as shown on the blue print without altering the layout to some extent.

### Minor Alteration

The same applies to coils in many sets, and we would always advise set builders to keep as closely to the list of parts actually used in the original set, unless they are certain that they will be able to make any minor alteration that may be required by the substitution of another make or type.

In most cases the various makes of components—chokes, valve-holders, condensers, switches, transformers, and so on—run closely enough to each other to

details of this part of the outfit than is usual.

In the first place, the aerial should be as clear from shielding influences, such as trees, buildings, telegraph and telephone wires, as possible. One about 30 feet long and about 30 feet high will probably do very well, especially if it is made of good wire, and not merely a length of corroded D.C.C. or stranded wire that has seen far too long service.

### Good, Stranded Wire

Aerial wire corrosion is a frequent cause of trouble, as it often happens that one of the strands corrodes through, and the efficiency of the system is severely impaired. Keep an eye on your aerial and renew the wire every now and then.

Good, stranded wire should be used, or some proprietary article such as Superial, which makes an excellent antenna.

In the case of the indoor aerial, good, insulated wire should be used, the same type being suitable; but here it is essential that the wire does not run for any great distance close to the walls of the house, and it is usually advisable to have a long (or



## ALL ABOUT THE PARTS

## —AND RECOMMENDED MAKES

### THE "PROGRAMME PRINCE" FROM PANEL TO WANDER-PLUGS

#### PANEL

14 in. × 7 in. (Goltone, Becol, Permcol, Peto-Scott, Wearite, etc.).

#### BASEBOARD

14 in. × 10 in.

#### CABINET

For 14 in. × 7 in. panel and 14 in. × 10 in. baseboard (Camco, Ready Radio, Osborn, Peto-Scott, Gilbert, etc.).

#### VARIABLE CONDENSERS

2 .0005-mfd. tuning condensers (J.B., Cyldon, Utility, Lotus, Polar).  
2 slow-motion dials (Ready Radio, Ormond, Igranlic Indigraph).

1 .0003- to .00035-mfd. differential reaction condenser (Graham Farish, Telsen, Lotus, J.B., Ready Radio, Peto-Scott).

1 .0001 max. compression condenser (Sovereign, Polar, Formo, Telsen).

#### COILS

1 type G.G.C. and 1 type G.G.R. (Goltone).

#### RESISTANCES

1 2-megohm resistance (Graham Farish Ohmite, Dubilier, Lissen, Ready Radio).

#### SWITCHES

3 2-point push-pull type switches (Bulgin, Ready Radio, Lissen, Telsen, Tunewell, Goltone, Wearite, Keystone, Ormond).

#### L.F. COUPLING UNIT

1 Transfeeda (Benjamin).

#### VALVE HOLDERS

1 5-pin S.G. valve holder (W.B., Lissen).  
2 4-pin valve holders (Lissen, Telsen, W.B., Lotus, Bulgin, Benjamin, Ready Radio).

#### FIXED CONDENSERS

1 .0001-mfd. condenser (Dubilier 670, Telsen, Igranlic, T.C.C., Graham Farish, Formo).  
1 .0003 (T.C.C., Lissen, Telsen, Ready Radio, Graham Farish, Dubilier, Ferranti).

#### H.F. CHOKES

2 H.F. chokes (Sovereign, Lissen, Tunewell, Lewcos, Ready Radio, Telsen, Wearite, R.I., Sektun, Varley, Bulgin, Peto-Scott).

#### MISCELLANEOUS

1 crocodile clip.  
1 piece of copper foil, 10 in. × 5 in.  
2 pieces of ebonite, 2 1/2 in. × 1 1/2 in.  
1 six-way battery cord (Goltone, Lewcos, Bulgin).  
4 terminals (Belling & Lee, Igranlic, Bulgin, Lissen, Elex).  
2 wander-plugs (Belling & Lee).



coils are sent out from the factory, and so the connection to earth must be made when the set is built.

The smaller components are quite usual; there are two fixed condensers, three valve holders, and two terminal strips carrying two terminals each.

There are also two H.F. chokes, but here there is a difference in them. The first one, to which is connected the anode feed of the screened-grid valve, must be of good and efficient make. The other choke is used for reaction purposes, and is situated in the anode circuit of the detector. In this case a smaller component can be used, and there is not the same great need of low self-capacity and high inductance as in the case of the other choke. Obviously another big choke could be used in this position, but the small type of choke should not be substituted in the place of the screened-grid choke.

### Shunt-Fed

Probably the most interesting component in the "Programme Prince" is the Transfeeda, which takes the place of the usual trans-

former as the coupling device between the detector and the output valve. In its essence it is a transformer, but instead of the windings being in the anode circuit of the detector they are shunt-fed with the low-frequency impulses, the high-tension current to the anode being passed through a resistance.

This obviates the possibility of leads falling off (as they do if the terminal is not tightened properly) or being shorted, which not infrequently happens if somebody goes and puts a pair of scissors or a metal pencil on them.

And now we are going to bring up the old, old problem; that of alternative makes. In our list of components you will see after the first-named make (which is that used in the original set and the photographs) several other makes in certain instances, or no other makes, as the case may be.

### Using Alternatives

These alternatives give an idea of those makes of components that can be substituted for those used in the original receiver. They do not necessarily constitute all of these alternatives, but give just a good idea of what other things can be used.

In some cases it is difficult to decide whether or not an alternative should

allow of the substitution being carried out without any notable alteration to the design. It is in the case of coils and such things as special units like the Transfeeda that trouble may occur.

This trouble is usually caused through misunderstanding the interior arrangements of the parts concerned, rather than through any serious alteration in the layout of the set, for often the different numbering of coils will throw the constructor out completely.

### Inferior Systems

So keep to the specified parts as far as you can and you will not go far wrong.

Although it should, properly, come under the heading of "accessory," it is not out of place here to discuss another very important part of the set installation; namely, the earth and aerial equipment.

Far too many perfectly good receivers are spoiled because they are asked to operate on inferior aerial-earth systems, and it is with the object of emphasising this that we have decided to go more into the

as long as possible), straight lead rather than one that is doubled back on itself or runs round corners.

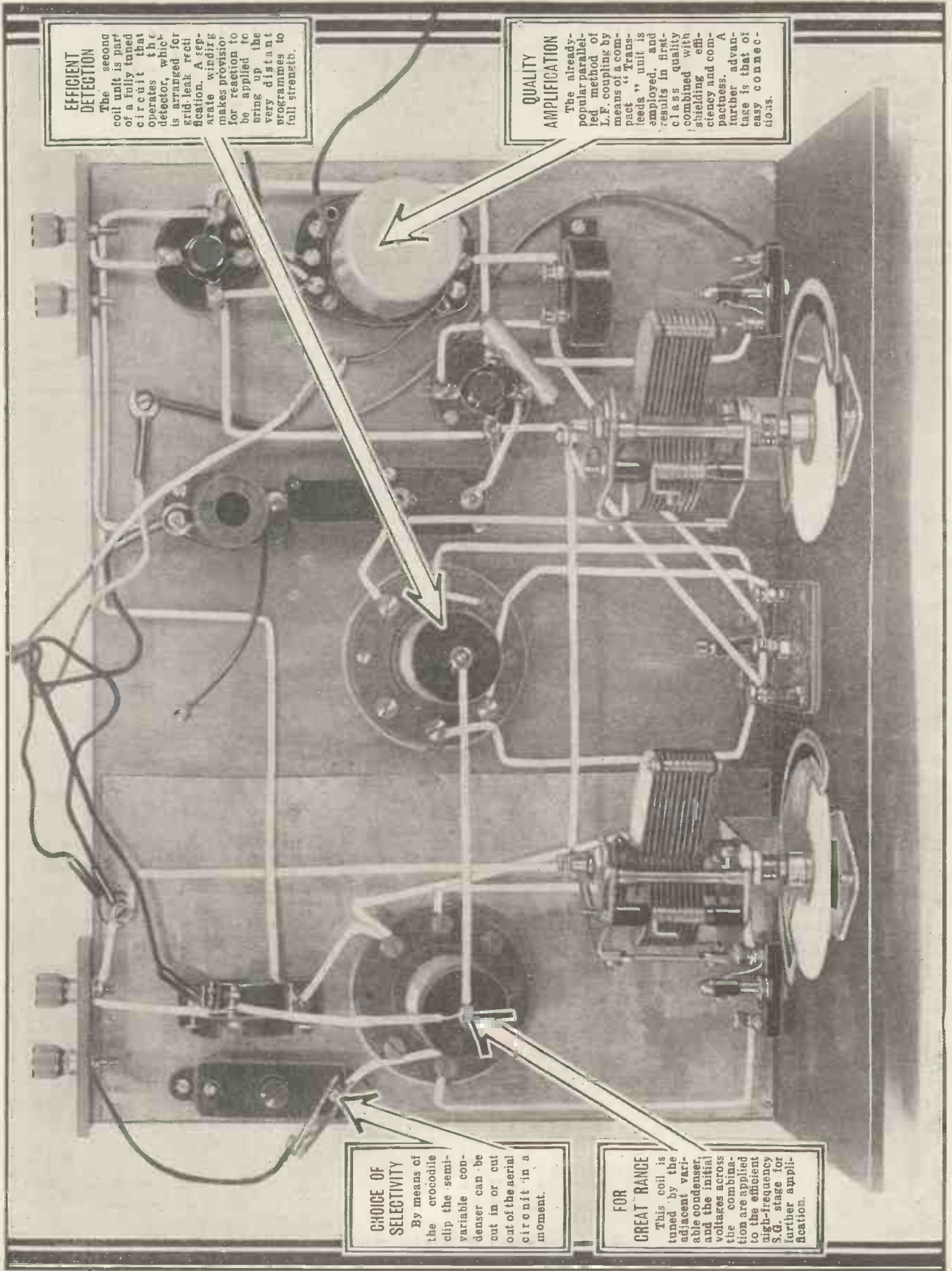
More often neglected than the aerial is the earth. It seems to be the general rule that once an earth (whether it be a water-pipe connection or a direct lead to the ground) has been made, there it is for good and all.

That is quite a fallacy, and the earth should be overhauled even more frequently than the aerial.

### Keeping it Damp

Automatic earth damping is an ideal that has been a mere ideal till lately, when the Graham Farish Filt system was introduced, solving in a very neat manner the problem of keeping the earth moist.

The Filt device percolates moisture through the inclusion in it of a hygroscopic substance, and while this is in operation it keeps the earth for some distance round the device really moist and conductive. After a time it is advisable to get a new Filt and replace the old one, but as this costs but half a crown or so, and each one lasts a considerable time, it is money well spent.



**EFFICIENT DETECTION**  
 The second coil unit is part of a fully tuned circuit that operates the detector, which is arranged for grid-leak rectification. A separate winding makes provision for reaction to be applied to bring up the very distant programmes to full strength.

**QUALITY AMPLIFICATION**  
 The already-popular parallel method of L.F. coupling by means of a compact "unit" is employed, and results in first-class quality combined with shielding efficiency and compactness. Advantage is that of easy connections.

**CHOICE OF SELECTIVITY**  
 By means of the crocodile clip the semi-variable condenser can be cut in or out of the aerial circuit in a moment.

**FOR GREAT RANGE**  
 This coil is tuned by the adjacent variable condenser, and the initial voltages across the combination are applied to the efficient high-frequency S.G. stage for further amplification.



# ASSEMBLING the "PROGRAMME PRINCE"



making sure that the parts are in the correct location.

If alternative components are employed, it will not be possible to use the blue-print as a template, and you will have to follow it as closely as possible, making sure that such important parts as the coil units and the S.G. valve holder, the S.G. choke and the accompanying .0001-mfd.

condenser are placed as shown.

The S.G. valve holder is a horizontal-mounting one for a purpose, for probably you have wondered why this type was used seeing that no vertical screen is employed. The reason is that it is desirable to keep the leads in the H.F. side of the set as short as can be, and by mounting the valve on its side we get the anode terminal close up against the H.F. choke that is to be connected to it.

## Only an Inch or So

From this choke we go by a condenser to the grid condenser, which itself is connected to the coil by a very short lead, and the other side of the grid condenser is taken to the grid of the detector valve by another lead a mere inch or so in length.

Thus it will be seen that the leads round that critical section of the set are really short and, as a

THE assembly of the receiver is not a difficult matter, especially as a full-size blue print is provided with this copy of "M.W." It shows every lead clearly, and the baseboard layout can be copied exactly by using the print as a template.

## Tackling the Panel

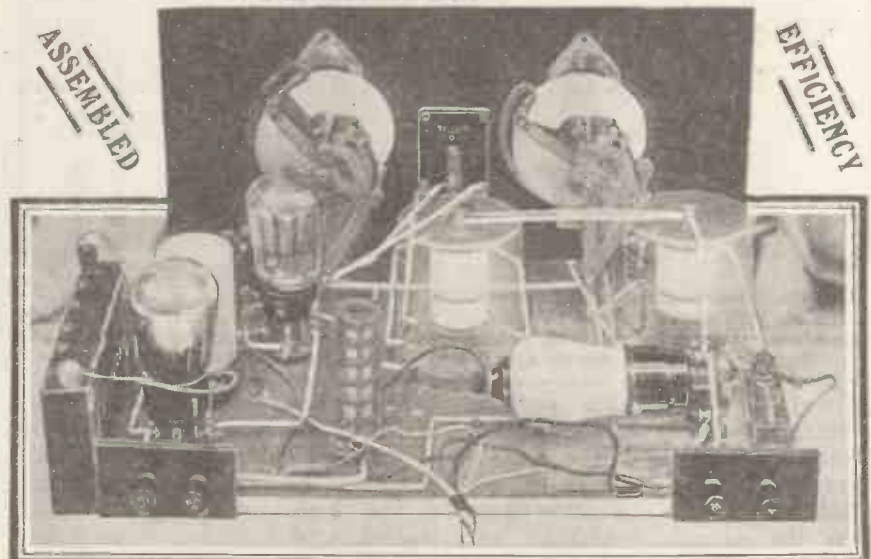
The first part to tackle is the panel, which should be drilled in accordance with the separate diagram in these pages, and the necessary components mounted on it. Then the panel should be put aside while the baseboard is got ready. This consists in mounting the two terminal strips as shown and tacking the foil down on the H.F. end.

This foil should be 5 inches wide and no more, so that it acts also as a guide to the positioning of the second coil, which it will be seen is situated just off the left-hand edge of the foil.

Having done this, the panel can be mounted on the baseboard, it being carefully held against the baseboard while the hole positions for the screws are made and again when the screws are driven home. It helps if this can be done with the baseboard on a table with somebody holding it so that it does not slip, while the constructor screws in the three fixing screws with the panel vertical against the baseboard.

## Correct Location

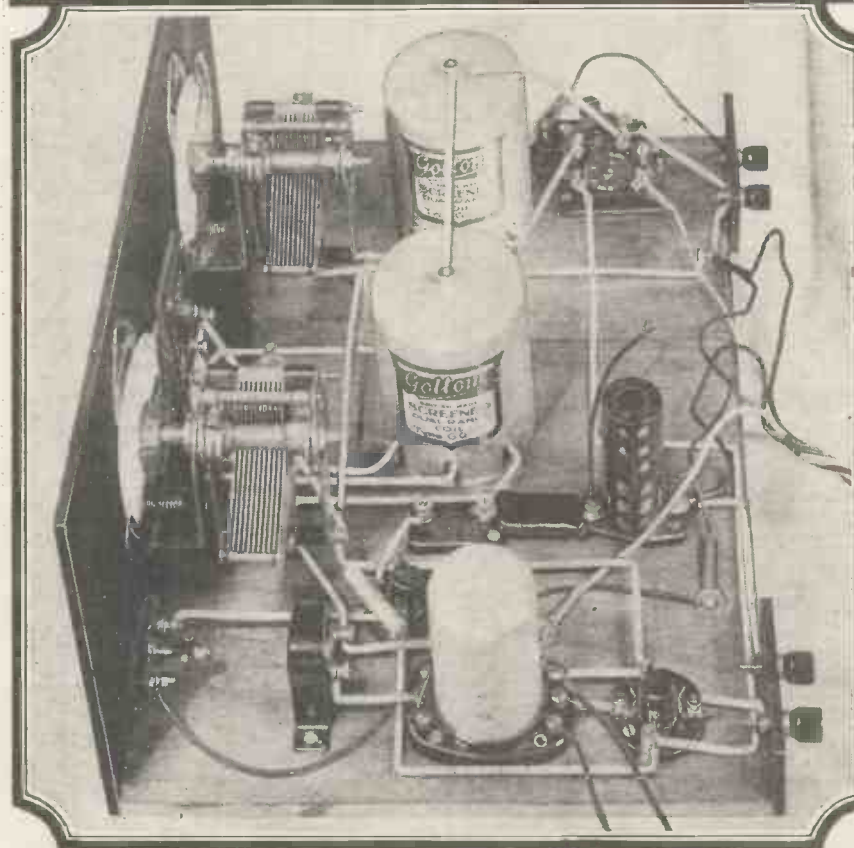
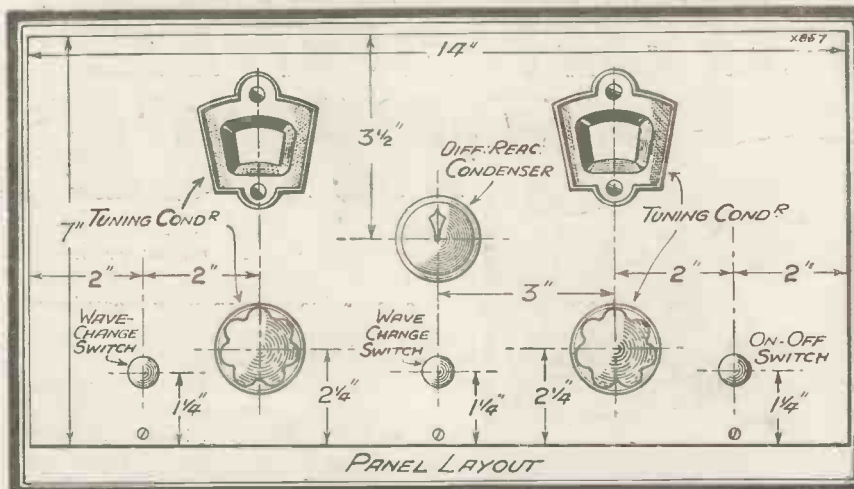
With the panel in position, the components on the baseboard should be mounted, care being taken that they are situated as shown on the blue-print. As we said before, it is a good plan to use the blue-print as a template, pricking the positions of the components' screws through the print, and thus



The construction is both easy and interesting, while the very high efficiency obtained makes the finished set a delight to handle.

matter of fact, all the grid and plate leads of the receiver are short, a feature that is most important desirable that those from the first switch should run along the metal foil at that end of the receiver.

**FORE AND AFT THE "PRINCE'S" PANEL**



In the diagram above you see the controls of the "Programme Prince" while all the dimensions necessary for positioning them are indicated. The photograph shows clearly how the panel components appear when viewed from the back of the set.

and which plays a big part in assuring the stability of the set.

It is advisable to do the connections to the three switches on the panel first, before the connections from the variable condensers are made. These switch leads can conveniently be kept low down on the baseboard though it is not

After these switches have been wired up the filament connections of the valve holders should be done, and then the grid and plate leads of the three valve holders can be tackled.

These leads are all kept reasonably low on the baseboard, though they do not touch it. The leads

to the variable condensers and the reaction condenser can be done next, and they should be taken as direct as possible.

Care should be taken that the connections to the coils clear the slits in the cans, or the insulating covering of the wire may be cut through when the lids are replaced, with disastrous results. Incidentally, do not omit to place the metal base discs under the two coils when they are being screwed on to the baseboard.

**For Your Guidance**

It will be noted that the reaction condenser, which is of the differential type, has its fixed vane terminals marked on the diagram  $F_1$  and  $F_2$ , respectively. These markings will not be found on the condenser itself unless it be of Igranic make, but they are used so as to enable the reader to compare the theoretical and practical diagrams.

There are one or two unusual points that should be cleared up. These are the connections to screws in the baseboard. It will be noted that in two places on the foil-covered section of the base and in two places in the bare section there are leads screwed down to the wood.

In the first cases the connection is expressly for the purpose of connecting the circuit to the metal foil and thence to earth, while in the second pair the use is to anchor or extend a wire.

**In All Cases**

The method is the same in all cases. The wires concerned are looped and then a screw is passed through the loop, a washer placed on top and the screw driven home into the board. In the case of the non-foil-covered section the two leads concerned are flexible leads of the battery connector cord, and it is desired in each case either to anchor the leads or to extend them by adding a length of ordinary rubber-covered flex.

Note also the lead marked "to top of anode coil can," and that marked "to top of aerial coil can." These are leads which are required to connect together the tops of the cans for earthing purposes; the cans not being provided with any other means of earthing than the terminals that are used for securing the lids of the cans.

# CHOOSING YOUR ACCESSORIES

**A**MONG the accessories of a receiver we usually count the loudspeaker, valves, H.T. and L.T. batteries, or mains unit, and the grid-bias supply, and in many cases the choice of these important parts has to be carried out with some care.

In the case of the "Programme Prince," picking the accessories is particularly easy. The valves are chosen from the list provided on this page, and the loudspeakers are also given.

## Double Capacity

As regards batteries, it is important to remember that the capacity required for the H.T. will depend upon the output valve used.

We advise the "small" valve and a double-capacity battery of 120-150 volts, unless a mains unit is considered, and then a larger output valve, with greater power possibilities, can be used.

The valve list is given with output valves suitable for battery operation, and alternative types for

mains units are mentioned in the text. Though a mains unit can be used to work the "battery" valve, a battery should not be used if the "mains" valve is employed.

In choosing mains H.T. supply it

## RECOMMENDED MAKES

Loudspeaker. Lissen, Blue Spot, Marconiphone, Celestion, Baker's Selhurst, R. & A. Epoch, H.M.V., B.T.H., Ormond, W.B., Lanchester, Clarke's Atlas, Igranic.

Batteries. H.T.: 120 to 150 volts.  
NOTE: This should be of ample size to deal with the requirements of the valves chosen. (Pertrix, Lissen, Magnet, Ediswan, Ever Ready, Marconiphone.)  
G.B. battery: See above list.

Accumulator. 2 volts. Oldham, Ediswan, Pertrix, Lissen, G.E.C., Exide.

Mains Unit (to give 20-52 milliamps at 120 volts). Clarke's Atlas, Heayberd, Ekco, Tunewell, R.I., Regentone (see text).

Aerial and Earth Equipment. Electron "Superial"; Graham Farish "Filt" earthing device.

## VALVES FOR THE "PROGRAMME PRINCE."

Make	H.F. Stage	Detector	Output Stage. For use with batteries
Mullard	P.M.12	P.M.1H.L.	P.M.2A.
Cossor	220S.G.	210H.L.	220P.A.
Mazda	S.G.215	H.L.2	P.220
Marconi	S.22	H.L.2	L.P.2
Osram	S.22	H.L.2	L.P.2
Tungsram	S.210	H.210	P.220
Lissen	S.G.215	H.L.210	P.220
Six-Sixty	215 S.G.	210H.L.	220P.A.
Eta	B.Y.6	B.Y.1814	B.W.1304

The S.G. valve chosen should preferably be of the metallised type.

is essential to remember that you require a mains unit with three H.T. taps. One must be suitable for the S.G. of the screened-grid valve, another for the detector, and the third is the maximum output of the mains unit.

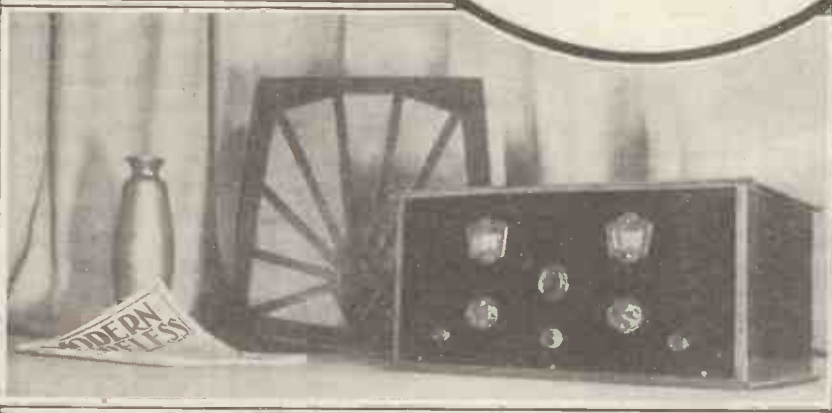
## Detector Tap

In the first case a voltage preferably adjustable between 60 and 75 is required, while for the detector a tap having about 75 to 100 volts is advisable.

As regards the valves advised for mains unit working, the following somewhat larger counterparts of the output valves listed in the table above can be used. They are not too big, so that quite an ordinary size of mains unit can be used; one with an output of 20-25 milliamps. will cover any of the valves given herein.

Here, then, are the valves:

Mullard P.M.202, Cossor 230X.P., Mazda P.220A., Marconi and Osram P.2, Tungsram S.P.230, Lissen P.X.240, Six-Sixty 240S.P., Eta B.W.303.



The finished set presents a handsome appearance.

# GETTING THE STATIONS



*All about getting your share of alternative programmes.*

**W**HEN the "Programme Prince" has been completed, the batteries must be connected, aerial and earth joined up, the loudspeaker and valves positioned, and we are ready for action.

The H.T. voltages should be as follow. The full voltage of the battery or mains unit on H.T.3, about 70 volts on H.T.1 and from 60 to 100 volts on H.T.2. This latter will have to be adjusted to that voltage which provides the best reaction control and the best sensitivity.

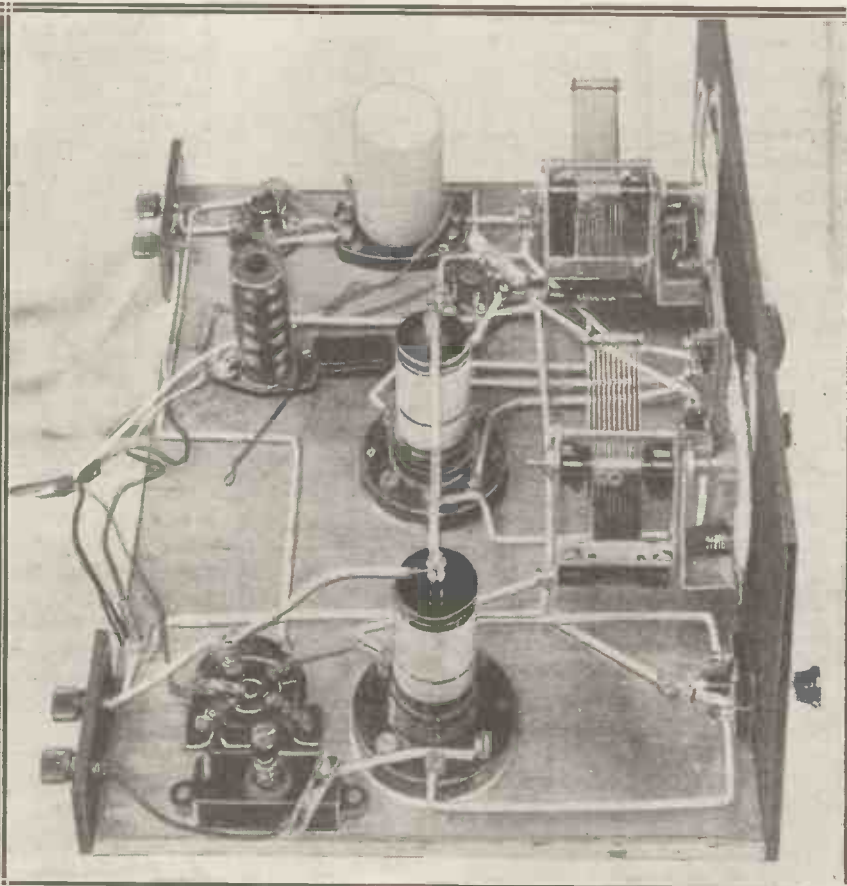
### All Out

All the switches are pulled out for reception on the medium wave-band, and the left-hand and centre ones are pushed in for the long waves. The other switch is, of course, the "on-off" switch.

The first thing to do is to screw the knob of the pre-set condenser about half-way down, and then, with the set switched on, rotate the tuning dials in search of the local station:

to increase the selectivity, especially when listening near the local transmissions or on the long waves. This is done by unscrewing the control on the pre-set condenser, when it will be found that the tuning becomes progressively sharper as the knob is turned in an anti-clockwise direction.

### SELF-SCREENED UNIT SIMPLICITY



The compacting of coils into self-screened units, and the use of a complete L.F. coupler stage, enables external screens to be dispensed with and greatly simplifies the construction of the "Programme Prince."

(It is assumed that the S.G. valve is in  $V_1$  socket, the detector in  $V_2$ , and the other valve in  $V_3$ ).

The local station should not be difficult to find, always provided it is on, and then the set can be tested for selectivity. The adjustment required to get this properly in the best proportion will depend on the distance of the set from the powerful transmissions of Great Britain and the Continent.

### Use the Reaction

All that can be done is to test the receiver carefully, keeping the two tuning dials in step fairly closely as search is made from one station after another, and using reaction whenever it is necessary to increase the strength of a transmission.

Possibly you can do with the input increased somewhat; if so, screw the pre-set control down still farther; but more probably it will be necessary

### The Best Ally

It must not be forgotten that the reaction control is one of the best allies we have in getting selectivity and free use should be made of it in this receiver. For instance, suppose we have a distant station that is being interfered with by some other on an adjacent wavelength. The best thing to do is to increase the selectivity by means of the pre-set condenser till we feel that we cannot do so any more without losing the distant station, and then to increase reaction to bring up the strength and at the same time to increase still further the selectivity.

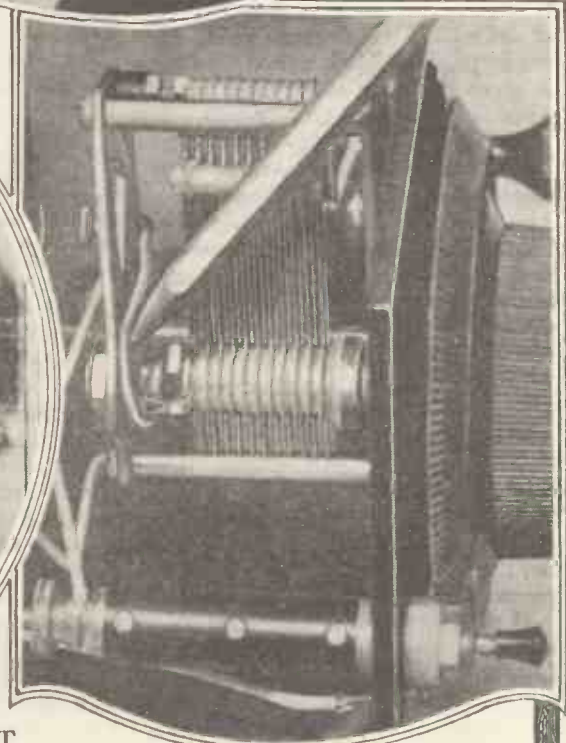
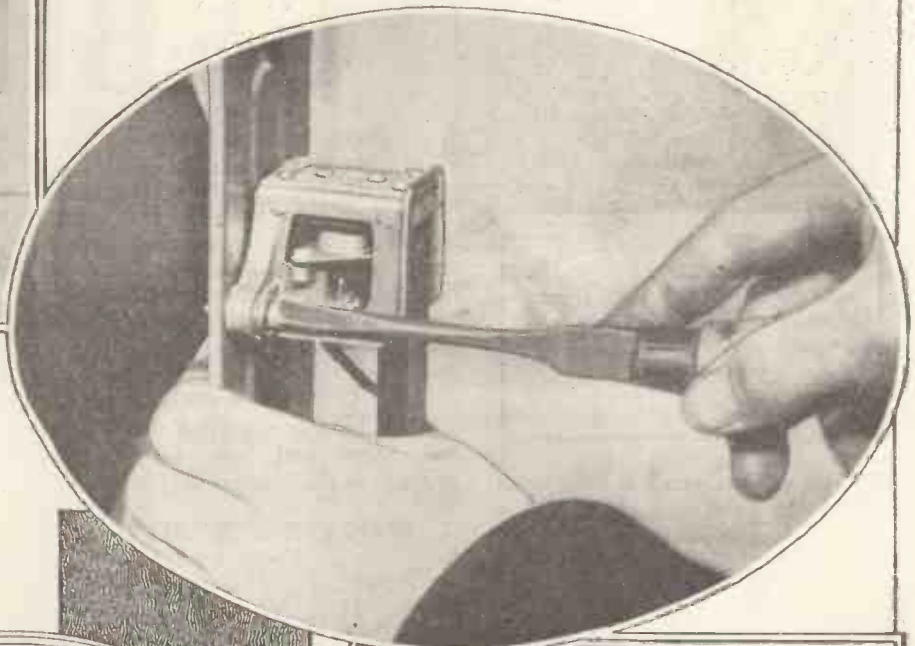
# WHEN TO TIGHTEN— —AND WHEN NOT TO!

There are times when a screwdriver should be used with a bit of "pep" behind it, and there are also times when restraint must be exercised in its application. Two typical instances are illustrated in this quartette of practical tips.



## URNS THAT MATTER

Don't try to screw the knob of a pre-set condenser down hard after it becomes tight, or you may burst out the bottom of the condenser. On the contrary, fixing screws for speaker units (right) cannot be too tight to prevent rattle.



## FIX IT RIGHT AWAY

If the bulb of a valve comes loose in the base. Seccotine will secure it before the internal wires are broken. To avoid noise see that condenser pigtails are quite O.K. and do not make unwanted contacts when in action.



# CONSTRUCT YOUR OWN CABINET

*If you fancy yourself as an amateur wood-worker now is your chance! Here are full details of a very useful and handsome cabinet.*

*By S. W. CAPPER.*

**T**HE cabinet which is built upon the baseboard of a set has valuable advantages over the ready-made "slip-in" case so often specified and used. It is cheaper, lighter and more compact; the sides can be used for mounting components or drilled for wave-change rods. It can be just the right size, and, finally, it gives the home-constructor more pride of possession.

The cabinet is made as follows:

The panel, wood or ebonite, and sides are screwed to the baseboard. Also, the panel is longer than the baseboard, the ends fitting into vertical grooves in each side, making brackets unnecessary. The lid rests on the sides and is held by concealed screws.

## Cutting the Wood

This is the most important part of the construction. Of course, the height of the case depends on the height of the set.

Both sides should protrude from the panel, and the lid, which should protrude from the sides, more so.

Here are some useful measurements:

Length of panel = length of baseboard +  $\frac{1}{2}$  in.

Breadth of sides = breadth of baseboard +  $\frac{3}{4}$  in.

Length of lid = length of baseboard + 2 in.

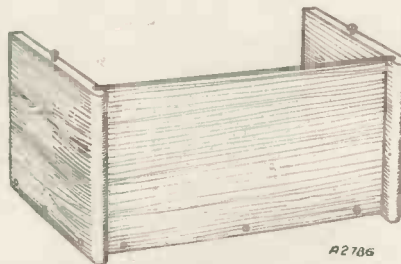
Breadth of lid = breadth of baseboard +  $1\frac{1}{4}$  in.

If the panel is wood it should be three-ply; the lid and sides should be  $\frac{1}{2}$  in. or  $\frac{5}{8}$  in. thick, preferably of oak. The baseboard, being the backbone of the case, must be at least  $\frac{1}{2}$  in. thick, and flat. Don't use a hard wood here.

## Fixing the Sides

After cutting the wood, screw on the panel and saw rectangular grooves in the side-pieces  $\frac{1}{4}$  in. deep

### SLOTTED SECURITY



Grooves in the sides of the cabinet to take the panel are easily arranged for, and result in a very neat finish as well as making the job a strong one.

and about  $\frac{1}{2}$  in. wide, the width being a little greater than the thickness of the panel, so that the backs of the sides are flush with the back of the baseboard.

See that the baseboard is on a level surface and then screw on the sides. Probably the panel will not slide into the grooves. This may be so for three reasons. The grooves may not be wide or deep enough and they may have been cut like a U or V. Cures are obvious.

## A Removable Back

To secure the lid a smooth round-headed screw (the head's diameter might be  $\frac{3}{16}$  in.) is driven into the top of each side of the case until a  $\frac{1}{4}$  in. of the screw is left visible. Drill

corresponding hollows, *not* holes, in the lid  $\frac{1}{4}$  in. deep and large enough to clear the screw heads, so that the lid rests centrally, its back level with the backs of the sides and baseboard.

If a back is required to keep out dust, make it out of three-ply. Its length should equal the length of the baseboard plus twice the thickness of a side-piece, and it must be the same height as the panel; but make allowance for terminal strips.

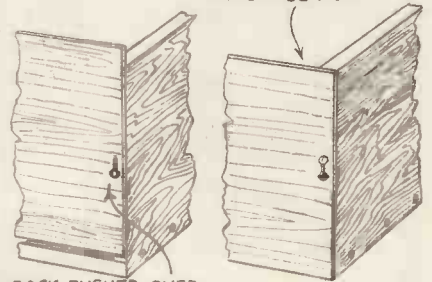
Screw the back loosely to each side; one screw each is enough. Now mark points on it  $\frac{3}{16}$  in. below these screws and drill these points out until they will clear the screw heads. File away the wood between the holes. The back can now be lifted up and out and replaced *vice versa*.

## Staining and Polishing

Dismantle the case and stain and polish the sides, lid, back and, if necessary, the panel. The stain must not contain varnish. Beeswax and turpentine make the best polish, but there are many excellent furniture creams on the market for those who prefer a ready-made preparation.

## A NEAT FITTING

BACK LOWERED INTO POSITION.



BACK PUSHED OVER FIXING SCREWS.

Here is an idea for fixing a dustproof back which has the advantage of facilitating removal for inspection.

# The "DIODE" FOR SUPER-HETS



*One of the great advantages of the diode detector is the way it separates the H.F. completely from the L.F. side of the set. Keeping H.F. out of the low-frequency side of a super-het. is one of the difficulties facing the designer of these receivers. The application of diodes to super-hets. should do much to overcome the difficulty.*

ONE of the greatest troubles that beset the designer of the super-heterodyne receiver is the transference of high-frequency impulses into the low-frequency end of the set. The detector (usually called the "second" detector, though the first "detector" is really a mixer valve) is supposed to remove the H.F. and merely let the L.F. component of the received energy pass into the audio side of the receiver, for further amplification, and for conversion by the loud-speaker into sound.

#### Amplifies as Well

Unfortunately, the average triode "detector" valve is an amplifier as well as a rectifier, and it does pass a comparatively large percentage of high-frequency energy into the following audio stages of the set. H.F. chokes and by-pass systems will do a great deal to remove this, but they often do so at the cost of quality, the result being that the loss of high notes in the reproduction is even greater than that normally caused by the actual system of super-heterodyning.

The problem is no easy one to solve by ordinary methods, but there is a scheme that can be used with great success, and which we shall shortly deal with more fully. I refer to the diode rectifier, which is much more efficient than the ordinary triode detector, and which offers greater ease in the cutting out of unwanted high-frequencies.

As far as we know, the diode has not been applied to this type of circuit before, certainly not in the realm of the home-constructor, and we hope very shortly to place before you a design that will not only include this method of rectification, but will also be the very last word in super-hets.

#### Efficient Rectification

A great deal of the distortion experienced in super-hets. that are not working as they should is due to the presence of high-frequency impulses in the low-frequency side of the set, and is due to inefficient rectification. Further distortion is also caused by overloading of the detector, whether it be operated on the leaky-grid or anode-bend principle.

The diode rectifier changes all this and allows of efficient rectification, whilst the overloading possible in the triode cannot take place, provided satisfactory L.F. valves are employed after the diode.

In fact, the set can be so arranged

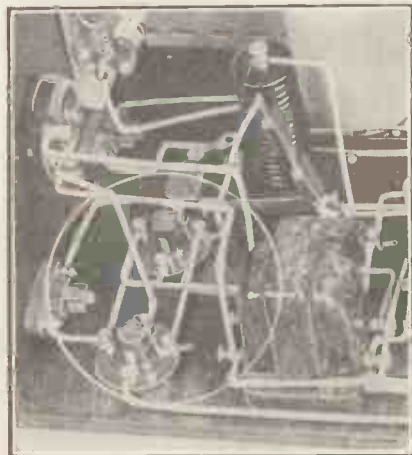
having the effect of overblasting the L.F. valve and automatically stopping the operation of the L.F. side of the set.

#### Avoiding Overloading

This limit can be arranged to coincide with the fully-loaded point of the output valve, so that the set ceases to function as that valve starts to be overloaded. Alternatively, such limiting can be neglected altogether, so that no self-checking takes place, and the overloading of the output valve can take place on exceptionally powerful impulses in the same way as it does in ordinary receivers, there being the one difference, of course—that there is no distortion caused by incomplete rectification due to detector overloading.

Naturally, a super-het. with a diode rectifier needs one more valve

### THE MAGIC CIRCLE



than it would to give the same volume with a triode detector, but this is not really a disadvantage, as practically any valve can be used for rectification, and as the plate is not employed (the grid being used as the anode) and no H.T. is applied to it, there is no extra drain on the H.T. battery.

Absence of a grid leak across the diode input circuit allows the last intermediate H.F. transformer to operate in its most efficient condition, practically free from damping, and thus the fullest amplification can be obtained.

We have recently applied the diode principle to "straight" receivers with great success, and those who have tried them will have noticed the high degree of quality which has characterised the reproduction.

The diode super will constitute another advance in the design of super-hets., and will, we feel, do a great deal to improve both quality and selectivity of this most interesting type of radio receiver.

The diode has not been given a real trial in home-constructors' sets, and it will be, interesting to hear from readers—who build receivers with this type of rectifier—how they get on.

Increased selectivity should be very noticeable in the majority of cases, though perhaps not so much in the case of a super-het. as with ordinary receivers, while the purity of reproduction is another very marked feature.

Ordinarily, the lack of reaction gives the feeling that the very last ounce is not being got out of the receiver, but with a super-heterodyne this is not present, and the effect is one of a cleanness of reception that has to be heard to be appreciated.

The two valve holders in the circle are for the L.F. valves in the "M.W." "diodion." The "upper" one immediately follows the diode valve, and carries out the preliminary amplification normally done by the detector.

#### Different Circuit

In the super to which we particularly refer the diode is used in a slightly different circuit from that usually employed. In most cases the resistance between the diode anode choke and earth is taken also to the grid and filament of the following L.F. valve, but in this receiver, which you will be able to examine fully next month, another arrangement is used.

This is to take the grid of the following valve to a tap on the resistance, so that not only is

the full voltage not tapped across on to the grid, but the section of the resistance that is between the choke and the grid of the low-frequency valve acts as a grid stopper, still further preventing any stray H.F. from entering the low-frequency side of the set.

This scheme operates exceedingly well, for it allows the diode to be well loaded before sufficient energy is passed on to the low-frequency section to cause overloading there. We have said that the diode itself cannot be overloaded in normal circumstances, and it is therefore a good scheme in such a set where there is plenty to play with in the way of input to reduce the output of the diode by a definite ratio, and thus reduce the possibilities of overloading on the low-frequency side.

#### Spread Eliminated

The sharpness of the super-het. is undoubtedly increased by the use of the two-electrode rectifier, for in the particular model which we are presenting next month the local station, on a full-sized aerial, comes in and disappears in one degree of the oscillator tuning dial. This is no small feat, for the tendency to spread is usually very marked even in super-hets., and with band-pass tuning; several degrees being covered in some instances.

We do not claim all this selectivity as due to the use of the diode, however, as some must inevitably be due to the band-pass and intermediate coils used, and to the design of the oscillator coupler. But you will see for yourselves what type of circuit is employed when the full details appear.

And talking about next month, we might take this opportunity of announcing another unusual receiver that is in preparation as a companion to the diode super. It covers a particularly wide band of wavelengths, and is of quite unique design, and of an unusually high degree of sensitivity and selectivity.

#### Two Good Sets

In fact, the "M.W." sets for next month are both well out of the ordinary in both design and the results they will give, and we very strongly draw your attention to them, whether or not you may feel inclined to build one or other.

MODERN WIRELESS set designs are the work of a special group of technicians who do nothing else all day and every day but test out new circuits and endeavour to improve the old ones.

It is a task that is by no means easy, and a great deal of time spent on this work bears no direct fruit. We say "direct" because all such experiment teaches something about the vast science of radio, and things found out one day are sure to be useful later on, if they are not applicable to the work on hand.

# RADIOGRAM POINTERS



Radio and record reproduction are so closely bound up nowadays that one can almost look upon the electrical playing of gramophone records as a branch of radio reception, and here are some timely hints towards better results.

THE radio-gramophone has undoubtedly not only come to stay, but is rapidly increasing in popularity: finding its way into an ever-increasing number of homes. And, to my mind, this side of radio is just as fascinating as that which is strictly concerned with the reception and reproduction of programmes conveyed over the ether.

The experimenter with a radio-gramophone has additional scope for his ingenuity, for experiments on both the radio and record sections of the set are possible. He can try not only to improve his selectivity or sensitivity on radio, but to improve his quality on both radio and record, testing different pick-ups, different coupling schemes on the L.F. side, and all sorts of frequency correctors, various needles, loudspeakers, and so on.

Moreover, the fact that he can play over and over again the same record, and thus have a definite comparison between each experiment, is a great advantage, and one that does not so easily occur when one is dealing solely with radio reception.

A small collection of test records is invaluable, and the home constructor who is interested in radio-gramophones should make a point of having half a dozen or so. These should include such items as brass bands, piano solos, string quartets, dance bands and organ solos, together with vocal records of various types. It is of added value if the collection contains recordings of well-known broadcast artistes and bands, for then further comparisons with broadcast reproduction can be carried out.

### Notes on Needles

The needle is the prime mover in the case of record reproduction, and as such should be treated with a certain amount of care. Never put your trust in unknown makes; they may be very good, or, like some I was trying a short time ago, they may be very poor. These particular specimens of ordinary loud steel needles were, almost without exception, blunt, and a blunt needle will play havoc with the record.

Try all sorts of needles; don't stick to one sort. But always carry out the directions on the needle box, and when you are requested to change after every side do so. This direction is given for a technical reason, and not merely to increase the sales of the needles.

Tungstyle needles should not be used with blind faith that you

will get 150 playings with each one. You probably will get more like 30 before the point is too far gone to be of any real use.

Always treat the needles gently, as the points are comparatively easily damaged, and a bent point means a spoiled record.

Once such overloading takes place it is good-bye to any hope of quality, and the consequence is that the owner of the set thinks pick-up reproduction is a wash-out.

The volume control, in the form of a potentiometer of suitable value (according to the make of pick-up), should always be used to control the input from the pick-up to the grid of the first valve, which will ordinarily have a fairly short grid swing.

Some instruments are marketed complete with such a control in the base, but many have no such fitment, and a separate control must be used on the motor-board or on the panel of the set or some convenient place. It avails nothing in the case of first-valve overloading that the set has a control "in the L.F. side" because this is usually the control for the grid of the second valve when "gramophone" is used, and the overloading has already taken place before this comes into effect.

### Keep Them Clean

Always keep your records clean. Dust is a very serious enemy to the life of the disc, and it invariably pays to have at hand a small cleaning pad such as is sold by the gramophone companies for dusting the surface of the record. Then when the turntable and record are set revolving, the pad is held lightly on the surface of the disc and the grit and dust are easily removed.

Dust is an abrasive, and if the record surface is allowed to get dirty, serious wear will rapidly take place. Normally, a record should

## HAVING A LOOK AT THE WORKS



One of the extensive range of H.M.V. radio-grams with the motor-board removed to enable the interior design to be inspected.

### An Important Point

I wonder how many sets using adaptors or attached pick-ups, as distinct from complete radio-grams, are spoilt owing to the omission of a volume control across the pick-up? It is a fact that, with the exception of about one or two pick-ups, an input volume control is an essential part of the outfit. Most pick-ups are connected in the grid circuits of the detectors, and on loud passages of the records will overload these valves.

last for many playings if the needles are properly chosen and changed, and if the disc is kept clean; always assuming that the tracking of the pick-up is correct.

### Preventing Peaking

Nothing can be more annoying at times than a pick-up that peaks on a certain frequency, causing harshness on the top notes and distortion at most disconcerting moments. Alas, such a state of affairs is too common; and yet, without going

into technical details, such a fault can be easily mitigated if not cured.

The proper way would be to design a tone corrector that will remove the peaks and leave the rest of the frequency curve unaltered, or to use a zone corrector of the continuously adjustable type so that the result that is desired can be obtained by aural adjustment.

Simpler, however, is to connect a resistance across the pick-up windings, a resistance that will cause the characteristic to fall at the top end and so suppress the peaks to a great degree. The value of the resistance will vary with the make of pick-up, but a usual value is about 20,000 ohms, or even less, according to the amount of suppression required.

### Storing Records

If you want to store records without any danger of warping they must be kept upright, standing on their edges in stiff covers to prevent them getting scratched. The books sold for records are a snare, for they are rarely kept properly.

Too often they are piled up in heaps, and this causes terrible warping after a time. Book-stored records must be kept edge up, or the very construction of the books, with their stiff backs and sagging leaves, will tend to cause very bad warping.

Warping can be reduced by careful warming of a record and placing between heavy flat plates, but as a rule this is not particularly successful.

### On the Level

It is most important that the turntable of a radio-gramophone, or of an acoustic gramophone, for that matter, be level. A sloping surface will tend to wear the record very badly in many cases, and in only one direction may a slope be tolerated.

When a record is being played the walls of the grooves push the needle of the pick-up, moving the whole mass of the pick-up and tone-arm towards the centre of the disc.

This entails steady wear on the one side of the grooves, and it can readily be seen how this wear is increased if the movement has to be slightly uphill.

This up-hill effect will be present if the turntable is sloping back; the instrument being not level on the floor, but itself sloping back.

Slight sloping forward is not so bad, as this helps the record to push the pick-up across, though excessive slope this way will wear the inside of the grooves.

The turntable should be level, and pains to get this so should be taken if long life for your records is to be enjoyed.

### Housing the Radio-Gramophone

The question of housing a radio-gram receiver, or, rather, one that has been built with provision for a pick-up and not as a complete radio-gramophone, is a problem that is continually cropping up. It is easy enough to place the set in an ordinary cabinet, and to run trailing leads from it to the pick-up and gramophone motor somewhere else in the room, but this practice is not always very satisfactory.

It causes trouble due to the long pick-up leads, and the whole affair is not a particularly tidy or efficient arrangement. It is far better to place the whole outfit under one roof as it were, with the set underneath the motor-board of the gramophone, and if desired the loudspeaker underneath the set.

There are plenty of suitable cabinets for the purpose on the market, with sizes to suit the standard panels used in home set-construction; but one of the most useful that has been lately listed is the new Adaptogram cabinet marketed by Messrs. Peto-Scott, and containing a motor and pick-up ready for use.



# TWO-VALVE AMPLIFIER



By  
THE  
"M.W."  
RESEARCH  
DEPT.

To look at a modern radio-gram is inclined to give one the impression that the electrical reproduction of records is somewhat of a complicated operation. Actually this is far from the truth of the matter.

The complicated appearance comes largely from the radio side of the radio-gram, and the fact that a certain amount of the apparatus to be seen is for the purpose of providing power from the mains. Apart from the accessories such as pick-up, loudspeaker and batteries, the amplifier for record work can be one of the simplest pieces of electrical apparatus.

Just take a look at the amplifier illustrated on this page; no one would have any doubts about tackling its construction. And yet, quite apart from being able to give fine quality record results, it is suitable for following a detector valve of a radio set to enable the received results to work a loudspeaker.

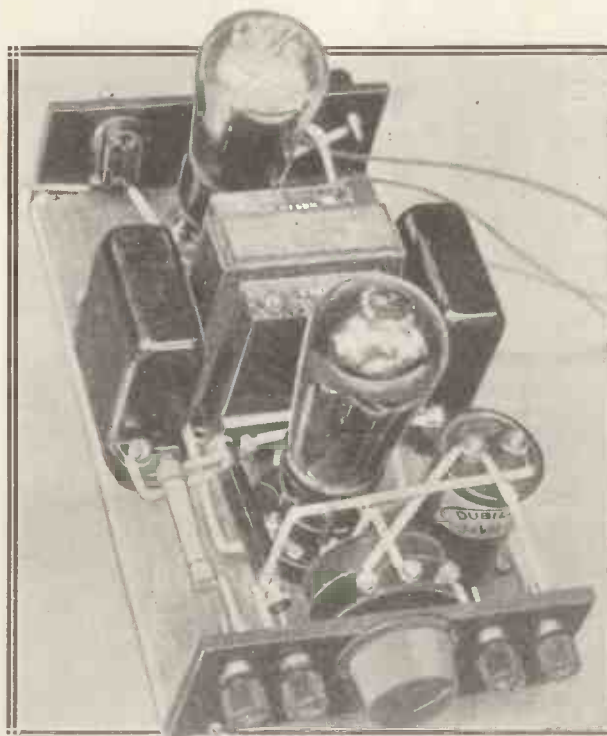
## Radio or Record?

It is thus a dual instrument for those who require a simple but first-class amplifier, and it can be run from batteries or mains H.T. unit.

For those who like to have an electrical gramophone quite separate from their radio receiver, and for those who wish to convert an existing console type gramophone into an electrically-operated one, it is ideal. Its size is such that it can be fitted away in

*If you build this small amplifier you can have all the advantages of electrically reproduced records, and at the same time you will provide yourself with an amplifier that can follow after any detector to give loudspeaker results.*

quite a small space, but at the same time it is a simple matter to provide it with a cabinet so that it could be used alongside an existing receiver.



## FROM A WHISPER TO A ROAR

That's where electrical reproduction scores over the ordinary gramophone. You can adjust volume to just the strength which suits your taste and the particular item which you are playing. The volume-control knob is fixed on one end-piece of ebonite.

A volume control is incorporated in the design, and this is arranged before the first valve so that there is no need for any overloading to take place inside the amplifier, either where the first or the second valve is concerned. This control is so arranged that it is operative whether the amplifier is being used after an existing receiver or for pick-up work.

If you look at the circuit diagram you will see that there are separate input terminals for radio and for record. The reason for this is as follows.

## Decoupling

In a set with no L.F. valves there will not be any decoupling in the anode circuit of the detector valve. But when low-frequency stages are added this becomes very desirable, although it is not wanted in the case of pick-up work.

For this reason it is incorporated in the design in such a way that it is only effective when the radio input terminals are connected up. The terminal which is marked "To 'phone terminal of receiver" will go to the plate of the last valve, and the 50,000-ohm resistance will take the place of the telephones, and in conjunction with the .1-mfd. condenser forms a resistance-capacity coupling between the first valve of the amplifier and the detector valve in the set.

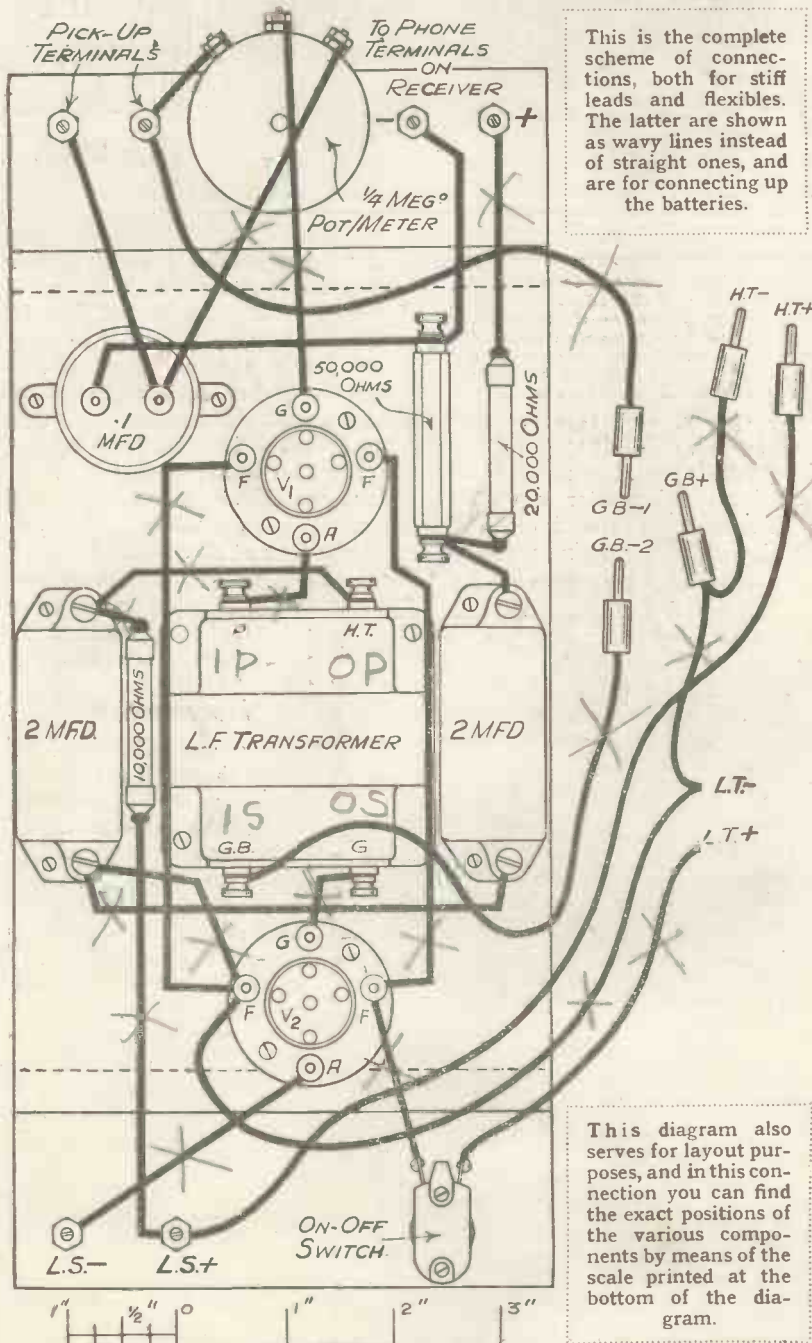
The 20,000-ohm resistance that is wired in series with the 50,000-ohm one acts as the decoupling resistance in conjunction with the 2-mfd. fixed resistance. In the case of radio the 1/4-megohm potentiometer acts as the grid leak for the valve.

Another feature of the amplifier which ensures low-frequency stability, and therefore aids in the attaining of

and another 2-mfd. fixed condenser. Complete battery connections are provided for when the amplifier is used by itself. When it is used as a radio amplifier the H.T. negative connection is not needed; indeed, it is important that it should not be connected up, as the same batteries should be used for both amplifier and radio set, and the connection of H.T. -

Don't imagine that the amplifier is capable of handling only small power because of its small size. The volume that it will give is dependent upon the output valve that is used with it, and the output valve that you use is dependent upon the amount of high-tension that you can supply. You will realise in consequence that where a mains unit is available that greater power can be obtained because of the unlimited, or nearly so, amount of high-tension that can be supplied.

**LINES THAT LEAD TO POWERFUL REPRODUCTION**



This is the complete scheme of connections, both for stiff leads and flexibles. The latter are shown as wavy lines instead of straight ones, and are for connecting up the batteries.

**A Stand-By**  
Where batteries have to be employed there is one great advantage in having a small amplifier like this incorporated in your console type gramophone cabinet. In most cases it enables the acoustic side to be left entirely untouched, so that should your batteries let you down at a critical time you will not be lost for a means of reproduction. But it's pretty certain that you will not feel very pleased with the acoustic results after getting used to the electrical reproduction!

**CONSTRUCTIONAL HINTS**

**T**HE construction, as already indicated, is particularly simple and straightforward. So much so is this the case that there is no doubt that many will tackle this amplifier as their first constructional item, and for this reason very full instructions for the job are given.

First of all, cut the baseboard and end pieces of ebonite to size. There is no need for the dimensions to be mentioned, because they can be obtained by means of the scale on the wiring diagram.

**Measuring Out**

For instance, by using this scale you will find that the terminal strips are equal to two divisions on it—that is, they are two inches. So you measure them out as two inches with a proper size ruler on the ebonite. Measure these strips to the dotted line and not to the full line which represents the top of the baseboard, the distance between dotted and full lines being the thickness of the baseboard.

The next job is to mark the

really good quality, is the decoupling that is provided in the anode circuit of the first amplifier valve. It consists of a 10,000-ohm resistance

might lead to a serious short-circuit. The correct thing to do when using the amplifier with radio set is to ignore the H.T. negative plug completely.

positions of the holes that you need to drill in the end-pieces. Any sharp metal point will do for the job.

When you have marked the points to be drilled, make a small dent to prevent the drill from wandering when you start making the hole—a centre-punch being the official instrument to employ.

### Mounting the Components

Don't forget a couple of small holes have to be made in either end-piece to attach the strips to the baseboard. They should be made a distance equal to half the thickness of the baseboard up from the bottom of the ebonite.

Two of the holes will require to be fairly large, about  $\frac{5}{16}$  in. They are

Then screw down the transformer, still keeping the valve in position. Note that the transformer is pretty close up to the valve holder, and also that it is nearer to one long edge of the baseboard than to the other.

On the one side of the transformer, the side nearer the edge of the baseboard, there is a 2-mfd. condenser by itself, while on the other there is a resistance as well as a fixed condenser. See that you get the condenser on this side well up to the edge of the baseboard, so that there is ample room for the resistance.

### Resistances With Pigtailed

This leaves you with two more parts only to screw down, the other

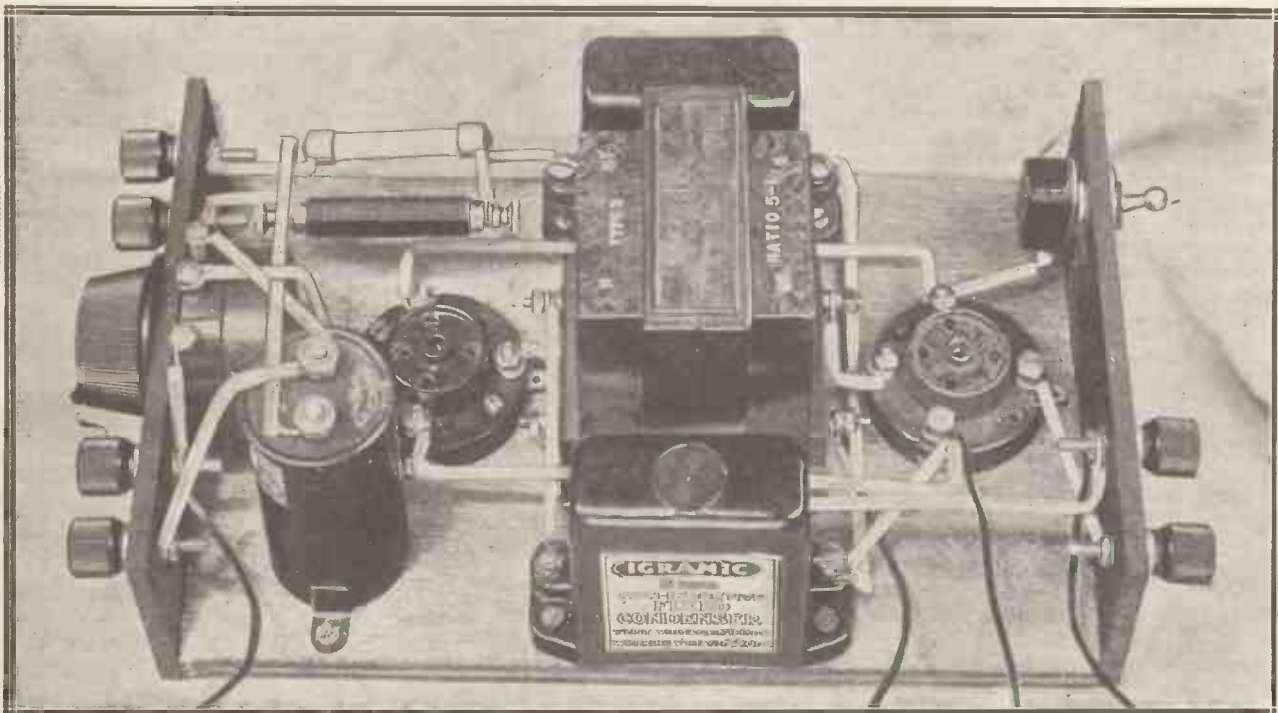
tempted to hurry this. It is naturally essential that there shall not be a single mistake in it, and it is also very desirable that each terminal screw shall be really tight or you may have trouble in the future from loose connections.

### Use Pliers

It does not matter what kind of wire you connect up with so long as it is insulated and fairly stiff. Number 18-gauge tinned-copper wire, insulated with lengths of systoflex, is as good as any.

Finger-tight connections are not good enough; use pliers for screwing up all the nuts and terminal screws, and you will not be bothered with

## THE SORT OF THING YOU CAN "KNOCK UP IN AN EVENING"



Owing to the comparatively few components and to the fact that H.F. is not being dealt with, the layout and wiring present no difficulties, and the actual work of assembly is easy and enjoyable.

those that take the volume control and switch.

Having reached this stage we are well on our way, for the next step is to start mounting the components. Put the six terminals, potentiometer and switch on the ebonite end-pieces, and then screw these to the baseboard.

Then come the baseboard components. First of all mount the  $V_2$  valve holder, putting a valve in it to ensure that there will be plenty of clearance between the switch and the valve after the holder is screwed down.

valve holder and the 1-mfd. condenser. The three resistances are not anchored to the baseboard in any way, their connecting leads being sufficient to hold them in place.

They should be of the types that have either a pigtail at the ends or terminals. Both types are to be seen in the photographs. The advantage of the terminal type is that no soldering is necessary with them, as it is with those with pigtailed.

### Avoiding Future Trouble

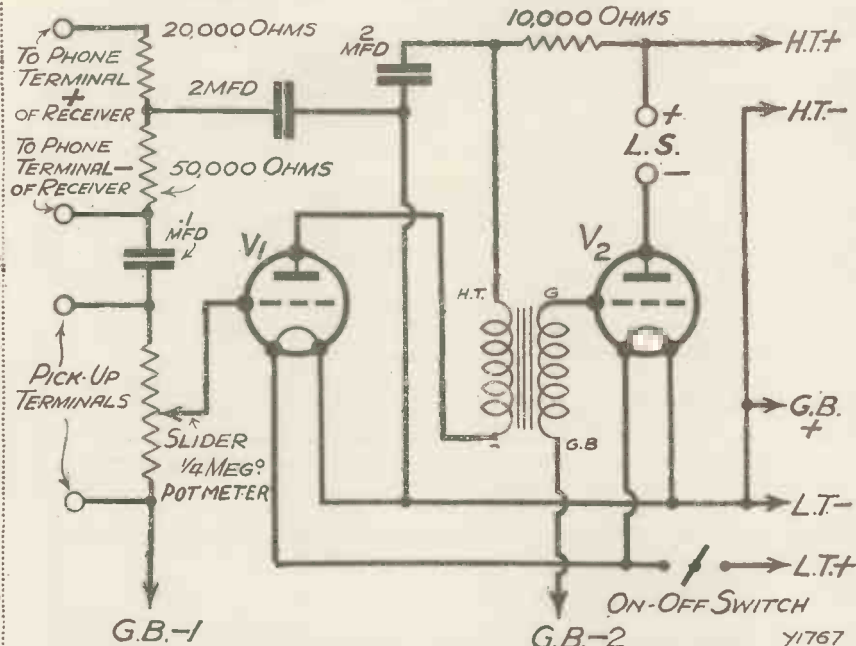
The next and final part of the construction is wiring. Don't be

cracklings when the amplifier is put into use. There are less than two dozen stiff-wire connections to be made, so the whole wiring up will not take you long.

If you use fixed resistances with pigtail connections, you will find that in one or two cases these pigtailed can be joined up direct to the terminals on other components. This is one small point in favour of the use of pigtail resistances over terminal type, but, after all, it is entirely a matter of personal choice.

Now for the flexible leads. There are five of these in all, but one of

**TWO VALVES—DUAL INPUT—DOUBLE PURPOSE**



The circuit is quite straightforward, but nevertheless has several notable features. There is decoupling for the first L.F. valve, and also decoupling for the detector when the amplifier is used after a radio set. The volume control is always operative.

them is divided into what is really three leads by the G.B. positive and L.T. negative points of connection.

It is impossible to state any particular lengths for these flex leads, as it all depends upon the positions and distance away from the amplifier of the batteries. The best scheme is to measure them with the amplifier and the batteries all in the places where they are finally to be used.

**A Last Word**

The wires for connection to the accumulator should be provided with spade tags and all the others with ordinary battery plugs, except perhaps in the case of those for H.T. when a mains unit that has terminals for output is to be utilised.

And with that we have written the last word about the construction, and come to what is perhaps more interesting to many—trying out.

**TO RUN YOUR AMPLIFIER**

- Pick-up.** Marconiphone, H.M.V., Bulgin, Radiophone, Bowyer-Lowe, Celestion, Igranic.
- Loudspeaker.** Baker's Selhurst, Lanchester, B.T.-H., R. & A., Marconiphone, W.B., Celestion, Epoch, Atlas.
- Batteries.** H.T.: 120-150 volts (see text). (Pertrix, Ediswan, Magnet, Ever-Ready, Siemen's, Lissen.)  
G.B.: To suit valves. (Ever-Ready, etc.)  
L.T.: 2-volt. (Lissen, Oldham, Ever-Ready, Pertrix.)

try the -1 plug in 1½ volts negative and also 4½ volts negative while the amplifier is working, to see whether results seem better.

**USE THESE VALVES**

	First	Second
Mullard	P.M.1L.F.	P.M.2A.
Mazda	L.210	P.220
Cossor	210L.F.	220P.A.
Marconi	L.210	L.P.2
Osram	L.210	L.P.2
Tungsram	L.G.210	P.220
Lissen	L.210	P.220
Eta	B.Y.1210	B.W.604
Sixty-Sixty	210L.F.	220P.A.

But never move the G.B.-2 plug while the amplifier is switched on. It is not good for the power valve.

The grid-bias voltage to apply to -2 depends entirely upon the particular power valve you choose, and upon the high-tension voltage applied to it. But it should be quite clear from the instructions issued with the valve what bias you should apply with the H.T. you have available.

**Economical Working**

The high-tension voltage, by the way, should be as high as you can manage, so long as it does not exceed the maximum recommended for the power valve in question. It will not matter if the permissible maximum for the preceding valve is not so great, because the 10,000-ohm decoupling resistance reduces the H.T. voltage applied to the first valve in the amplifier.

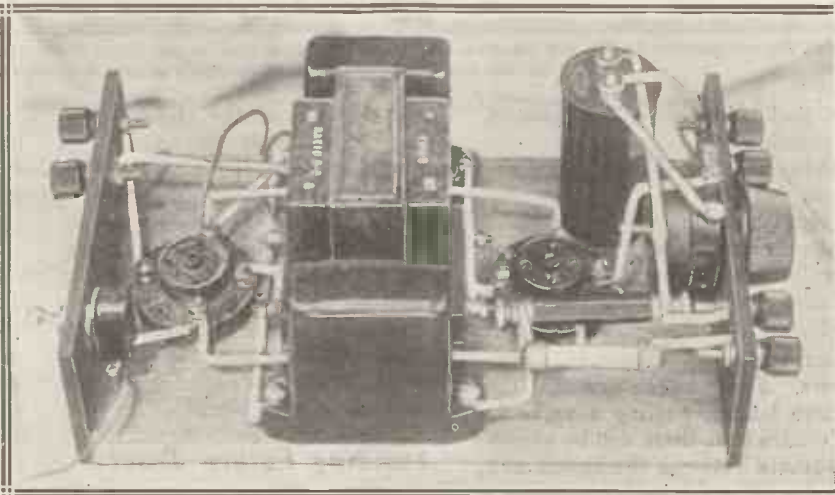
For economical working from small H.T. batteries it is necessary to keep to a small output valve. Any of those listed in the special valve table would be quite O.K.

**THE AMPLIFIER IN USE**

**W**E have already indicated roughly the main points about connecting up the amplifier, according to whether it is to be used for pick-up or radio work. A word or two about battery voltages will not come amiss, however.

Grid bias -1 supplies the first valve in the amplifier, which should be of the L. or L.F. type, and will need about 3 volts G.B. You can

**YOU'LL GET AMPLE POWER FROM THIS AMPLIFIER**



Though small in size and particularly easy to make, you can get ample power from this amplifier—and it will not be at the expense of quality.

But while these give adequate volume for an ordinary size room, they are not suitable for very big outputs. When these are desired, a larger valve must be employed and super-capacity batteries or mains unit. The latter is most strongly to be advised if you have mains available.

### A Switching Reminder

You will find a special list of the accessories needed when the amplifier is for pick-up work only. You will naturally appreciate that they will not be needed, except perhaps the pick-up and loudspeaker, when the amplifier is to be used with an existing receiver which already has suitable H.T. and L.T. supplies.

There is one little warning that we must give, and it may seem to be rather unnecessary, but since it concerns the switching off of the amplifier when not in use, it is worth mentioning, since it is just possible it will save your batteries being run down while doing no useful work.

You may be so used to operating the on-off switch of the receiver only,

TYPES AND MAKES OF ALL THE COMPONENTS	
<b>VALVE HOLDERS</b>	Sovereign, Lissen, Tunewell, Radiophone, Ready Radio, Bulgin).
2 4-pin (W.B., Benjamin, Telsen, Lotus, Chix, Ready Radio, Bulgin).	
<b>FIXED CONDENSERS</b>	<b>L.F. TRANSFORMER</b>
2 2-mfd. (Igranic, Telsen, T.C.C., Ferranti, Dubilier, Lissen).	1 L.F. transformer (Lotus type 3, Lissen, R.I., Telsen, Ferranti, Varley, Slekton, Tunewell, Ready Radio, Sovereign).
1 1-mfd. (Dubilier non-inductive).	
<b>RESISTANCES</b>	<b>SWITCH</b>
1 50,000-ohm, with holder if required (Graham Farish, Dubilier, Igranic, Ferranti, Lissen).	1 on-off toggle (Bulgin).
1 20,000-ohm (Dubilier 1-watt, etc.).	
1 10,000-ohm (Dubilier 1-watt, etc.).	<b>MISCELLANEOUS</b>
<b>VOLUME CONTROL</b>	6 terminals (Belling-Lee, Igranic, Bulgin).
1 1-meg. potentiometer (Varley, Igranic,	1 baseboard, 8 in. x 5 in. x 3/4 in.
	2 terminal strips, 5 in. x 2 in.
	Flex, 18 gauge wire and sleeving.
	5 wander plugs and 2 spade terminals (Bulgin, etc.).

that the amplifier's L.T. switch might get overlooked, and it is this which you must guard against. Even when the amplifier is in use for pick-up work only, the switch may get overlooked by those who are used to the acoustic type of gramophone only.

### Adjusting Volume

Lastly, when working on radio, you find reaction is necessary to bring up the volume of a distant station to the desired strength, always make sure the volume control on the amplifier is set for maximum

loudness. It would be a pity to have to push reaction to its limit to get a station in well when amplification is being cut down the whole time by the amplifier's input control.

It may be of interest to note that the amplifier can follow a crystal set. The connections are as follows.

Connect one 'phone terminal of the set to the pick-up terminal farthest from volume control. The other pick-up terminal then goes to one side of a 1-mfd. condenser, the other side of which is connected to the remaining set 'phone terminal.

### KEEP YOUR L.T. UP TO SCRATCH

**DO** have some ammonia or soda handy in case acid from the accumulator gets spilt on the carpet.

—smear the terminals with vaseline to prevent them being eaten away by corrosion.

—test the specific gravity of the acid from time to time with a hydrometer.

—measure the voltage after the accumulator has been in use for a few minutes.

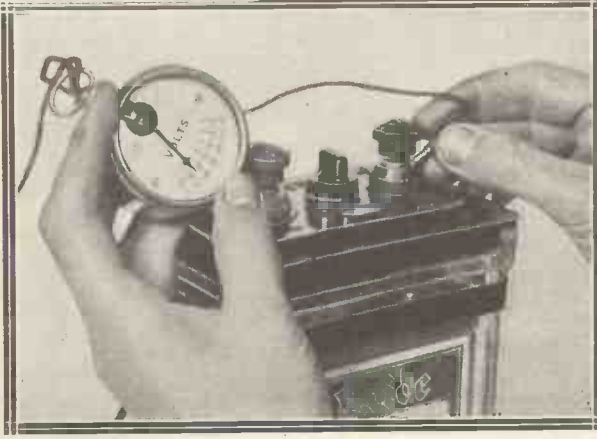


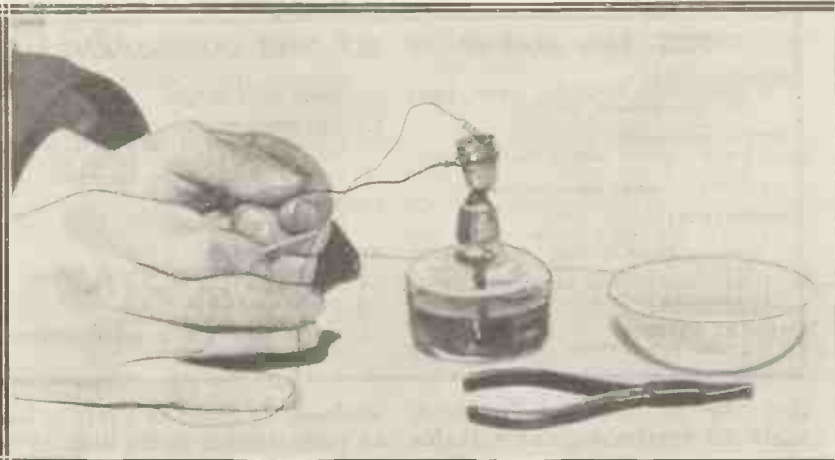
**DON'T** forget to top-up accumulators with distilled water from time to time.

—leave cells standing in a discharged state.

—test for full-charge by obtaining a spark with a piece of wire across the terminals.

—connect up the wrong way to your charger if you charge your batteries at home.





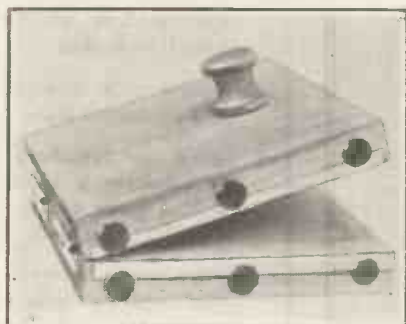
It is a difficult matter to remove the enamel insulation from extremely fine wires by ordinary methods, but a thimble of certain chemicals heated up will do the trick in a really satisfactory manner.

### Removing Insulation From Fine Wires

**B**ELIEVE the word of one who has tried it—it is the very dickens of a job to remove the enamel insulation from very fine wire without injuring the wire at the same time.

I have tried the sandpaper method, as recommended by some people. But when you rub fine enamel-insulated wire with even the finest sandpaper, employing the very gentlest of

### SUITS HEAVY GAUGES



This insulation remover is ideal for ordinary gauges of wire when the idea illustrated at the top of this page is unnecessary.

movements, you generally find that you have managed to rub the wire away as well as the insulation!

The accompanying illustration shows a really satisfactory method of removing enamel insulation from fine wires.

Take an old thimble, and provide it with a holder in the shape of a length of stout wire tightly bound round it.

Now fill the thimble-crucible with caustic-lye, made by putting a lump of caustic soda about the size of a pea into the thimble and by filling up three-quarters full with water.

Boil up the contents of the thimble over a gas-flame or a spirit lamp, and then, having twisted the end of the fine wire whose insulation it is desired to remove into a little spiral or helix, dip the spiral of wire into the hot caustic lye and allow it to remain immersed for a few seconds.

Repeat the operation two or three times, and then thoroughly wash the end of the fine wire with pure water.

Result—a clean and enamel-free end of the wire, and one which will not have been abraded or weakened with rubbing or scratching, as is usually the case.

### A Workroom Adjunct

The simple device here illustrated will remove enamel, cotton or silk insulation from a wire easily, and without causing any damage to the wire. It is a very useful adjunct to the workroom equipment, and in use it will well repay the small amount of time expended in making it.

Obtain two flat blocks of wood, each about 2½ or 3 in. square. Hinge these together and provide some sort of a knob for the upper wooden block.

Now cover the opposing faces of this wooden "sandwich" with good-grade sandpaper. The best way of effecting this is to cut the pieces of sandpaper somewhat bigger than the wooden blocks, and to turn down the sandpaper over the edges, securing it in position by means of brass-headed pins, as illustrated.

Wire, thick or thin, placed between the sandpaper surfaces and gently pulled, will come away, leaving most of its insulation behind it.

The sandpapers will, of course, require renewing at intervals, but

## IDEAS

### FOR THE CONSTRUCTOR

*A few items which the constructor, experimenter or ordinary listener may find of help in connection with the practical side of radio.*

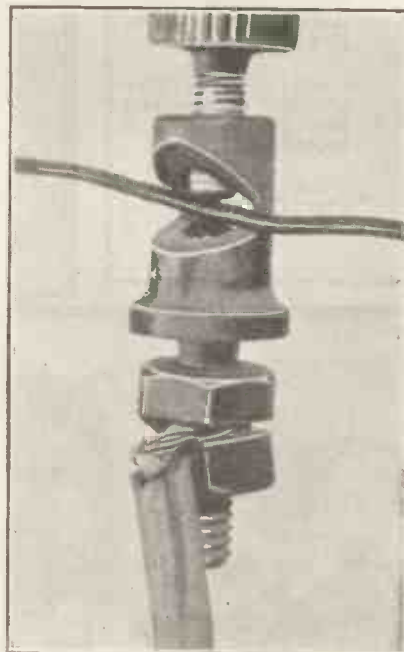
with average use they will last a long time before they require changing.

### An Improvised Terminal Clip

Sometimes you may wish to connect a wire to your aerial down-lead, to your earth lead, or to some other wire, and yet you may have run out of the orthodox connecting-clips for the purpose.

Fish out a large-sized "push-through" terminal from your work-box, place it in a vice and, using a fine saw, cut a V notch in the face of the terminal, the notch to penetrate about two-thirds of the way through the terminal.

### QUICK CONNECTOR



How a large "telephone-type" terminal can be used for making temporary connections to heavy gauge wire such as is often used for aerial leads.



# QUESTIONS ANSWERED

## The Series Condenser

H. N. (Wolverhampton).—"I recently inserted a series condenser in my aerial lead to improve selectivity, but I find that although the tuning is considerably sharper, the volume has decreased, with the result that I am now unable to receive distant programmes at a strength worth listening to. How can I regain the volume I had previously?"

The answer to your question, H. N., is that you cannot get your volume back unless you are prepared to sacrifice selectivity. Your set is one without high-frequency amplification, and you are compelled to rely solely upon what your aerial picks up for your volume.

The effect of the series condenser is virtually the same as decreasing the coupling between the aerial and detector grid circuit, and in consequence there is a smaller transfer of energy from one circuit to the other.

Your best plan is to build a set with a good tuned S.G. stage. This will provide you with the selectivity you require, plus the range and volume you had previously.

Listeners do not always appreciate that volume and selectivity only go hand in hand when there are sufficient tuned high-frequency stages.

It is impossible to sharpen the tuning of a simple detector and L.F. receiver without some loss of volume.

## Aerials in Flats

M. K. (Kensington).—"I am at present living in a flat and one of my problems is to get a reasonably efficient aerial and earth. I am compelled to use a very long earth lead, together with an indoor aerial round the picture railing. On trying out this arrangement in conjunction with a three-valver I noticed that the

aerial made no apparent difference to the results, but I was able to bring in numerous stations at quite decent strength on the earth lead alone. Is this usual or does it indicate that something is wrong?"

You are up against a problem that many others in addition to yourself have to contend with. The difficulty is the long earth lead. Yours probably wanders about all over the house

## TECHNICAL QUERIES DEPARTMENT

Are You in Trouble With Your Set?

The MODERN WIRELESS Technical Queries Department is in a position to give an unrivalled service. The aim of the department is to furnish really helpful advice in connection with any radio problem, theoretical or practical.

Full details, including the revised scale of charges, can be obtained direct from the Technical Queries Department, MODERN WIRELESS, Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do. On receipt of this all the necessary literature will be sent to you, free and post free, immediately. This application will place you under no obligation whatever. Every reader of MODERN WIRELESS should have these details by him. An application form is included which will enable you to ask your questions so that we can deal with them expeditiously and with the minimum of delay. Having this form you will know exactly what information we require to have before us in order to solve your problem.

London Readers, Please Note: Inquiries should not be made in person at Fleetway House or Tallis House.

if you are using a water-pipe or the earthed conduit of the lighting system.

Of course, what happens is that the earth lead picks up energy in exactly the same manner as an aerial, and therefore your earth is a perfectly good aerial.

Flat-dwellers like yourself will often find that it pays to join the earth lead to the aerial terminal and to have the earth terminal blank. Try it and see what kind of results you obtain.

## Boxing the Speaker

A. C. (Lewisham).—"I recently purchased a moving-coil loudspeaker which I used for some time on a wooden baffle with highly satisfactory results.

"I then decided to build the set and loudspeaker into a cabinet, but much to my disappointment I found that the effect on speech and music was to 'muffle' it, the announcer's voice sounding booming and unnatural. What can I do to improve matters?"

This "boxey" effect is by no means unusual, but it can be minimised by care in the construction of the cabinet and the arrangement of the speaker.

You will appreciate that if you were to place your head in a box and speak, your voice would lose its crispness and naturalness owing to reflection and resonances from the sides and back of the box.

This also applies in the case of a loudspeaker, and the methods of minimising it are these:

(a) Use a large cabinet, and see that it is constructed from thick wood. It must be solid.

(b) Do not have a back on the cabinet. If you wish to keep the dust out, make up a framework and cover it with muslin or some other gauzy material.

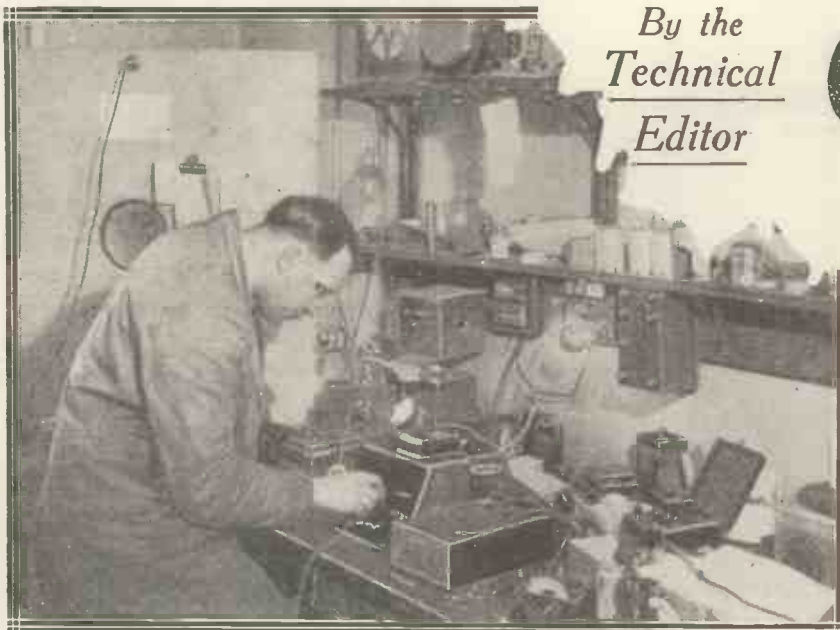
There is a scheme used by the B.B.C. which entails lining the inside of the cabinet with slag wool, but it is rather difficult for the average constructor to carry out successfully.

## BACK NUMBERS OF "M.W."

Readers desiring copies of past issues of "Modern Wireless" may obtain them, price 1s. 3d., post free, from our Back Number Dept., Bear Alley, Farringdon Street, London, E.C.4.

By the  
Technical  
Editor

# On the



successful when the average constructor applies patience and care to it.

The difficulty is to obtain and wire up coils and condensers which will match all round the dial. Many times amateurs possessing ganged sets must have felt uneasy as to their adjustments, and itched to tinker with the trimming.

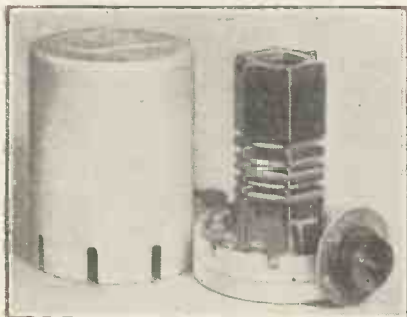
This is not necessary with the J.B. ganged condenser illustrated, for the trimming of one section can be done, while searching for stations, as a form of vernier control which is remarkably effective. Thus the operator has the comforting assurance that he has two-condenser maximum efficiency to hand, with the advantages of the simplicity of ganging if

## The Telsen Screened Coil

**T**HIS is one of the most notable of this season's new components. It comprises a dual-wave coil unit complete with switch and effectively thorough screening. The screening extends to the underneath of the unit, and is so efficient that even when close-mounted in pairs there is no coupling trouble.

The switch is operated by a spindle which passes through and projects

### EFFICIENT SHIELDING



A feature of the Telsen coil is its effectively thorough shielding.

behind the component and enables ganging easily to be carried out.

We have tested numbers of these Telsen coils and in all cases perfectly satisfactory results were given. Good selectivity, without undue power loss, and an absence of "break through," contribute to an excellent performance.

And in that the coil is also well made and inexpensive its popularity is assured.

## A Westinghouse Rectifier

The Westinghouse range of H.T. metal rectifiers is most comprehensive,

and there are numerous models available for constructors, and there are no practical limitations as to output.

At the one end of the scale is the popular H.T.5, which provides 20 milliamperes at 120 volts, and at the other, the H.T.11, which has an output of no less than 150 milliamperes at 400 volts (120 milliamperes at 500 volts).

Obviously such a rectifier is capable of undertaking the most arduous of duties, and could be extended to its limits only by the most ambitious of amplifiers.

But it is of direct interest to all constructors in that it exemplifies the completeness of metal rectification, and illustrates that it has none of those power restrictions that many appeared at one time to debit against it.

Nowadays Westinghouse rectifiers figure in the majority of commercial mains sets and units, and that fact speaks for itself.

We have had the H.T.11 unit under observation, and it has given consistently good performances in varying conditions of service.

## J.B. Ganged Condenser

Perfect trimming in a ganged condenser is only possible given expert skill and ideal conditions. However, the operation is moderately

### FOR CONSTRUCTORS

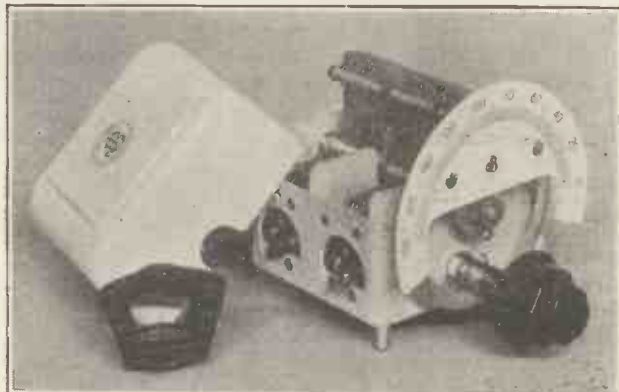


A high-power H.T. metal rectifier—the Westinghouse H.T.11.

he desires to ignore the "vernier" and refer only to the tuning knob. (The accessible trimmer is actually controlled by a knob mounted concentrically with this.)

The J.B. ganged condenser does not, however, rely only on this handy feature for its appeal, as it is a first-

### TRIMMING FROM THE FRONT PANEL



The trimming of one section of this J.B. gang is controlled by a knob concentrically arranged in front of the main tuning control.



# Test Bench

This month we deal with Telsen, Westinghouse, J.B., "Davenset," G.E.C., Ready Radio and "Utility" products.

class component regarded purely as a modern, shielded, ganged condenser. It is built solidly, but has a pleasing design, and the movement is smooth.

## For A.C. Mains

We have had the opportunity of testing a "Davenset" mains transformer made by Messrs. Partridge, Wilson and Co. It is their No. 12 model, and provides for an output of 300 volts for H.T. at 60 milliamperes, and a 3-ampere filament current.

It is a most substantially constructed component, designed in accordance with the best of modern engineering practices.

There is a core of ample dimensions tightly compacted, and its insulation resistances are of an unusually high order.

We consider it to be above the average in every respect.

## An Attractive Accessory

The moving-coil loudspeaker principle will develop into a fetish if traders and constructors do not endeavour to consider loudspeakers impartially in the first instance, and resist the temptation to pre-judge them by the principles employed in their design.

The G.E.C. "Magnetic" loudspeaker does not claim to be a moving-coil instrument, but it is none the less deserving of the keenest consideration for that.

## THE "DAVENSET" TRANSFORMER



A high-quality mains component made by Partridge, Wilson and Co.

It is built into a tastefully moulded bakelite cabinet, greatly superior in appearance to those cheap wooden affairs, and its interior will bear the most critical examination, for the G.E.C. maintains a very high standard of workmanship in out-of-sight details as well as in exteriors which catch the eye.

And the "Magnetic" gives a clean, peakless response which we believe will

## TASTEFUL DESIGN



This G.E.C. loudspeaker is built into a fine moulded bakelite cabinet.

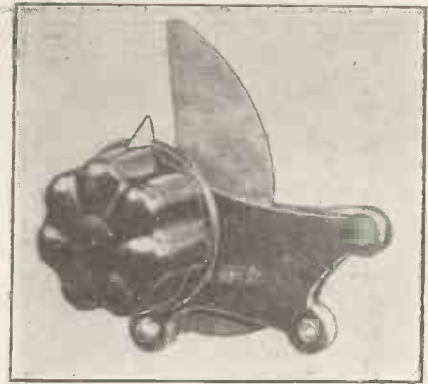
appeal to many discriminating enthusiasts as superior to the "muddier" reproduction of some moving-coils.

## New Ready Radio Component

Messrs. Ready Radio have now entered the market as component manufacturers on a large scale. And they have the advantage that, through their extensive experience in serving the needs of home constructors by supplying kits, they know what is wanted.

Their "Microlog" condenser is one tangible proof of this. It is a "solid-dielectric" variable condenser sold at a competitive price, but with new features making it succeed, where many others tended to fail, as a serious alternative to "air" types.

There are hard brass moving vanes, and a new dielectric is employed which is very superior in electrical qualities to the somewhat shoddy material frequently met with in components of this kind.



A Ready Radio "Microlog" condenser.

Indeed, the losses are such that the "Microlog" is by no means barred from tuning circuits, although its main applications are, we presume, for reaction, aerial selectivity and similar purposes.

## Development in Dials

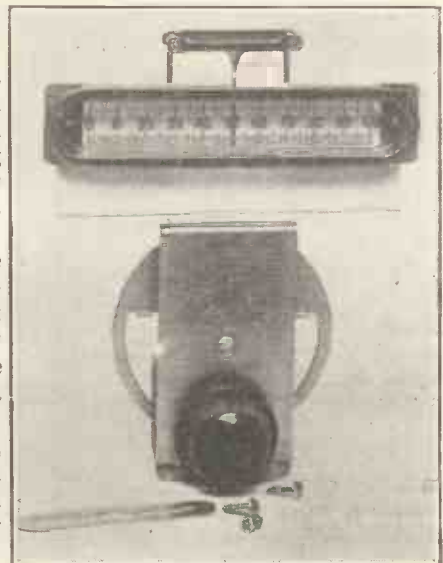
The "Utility" straight-line dial manufactured by Messrs. Wilkins and Wright introduces a variation from conventional practice that ought to appeal to constructors.

Instead of the scale being engraved round the edge of a disc or on a drum, it is arranged horizontally in a straight line. A pointer moves laterally as with adjustments of the smoothly operating knob.

This is a very convenient form of construction, for the whole scale, and the position of the pointer relative to it, can be seen at a glance.

Many new ideas fail when judged on the scores of cost or usefulness (or both), but this "Utility" dial does not, and we predict considerable popularity for it.

## A STRAIGHT SCALE



The new "Utility" straight-line dial.



Only the essential controls are on the front of this cabinet, the "on-off" switch being placed at the side.

# THE "EKCO" M23 A.C. RECEIVER

*A review of a compact yet powerful all-mains three-valver, incorporating a moving-coil loudspeaker and single-knob tuning.*

*By an  
"M.W." TECHNICIAN.*

who are unable to erect an ordinary aerial, a mains aerial is provided, but it should be remembered that the normal type of aerial gives better results, and should be used wherever possible.

We have said nothing about the appearance of the set, but, as the photograph shows, the cabinet is most striking and consists of a very artistic walnut bakelite moulding with an illuminated wavelength indicator and four controls on the front; these are the tuning control, volume and selectivity control, reaction, and wave-change switch.

### Lucid Instructions

The "on-off" control is on the side of the receiver, so that only the essential operating controls are on the front.

A noteworthy feature about the range of receivers produced by E. K. Cole & Company is the extremely lucid and detailed instructions sent in book form with each receiver. The instruction books tell the listener all that he can possibly want to know about the operation, and the sketches and charts make the installation of the set as simple as it possibly can be.

In fact, this Ekco receiver at 17 guineas is a thoroughly sound proposition, and one which potential purchasers of mains sets will be well advised to consider.

### COMPACT AND EFFICIENT



The skilful planning of the layout is a feature of this receiver and nothing has been sacrificed for efficiency. The mains transformer, with its sockets for voltage adjustment, may be seen on the extreme right.

ONE invariably associates the name of Ekco with mains equipment. The mains units manufactured by this firm are in use in many thousands of homes in this country, and are giving trouble-free service on every type of set, ranging from a simple "two" to a seven-valve super.

### Highly Effective Circuit

Hence, on taking over one of the new Ekco M23 receivers our first thoughts were that if the set was up to the standard of the other products of the Company, then it must be good. And the M23 is good.

The circuit comprises an S.G. valve, detector and pentode, and the set is designed for A.C. mains having voltages from 200-250. A simple mains-voltage adjustment panel is situated at the back of the set, so that the operation of changing over from one voltage to another is only a matter of a moment.

That the circuit is highly efficient is proved by the results we obtained in our tests. Using our large outdoor aerial, we found that the spread of the London Regional amounted to no more than 10 metres, and the National spread was even less, namely, only 5 metres. In the case of the London Regional no sign of that station could be heard when the tuning was 15 metres "off tune." This was on an aerial known to be inselective, and situated in London.

### Excellent Volume

The range of the set is also good. For instance, we were able to pick up the Midland Regional at fair strength in broad daylight, using only a small

indoor aerial. On the outside aerial, also in daylight, such stations as Northern Regional, Brussels, Radio-Paris and Eiffel Tower could be received at excellent volume on the speaker, which, by the way, is of the moving-coil variety.

Incidentally, in connection with the speaker, it is interesting to note

### TECHNICAL SPECIFICATION

Number of Valves. Three.  
Circuit. S.G., detector and pentode.  
Special Features. Single-knob tuning with illuminated dial calibrated in wavelengths, moving-coil loudspeaker, Westinghouse metal rectifier, connections for gramophone pick-up and additional speaker.  
Cabinet. Consolette.  
Price. 17 guineas.  
Makers. E. K. Cole & Co., Ltd., "Ekco" Works, Southend-on-Sea.

that the designers have compensated for the small baffling effect of the bakelite cabinet, so that on radio the set gives a pleasing round, even tone.

### A Wise Move

As far as the gramophone side of the set is concerned, it is left to the pick-up user to compensate externally if he so desires. This is a wise move, for it is impossible to compensate for every eventuality in the choice of a pick-up, and the owner can very well insert a tone-control device when he fits the volume control across his pick-up on the instrument.

On gramophone the volume is fully adequate for any domestic purpose, and this applies equally on radio.

For the benefit of those listeners

# THE WORLD'S PROGRAMMES

## HOW WHEN AND WHERE TO HEAR THOSE FOREIGNERS



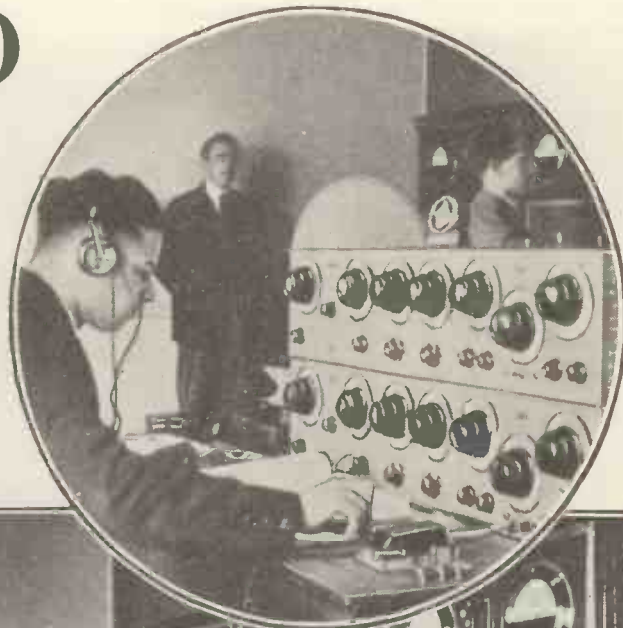
**THE DEPTHS OF THE SEA.** What won't they do for novelty! This diver, to test a new Australian diving suit, created a world's record in Sydney Harbour by rising 105 feet in three minutes. And just for a change he took a microphone with him so that he could broadcast his experiences from the sea bed.

### CONTENTS OF THIS SPECIAL SUPPLEMENT

- |                                   |                                      |
|-----------------------------------|--------------------------------------|
| Police Radio in Paris.            | Hints for Short-Wave Beginners.      |
| A Visit to Budapest.              | Radio Waves in the Arctic.           |
| From Here, There, and Everywhere. | Those Peculiar Short Waves.          |
| Between 200 and 550 Metres.       | Jottings from Java.                  |
| Shaking Up the Ether!             | On the Long Waves.                   |
| Germany's Giant Transmitters.     | A Clock That Speaks the Time.        |
| Providing Alternative Programmes. | News and Views.                      |
| Station Information.              | Warden of the Wavelengths.           |
| American Announcements.           | What the Distant Stations Are Doing. |
|                                   | Below 100 Metres.                    |

# POLICE RADIO IN PARIS

*Some views of the Sûreté  
Générale's newest venture.*



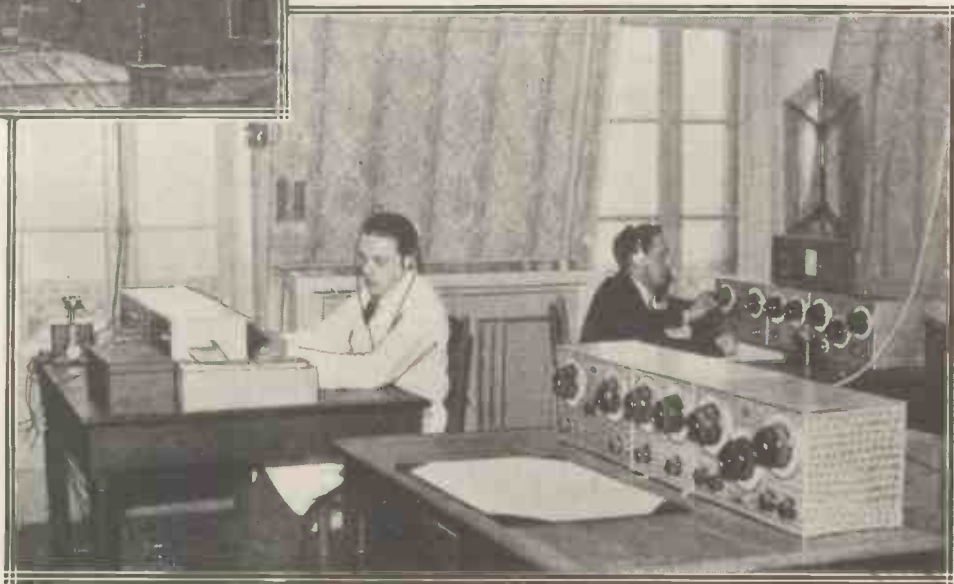
France plans a great new network of radio stations to aid the police in combating crime, and the headquarters and nucleus of the scheme is now completed and working in Paris.

The photograph in the circle is a general view of the control panel, with the transmitter in the background.

In the larger photograph above, the powerful transmitter is shown in greater detail with an engineer adjusting one of the controls.

Above you can see one of the tall aerial masts which tower above the "Scotland Yard" of Paris as a constant warning to criminals that the police are on the alert.

Simultaneous reception on several wavelengths is possible with the apparatus shown in the photograph on the right. Notice the super-heterodyne, with frame aerial, which is used for long-distance reception. The operator in the white coat is tabulating reports from provincial stations.



LAST March I described for "M.W." readers a visit to the Ljubljana station. The engineers who built it also built Budapest, and there is a striking resemblance between the two stations when you get inside, although from the outside there is all the difference in the world.

The Budapest building is striking, looking like a large electric power station and being built of bright-coloured brick topped with grey tiles.

#### Rocking Masts

The station is a few miles out of Budapest itself in fairly open country. There are probably not more than a hundred people living within the direct electrical shadow of the aerial, so that in spite of Budapest's 18.5 kilowatts not many listeners suffer a wipe-out.

The aerial, a single wire with a long T lead-in, is on pillar masts of the "rocking" variety. Rocking masts are those which stand on a comparatively small pivoting point and are held up solely by guy wires.

The advantage of this is that in open country, such as that around the Budapest station, and where there is a fair ground wind at times, the masts can sway and are much safer than are rigid masts built like, say, the Eiffel Tower.

The masts at Budapest have a little ladder going up to a gallery some twenty feet up. This gallery is around the actual base of the mast before it begins to taper off down to the pivoting point.

From the gallery a very dangerous looking ladder runs up to the top.

#### Limited Funds

I climbed up to the gallery and looked down on the station building. Up above the ladder leading to the top towered dizzily, and I refused a pressing invitation to get a view of the surrounding countryside from the top.

In vain did they persuade me that at the top, too, was a second gallery with a safe rail! My twenty-foot-high gallery seemed crazy enough. We then climbed down!

The guy wires come down to big concrete blocks, and although these are each about two yards square, they are, I was told, four or five times beneath the ground as they are on top. These take the whole strain of the masts, you see.

A little wooden post at the right of the building is the electrical anchorage point for the lead-in, but the mechanical strain is taken by a preliminary set of guy wires which are insulated by a chain of porcelain rods from the cable which runs up to the join point of the aerial.



Heard Budapest lately? Well, what do you know about it? It has a wavelength of 550 metres and a power of 18.5 kws.—yes. It has a pleasant musical-box interval signal—yes. Anything else? Why not accompany our Special Correspondent on a private tour of Hungary's popular broadcaster? There's plenty to interest you at Budapest.

Considering the limited broadcasting funds in Hungary, the Budapest station is very well fitted out. An imposing portico above which is the station emblem, is the entrance to the office section of the building.

#### Safety First!

This is a low, one-storey block, the transmitting panels and rectifiers being in the two halls, one on each side of the offices. The transmitter is on the left-hand side, and the control room, where also is the amplifier rack for the land-lines, leads out of it.

The transmitter, although resembling that of Ljubljana, is larger, and the control desk is of a more modern type. At Ljubljana each water-cooled valve stands on top of its own coil of pipes carrying the cooling water, but here at Budapest there is not quite the same danger of being electrocuted by stray H.T. leads!

A safety chain is put along the front of all the high-voltage apparatus, and the tuning coils, each on a separate stand, have remote controls with slow-motion gearing, about four feet away from the coils themselves. Without unhooking the safety chain the control engineer can tune all the H.F. circuits of the last two power amplifiers. The first stage of the transmitter is in a separate rack and does not need frequent attention, nor are the voltages here of a high order.

There are not many voltmeters. Most of the meters are high-frequency jobs showing the actual H.F. current flowing in the anode and

coupled circuits of the power stage. The final high-tension meters are stood up on tall poles as at Ljubljana, and where, as is the case with two of them, a series high-frequency choke is needed so that the meter reads pure D.C., the choke is supported in mid-air on

In front of the bank of apparatus lined off by the safety chain is the usual white-panel control desk with indicator lights, relay buttons and four high-tension peak voltmeters for the incoming H.T. circuits.

In the ante-room of the transmitter hall, as I have said, is the amplifier rack which deals with the incoming studio lines from the lofty studio way back in Budapest itself. A telephone line has been taken over from the postal officials, and is tone corrected.

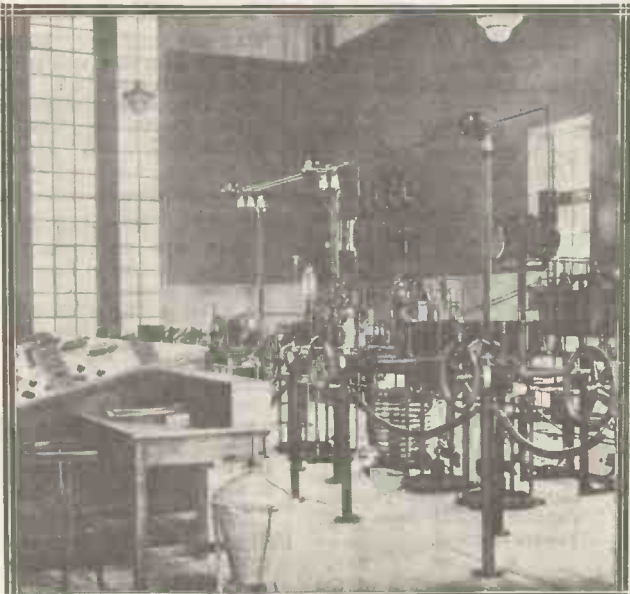
#### Reports Wanted

Unfortunately, I did not have time to see the studio. The leading light at the programme headquarters is Herr Ernst Shots, who arranges the programmes, announces and carries out the general administrative work of the station.

He is anxious to get reports from British listeners, and if you have anything worth sending in as a reception log then send it to Radio Budapest, Budapest, Hungary.

It was Herr Shots who arranged that announcements should be frequently made in Magyar, German and French, and that is why Budapest's call is a long one. First comes the Magyar announcement: *Hallo; It Radio Budapest*, then the German *Hier Budapest*, and finally the French *Voice le poste radiophonique Budapest, Hongrie!*

#### PLEASE KEEP OFF THE GRASS!



A stout safety chain runs around all the high-voltage apparatus at Budapest to prevent the casual visitor from being electrocuted by stray H.T. leads! Incidentally, the tuning coils have remote controls so that the engineer can deal with them without having to unhook the chain.

the copper tubing which forms the wiring.

The room has a gay appearance, the tall, church-like windows admitting a flood of light and the colour scheme being distinctly jazzy. All round the top of the coloured border on the wall is a wavy decoration including symbolic representation of aerials, tuning coils and earths, all in line!

#### Tone Corrected

Through a little window at the top right-hand corner of the east wall comes the lead-in, an outside porcelain insulator keeping the lead-in rod away from the wall. There is an earthing device just on the inside of the wall so that by pulling a long rod coming down within his reach the control man can disconnect the aerial.

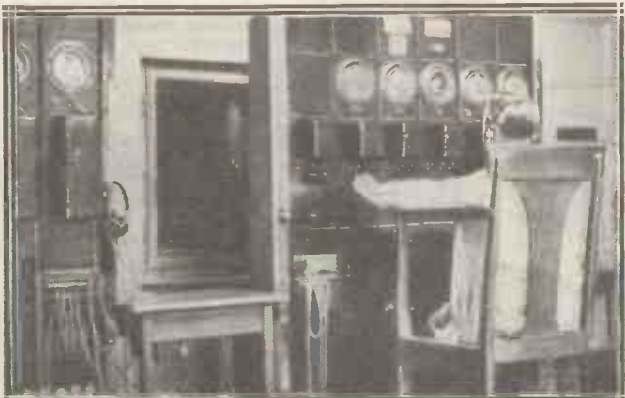
The quaint musical call-sign, also used as an interval signal, is made by a kind of musical box in which studs on a rotating drum set reeds in vibration. This gives a phrase of nine notes in harmony.

The control man at Budapest is proud of the station's constancy on its allotted frequency of 545 kilocycles. The average error is only 0.5, and the maximum, over a month's working, 0.8.

At the moment Budapest has a clear channel in the ether, its nearest companions in wavelength being Sundsvall and, just above it, the Augsburg-Kaiserlautern relays.

In the control room at Budapest is a U.I.R. wavemeter. Tests are made nearly every morning and are checked up with the official curve published by the U.I.R. Technical Committee's laboratory.

#### A WAVELENGTH WHICH NEVER VARIES



The wavelength-checking station at Brussels has no need to complain of Radio Budapest. The control engineer justly prides himself that the maximum error over a month's working is only 0.8! So if you tune to 550 metres you'll be sure to find Budapest there, too!



# FROM HERE, THERE AND EVERYWHERE

Flashes from all over the world about broadcasting stations and their doings.



**PLYMOUTH.** Fears that the relay station at Plymouth will be closed when the West Regional opens have been allayed by the announcement that the relay is likely to be retained.

**RADIO L.L.** The short-wave relay of this 370-metre station goes out on 61 metres.

**COPENHAGEN.** The midnight chimes, heard in the interval between dance music items, come from the Town Hall.

**THE WEST REGIONAL.** Something like a record in mast construction was made in erecting the second of the lattice masts of Watchet, its 500 ft. of height being completed in 20 working days.

**ON 830 METRES.** Precise modulation test signals of 1,000 cycles are to be transmitted by the N.P.L. (National Physical Laboratory) station on 830 metres.

**LUXEMBOURG.** During tests this "propaganda" station announces itself as "Ici Radio Luxembourg émission expérimental."

**WELLINGTON.** The N.Z. State Broadcasting Board has recommended that the Wellington, Auckland, Christchurch and Dunedin stations should have their powers doubled.

**PARIS.** The invalids of the city are greatly interested in the medical talks from Radio L.L. in which diseases and treatments are discussed in detail.

**U.S.S.R.** Soldiers of the Soviet have been ordered to listen to the radio programmes for at least one hour daily.

**COPENHAGEN.** During the autumn manoeuvres loud-speaker "sergeant-majors" shouted orders at the troops. On the march, the same source provided the musical accompaniment.

**MOYDRUM.** The new Dublin station at Moydrum, near Athlone, employs a T-type aerial suspended on two masts about 300 ft. high.

**FÉCAMP.** A new control-room has been installed by the popular Radio Normandie station.

equalled only by Warsaw and Prague.

**MADRID.** The Radio España station works on 424.3 metres until 7 p.m., at which hour Union Radio takes over.

**WASHINGTON.** A report recently issued states that during one month fifteen persons were caught committing crimes, in one American city, through the wireless-equipped cruising patrols.

**MILAN.** The Italian Alpine Club has been successfully experimenting with radio links between Alpine refuge huts.

**SIZIANO.** This is the site of the new Milan station, due on the air by the time these lines are in print.

Its power is 50 kw., and the wavelength allotted is 331.4 metres.

**BARI.** This station, the tenth of Italy's regionals, was built in Chelmsford by the Marconi Company.

**REYKJAVIK.** This Icelandic station, which was not too easily received last year, is now being picked up on 1,200 metres with quite simple two-valve apparatus.

**SHANGHAI.** The new beam station capable of telephony, ordered by the Chinese Government from the Marconi Co. is to cost £40,000.

**ATHLONE.** The power of Dublin's new station at Athlone is 60 kw., but this can be doubled if the need arises.

**EMPIRE STATE BUILDING.** This New York skyscraper is equipped with a 6-metre television transmitter which works daily.

**PARADE.** This is the name of the new Portuguese station working on 431 metres.

## YOUR FRIEND ABROAD

Why not send him "Modern Wireless" every month to keep him in touch with all the latest radio news and developments? Post his name and address with 17s. to the Subscription Department, Amalgamated Press, Ltd., The Fleetway House, Farringdon Street, E.C.4, and "M.W." will be sent every month for a year.

**MONTREAL.** Canadian set-makers have now to fix on each set a notice re licence, warning "pirates" that they are liable to three months imprisonment or a £10 fine.

**POSTE PARISIEN.** The recitals of "electric organ" music (oscillating valves) are well worth tuning for, and have recently been given at about 10.45 p.m.

**LEIPZIG.** This is to be the most powerful of Germany's new regionals, the power rating being 120 kw.—

**HILVERSUM.** The new equipment now in use includes an improved 20-kw. transmitter, with crystal control of wavelength.

The mast used is 465 ft. high. It is made of steel, and stands on a porcelain base.

**BUDAPEST.** The Budapest No. 2 station, on 210 metres, usually commences its programme at 7.30 p.m.

**RADIO VITUS.** This Paris station, on 312 metres, has a short-wave relay on 43.75 metres.





## BETWEEN 200 AND 550 METRES

*The medium waves never fail to provide a feast of good entertainment night after night. Here you can read all the latest information about medium-wave conditions.*

**S**IMPLY wonderful, aren't they, these stations on the medium wavelengths? Night after night they come up trumps, and there always seems to be something of special interest when one investigates the evening entertainments.

Most people find Fécamp, on 223 metres, the lowest wavelength worth watching, but in case you have any dial space below his reading and are curious as to how low your set tunes on the medium waves, it is worth mentioning that there is at the time of writing an easy way of finding 210 metres. Owing to the Regional re-shuffle in Scotland, Aberdeen, on 214.3 metres, now comes immediately above Newcastle on 211.3 metres—two National programmes separated by just a couple of degrees or so.

There is no other case of this kind on the air, so if you have a sensitive and sharp-tuning set, and you are not very certain of what the lower wavelengths are on this waveband, there is now an exceptional chance of determining where 211.3 and 214.3 metres come in.

### Magnificent Programmes

Owing to the way in which many stations are packed on common wavelengths near the bottom of the dial there are far too many heterodynes there to be healthy, but there are nights on which magnificent programmes may be obtained in this sector. And Trieste—even though eight different programmes share the wavelength above his—is always a possible; anyway, in the southern counties.

A little above the London National we have Turin and Heilsberg, on 273.7 and 276.5 metres respectively. Both have been wonderful, with the palm going to Heilsberg because of his superior reliability over the last few weeks.

Hilversum, on 296.1, has been putting up a fine showing during the past month. And, incidentally, he really is Hilversum now, and not Huizen, as was the case before October.

Despite the fact that reduced power is used in the daytime, he is often quite a good programme in the afternoon, and at night, of course, he reaches out far and well.

\* \* \*

One of the best programme clusters on the dial is round 325 metres. This is Breslau's wavelength, and on 322 there is Göteborg, while on 328.2 we have "Poste Parisien."

The new Breslau, about which there seemed a little doubt at first, has now blossomed out into a winner. In fact, I think he beats his stable companion, "Poste Parisien," on most nights, though his power is equal and his distance 740-odd against 200-odd miles. The new Breslau, in fact, is an acquisition.

### First-class Stations

Another hot-spot is the neighbourhood of the Scottish Regional (Hamburg and Paris Radio LL below it, and Lwow and Toulouse just above, all being noteworthy). Just above the Midland Regional, Suisse Romande has been making 403 metres a warm place, and Katowice, on 408 metres, has glowed there with wonderful consistency. Dublin, too, seems to have found where they keep the ginger, his strength showing remarkable gain.

\* \* \*

Still working up the dial, we must mention Stockholm and Rome (436 and 441 metres respectively), the former being as easy to get as Motala, his long-wave relay, which is saying a lot for Stockholm.

Between this point and the North Regional there are at least two other first-class stations, for located on 459 we have Schweizerischer Landessender, and on 473 metres is Langenberg.

### Clear and Powerful

These two are often confused because both speak in German. But while Langenberg is a true dyed-in-the-wool German, his companion with the long title is a Swiss. And his mountain air seems to do him no end of good, for he is always clear and powerful.

One easy way of telling them apart is to remember that whereas Langenberg thinks nothing of midnight or after, his friend What's-his-name, on 459 metres, likes to turn off the carrier-wave round about 10 p.m.



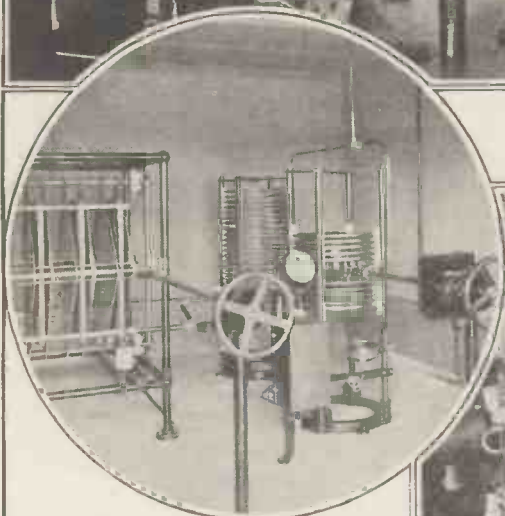
# SHAKING UP

# THE ETHER!

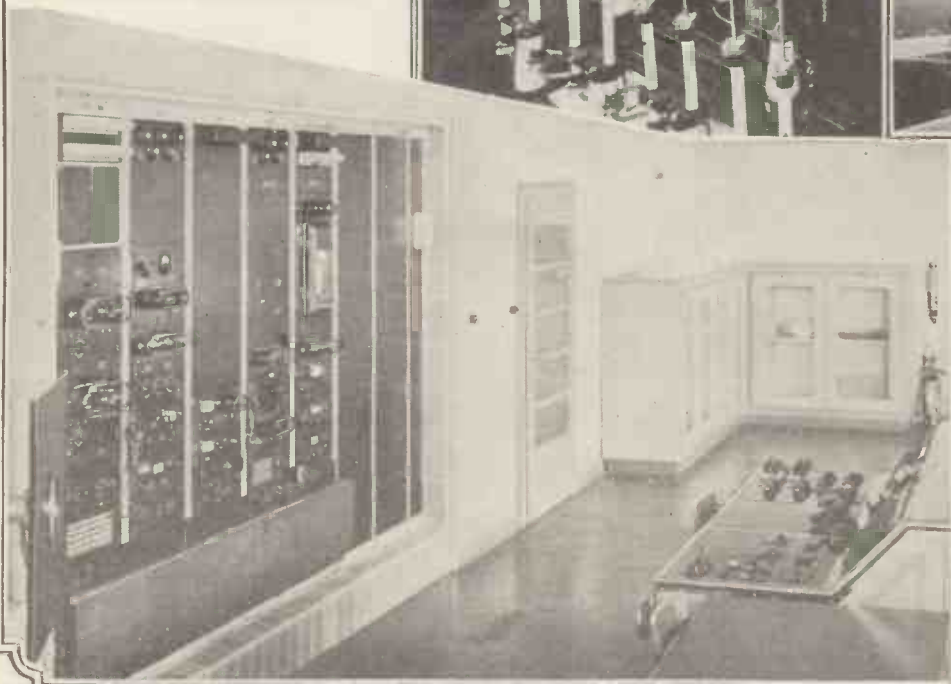
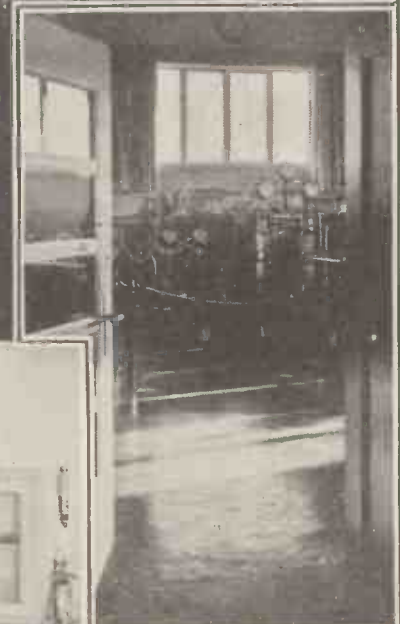
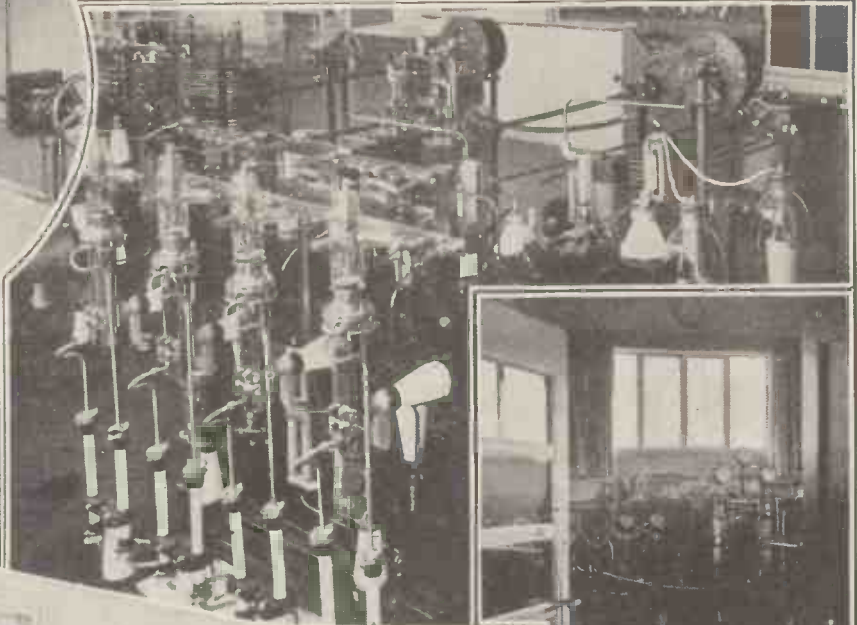


There are no half measures about the new German transmitters at Leipzig and Breslau. "Put it over good and strong" is their slogan—and they'll be able to do it, too, with their respective 120 and 60 kws.! Breslau's new anti-fading aerial in the world's highest wooden mast has produced some pretty good results in Britain, and when they settle down you won't have any trouble in hearing the new "Rundfunksenders."

Just above, engineers are making adjustments to the giant transmitting valves, which are also seen in the big centre picture. Special porcelain "tubing" is used for conveying the cooling water—and take it from us, these valves certainly do need some cooling off!



Ever tried the gay game on the pier when you steer a model car round a track? These "steering wheels" look something like that, don't they? Actually, the engineers use them to control the aerial tuning on the 60-kw. transmitter at Breslau.



Breslau is quite up to date in every department, but the engineers take quite a special pride in their control desk and amplifier rack, which we show you in the left-hand picture. Above is the entrance to the transmitting hall.





German listeners and engineers are proud of their new high-powered transmitters at Leipzig and Breslau—not only because they are the biggest stations in the country, but because they represent a complete departure in technical design. Our own correspondent in Germany here gives listeners to "The World's Programmes" a full description of the new stations.

**T**HE new high-power station at Breslau has taken up regular service, and the Leipzig station, Germany's biggest (120 kw. in aerial), is due to start by the time this is in print.

These two new stations are not just transmitters like the large number dotted over Germany and Europe. They incorporate totally different ideas as regards design and construction. We are wont to compare the advance of receiver design from Olympia to Olympia, but little is ever said of transmitter design.

### *A Mast with a Halo*

I will first deal with the new Breslau station. It is situated exactly 15 kilometres to the south of Breslau as the crow flies. The small village near which the transmitter stands goes by the name of Grothsürben. The station, however, will continue to be known as Breslau.

A special cable runs from the studios in Breslau to the trunk exchange, and from there to the transmitter. This cable is exactly 25 km. in length. It contains eight single lines, each wire being 1.2 mm. in diameter.

Breslau is remarkable for one thing—the new type of aerial. Dr. Böhm, of the Telefunken firm, is responsible for this new aerial. Instead of having a horizontal wire strung between two masts one quarter of the wavelength in length, a vertical wire is used just slightly longer than half the wavelength. That is to say, the wire is not actually over half the wave, but the total inductance and capacity of the aerial accommodate just half the wave.

The aerial wire is suspended in the centre of a wooden tower exactly 140 metres in length. This is the highest tower entirely of wood in the whole world. Breslau's wavelength is larger than 280 metres, so a special inductance had to be affixed to the top of the aerial to save building the tower 40 metres higher. The whole thing looks like a tower with a halo round it.

### *Curing Fading*

The action of this new aerial is to prevent fading close to the transmitter, i.e. to increase the service radius. This has been an entire success. At 2 km. distance of the station field strength was found to be 26 per cent greater than when

using an ordinary aerial. At a distance of 80 kilometres fading was from 1 to 30 with the normal aerial, whereas maximum fading with the new type was just 1.2!

### *Service Area Doubled*

The advantages of the new aerial were actually most apparent at a distance of 160 km. Normal aerial gave field strength fluctuations of from 1 to 50 owing to fading. New type aerial only gave 1 to 3, with a maximum value of only 1 to 12.

These figures prove that the new type of aerial has actually increased the service radius of the direct ray by exactly 100 per cent. The measurements and tests were carried out after dark, so that full fading effects could be expected.

The aerial mast is 200 metres distant from the transmitter building, which was erected by the Breslau section of the German Post Office. Instead of the old type of overhead feeder line, the new method of procedure is employed, using two copper tubes running along just above the ground. They do not go straight out to the aerial, and thus are 265 metres long.

The transmitter proper differs from the usual Telefunken stations. The first four stages have been united in one case, whereas the remaining stages are all open, as is the custom with that firm.

**New Cooling System**

The transmitter is crystal driven, which keeps the waves steady to 5 cycles of 923,000 cycles, which represent the present Breslau wave. The modulation is brought in in the fifth stage, and two further stages, one using 20-kw. valves, and the seventh, using 150-kw. valves, bring the power up to the required 60 kw. in aerial unmodulated carrier-wave. Modulation of 70 per cent is applied.

The cooling system of the valves has one novel feature. Instead of the old rubber tubing used for the cooling water, porcelain "corkscrews" have been made use of.

The new Breslau aerial does not prevent good distance reception, as probably most listeners in Britain will already have ascertained.

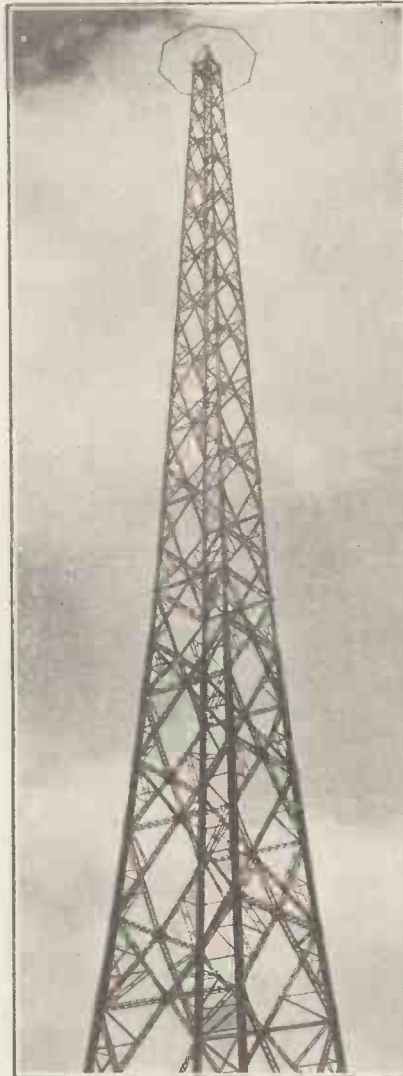
Germany's giant, the highest-powered station in Germany, has been built by Lorenz. The station stands at Pegau Wiederau, 18 km. to the south-south-west of the centre of the town of Leipzig. The river Elster flows past quite near to the site.

**Frequency Doubling**

Leipzig, although producing exactly double the power of Breslau, also has only seven stages. The crystal drive produces the double wavelength to prevent reaction of the last stages on the first very sensitive ones. Later the frequency is doubled, bringing the wave down to its proper value.

Leipzig operates on the wave formerly used by the Frankfurt-am-

**A TALL STORY!**



Breslau boasts the highest wooden transmitting mast in the world. Here it is—140 metres (or a matter of 460 feet) in height and containing a special Telefunken anti-fading aerial suspended in the centre. You will also be interested in the additional inductance at the top of the mast.

Main station. The wave is 390 metres. Leipzig uses the usual type of aerial pending the definite results of the tests carried out by Lorenz with a new type of six-fold aerial, which would have the same action as the Telefunken single-wire vertical half-wave aerial used at Breslau.

**Precautions Against Breakdown**

After the frequency being doubled in stage three and further amplified in stage four, the modulation is applied in stage five. The modulated H.F. is brought up to 1 kw. in this stage. The two last stages bring the power up to the required 120 kw. in aerial unmodulated carrier.

The amplification factor of stage six is 20, and of stage seven just six. In the last stage two 150-kw. valves, each weighing 35 kilogrammes, are used. Another two valves provide an adequate standby in case of breakdowns on one or other of the two in service.

In Leipzig, again, porcelain "tubing" is used instead of the older type of rubber tube. A cooling tower is provided to cool the water, though actually a double system is used both in Leipzig and in Breslau; the cooling water coming into contact with the anodes of the valves remains in a closed system of piping, these pipes being cooled from outside with other water, which then trickles down the cooling tower.

**New Stations**

Frankfurt, with 17 kw. in aerial, another Lorenz station opened at the same time as Leipzig and Munich, will follow shortly with a mere 60 kw.; 60-kw. stations have also been ordered for Berlin and Hamburg.

Sir,—Being a regular reader of your "M.W." magazine, in which I find much to interest, I would like to add my experience on my two-valve "Sterling" anodion, which, by the way, has been over six years my boon companion.

**Short Waves**

I regularly pick up KFI, Los Angeles, California. I had never tried for such a distance, thinking it impossible, but a friend of mine asked me to try, and what an astonishment I got.

My many radio friends are surprised at the efficiency of this two-valver. I am also very enthusiastic on short

**THE WORLD'S PROGRAMMES IN NEW ZEALAND**

"British sets are best," says a reader who records his remarkable results.

waves, and many very happy hours are spent searching the air.

Zeesen is my best station. Rome, Russia, Bandoeng, and many American stations, also come through quite nicely.

**Good Volume**

I am sorry to say that G5SW is the weakest of the lot, but I see that a

change will be taking place in the distant future.

P C J, who is off the air at present, is received here in good volume early mornings and late afternoons.

My set, complete with speaker, valves, eliminator and battery, is entirely British.

**British is Best**

There is a feeling here that Britain cannot compete with America in wireless sets, but I beg to differ and never lose an opportunity in saying so.

Best wishes.

Yours sincerely,

T. P. SEWELL.  
Christchurch, New Zealand.



"I CAN get dozens and dozens of foreigners on my set. It's as easy as shelling peas!" Yes, and I'll bet that in nine cases out of ten they sound like shelling peas—into a tin basin!

As often as not, the man who talks like that zips round the dials, pausing for only a second or two at each station, and identifying them entirely by means of their positions in relation to other broadcasters. That's not real long-distance reception; it's playing at it. Anyone can do it! Why, it can even be done with a set that is oscillating the whole time!

**Distance Spanning**

What exactly does getting a station mean? Would you say you had "got" the local if it came in with a lot of squawking and it was impossible to tell whether a brass band or a symphony orchestra was playing, or to hear the articulation of the announcer? Of course you would not. You would say the set was not working properly!

Then why put this interpretation on "getting foreigners"? It is much better to hear a few foreigners coming in with clarity and fine volume than to have a whole host of those nasty, whistly, squeaky noises so often proudly claimed to be "foreign stations."

If you want to get the most fun out of distant reception you should concentrate on putting a few foreigners on the speaker with as much resemblance to the local as possible. As a matter of fact, you will find that the more you concentrate on doing this the more stations your set will bring in nicely, and also the greater will become its distance-spanning properties.

**Choosing Stations**

What you should aim at, at first, is getting, say, a dozen stations as well and as consistently as you can. Some on the medium and some on the long, although naturally not so many on the long as on the lower band.

Before we go any farther you will want to know how I propose that you should choose the stations "to be operated on." Well, here goes!

To start with, I cannot mention any names. That's because no two listeners work under the same conditions. A station that comes in well in one place may be drowned by the local in another, or a station that is always good in your district may fade like anything in someone else's neighbourhood.

**Get Comfortable**

There's no end to the ways in which local conditions effect reception. You must pick and choose for yourself.



**PROVIDING ALTERNATIVE PROGRAMMES**

There's not very much fun in getting foreigners unless their programmes are clear enough to be enjoyed. Why not make your foreign listening a real alternative to the "local"? This article tells you how you can get anything up to a dozen stations on the speaker at a moment's notice—and all worth hearing, too. Isn't that what real "DX" work should be?

Right. Having decided that we can "get on with the washing," get comfortable in front of your set and switch on. Now proceed to tune slowly—mark that, slowly—upwards from the bottom of the dials and make a note of the settings for stations that are picked up easily and clearly.

**Half the Fun**

You can use reaction, but don't push it to the extreme. That should not be necessary for your alternative programmes from the Continent: at the same time, don't imagine you should get many stations without a spot of knob twiddling. That's half the fun of long-distance work.

with those already made. You will soon begin to know which stations give a good account of themselves really consistently, and these are the transmitters on which to concentrate.

You must log their dial readings very accurately, so that you will always be able to turn to them again at a moment's notice, and will always be able to put a station listening to on the speaker. That alone will get you a name as a real DX-man!

**A Proved Asset**

But there is much more that you can do, having chosen your stations. (It must be mentioned here that the list will no doubt vary slightly

slight bit perhaps, but not so much as you might think.

After all, the real DX man will keep his detector H.T. (and all the other H.T.'s for that matter) up to their optimum value, and what if you do have to change the detector valve? Doesn't everyone expect to re-calibrate a set if the valve in the rectifier position is changed?

The next point concerns selectivity. On most sets there is some way in which selectivity can be varied. It may be by means of taps on one of the tuned coils, or by a series condenser in the aerial lead, or by some other means.

**The Best Setting**

For general work it is usual to set such an adjustment to the position which gives the best all-round results, but for special work like we are considering this does not necessarily apply. Stations near to the local (in wavelength that is) will need greater selectivity from the receiver than those which are farther away and which are well separated from other powerful foreigners.

So you want to find the best setting for each of the special stations of all the variable selectivity factors. And don't forget to note them down, or you will take "hours" tuning from one station to another, which is just what you want to avoid if the stations are to be used as real alternatives.

**Remarkable Difference**

Yet another point concerns the power valve that you are using. The bigger a power valve is—that is to say, the more grid volts you can apply to it—the smaller is the magnification that you will obtain from the last stage (assuming valves of equal efficiency, of course). Since you will not, in many cases where small sets are concerned, be able to get the same power from the distant stations as from the locals, you may quite easily be able to employ a smaller power valve and take advantage of the higher amplification that will result.

Don't despise this suggestion, as you may at first be inclined to. I have known cases where the substitution of a super-power valve (particularly one of the older ones) for a modern steep-slope small-power valve has made a really remarkable difference to the results obtainable on foreign stations.

I think I have written enough to show you the idea in getting some worth-listening-to foreign programmes.

So set to work right away on your "daily dozen." A. S. C.

**MUSIC HATH CHARM!**



Carl Orff, the music teacher of the Berlin studio, certainly has original ideas. This—would you believe it?—is a broadcast music lesson from Konigs-Wusterhausen, with Carl Orff and his assistants squatting round the microphone. Original, certainly—but what would Sir Walford Davies think about it?

Ignore stations that have a heterodyne whistle on top of them, even if they are powerful, and don't waste any time on those which come in with awful quality and with fading. They are no good at all for providing an alternative programme.

And, naturally, a station that cannot be separated from a background of some other broadcaster is not worth wasting time on. As a matter of fact, even with a set using H.F., your list will not take up many sheets of paper!

**Comparing Lists**

The idea now is to repeat this careful search on quite a number of nights and at various times, comparing the lists obtained each night

from month to month, due to station alterations and the time of the year.)

My first suggestion may cause many experts metaphorically to splutter in their anxiety to get out all their objections to it. For all that I am going to put it forward, because to a small degree at least it can always be carried out, and because I have proved it time and time again to be a great asset to quick tuning in.

**Calibrating Reaction**

Put a dial on your reaction condenser so that you can log the setting of the reaction condenser for each of your star stations when they are correctly and fully tuned in. It will have to be altered a





# STATION INFORMATION

The very latest authentic information about "Le P'tit Quinquin"—Leipzig's Silent Night—Newcastle's Distinction—The Gong at Istanbul—Parisien Physical Jerks—A Swedish Relay, etc., etc.

**MOSCOW.** The Soviet Government now seems to be determined to change its policy of non-co-operation with other broadcasting authorities, and lines for relaying Polish programmes from Leningrad and Moscow are now being installed.

**POSTE PARISIEN.** An ingenious broadcast from this station is a gramophone record giving different types of interference caused by electrical machinery. It enables unlucky listeners to recognise the type of interference they are up against.

**ARANJUEZ.** The Aranjuez short-wave station at Madrid (30.4 metres) employs a power of 20 kilowatts.

**DIVIS HILL.** This is the site, four miles inland from Belfast, on which the B.B.C. will erect the new Belfast Regional station.

**HUDIKSVALL.** This Swedish relay station is working provisionally on 226 metres.

**LEIPZIG.** The engineers erecting the 150-kw. station at Leipzig have found that all sorts of snags occur when such high power is employed, and the opening of the station was unavoidably postponed again and again.

**HILVERSUM.** The Dutch words "Wel te rusten,"

often heard from Hilversum, are equivalent to "Sleep well."

**LILLE.** The quaint little air played on a musical box with which Lille P.T.T. closes on 265.4 metres is a local tune known as "Le P'tit Quinquin."

**RADIO-PARIS.** The physical jerks programme now commences at 6.45 a.m.

**BEROMUNSTER.** The interval signal of the Beromunster (Schweizerischer Landessender) station is a repetition of two notes (striking clock).

**RIGA.** The power of the Riga station which works on 525 metres is to be increased from 15 to 50 kilowatts. Its wavelength also is likely to be changed to a higher one.

**G Y B.** This Admiralty station, situated at Cleethorpes, now broadcasts a Naval Standard Exercise in Morse on Mondays, Wednesdays and Fridays at 10.30 p.m. on a wavelength of 4,444 metres.

**BELFAST.** It is hoped that the new Regional station for Belfast will be working before the end of next year. It will not be a "twin" like the other Regionals.

**KAUNAS.** The power of this station is to be increased shortly. It occupies Europe's longest wavelength—1,935 metres.

**ISTANBUL.** The Constantinople station—i.e. Stamboul, or Istanbul—has for its interval signal a gong struck at the rate of 77 times a minute.

**REYKJAVIK.** A woman announcer is employed at this (Icelandic) station. She closes down with the words "Goda Nott" (Good-night).

**LEIPZIG.** For the benefit of "long-distance" enthusiasts living near, the Leipzig station has a "silent night"—usually Thursday—when it closes down soon after 9 p.m.

**TESSIN.** The new Swiss station that is being erected near Tessin will make all its announcements in Italian.

**BRESLAU.** The Breslau programme is linked with Gleiwitz, and the "Good-night" takes the form of "Breslau and Gleiwitz wish you a very good night. Do not forget to earth your (outdoor) aerials. Ladies and Gentlemen, good-night"

In German this is: "Breslau und Gleiwitz wuenschen Ihnen eine recht gute nacht. Vergessen sie aber nicht ihre hoch und aussenantennen zu erden. Meine Damen and Heren, Gute Nacht."

**KALUNDBORG.** Work on Kalundborg's new station is being pushed ahead rapidly in the hope of getting on the air by the end of the year. The wavelength will be 1,153 metres.

**FRANKFURT.** The word "Sudwestfunk," often used as an introductory announcement by Frankfurt, means "South-West Radio."

**NEWCASTLE.** Newcastle now has the distinction of holding the lowest of the B.B.C. medium wavelengths. It works on 211.3 metres, exactly three metres below Aberdeen.

**OSLO.** This station usually gives its main time signal at 7 p.m., or, failing that, at 8 p.m.



# AMERICAN ANNOUNCEMENTS

Particulars of the varied languages used by broadcasting stations in North and South America, which will make your short-wave listening easier and more interesting.

WHEN anyone speaks of "receiving America", we invariably think of the tongue used as being British, or, perhaps I should say, American. And when we search for American stations we are far too inclined to listen only to stations employing our language and to ignore all others.

During 1932 conditions have been such that Argentine, Brazilian, Mexican, Cuban and other Latin-American stations have come in extremely well and have doubtless been passed over by many distance enthusiasts as being merely "late Spaniards."

For this reason it is very much to the enthusiast's advantage to know something of the languages employed by the various countries and stations of America.

### Mexican Revenue

Many Mexican stations announce in English as well as in the native tongue of Mexico (Spanish). Indeed, Mexico is probably the Latin-American country which makes most use of both tongues. The reason is easily understood when one considers the fact that Mexico adjoins the United States. For this reason many Mexican stations can obtain greater revenue by announcing in English as well as in Spanish, for announcements are then understood in both countries.

X E W, Mexico City, a station that has been heard in Europe fairly frequently, announces in Spanish and English.

This station radiates upon 395 metres and employs a power of 5,000 watts.

Then we have the lesser-known Mexico City station, X E T Y, also employing both tongues. This station works upon 357 metres with a power of 2,000 watts.

C M C is the only Cuban station that regularly announces in English and Spanish (the native tongue).

We next turn to the interesting Mexican station, X E D. The transmitter is located at Reynosa and is Latin-America's highest-powered transmitter—employing a 100,000-watt transformer upon 412 metres.

### A Curious History

X E D is a station with a history, for it belongs to a gentleman who originally owned a United States transmitter. Owing to the material broadcast the Federal Radio Commission refused to renew his licence, and so this gentleman left his studios in the United States, at El Paso, Texas, and obtained permission to erect a high-powered transmitter just across the border, in Mexico. X E D is the outcome. I need hardly mention that this station employs both the British and Spanish languages.

Three other Mexican stations that have become popular owing to their employing two languages for announcements are X E J and X E Q, at Ciudad Juarez, which employ 300- and 399-metre wavelengths; and X E P, Nuevo Laredo, which works upon 214.2 metres.

The most powerful of these transmitters is X E Q, which operates with a power of 1,000 watts. X E P comes next with a power of 200 watts, and finally we have X E J with a power of 100 watts. X E P is relayed by two short-wave transmitters, the most noted being X 26 A, which operates upon 39.4 metres.

### Spanish-Announcing U.S. Stations

Although the southern states of the United States now belong to the U.S., it is obvious to the traveller and the radio enthusiast that they still have a strong element of Mexico in them.

Many of the radio stations in the southern states announce in English and Spanish, whilst several employ the latter language only.

Contrary to the opinion held by many, Canada does not employ the English language alone for announcements from its stations.

At St. Hyacinthe we have C N R M (and the "phantom" stations C K A C and C H Y C), employing the French as well as the English language. C N R M employs a power of 5,000 watts, upon 410.7 metres, and is well heard.

Perhaps I should explain that when I refer to "phantom" stations I refer to stations that exist in calls alone, and are not represented by a transmitter.

### "Phantom" Radio

The reason for this somewhat peculiar state of affairs is that several firms employ the same transmitter, but different studios and call letters. The call letters under which the transmitter is licensed are the call letters of the station, and the remainder are "phantom" calls, and they are very misleading.

On 340 metres there are two Canadian stations (of low power) that also employ the French as well as the English language for announcements. These are C H R C and C N R Q (and "phantom" station C N R V) at Quebec. C H R C has a power of 100 watts and C N R Q-C N R V of 50 watts.

Another low-powered transmitter making announcements in the two languages is C K C I at Quebec. This station employs the extremely low power of 22.5 watts upon 480 metres.

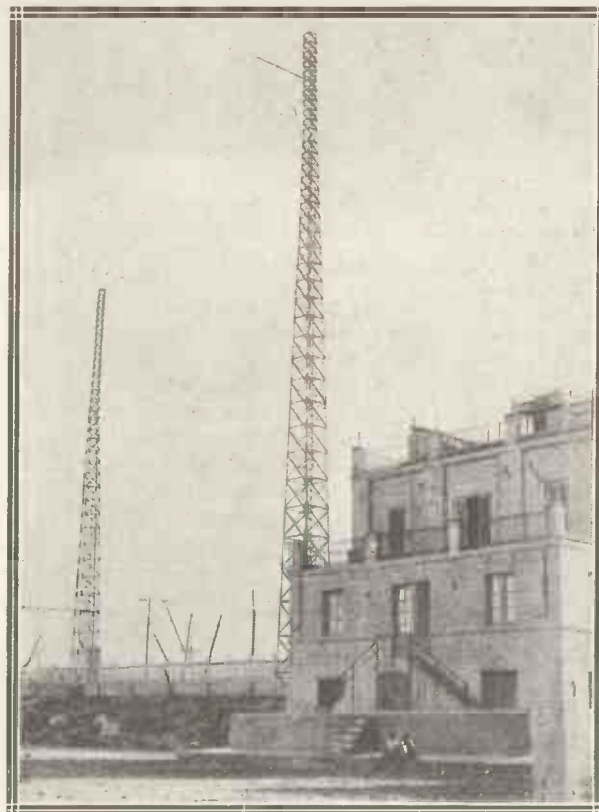
### Haiti's Broadcaster

Haiti has one broadcast station that resembles Toulouse in being a wavelength wanderer. However, whereas Toulouse has improved, the Haiti station, H H K, Port au Prince, has not.

The language employed by this station is French, and a power of 1,000 watts is employed upon the wavelength of 325 metres, or thereabouts.

Many other Latin-American stations announce in English as well as Spanish, but in almost all instances only upon important occasions.

L. W. O.



A SHARED WAVELENGTH

The transmitter house and aerial masts of the Spanish station at Valencia. It works with 1.5 kilowatts and shares its wavelength of 267.6 metres with its compatriot, Oviedo.

## HINTS FOR SHORT-WAVE BEGINNERS

Curing Hand-Capacity—Your Aerial—New Stations—Winter Listening.

"HAND-CAPACITY" is one of the chief causes of failure in long-distance short-wave work. If you can't cure it by any of the usual methods, all of which have been frequently detailed in "M.W.," then use extension handles on your variable condensers and bring the dials out to a "false panel" three or four inches in front of your proper panel.

This should seldom be necessary with any up-to-date set, particularly if the modern practice of covering the underside of the baseboard with copper foil is adhered to.

About aerials, it is as well to mention that results on the short waves are often just as good with a small indoor aerial as with a large affair strung up outside.

The reason for this is partly that one can use tighter coupling with a small aerial, and make up for loss in strength in that way. Particularly if you live with your set in an upstairs room, it is worth your while to try a length of wire diagonally across the room, about a foot below the ceiling.

You should find it possible with a good three-valver to receive American stations on the speaker whenever conditions are reasonably good. With a "two" it is unwise to hope for much in the way of loudspeaker work, although it can be done.

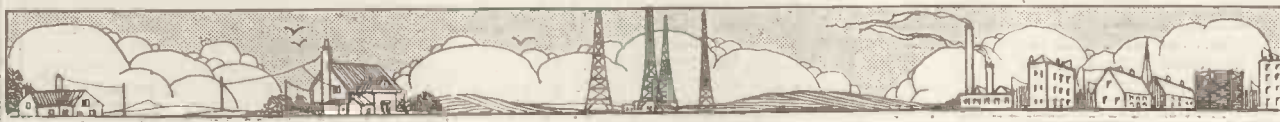
For information regarding "conditions" prevailing, new stations to be heard, and the wavelengths of the old-stagers, watch "On the Short Waves" each month. Under that heading I do my best to forecast, month by month, the state of the short-wave ether.

### It Can Be Done

Make up your mind not to admit that you are beaten if your first trial is not a success. It can be done—thousands of readers like yourself are doing it—and the little extra difficulty just serves to make it more interesting.

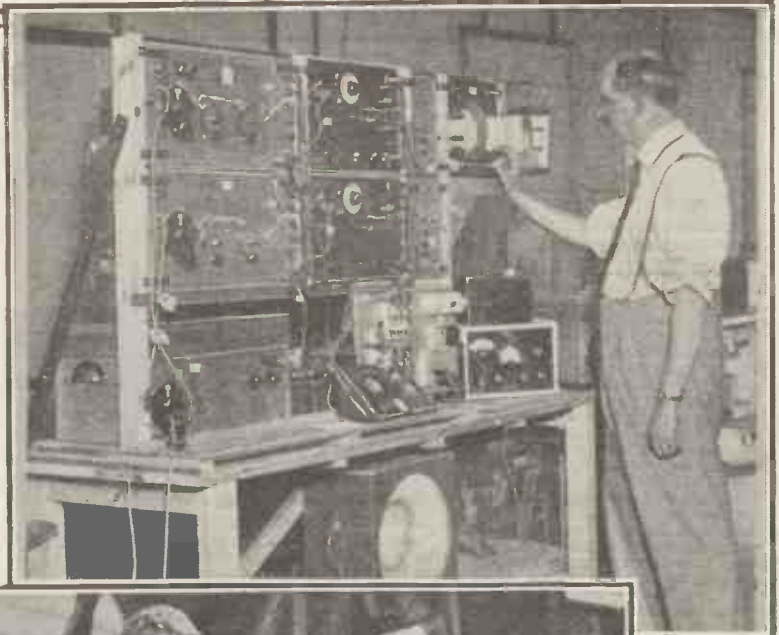
Reception conditions should be good this winter, and although we have had a very bad spell, the general level of reception should now be on the up-grade once more.

W. L. S.



# HOW RADIO WAVES BEHAVE IN THE ARCTIC

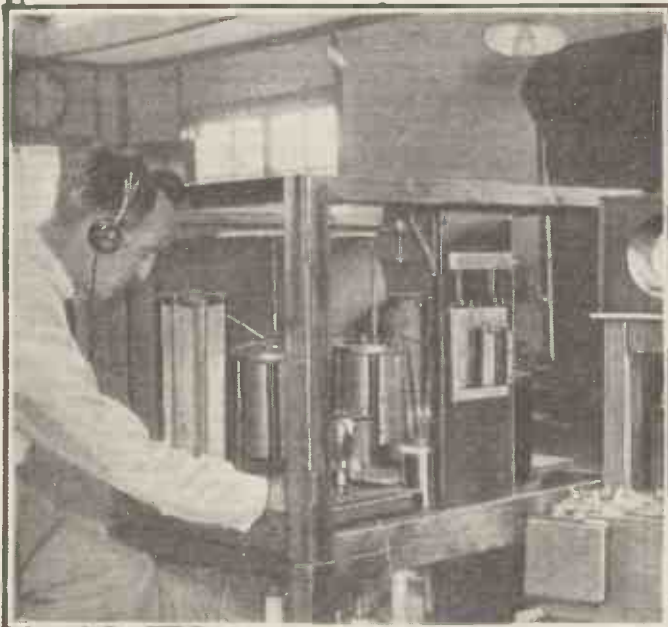
There's no end to the things these short-wave enthusiasts want to find out! Meet Professor Appleton, the genial Physics expert of King's College, who wants to know about the "ionised" layers of the upper atmosphere and their effect on short-wave transmissions. To this end he has sent an expedition into Arctic regions, with Tromso Island as headquarters.



The apparatus at the top is a polarimeter, for reproducing, by means of the cathode ray tube, the echoes reflected from the ionosphere as pattern.



Some of the men who matter in this all-British radio research expedition. On your left is the Director of the Radio Research Station at Slough, and next to him is Professor Appleton.



On the left : Mr. Brown, who is spending his time operating a 3-kilowatt Tulse transmitter, which is used at Simavik to transmit to Tromso. And on your right : Mr. Geoffrey Builder (Professor Appleton's second-in-command) with his super-heterodyne receiver fitted with cathode-ray oscillograph and recording camera for photographing echo.

# THOSE PECULIAR SHORT WAVES

by "W.L.S."

Our popular short-wave expert tells you something of the odd way in which short waves behave on the various bands from 100 metres downwards.

THE steady conquest of shorter and shorter wavelengths by the amateur transmitters is a well-known piece of radio history. Incidentally, the great activity at the present time among the amateurs on the 5-metre band leads us to believe that the downward movement is not yet finished.

The most striking fact that has come to light as a result of the whole movement is, of course, that the short waves vary almost unbelievably in their behaviour as one goes steadily down from 100 metres. The amateur transmitters are allowed to use five bands in "harmonic relation" centring roughly round 84, 42, 21, 10.5 and 5.25 metres. In between these regions we have the Washington - allotted broadcast bands in the neighbourhoods of 49, 31, 25, 19, 16 and 14 metres. Since these comparatively narrow bands, eleven in number, exhibit eleven completely different sets of characteristics, it will be seen that the study of "short waves" becomes a complicated matter

### Before Broadcasting

Let us consider very briefly the differences that can be noted between these various wave-bands.

In 1922, just before broadcasting commenced, the great majority of amateur transmitters were using the 150-200-metre band. Communication was easy and reliable up to about 300 miles, but for a long period nothing very much in excess of this was covered. In 1923, however, improved receiving and transmitting gear made possible, on this band, the first two-way work across the Atlantic.

At about the same time the Americans had found that the "useless" band in the region of 100 metres that had been allotted to them exhibited greater potentialities for long-distance work than the 150-200-metre band. Accordingly the amateurs moved down to 100 metres, where two-way transatlantic work became a commonplace. On this band, too, the first reception of New Zealand took place, and also the first two-way work with Australasia.

### Thousands of Miles

In spite of bad conditions, similar work is still possible on the 80-metre band to-day—100 metres not being available for amateur work.

Broadly speaking, the characteristics of the 80-metre band are that work up to 500 miles is easy by darkness and possible by daylight, and that suitable choice of time and season makes possible the covering of distances of the order of 5,000 and even 10,000 miles without any great difficulty.

For "local" work the band is useful continuously from a distance of 50 miles up to 200 miles, although between 10 and 50 miles there is liable to be a "dead" area.

The next band to be explored—in 1925 and 1926—was the 45-metre band, sufficiently similar to the present 42-metre band to be considered as identical.

### Transatlantic Work

The changes noticed when this band first came into general use were these: local work was less reliable, the "dead" area extending from 10 miles up to 150 or 200 miles; transatlantic work was very much easier, and lower powers could be employed; and two-way work with the Antipodes ceased to be a rarity.

In many ways the 42-metre band is still the best for DX work, and in the winter season all parts of the world may be received in this country without any great difficulty.

In the late evenings North and South America are heard; in the early mornings and late afternoons the Antipodes and sometimes the Far East are in evidence; while the few hours before and after noon seem to be of little use except for comparatively local work.

By 1927 the next "downward step" was well under way, and the amateurs of this country had discovered that the 21-metre band (then the 23-metre band) showed unrivalled possibilities for reliable work with Australia and New Zealand.

The local "skip," as one would have expected, was lengthened still more, and the transmitted signal, fading out after ten miles or so, was not received again up to a distance of 600 or 1,000 miles in daylight, or 2,000 miles after dark.

### "Skip" Distances

This "skip" depends greatly upon general conditions—believed to follow the eleven-year sunspot cycle and its "harmonics"—with the result that for certain periods of the year it is so great that the transmitted signals do not appear to "come down" at all.

Probably the truth of the matter is that at those particular periods the "skip" is such that signals transmitted from this country are reflected down into certain parts of the world where no receivers exist! This seems more than probable when one looks at a globe

and observes the large areas of water, and the deserts and unpopulated land areas.

As one might expect, the 10-metre band ("discovered" in 1928-9) shows an exaggerated version of the characteristics of the 21-metre band. In 1929 and 1930 it was possible to maintain two-way work with the United States, South Africa, and India, but since then no trace of long-distance signals has been found. "Ground-wave" signals are reliable up to ten miles, and occasional "freak" contacts at distances of 100 or 200 miles are made.

The steady decline in the usefulness of this band for DX work fits in quite logically with the "eleven-year cycle" theory, since we are this year approaching the "trough" of the cycle. In the "peak" year, 1927, no use was being made of the 10-metre band, but it seems reasonable to suppose that it would then have been useful and reliable for long-distance work.

### Five Metres

The 5-metre wave band is the latest "discovery," but no long-distance contacts whatever have been made, as yet, on this wave. The ground-wave is readily absorbed, and work over more than five miles appears to be impossible unless the transmitter is situated on high ground.

Experiments with a transmitter on an aeroplane, carried out recently in America, have resulted in the establishing of contact over distances of 115 miles, and probably this record will have been broken by the time this article appears in print.

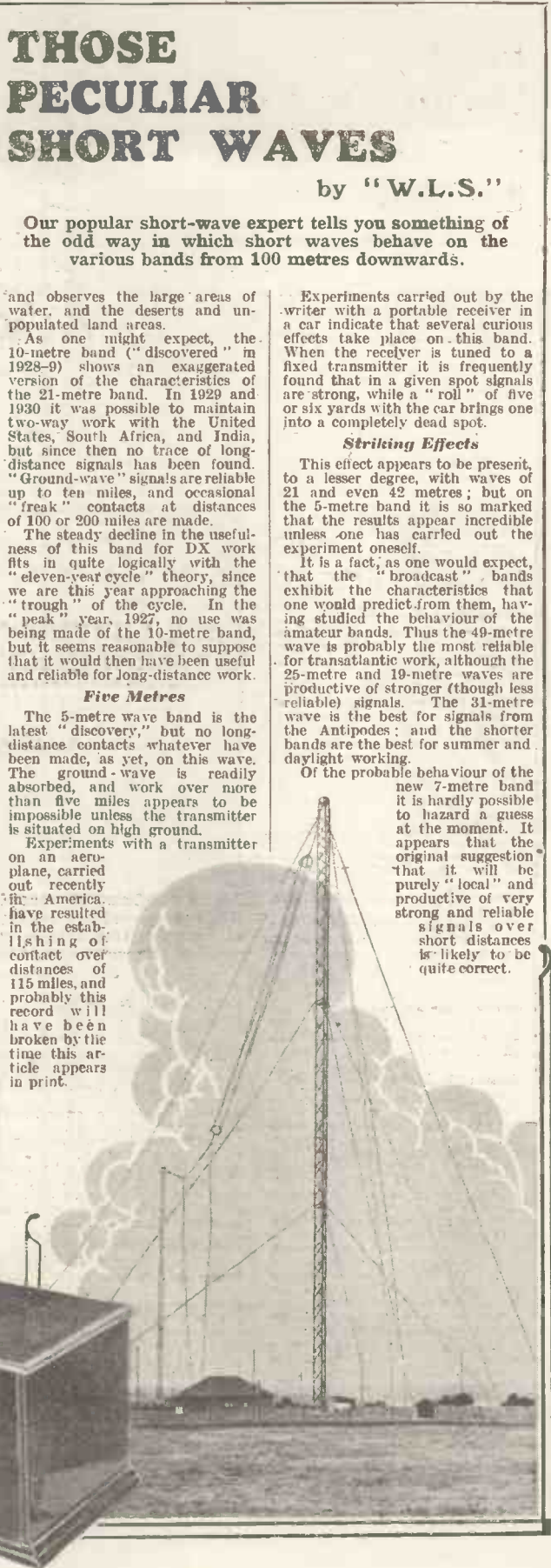
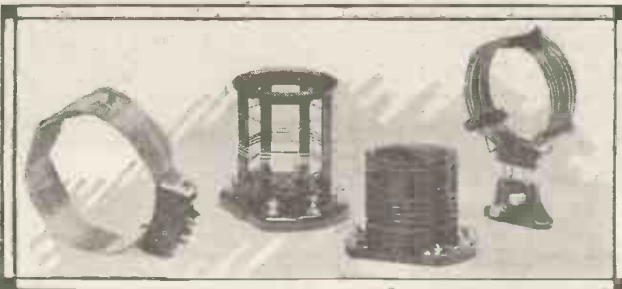
Experiments carried out by the writer with a portable receiver in a car indicate that several curious effects take place on this band. When the receiver is tuned to a fixed transmitter it is frequently found that in a given spot signals are strong, while a "roll" of five or six yards with the car brings one into a completely dead spot.

### Striking Effects

This effect appears to be present, to a lesser degree, with waves of 21 and even 42 metres; but on the 5-metre band it is so marked that the results appear incredible unless one has carried out the experiment oneself.

It is a fact, as one would expect, that the "broadcast" bands exhibit the characteristics that one would predict from them, having studied the behaviour of the amateur bands. Thus the 49-metre wave is probably the most reliable for transatlantic work, although the 25-metre and 19-metre waves are productive of stronger (though less reliable) signals. The 31-metre wave is the best for signals from the Antipodes; and the shorter bands are the best for summer and daylight working.

Of the probable behaviour of the new 7-metre band it is hardly possible to hazard a guess at the moment. It appears that the original suggestion that it will be purely "local" and productive of very strong and reliable signals over short distances is likely to be quite correct.





# Jottings FROM JAVA

*It is a far cry from England to Java, the large island in the Indian Archipelago. So universal, however, is the appeal of radio in the modern world that even in the tropical regions we find broadcasting in full swing.*

**I**F you glance at the map for a moment you will notice a trio of large islands in the Indian Ocean forming, roughly, the shape of a triangle. They are Borneo, Sumatra and Java.

Java is the smallest of these islands. Nevertheless, as things go, it is a very rich and prosperous country, and in many directions it is well in advance of its surrounding islands.

It is to the credit of the Dutch colonists that radio has been able to develop to so great an extent in the Dutch East Indies.

### Multitude of Amateurs

There are seven or eight official wireless stations in Java alone, besides a minor multitude of amateur transmitters.

Naturally, the majority of the official stations, which have been erected by the Dutch Government postal authorities, are used solely for official purposes. One of these stations, however, runs a broadcasting service three times a week as a sort of side-line for the benefit of the white inhabitants of the island.

Radio is popular in Java—as popular as it is in this country. You cannot traverse any portion of the civilised territory without coming across aerials, either of the receiving or of the transmitting variety.

Most of the radio transmissions in Java are carried out on short waves.

Some of the stations transmit telegraphy only. Others confine themselves to telephony, whilst others, again, indulge in the amenities of both! Most of them are empowered to operate upon one of two wavelengths.

### Beam Reflector

To take concrete examples, the station at Tjililin, about 18 miles from the main Dutch Government establishment at Bandoeng, transmits telegraphy only on 26.2 and on 40.2 metres. The Malabar station transmits both telegraphy and telephony on a 17.4 metres wavelength.

There are two long-wave stations on the island of Java, together with a beam-reflector station at Tjimindi, which is more or less experimental in nature. The long-wave stations are mainly associated with the high-power station at Malabar.

The Dutch Government station at Bandoeng is a very important one. This station, which operates on a wavelength of 17.4 metres has two distinct functions.

Regularly on Mondays it establishes communication with Holland, the usual time of this transmission being between 14.00 and 16.00 G.M.T.

### Too Hot for Talks

On Wednesdays, Fridays and Saturdays, between 13.00 and 16.00 G.M.T. it becomes a broadcaster pure and simple.

The programme material which it serves up to surrounding listeners

varies. Normally, it is made up of concert and news items, weather reports and occasional informative talks. But they don't overdo the talks in Java; the climate is too hot for that!

Thus it is that light entertain-

## WHERE TESTS ARE MADE



A corner of the radio research laboratories at Bandoeng, where Dutch engineers are engaged upon solving the problems not of Javanese transmitting stations, but of radio technique in general. Short-wave working and atmospheric-eliminating apparatus are chiefly dealt with.

ment, served up as daintily as possible, forms the main food of the broadcasting microphone at Bandoeng.

Actually, the station is located in the Government buildings at Bandoeng. It is replete with a very comfortable, if not over-luxurious, studio, a control-room and a transmitting-room.

The transmitter sends an 8-amp. current into its aerial. It is fed with double-rectified A.C., at, approximately, 12,000 volts, 500 cycles, which power is derived from the Dutch Government generating establishment at Bandoeng.

### Radio Laboratory

At Bandoeng, too, is located the Dutch Government radio laboratory, an institution which is of much importance, and which is due in very large measure to the energies and activities of the late Dr. C. J. de Groot, a Dutch radio pioneer, engineer and enthusiast.

The radio laboratory at Bandoeng not only deals with the problems of the various radio stations throughout the island of Java, but it is also actively engaged upon radio research itself.

### Atmospherics

This research is both of a pure and an applied nature. It is not surprising, however, for us to learn that in a land given over to atmospheric disturbances of a more or less severe character

throughout the greater portion of the year, the majority of the Bandoeng radio laboratory's radio investigations are concerned with the practical problems of short-wave working, and also with those concerning the efficiency of atmospheric-eliminating instruments and circuits.

### A Fine Station

The Bandoeng radio laboratory utilises the services of three transmitters. Two of these broadcast telephony on 17.4 metres, and the third has a choice of 19.4 and 30.2 metres for telegraphy only.

Putting aside broadcasting activities, however, the Dutch authorities in Java can boast of a very fine high-power station at Malabar. This station employs the arc system of transmitting, and its function is to establish continual communication with the Dutch Government officials in Holland.

There are transmitters at Malabar—there are two of them—develop 200 and 2,400 kv. respectively. The Poulsen arc is used. In one of the transmitters a Telefunken

The official long-distance receiving station of the Dutch East Indies is situated at Rantja-Ekek, a tiny village which is merely a collection of huts, and which I am sure you will not find on any map.

Whilst the Rantja-Ekek station receives principally transmissions from Holland, it can be used as a receiver for any other station.

The Rantja-Ekek station cannot transmit, but it is in telephonic communication with every transmitting station in Java.

## SHORT NOTES on the SHORT WAVES

**T**HE popular Tuesday afternoon concerts from Bandoeng, Java, have been discontinued indefinitely, owing to "the bad times," according to a letter from the station director.

The two Canadian stations, VE9JR and VE9CL, both at Winnipeg, used to be well received in this country, but closed down for a long time. By the time this note appears they will be in regular operation again on 25.6 metres and 48.85 metres respectively.

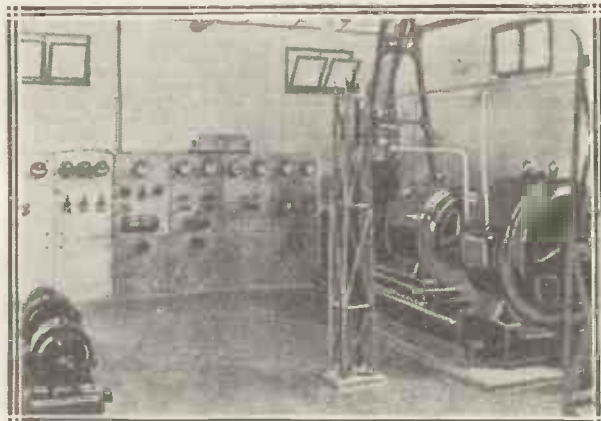
The Bowmanville station, VE9GW, now works on 25.4 metres and 49.22 metres simultaneously, with a power of half a kilowatt.

The "smallest broadcasting station in the world"—little T14NRH, Costa Rica—is now working on 19.9 metres as well as 31 metres. This station, though rated only at 7½ watts, has been heard in this country several times, and should be easier to find on 19.9 metres than the higher wave. We have also heard that an increase in power is contemplated.

El Prado, Ecuador, has shifted from 39.8 metres to a new setting on about 45.3.

Several telephony stations are working from Cairo to England apparently as a preliminary to the establishment of a regular 'phone service. SUV, SUW, SUX and SUC have been heard on various wavelengths between 40 and 25 metres.

## POWER FOR TJILILIN



The Telefunken high-frequency alternator system is a great favourite with the Dutch. The alternator and switchboard which you see here are employed at the Tjililin station which transmits on two wavelengths, 26.2 and 40.2 metres.





# ON THE LONG WAVES



A FEW weeks ago it was being said that all sorts of exciting things were going to happen on long waves, including the full-dress appearance of the much-talked-of Luxembourg station. Test transmissions on low power from Luxembourg on about 1,200 metres had shown that work was well advanced there, and it was confidently predicted that at any moment one might hear the new transmitter in full blast.

### On 1,200 Metres

For these reasons many readers gave, as I did, special attention to the stations over 1,000 metres. And no doubt the majority got sick and tired of the 1,200 metre dial-reading, for Luxembourg delayed his appearance—except possibly as a feeble test programme. And even Reykjavik, said to have been coming over well on the same wavelength, failed to score on my aerial.

Nevertheless, there was plenty of interest on the long waves, and time spent in tuning over them was well repaid.

My surprise station was Leningrad, who works on 1,000 metres. As you probably know, this is one of the worst wavelengths—if not the very worst—allocated to broadcasting.

It is adjacent to the wavelengths of those never-stop sinners, the direction-finding or "beacon" stations round our coasts, and there is no more annoying jamming known than the twenty-four-hours-a-day reiterations of these stations.

### Leningrad Again

But Leningrad has developed such a punch that on many occasions he emerged quite head and shoulders from the medley of Morse around him. Unfortunately, his programmes are almost always talks, in Russian; and anything less pleasant than a Russian talk, completely swamped in Morse, is impossible to imagine!

No one could stand it long, but I confess to frequent visits to that part of the dial just to confirm Leningrad's quite remarkable strength.

If, as is stated, the Soviet Governments come into line with the rest of Europe and co-operate as regards wavelength positions, this will be a station worth watching.

### Oslo and Kalundborg

A little higher up the dial was Oslo. And his strength, on many occasions, has been simply gigantic. On several evenings Daventry, Radio-Paris and Oslo stood right out above all other stations, which is "going some" for Oslo considering his 720 miles away aerial!

Kalundborg, just above him, although good was generally compelled to take a back seat, which is against all my experience of these two stations.

Near the middle of the dial Moscow Trades Union was good, and Motala

was usually a lot better, while Warsaw and Eiffel Tower were both good companions. Warsaw is not as strong as last year, I fancy, and when "Eiffel" was on at the same time it did not generally pay to bother with the Pole.

Radio-Paris, on 1,725 metres, has behaved like a gentleman. Always urbane, punctual, and efficient, he is undoubtedly one of the South of England listeners' brightest stars. And Konigs-Wusterhausen, just below him on 1,635 metres, is a no-account station by comparison.

### Heard Huizen?

Right at the top of the dial is our old friend Huizen, on the 1,875-metre mark, and this is another programme which seems to have less vigour than at the corresponding period of the calendar last year. Incidentally, he now really is Huizen, announced as such, until the end of the year, when the Hilversum announcements will go out from Huizen again.

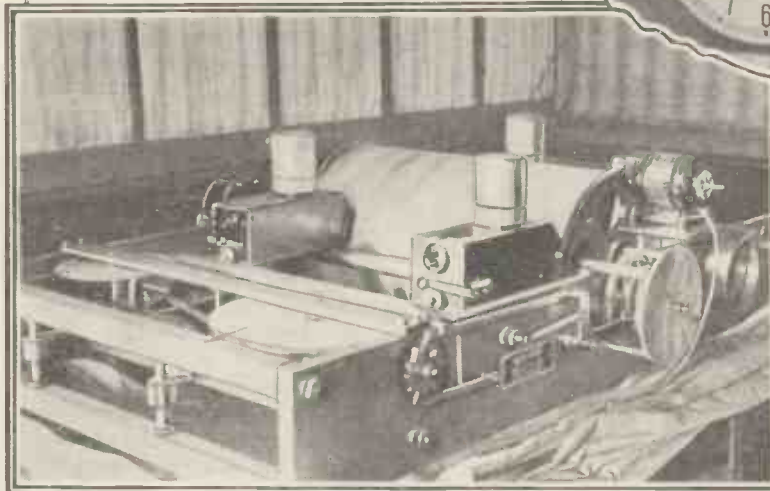
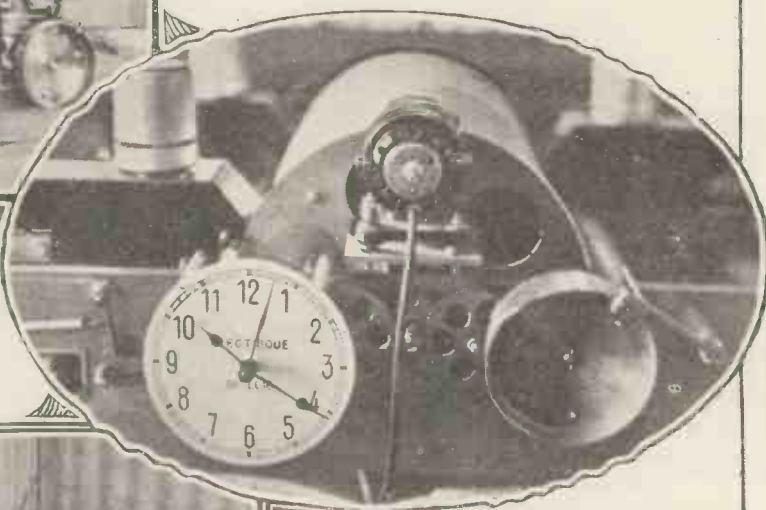
The chief blot on the long-wave landscape at the moment seems to be Morse, and the extremely good, easy-to-get programmes often suffer from the dash-dot merchants, or from the heterodynes which they originate. Some of the French stations seem to almost tear the air, while our own GF's are no soothing syrup when one is settling to enjoy a programme that can be pierced by their penetrative patter! But on the whole the long waves have been splendid. D.X.





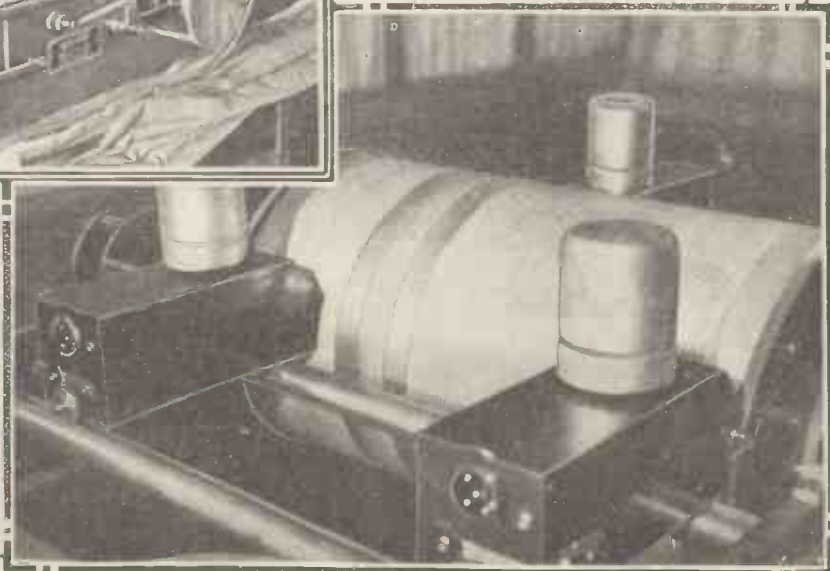
*Pictures from Paris of*  
**A CLOCK**  
**THAT SPEAKS**  
**THE TIME!**

In England, if you want to know the time you ask a policeman, or ring up your telephone exchange and ask the operator. Paris has gone one better, and the job will be done mechanically by this fierce-looking apparatus. The inventor, M. Nimier (seen above with his assistant), says it's quite easy—when you know how!



The system used is similar to that of some talking films. A record has been made announcing, in speech, each hour, each minute, and each period of ten seconds. When this record is synchronised with the master clock, any telephone subscriber calling the number of the Paris Observatoire gets a spoken record of the exact time.

The first three pictures give you a general view of the apparatus at the Observatoire, showing the master clock together with the synchronising motor and gears. The piece of apparatus on the right—which looks rather like an outsize tuning coil—is the drum on which are cut the sound tracks. The three black boxes, surmounted by miniature "towers," are the amplifiers with their valves.



# NEWS AND VIEWS

of broadcasting throughout the world



**CINCINNATI.** The W S A I station on 225.4 metres has been coming over well to this country in the small hours.

**GLEIWITZ.** This well-known German station on 253 metres includes a ten minutes of Esperanto for workers in its programmes.

**KEMIKAWOA-CHO-CHIBAKEN.** This formidable name belongs to the Tokio short-wave station, which usually broadcasts from 11 a.m. to 1 p.m. on 38.07 metres and 19.36 metres.

**CHELMSFORD.** Experiments have recently been carried out on 75 metres from a transmitter located at Chelmsford.

**BUENOS AIRES.** Several reports have already been received of Radio Splendid, Buenos Aires, and other South American stations being heard direct in this country on medium waves.

**BRESLAU.** One useful feature of this station's programmes is answers to technical questions on wireless reception.

**"RADIONORMANDIE."** The usual time for the opening of Fécamp's programmes is noon.

**STUTTGART - MÜHLACKER.** It seems to have escaped general notice that Stuttgart-Mühlacker is not now occupying the next wavelength to that of London Regional. Tiraspol, Russia, now intervenes on 356.3 metres.

**BREMEN.** Although the Germans are good wavelength-keepers, Bremen has recently been about three metres too low.

**MADRID.** The E A J 7 station, Union Radio, has resumed 424.3 metres, which he had abandoned on account of Moscow's heterodyne interference.

**MOSCOW.** The English talks are usually given on Wednesdays, Fridays, and Sundays, from 9 till 10 p.m.

**BARL.** This new Italian station on 270 metres has already put up some fine long-distance feats, especially to places in South America.

Paris to be the premier foreign station.

**COPENHAGEN.** Announcements from Copenhagen—and its relays, Kalundborg on 1,153 metres and Skamleback on 31.51 metres—are made by either male or female announcers, both sexes being employed as announcers.

**RADIO L L, PARIS.** This station, which announces "Radio L L" (exactly as we pronounce the L's), closes down with the words "Ici Radio L L. Notre émission est terminée. Bon soir, mesdames, mesdemoiselles, messieurs."

**WARSAW.** The musical notes radiated by Warsaw (and often relayed by the other Polish stations) as an interval signal are the first two bars of Chopin's Polonaise in A major.

**TOULON.** The French navy is erecting a new long-waver at Toulon, for communication with submerged submarines.

**CAPE FIGARI.** This is the name of the place in Sardinia at which Marchese Marconi's 57-centimetre transmissions from Rocca di Papa, near Rome, were received. The distance is 168 miles—far beyond the limits hitherto allotted to these ultra-short-wave transmissions.

**NASHVILLE, TENN.** The new 50-kw. station is to have a vertical aerial, and on the roof of the main building an aeroplane beacon is to be installed.

**NEWARK, N.J.** Station W O R, recently licensed to increase its power, will work on 50 kw.—the maximum allowed in the U.S.A.

**BROADCASTING HOUSE.** The words: "Their Majesties the King and Queen honoured this building with their presence July 7th, 1932," are to be inscribed on a carved panel.

## Look out for the DECEMBER MODERN WIRELESS

It will be an unusually fine Christmas number with an extensive section dealing with THE WORLD'S PROGRAMMES

Out December 1st 1/- ORDER NOW

**SCHEVENINGEN HAVEN.** This Dutch long-waver, that may often be heard working telephony, is not a broadcasting station, but gives out commercial information, Stock Exchange prices, etc.

**GRENOBLE,** which lies rather outside the areas of the proposed French regional scheme, would be allotted a supplementary 20-kw. station under the plan.

**POSTE PARISIEN.** Listeners to whom the Poste Parisien station is a local complain that its quality is being impaired by the new high-power station at Breslau on the adjacent wavelength of 325 metres.

**BUDAPEST.** As the wavelength of Budapest is 550 metres it is usually found right at the top of the dial. It is the only station near that setting that has a nine-note musical phrase (G sharp, B, A, B, G sharp, B, A, B, G sharp).

**FLORENCE.** The Italian version of Florence is Firenze (pronounced Fi-ren-za).

**BRUSSELS.** The Brussels announcers usually introduce their station as "Hier Brussel" (pronounced "Here Brussel").

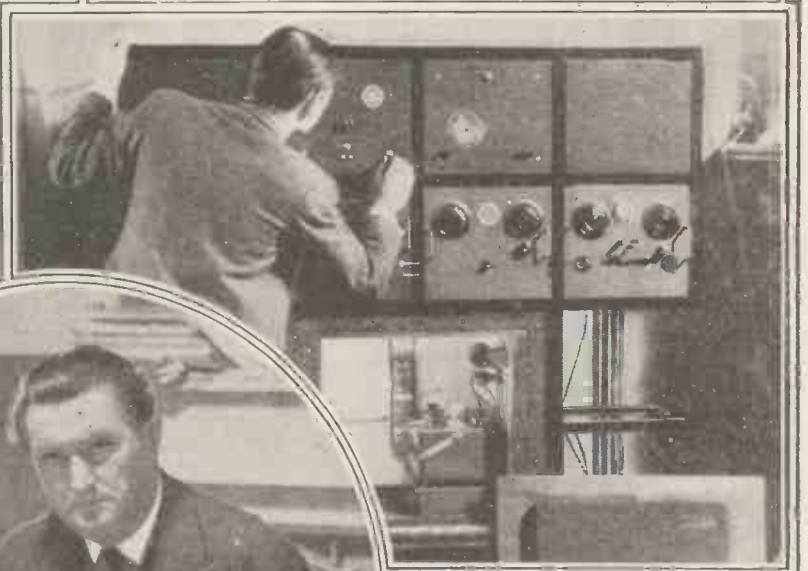
**HUIZEN.** Up till October this station, on 1,935 metres, was announcing itself as "Hilversum." There is an agreed "exchange" between these two stations every three months, but until after Christmas Huizen will announce itself as Huizen, and Hilversum (on 296.1 metres) will really be Hilversum.

**RADIO-PARIS.** The result of the new transmitting plant's first summer on the air is acknowledged to be extremely satisfactory. In fact most South of England listeners consider Radio-



## THE WARDEN OF THE WAVELENGTHS

*Pictures and Paragraphs about the European Check Station at Brussels which watches the wavelengths of all stations.*



In the circle, Raymond Brailard, President of the Union International de Radiodiffusion's delegation to the Madrid Conference. The tome he is studying contains 1,600 pages of suggestions for the Madrid Conference to consider!

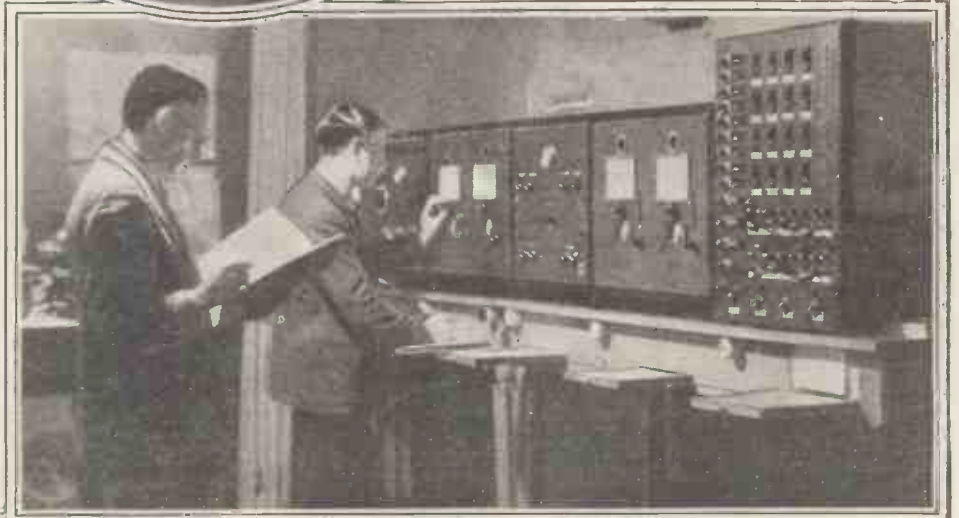
Thermostatically - controlled wavemeters are used to ensure wavelength accuracy in the Brussels Checking Station. The wavemeters have to be kept at a standard temperature to ensure constancy of calibration. A drop in temperature causes the thermostat to light a lamp, the warmth from which again raises the temperature.



Above is M. Brailard's secretary, filing correspondence from the "naughty" stations who wobble from their allotted wavelengths.



Two of the staff of the Brussels Check Station are noting and adjusting wavelength measurements in the illustration on the right. Note the special switchboard for controlling the various circuits and meters.



# WHAT THE DISTANT STATIONS ARE DOING

*The latest notes on reception conditions compiled after a month of listening to the stations of the world.*

stations above 300 metres will come in as well as those below that wavelength during the coming winter.

On one occasion I tuned in well over twenty stations, and verified, by calls, many of them. Amongst these were: W T A Q, Eau Claire, Wisc.; W J A S, Pittsburg, Pa.; W C A U, Philadelphia, Pa.; W H A M, Rochester, N.Y.; W P G, Atlantic City; W T I C, Hartford, Conn.; W C F L, Chicago, Ill.; W C S H, Portland, Maine; W I O D, Miami Beach, Florida; and W R U F, Gainesville, Florida.

### Moderate Haul

Although not so well represented as the United States, South America provided a moderate haul, for I received four Argentine Republic stations, besides several unrecognised Latin-American stations.

I have to admit that this was a "star" night, for on this occasion I received several American stations during daylight at the receiving end.

By 5.45 a.m. on this occasion I had tuned-in numerous stations and "settled" upon a particularly powerful signal. At 6 a.m. I was informed by the American announcer that I had been listening to the Pavilion Royal dance orchestra, under the direction of Tony Clines, from W P G, Atlantic City. This station then closed down with a profound "Good-night, everybody" from the announcer.

There were still three American stations audible at good phone strength, despite the fact that it was now quite light, and, tuning in

one of these, which I fancy was W I O D, Miami Beach, I listened to dance music until 7.5 a.m.

It is quite a common occurrence, to receive American stations upon the short waves during daylight, but it is seldom (indeed, I have never heard of it) one hears of medium-wave American stations being received under similar conditions. However, as I have experienced similar reception on a number of occasions since the occasion just related, I have come to the conclusion that many reports of similar reception would have been made but for the fact that, American stations presuming to be received only during darkness, listeners have not "tried" for them during daylight.

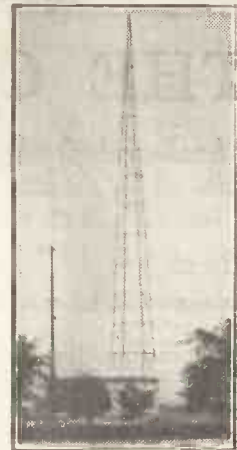
### Europe Affected

As would be expected, the improvement of conditions upon the medium waveband had effected European stations considerably.

Many stations unheard for a considerable time have been heard at good strength, besides many which have not been heard before.

France has provided a host of alternative programmes and stations, and, although the purity is lacking in many instances, volume is most decidedly not.

Amongst the French stations I have received during October are Grenoble; Lyons P.T.T. and Radio-Lyon; Paris P.T.T., Ecole Supérieur, Radio LL, Radio Vitis; Marseilles P.T.T.; Bordeaux P.T.T. and Sud-Ouest; Montpellier; Rennes P.T.T.; Lille P.T.T.; Toulouse P.T.T.; Nimes and Strasbourg P.T.T. From the



above list, which will provide readers with a useful list of stations that are coming in well, it is obvious that I have not mentioned the higher-powered French stations, such as Radio Toulouse, Poste Parisien, etc.

### Best Signals

As the evening wears on so do more and more stations make their appearance from the west, one of the best being W-8 X K, Pittsburg.

After midnight, numerous American stations commence broadcasting and so add more alternative programmes to the selection already audible. Those stations providing the best signals around this time are: W-8 X A L, Cincinnati; W-3 X A L, Boundbrook; W-9 X F, Chicago, and V E-9 D R, Drummondville.

### Closed Down

Several changes have recently taken place amongst the American short-wave broadcasting stations. Firstly, the well-known New York station, W-2 X E, has closed down indefinitely, a great loss to listeners. Secondly, I X A Z, Springfield, has increased its power to 1,000 watts, and is now on regular schedule (12.30 p.m. to 4 p.m., daily).

L. W. O.



**D**URING the last few months I have received American medium-wave stations at poor to moderate strength, despite the fact that summer was with us. This led me to expect an exceedingly good winter in this connection, and we certainly seem to be heading in that direction, for although winter is barely a month old, American stations are coming in at excellent strength almost nightly.

### A Newcomer

I should perhaps mention that for all the American reception mentioned this month, I used a newcomer to my receivers. This is a chassis-constructed mains receiver, and it employs one screened-grid H.F. stage followed by detector and one transformer-coupled L.F. stage.

### Poor Signals

I am extremely pleased by the fact that K D K A comes in well, for it is situated above 300 metres and, as readers will doubtless remember, stations above that wavelength have provided comparatively poor signals during the last couple of years. The fact that K D K A came in well leads one to think that it is probable that

### Conditions in Winter

**T**HE time has arrived for our three-monthly survey of conditions to appear once more, and depressing though it may sound, we must talk about short waves and winter.

Winter is usually the best season of the year for the short-wave enthusiast, not only on account of the dropping-off of outdoor activities, but because conditions are usually pretty good from November or December right through to Easter, or even later.

Reference to my famous log, which has been faithfully kept since 1922, and is, by the way, becoming quite a fair-sized one by now, shows that the general level of winter conditions has always been well above that for the summer or even the autumn.

### The Best Times

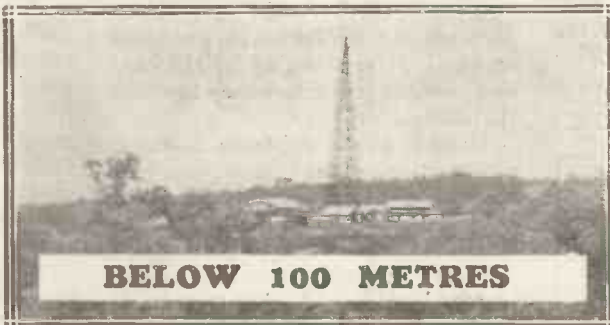
The following conditions generally hold good for the reception of various parts of the world. The times given are the *best* times, not by any means the only times at which the countries or continents mentioned may be heard.

#### Below 30 metres:

Australia and New Zealand: 06.00-09.00, and, in the New Year, also 14.00-16.00.

Asia: 12.00-16.00 (Far East), and 11.00-23.00 (Near East).

Africa: 16.00-20.00 (South



## BELOW 100 METRES

Now that the winter is really upon us we may expect snow any day now!—our short-wave expert deals with winter reception conditions and offers some items of interest concerning the short-wave stations.

Africa, and all day (North Africa).

South America: 21.00 onwards.

North America: Variable, but generally 14.00 onwards. Fade-out varies between 22.00 and 18.00, according to the hours of darkness.

#### Above 30 metres:

Australia and New Zealand: 05.00-08.00 and sometimes 17.00-21.00.

Asia: 14.00-20.00.

Africa: 19.00 onwards (South Africa), and 14.00 onwards (North Africa).

South America: Somewhat rare

at any time, but 23.00 onwards most favourable.

North America: 22.00 onwards. Times are, of course, in G.M.T., and apply alike to amateur transmissions and short-wave broadcast, although in the "above 30 metres" section the best times are naturally rather later for the 49-metre group of stations than for the 32-metre group.

I am going to keep a careful check on short-wave broadcast this winter, and will see how near to the truth this list has been. Perhaps some of my readers will do the same.

### Short-Wave Gossip

By the time you read these paragraphs, Radio-Nations, the new transmitter of the League of Nations at Geneva, will be "well away." At the time of writing, the wavelength used is 40.3 metres, and signals are not very strong in England, doubtless because the programmes are not intended for European reception at present. I hear, however, that a separate wavelength and aerial system for European broadcasts will be put into use later on.

The best DX broadcast stations at the time of writing seem to be W 3 X A L (49'18 metres), and Rio de Janeiro (P R X A) on 31'8 metres. The latter is consistently better than any of the North Americans, with the possible exception of W 2 X A D on his good days.

### Most Reliable

The 49-metre group are easily the most reliable, and one can be sure of finding most of them at some sort of strength practically any night after 11 p.m. The same cannot be said of the 32- or 19-metre groups, which are tremendously strong on good days and completely absent on bad ones!

The total number of active broadcasting stations between 70 and 13 metres is now over 100. Short waves are coming into their own at last.

W. L. S.

# THE OSRAM "THIRTY-THREE" MUSIC MAGNET

A handsomely finished, easy-to-build set for the home-constructor. Built up and tested By an "M.W." Technician.



The fine-looking bakelite cabinet which is a feature of the Music Magnet.

The screened-grid H.F. amplifier is there, of course. And a second screened-grid Osram valve is used for detection, provision being made in the grid circuit for the addition if desired of a gramophone pick-up.

The output stage is transformer-coupled to a power triode of the usual type. This gives sufficient undistorted output to operate, at good strength, the loudspeaker included with the kit.

THE managing-director, chairman, junior clerk or whoever it was who first realised that it would be a profitable as well as an acceptable gesture to include complete sets of components for home constructors in the range of commercially-built radio receivers thoroughly deserved the increased salary which he was undoubtedly given.

There is a great deal of satisfaction in knowing that your receiver is of the most recent design and will give just the results which you demand. But there is also another and no less pleasing satisfaction in the knowledge that you have built such a receiver with your own hands.

### Years of Research

The General Electric Company is one of those firms which has had the foresight to realise that, by giving the benefit of years of research work to the home-constructor, the reputable manufacturer fulfils the needs of the man with a slender purse without sacrificing anything of his own reputation.

Which explains why advent of the annual addition to the Osram Music Magnet range is awaited as eagerly

by radio enthusiasts as is the latest Morris design by the motorist, or the Irish Sweepstake by the gambler.

### Highest Marks

The "Thirty-Three" Music Magnet has probably been commented upon more for its external appearance and its working performance than for its design.

But while the *gourmet* may consider that the proof of the pudding is in the eating, the *chef* must be chiefly concerned with the simplicity of the recipe.

Therefore, the highest marks must be given to the General Electric Company not so much for having produced an excellent receiver, as for the easy and pleasant task which they have set the constructor.

There is not in existence to-day a construction chart more carefully thought out and sensibly prepared than that which accompanies the Music Magnet. Were all the advertisements of this receiver to be blazoned with the slogan "It is Impossible to Go Wrong," there is no one who would have a word of adverse criticism to offer.

### Popular Circuit

But the real charm of this chart lies in the fact that it does not abuse the intelligence of the man with commonsense, yet it leaves nothing to chance.

The "Thirty-Three" Music Magnet is priced at nine guineas. It employs a variation on that most popular screened-grid, detector and power output arrangement which the majority of medium-priced receivers delight in.



What the "Thirty-Three" looks like inside. A sturdy affair, isn't it? The performance is like that, too—strong and reliable.

### ALL ABOUT THE SET

- Number of Valves. Three.
- Circuit. S.G. H.F. stage; S.G. detector; Power output.
- Features. One-knob tuning, separate trimmers for medium and long waves, magnetic loudspeaker with floating cone, connections for gramophone pick-up.
- Cabinet. One-piece moulded bakelite—walnut graining.
- Price. 9 guineas (with valves).
- Makers. General Electric Co., Ltd., Magnet House, Kingsway, W.C.

### One Knob Tuning

Of the four controls, three are on the front of the cabinet, the "on-off" switch being placed at the back of the metal chassis. There is only one tuning knob controlling the two ganged condensers, and of the other controls one deals with the wave-changing and the other is the reaction-volume control.

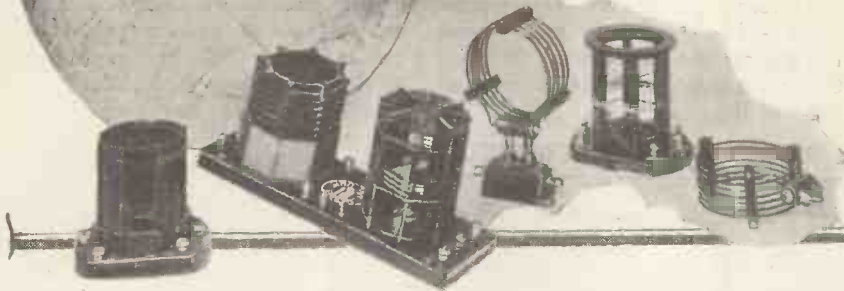
The Music Magnet was tested in London under conditions bad enough to constitute a real test of merit. Tuning is delightfully easy and the selectivity is such that all the British and continental broadcasting stations which one would expect to receive are obtainable at good strength.

### Excellent Investment

While the "Thirty-Three" Music Magnet should delight the man who likes to "play about" with his set for distant programmes, it is eminently suitable for the enthusiast who wants several alternative programmes of real entertainment value.

Whichever way you look at it—an excellent investment.

ON THE

SHORT  
WAVESby  
W.L.S.

THE awakening of general interest in short-wave radio is apparent on all sides, thanks largely to the fact that the Empire broadcasting station really is under way and promises to be one of the

best short-wave stations in the world. I receive my fair share of radio journals from foreign and Colonial parts, and the latter especially are "all hot and bothered" at the prospect of hearing some real programmes from the Old Country at last.

Whether there is any real justification for it or not, most of them have been treating G 5 S W as a huge joke, since in most parts his signals do not seem to have been comparable with those from other European short-wave stations. When the real Empire station starts up, however, they are all hoping to be able to say how proud they are of the British station.

### The "Ultra-Shorts"

Marconi's success in transmitting over a distance of 170 miles with a wavelength of 57 centimetres points to developments in this direction by the amateurs of the world. One of the amateur bands is in the neighbourhood of this wavelength, and up to now very little has been done. The limiting factor has been that the waves are believed to travel only in straight lines, so that the curvature of the earth has limited the distance that

*This month "M.W.'s" short-wave expert deals with a number of topics of absorbing interest to short-wave listeners and all wireless enthusiasts. You can read this article with enjoyable appreciation even if you do not listen on the higher frequencies. W.L.S. is himself so wholeheartedly enthusiastic about the "ultra-shorts" that he cannot fail to afford enjoyment to those who read his articles on the subject.*

can be covered to something very small indeed.

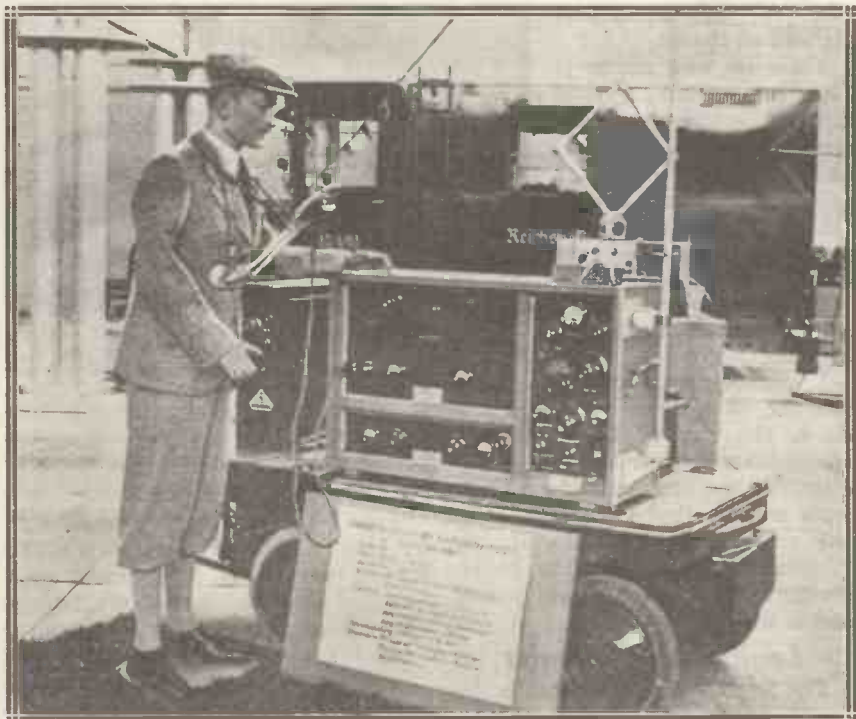
Marchese Marconi appears to have surmounted the difficulty somehow, and "Q S T," the A.R.R.L. journal, says: "If it is true, just let us amateurs have

a whack at it for about six months—"

### Madrid and the Future

The other big thing for short-wave folk is, of course, Madrid. The general allocation and restriction of short waves to the various sections clamouring for their use is a vastly important matter, and we are sure to see some changes. Personally, I rather expect to find the short-wave broadcast bands widened or increased in number.

### THE LATEST IN "PORTABLES" FROM GERMANY



A mobile short-wave transmitter recently shown at the Berlin Radio Exhibition. Although this outfit was developed by the German Post Office authorities, readers will no doubt recall that our own B.B.C. originally employed a "wireless perambulator" to transmit one of the early outside broadcasts from the London Zoo.



But that is only my own private opinion. I have no "inside knowledge," and neither has anyone else that is not actually in Madrid!

The present short-wave broadcast bands are, considering the limitations of short waves, quite wide enough. One doesn't often hear two short-wave stations heterodyning, for instance. There are, however, more stations arriving on the air every month, and one can see the distinct possibility of an interference problem arising in about a year's time if some alterations are not made.

**Active Stations**

As a concrete example, the Empire station is going to transmit in the 49-metre and 32-metre bands. Listen on the former after 11 p.m., or the latter during the early evening, and you will find quite a goodly crop of stations on the air.

There are, as a matter of fact, just about a level hundred active broadcast stations between 70 metres and 12 metres; not bad going when one realises that in less than eight years the short waves have been developed from a completely unknown quantity to a very important branch of radio.

I cannot see, at the moment, that there is much left to do in the way of development of transmitters or receivers. As I have often said, anyone can make a short-wave receiver that is "louder" than the previous one. Unfortunately, "loudness" still seems to be the standard by which they are judged, and it is absolutely wrong.

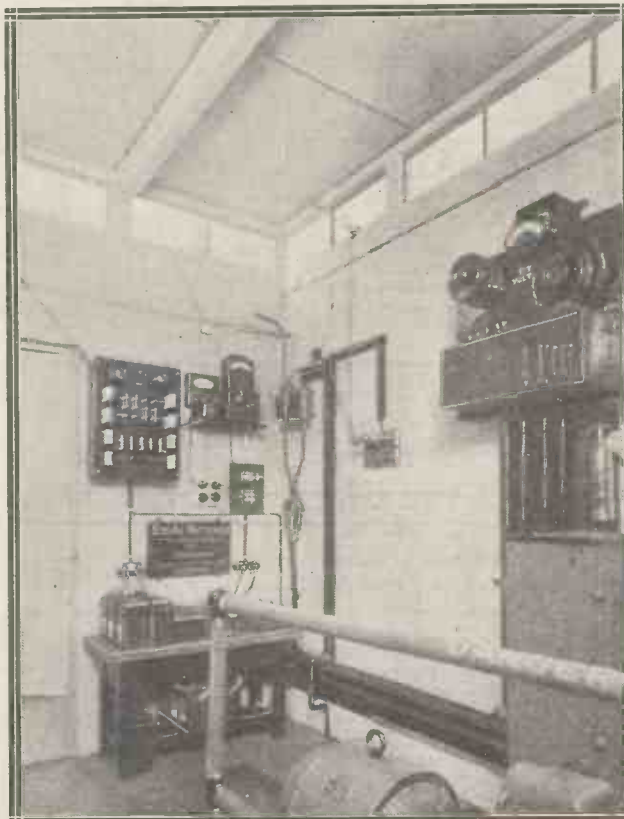
**Loudspeaker Results**

The receiver that is wanted is that one that will receive stations that are known to be "on the air," but which have not yet been heard here. There are plenty of them, and our receivers

are quite sensitive enough to find them if it were not for the eternal problem of background noise. I am convinced that this latter is going to be the limiting factor to the usefulness of short waves during the next few years.

The position, as I see it, is this: That, at the moment, a large, super-sensitive short-wave receiver will give excellent results on the better-known, more-powerful stations, whereas a small receiver—even a single detector valve—will be infinitely more useful for finding the really weak stations that are submerged in the background noise of the ether.

**FOR ROAD AND AIR TRAVELLERS**



The Automobile Association now serves the needs of both motorists and aviators, and has established this wireless station for the dissemination of weather reports to its flying members.

When we find that we want a large receiver for powerful stations and a small one for weak stations, surely it is time to get down to it and kill this background business as far as we can.

I am still looked upon as a crank (but a lucky crank) for my views upon single-valvers and the results I "somehow manage to get" with my own, but I am spending many hours on developing a larger receiver that will give real loudspeaker results without the introduction of more mush.

The lines I am working on at the moment are these. I am using an

untuned screened-grid stage with the filament voltage cut down; this gives no amplification, but certainly causes no loss, and makes the set infinitely nicer to handle. The detector is the part of the set that does all the work, and is as "hot" as I can make it by testing it out all on its own.

**Increased "Mush"**

The L.F. side uses resistance-coupling only, with the very best quality resistances and condensers I can get hold of, and carefully chosen valves. So low is the background level on the preliminary model that I don't think I have lost anything over the "single."

With transformer coupling, however, I can demonstrate to anyone who is interested that a signal that is very, very weak on one valve disappears completely when the transformer-coupled stage is added, just because the signal goes up by some 400 per cent, while the mush goes up to the tune of 600 or even 700 per cent. Under these conditions the signal is just "submerged," on going back to the single-valver it is found again without any trouble.

**"Band-Spreading"**

Here is an idea that is well worth trying out by those who are interested only in short-wave broadcasting. Note where each of the broadcast bands comes on your tuning condenser. Probably, in an average case, with the "middle-size" coil in use, the 32-metre band will be down near the bottom, and the 49-metre band either at the middle of the dial or somewhere near the top.

The idea is to arrange so that a separate coil is used for each band, the band itself being arranged to come right at the bottom end of the tuning scale. Take your "30 to 50" coil, for instance, and put on one or two more turns so that the lowest of the 32-metre broadcasters is right at the very zero end of your tuning scale.

**More Turns**

Now make another coil, on similar lines but with more turns, so that the 49-metre band can be brought right down to the bottom end. Do the same with the 25-metre and, perhaps, the





19-metre bands, until you find that each well-known group of stations occupies only a few degrees right at the bottom of the dial.

Next step—either pull your condenser to pieces and remove several plates, or insert a very small fixed condenser in series with it, so that each band spreads out and occupies most of the dial.

All the foregoing, for the benefit of the less expert, is a long-winded way of telling you to use a very small tuning condenser and to cut your coils exactly to the broadcast bands. The above is the easiest way I can think of for achieving that object.

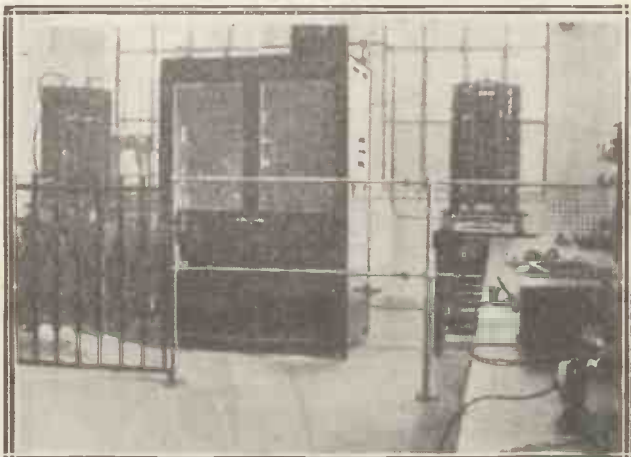
**Eliminating Morse**

Now consider the advantages. First, tuning is childishly simple. Secondly, signal strength should be greatly improved, since you are using the highest practicable ratio of inductance to capacity—always worth while. Thirdly, you can demonstrate your set to friends without being told that “these short waves are all Morse.” With luck you won’t have any Morse stations in evidence at all.

Someone ought to produce a commercial short-wave set on these lines.

When one considers that the 32- and 49-metre bands are infinitely farther apart than the two broadcast bands (250-550 and 900-2,000 metres), it hardly seems logical to attempt to

**A SHIP-TO-SHORE INSTALLATION**



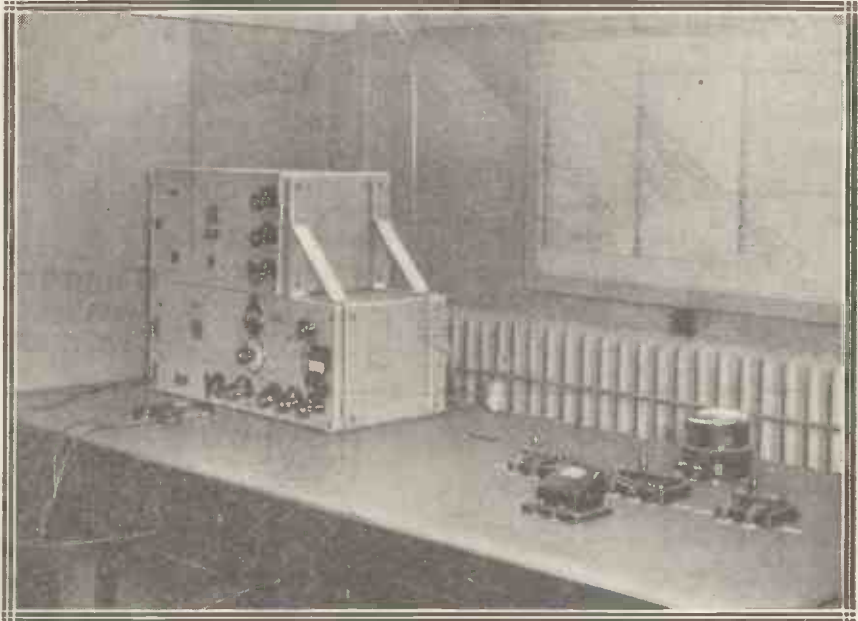
A modern coastal wireless station for communicating with ships at sea. It is a 3-kw. installation and was built by the Marconi Wireless Telegraph Co. for a new Greek station near Athens.

cover them on one swing of a condenser.

A broadcast receiver with a similar tuning range to that of the average short-waver—5,000 kc. or more on one coil—would tune from 60 metres

it was first formed in the days when it was a distinction to own the most elementary kind of radio (sorry, “wireless”!) apparatus. It has always been a body catering for the more advanced experimenter, and,

**AN AID TO INTERNATIONAL POLICE CO-OPERATION**



A special short-wave receiver installed at police headquarters in Berlin. The set is permanently tuned to a Hungarian transmitter, so messages can, therefore, be sent without any delay from one country to the other, and thus ensure the apprehension of criminals attempting to escape across the border.

to 300,000 metres on a single coil. Just imagine picking out the two broadcast bands on that.

**A Short-Wave Club**

I have come to the conclusion that we need a Short-Wave Club in this country. I mean an organisation for the benefit of short-wave listeners who treat the whole business as a pastime rather than a scientific pursuit. The

Radio Society of Great Britain, by a kind of mutual consent, settled down into a Transmitters’ Society, just as the National Radio Societies of several other countries have done, and there now seems to be a crying need for some sort of club for the less advanced people.

It was quite natural, I suppose, for the R.S.G.B. to develop into a society for the transmitter, since

naturally, when radio became universal, the advanced spirits took up transmission, which is the most difficult part of the game.

If anyone has any ideas about the formation of a society or club for short-wave enthusiasts only, I wish they would get into touch with me, via MODERN WIRELESS.

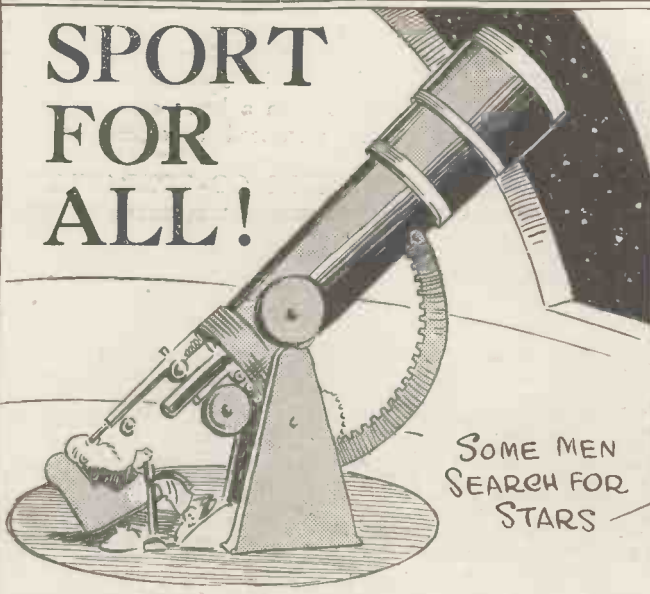
I am thinking, of course, of a real society that can hold meetings, rather than one that holds its members together only through the post or by means of a published journal.

**“DIODION” DELIGHT**  
*A Reader’s Experience*

Sir,—Thank you for such a fine set as the “Diodion,” it is ultra-selective, as you claim. London stations cut out within one degree; very good for my particular district. A friend also was surprised at it, although he possesses a well-boosted set. Wishing you success in your future publications.

Yours truly,  
P. A. GILBERT.  
Upper Clapton, E.5.

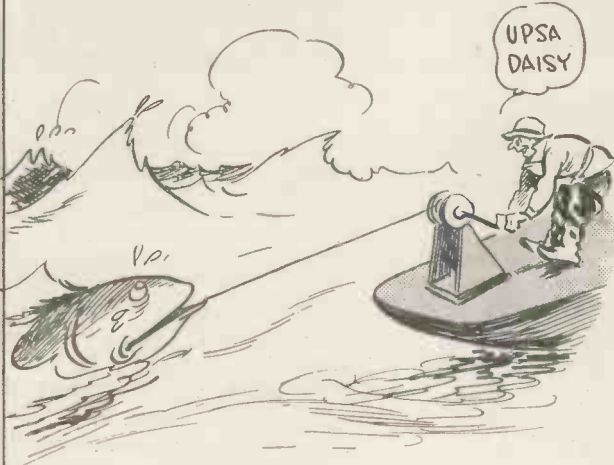
# SPORT FOR ALL!



SOME MEN SEARCH FOR STARS



OTHERS PURSUE BUTTERFLIES-



THERE ARE SPORTSMEN WHO CAPTURE SEA MONSTERS



SOME "SHOOT" BIG GAME -



- OTHERS MISS SMALL GAME

BUT ONE OF THE MOST FASCINATING SPORTS IN WORLD IS STATION HUNTING ON THE "MU-TONE"



TEN SHAW -

# A RADIO RECKONER

By *the late* W.A. Barclay M.A.



*The chief function of the valve is that of amplification, and the two N-diagrams given this month will be found useful in exhibiting the relation of mutual conductance to the various grid-volts and anode-current changes when a valve is operated with fixed anode potential.*

THOSE readers of MODERN WIRELESS who have been following this series will remember that in the issues of July and August last we considered—in a very general way—some aspects of the ordinary triode valve. It was shown then that the process of amplification is more concerned with the *variations* in the voltages and currents in the valve than with the *mean* or average values, though, of course, these average values must be approximately correct if the valve is to work properly.

## Correct Working Voltages

Naturally, each valve has its own particular working values of voltage and current, and these are usually specified by the makers. What we have to do in designing a receiver is to ensure as far as possible that the prescribed voltages will, in fact, be effective at the points where they are required.

It will not do, for example, to arrange a stage of resistance amplification using a valve for which the anode voltage specified is 100, and expect to get results when the H.T. battery employed has exactly 100 volts. The reason, of course, is that the anode is not connected directly to the positive terminal of the H.T. supply, but indirectly by means of the coupling resistance,

The anode current accordingly must pass through this resistance in its progress round the circuit, thereby setting up a "potential drop" across it.

## Controlling Electrons

This will effectively lower the working voltage on the anode—in some cases so much so as to put the valve entirely out of action. The obvious remedy is to use an H.T. supply large enough to ensure that the correct working voltage is applied to the anode, despite the inevitable "drop" which takes place in the anode resistance.

Most wireless "fans" at this time of day know that the function of the "grid" in a radio valve is to control the rate of flow of the electrons (or current) in their passage from the filament to the anode. The explanation of its action is simple. The electrons—those small particles of

negative electricity—boil up and evaporate from the hot filament very much like the steam from a kettle. Being negatively charged, they are immediately attracted by the positive anode, and this is why the anode must be kept at a positive potential.

But, being electrons, and all of one pattern, so to speak, they quarrel *en route*. Like charges, as we know, repel each other, and the electrons prove their unsociability by making it as difficult as possible for those that follow to leave the neighbourhood of the filament.

## Where the Grid Comes In

In this way the passage of current is obstructed—and here is where the grid comes in. If the grid is made to assume a small positive potential, this will form a new source of attraction for the negative particles, overcoming their natural quarrelsomeness to a certain extent, and expediting the flow of current. Indeed, some of the electrons will actually go to the grid, thus causing "grid current" to flow.

On the other hand, by making the grid slightly negative, we can damp down the electron flow to any desired extent; a large negative potential will cause the electronic current to cease entirely. Although the filament continues to "boil up" the

### WILLIAM ANDREW BARCLAY, M.A.

*The Editor deeply regrets to announce the end of this series of articles this month owing to the death of the author, William Andrew Barclay, M.A., late Lieut., R.G.A. His knowledge of computational principles was profound, but unknown to us his articles had been written under serious disabilities resulting from active service in France. Despite this handicap his gift of exposition had made them one of the most widely appreciated features of radio journalism.*

## Anode Potential Under Working Conditions

electrons, none—or very few indeed—can get away.

The actual amount of current flowing in the valve (or electron stream) thus depends primarily upon the attractive forces of the grid and the anode, which is merely another way of referring to the voltages at these two points. We have seen in previous instalments that quite a small voltage change at the grid will have the same effect on the current passing as a much greater voltage change on the anode, and this important property of the valve is made use of in amplifying radio signals. Such signals are applied as small voltage variations to the grid, which is thus sometimes called the "control grid" in order to distinguish it in some valves from the "screen grid," which has quite different functions.

### Not Easy to Compare

It is thus of importance to know precisely how much change in the current flow will result from a given amount of voltage variation on the control grid. Unfortunately, it is not easy to compare different valves in this respect, since even as regards a single valve the current change resulting from a given grid voltage change is by no means a constant quantity, but depends upon working conditions. A little reflection will show that when the grid is made sufficiently negative, a small change in the actual potential value will have little or no effect upon the very small anode current flowing under such conditions. On the other hand, in the neighbourhood of zero grid potential (i.e. when the grid and filament have approximately the same potential), a similar small change in the grid voltage may result in quite a considerable change in the rate of electron flow in the valve. (In all this, of course, we are assuming that the anode is held at a suitable positive potential.)

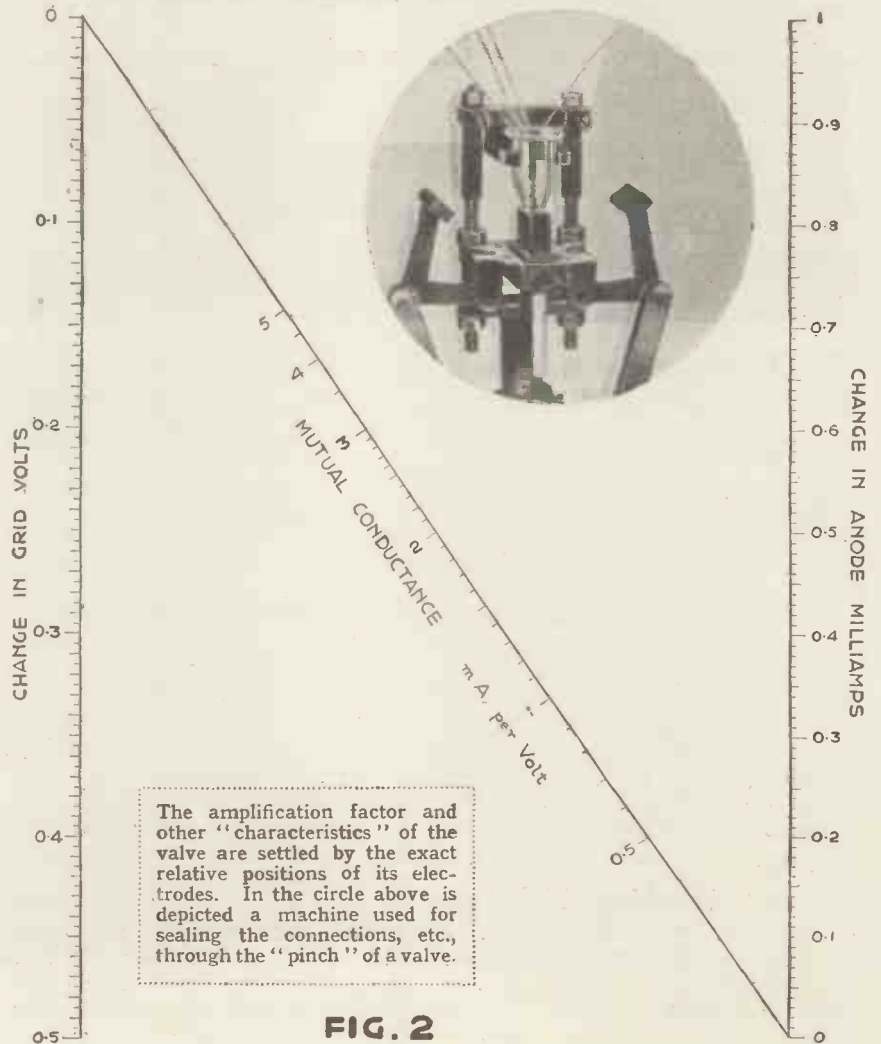
### A Variable Quantity

The amount of this ratio between the change of current flow and the change of grid voltage causing it is termed, somewhat clumsily, the "mutual conductance" of the valve, and is measured, naturally, in "milliamps. change per grid volts change," or simply "milliamps. per volt." As we have just seen, the mutual conductance of any valve is a variable

quantity, and its actual amount will alter with the potential conditions on the grid and anode. For this reason manufacturers often quote values of mutual conductance taken under so-called "standard conditions." Thus we may find the mutual conductance of a valve quoted as "2 milliamps. per

be very different from those indicated by the mutual conductance figure. The reason for the discrepancy will be found if we look carefully at the anode voltage value under working conditions. In giving a figure for mutual conductance, the makers assume that the anode potential is kept at a certain

### WHAT IS THE MUTUAL CONDUCTANCE?



The amplification factor and other "characteristics" of the valve are settled by the exact relative positions of its electrodes. In the circle above is depicted a machine used for sealing the connections, etc., through the "pinch" of a valve.

FIG. 2

### N - DIAGRAM

By laying a ruler across the scales at any two of the factors which are known, the third factor can be determined at a glance.

volt" taken under the standard conditions of, say, zero grid volts and 100 positive anode volts. This means, of course, that when the grid and anode have approximately these voltage values, a change of 1 volt on the grid will cause a change of 2 milliamps. in the current flow.

When, however, the valve is connected up as a working amplifier, the actual changes in anode current may

fixed amount, which is usually specified. Very often, however, the mean anode potential differs considerably from this prescribed amount, and hence the quoted value of mutual conductance will not be attained. Furthermore, under normal working conditions the anode potential is not fixed as we have assumed above. It, too, varies with the signals received; and this, again, prevents the "ideal"





*Mobile Recorders—Fun at Monte Carlo—  
“Jack” Makes a Record.*

*By “TONE-ARM.”*

**F**EW people, I think, have any idea of the tremendous trouble that is taken by the gramophone recording engineers to “fix” artistes on their discs. Mobile recording outfits are always at work, and in some cases artistes are followed all over the country, and even the Continent, in order that their voices or instruments shall be recorded.

**An Amusing Story**

In connection with this there is an amusing story concerning the way in which Jack Hulbert recorded the two “hits” from “Jack’s the Boy” — “The Flies Crawl Up the Window” and “I Want to Cling to Ivy.”

A few weeks ago H.M.V. sent a recording unit over to Monte Carlo to make some records by Ambrose and his Orchestra, who were playing at the new Beach Casino. When Mr. W. L. Streeton, H.M.V.’s recording manager, was visiting the bathing-pool at Monte Carlo he recognised the rakish angle of a cap on the head of a sunbather.

**Temporary Studio**

Further investigation confirmed that its wearer was Cicely Courtneidge, whose husband, Jack Hulbert, “His Master’s Voice” he had been trying to locate for the past month in order that he might make records of the songs he sings in “Jack’s the Boy.” When he learnt that Jack was bathing, he rushed him out of the water, bundled him into Ambrose’s car, and took him to the Metropole Hotel, the foyer of which had been temporarily converted into a recording studio.

A band, hastily gathered from the musicians at the local casinos, learnt the accompaniments to “The Flies

“Crawl Up the Window,” and “I Want to Cling to Ivy” after Jack had improvised them on a piano. The spectators in the hotel were much amused to see Jack Hulbert record the hits from his latest film clad only in a bathing costume.

It is interesting to note that until these recordings were carried out Monaco was the only country in the world in which gramophone records had not been recorded, and that, owing to the great heat of the Riviera sun, the wax recording blanks had to be kept in an ice refrigerator instead of the hot cupboard in which they are stored in England to ensure that they are at the correct temperature for recording.

I have been testing one of the many

synchronous gramophone motors that have appeared on the market during the last eighteen months or so. It was not the first I had tried by any means, but it was one of the most interesting in its design, and I thought I would give it a good test.

The results go to prove what a very useful motor the synchronous type is, with certain limits. These limits vary with the design of the motor, but the fact is that the power of this particular model is a little on the conservative side, so that should it have to rotate a very heavily modulated record, or one that is rather badly worn (a state of events that should never be if records are kept properly, for one nearly always gets sick of them before they reach the terribly worn state), it is inclined to slow down, with disastrous results to the reproduction.

**No Gearing**

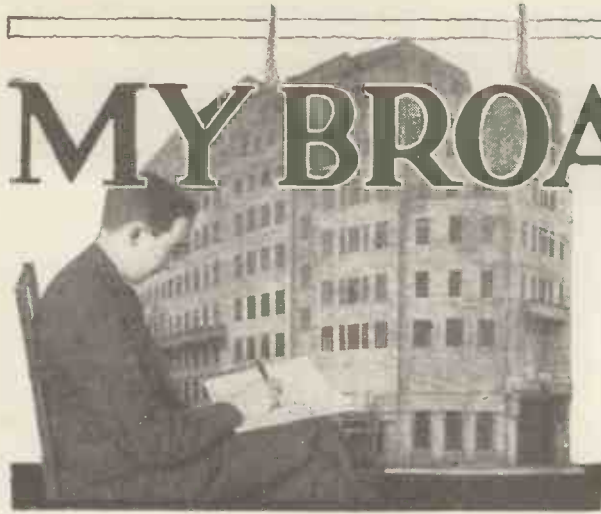
Obviously the synchronous motor has little energy stored up in the form of fast rotation and gearing, i.e. in inertia, as it revolves at the correct speed all the time, and except for the pull of the magnets on the phonic wheel it has no stand-by energy from which it can draw when confronted with a bit of extra stiff work.

In most cases the pull is adequate, and the motor will steadily revolve at 78 revolutions per minute till further orders; but if you are thinking of buying one of this type of motor, make sure that you have it thoroughly tested before completing the purchase.

**TELLING THE WORLD ON TOUR**



The attractive display arranged by Lotus for the radio convoy which recently toured part of England in connection with the Northern National Radio Exhibition.



# MY BROADCASTING DIARY

*Our Own Broadcasting Correspondent keeps a critical eye on the affairs of the B.B.C., and each month, for the benefit of listeners, comments frankly and impartially on the policies and personalities controlling British broadcasting.*

## *Regional Music*

**A**BOUT the time of the financial crisis last year the B.B.C. completed the demobilisation of the last of its fully constituted Regional orchestras, replacing them by nonettes, which were to play only the music adapted to their capacity. Incidentally, the introduction of nonettes was an idea originated by Captain Eckersley as far back as 1925, it being his opinion that the best music reproduction for broadcasting came from the smaller combinations of instruments.

In the year in which the nonettes have replaced the orchestra at the Regional centres there has been a chance to test the public view of the matter. There is evidence of cleavage of opinion, but I would say that most listeners regret the disappearance of the Regional orchestras, and it would not surprise me to see them restored at the beginning of 1934.

## *A Newspaper Man for the Board?*

It seems pretty well established that there will be at least one, and possibly two, changes in the personnel of the B.B.C. Board before the end of the year.

Well-informed students of broadcasting are anxious that an experienced newspaper man should be one of the new Governors. It would be necessary, of course, for him to be free of newspaper responsibility. This limitation would appear to handicap the candidature of Sir Robert Donald, who is now actively engaged in journalism.

Amongst those Fleet Street personalities who have retired, but are still able to work, are Lord Burnham and Mr. R. D. Blumenfeld, both of whom, it is believed, might be induced to accept Governorships of the B.B.C. It is believed that Lady Snowden will be persuaded to continue on the Board.

## *B.B.C. and the Salt Union*

The decision of the B.B.C. to move Daventry to Droitwich has brought in its train at least one unique problem. The site regarded as the best happened to be on land in which the Salt Union has acquired perpetual rights to bore for saline products.

Thus the B.B.C. had to cover itself as against the rights of the Salt Union. But this was not all.

Even if the Salt Union could be "squared" so far as the B.B.C. property is concerned, there remains the further problem that the proximity of salt boring operations might create subsidence with corresponding serious danger to the transmitter. There has been a good deal of

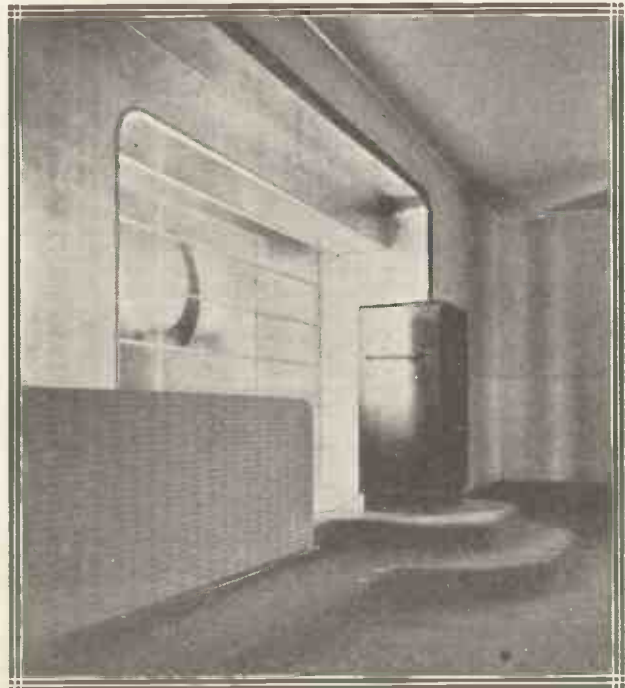
delicate negotiation, but I understand that an agreement has been reached and the work begun.

## *North Wales and Watchet*

Tests, official and unofficial, have revealed the hard truth that the new West Regional station at Watchet will not provide an adequate signal in North Wales. This is a great disappointment.

It means that North Wales will have to rely for the bulk of its broadcasting on Daventry 5 X X and Moor-side Edge. Fortunately, however, the transfer of Daventry to Droitwich, and the simultaneous substantial increase in the power and efficiency of the new 5 X X, will greatly improve the service from those aerials to North Wales.

## HEARD AT HEADQUARTERS



This modernistic interior shows what is known as "Press Listening Hall No. 1" at Broadcasting House, and as its name implies it is where the B.B.C. welcomes its critics of the Press to hear the programmes at first hand

## Candid Comments on Radio Topics of To-day

Also, certain recent experiments in the alignment of the aerials of Moorside Edge have given it a wider reach in the mountainous areas of the West. Taking these two facts together, there is some mitigation of the disappointment with Watchet. Then there is a further point, that North Wales culturally has very little in common with South Wales, which will continue to dominate the Welsh part of the West Regional programme.

I understand, indeed, that the genuine North Welshman has the same contempt for the Cardiff Welshman as the genuine Highlander has for the Glaswegian. Thus, if the new Daventry and Moorside Edge between them can somehow put on a fair proportion of programmes acceptable in North Wales, this will go a long way to solving the Welsh problem of the B.B.C.

### Filling the Gap

Some time ago I heard that the B.B.C. was considering bringing back the piano interlude to fill up programme gaps, long or short. I hear that the proposal has been debated at great length and in the end turned down.

On the other hand, the decision to keep something on the air between three and four in the afternoon, a period usually empty, is a definite step in the right direction. The B.B.C. should realise that in the long run it will have to keep something on the air from early morning until midnight, not only because of foreign competition and comparison, but also because of the importance of helping the trade from the demonstration end.

I do not advocate the rather monotonous slickness of the American practice, but I think we are in danger of being over-casual.

### The Real Birthday of the B.B.C.

The B.B.C. has lavished much money and attention

on the special programmes of the Birthday Week, beginning Sunday, November 13th. From what I know of the plans, it will be the best balanced and most distinguished programme effort of the decade, the end of which it celebrates.

But, curiously enough, the real birthday of the B.B.C. is not in that week at all. The real birthday is the day on which the first General Manager began to draw his pay.

That, of course, was Mr. J. C. W. Reith, now Sir John, who went on the pay roll on December 20th, 1922, although he did not begin work in the office until December 28th. I dare say he was working outside. I hope it is true that Sir John is to receive a further honour in the New Year's list.

### Political Broadcasting

In justifying the broadcasts of retiring Ministers and the replies of the Government recently, the B.B.C. advanced the plea that it was being guided by parliamentary precedent. It is the custom in the House of Commons to invite retiring Ministers to give personal explanations, and for the Government to reply in the same personal way, avoiding larger issues or the intervention of the Opposition.

It might be a good idea, and there is much to be said for it, that the B.B.C. makes it a regular rule to observe

parliamentary precedent of this description. It would put an end to a good deal of the difficulty which has been encountered in the past in trying to get the various Party Whips to agree to any scheme of political broadcasting.

Of course, the fact that Mr. Whitley, the present Chairman of the B.B.C., is an ex-Speaker of the Commons is very fortunate for the B.B.C. in applying under him any such idea.

## Superlative Sam

By JESTER.

**S**OME fooling of the Fairies at his birth  
Made Sam the most conceited soul on earth.  
He sees in all his fellow-men have wrought,  
Only an ill-done deed, a task ill-taught.  
He gilds the lily, paints the darkness black,  
And loads the last straw on the camel's back.  
Hence, when to wireless he turned aside,  
Men looked to see the Science glorified.

**A**ND it was so! With crystals he began:  
Nor were such crystals since the Dawn of Man!  
Nothing but lion's-whiskers, used he on  
His Super-Platinated Hertzikon.  
From wondrous windings, tapped at each half turn,  
His Eiffel time-sigs. made his earphones burn.  
While others pulled in Poldhu he got Brest,  
And said he did it—"as a simple test."

**D**ISDAINING childish diodes, on he went  
To valves employing the third element.  
When valves were soft, Sam's were as hard as brick  
And took two hundred volts to do the trick.  
When eight-tube super-hets: were all the rage,  
Sam laughed, and hooked up just another stage.  
Then, when nine valves pleased The Fraternity,  
Sam laughed again—and built a Super Three!

**S**WIFT ran he through the gamut of The Game.  
(One-valve DX; D.F. with six-inch frame!)  
Always a step ahead of better men  
Who stayed to smoke and play each round again.  
Short-circuited his erstwhile eager zest,  
His Joules, once so kinetic, came to rest.  
His mind's H.T. dropped to a milli-volt;  
Sam, Alexander-like, had shot his bolt!

**T**HEREAFTER, to escape from the potage,  
He introduced the vogue of camouflage.  
We made our sets to look like household gear—  
A clock, tallboy or lacquered chiffonier.  
Our Sam, too clever for such tricks as these,  
Built his receivers in the living trees.  
But Nature beat him! Balmy in both lobes,  
He now pots bulbs—to propagate pentodes!

### BROADCASTING—

is a world force of incalculable significance to-day. Thinking people will keep abreast of its developments, and will watch its tendencies and implications. No other magazine can keep you in touch so surely and completely as does

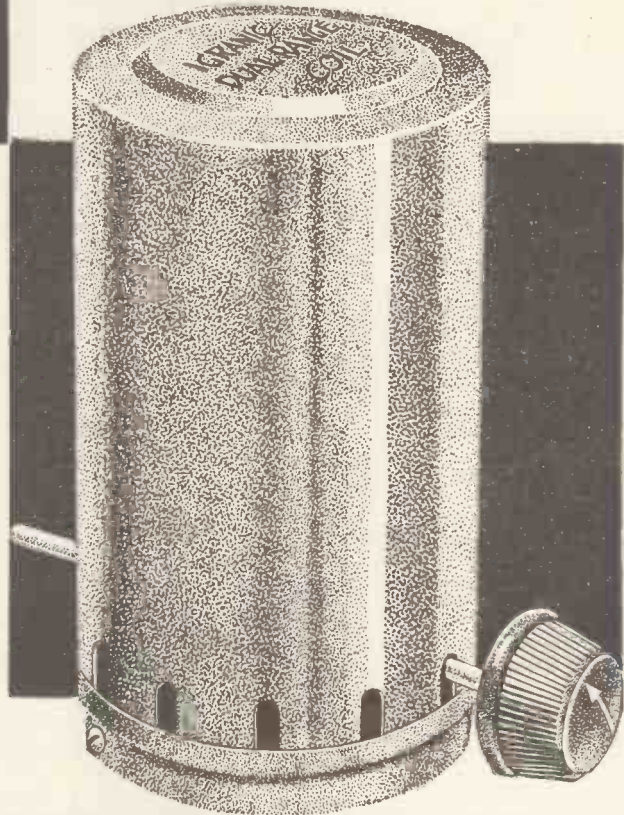
MODERN WIRELESS



# IGRANIC TUNING DEVICES

IGRANIC tuning devices—like all Igranic components—are built to the highest standards of efficiency and precision, as this new Dual-wave Coil exemplifies. These screened coils, with self-contained wave-change switch, have been designed to give maximum efficiency on the medium- and long-wave bands, covering a range of 200-500 metres and 1,000-2,000 metres when tuned with a .0005-mfd. variable condenser. A notable feature is the wave-change switch spindle, which protrudes on either side of the coil base, enabling any number of these coils to be ganged and operated by one movement. These coils are eminently suitable either for aerial tuning, with or without reaction, or intervalve coupling to S.G. or H.F. valves.

PRICE 12/6



**IGRANIC  
COMPONENTS WILL  
BE THE MAKING  
OF YOUR SET.**

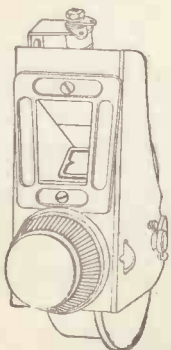
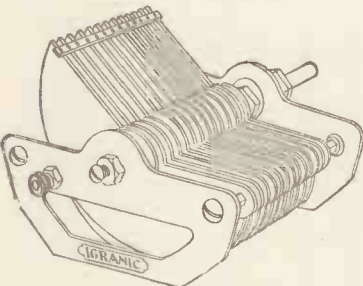
### SINGLE VARIABLE CONDENSER

Supplied in capacities .0003 mfd. and .0005 mfd. Designed on the mid-log law principle to ensure a better and more equal separation of frequencies over the tuning scale. One-hole fixing,  $\frac{1}{4}$  in. diameter spindle. PRICE. .0003 mfd., 5/3  
.0005 mfd., 5/6

### SLOW MOTION DRUM DIAL

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**SEND FOR THE 1932 CATALOGUE**





# MAKING SIMPLE MEASUREMENTS

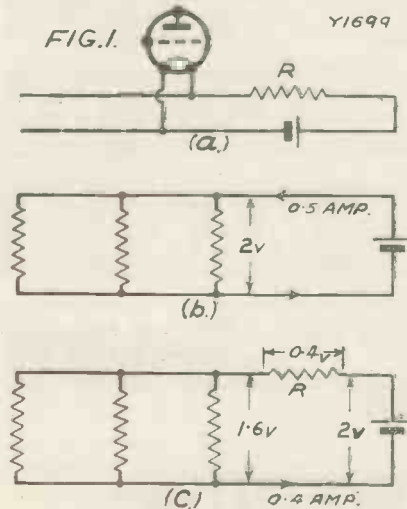
**I**N testing out a set the other day I had occasion to connect a low-reading voltmeter across the filament switch, and found that it registered 0.4 volt. I wonder how many readers could tell me what that indicated?

Had I coupled the meter directly across the valve filaments I would have found the reading down to 1.6 volts, instead of 2—the voltage of the accumulator. In other words, there was a “drop” of 0.4 volt in the switch as a result of bad contact, and the performance of the set suffered badly in consequence. Thus we can represent the switch as a resistance *R*, as shown in Fig. 1 (a) and (c); in (b) the full 2 volts exist across the three filaments.

## A Well-Known Principle

This “drop test” is used very often in electrical work to detect faulty contacts or connections. It depends on the well-known Ohm's Law principle—that a resistance always *absorbs* volts when we send a current through it. That is, if the current is *C* amperes, and the resistance *R* ohms, the drop  $V = C \times$

### LOST VOLTS



*R* in (a) and (c) represents the lost voltage across the defective switch referred to above.

There is any amount of interest to be had from measuring instruments, and this article shows how extremely useful they can be in improving reception.  
By HANDEL REES.

*R* volts. If *R* is of much magnitude (i.e. if we have a “high resistance” connection or contact), a low-reading voltmeter will at once indicate this drop, as in the example just given.

Since  $V = C \times R$ , it follows at once that  $R = V/C$  and  $C = V/R$ ; so that, knowing any two of these quantities, we can easily find the other. For example, to find the

## CHECKING THE VOLTAGE



This shows how a grid-bias battery and a resistance can be connected to a milliammeter for measuring the D.C. resistance of a choke or transformer coil.

resistance of a valve filament taking a current of 0.1 ampere at 2 volts, we have:  $R = V/C = 2/0.1 = 20$  ohms. Again, suppose we connected a 50,000-ohm potentiometer resistance across an H.T. supply at 200 volts, the current will be  $V/R$ , or  $200/50,000 = .004$  ampere, i.e. 4 milliamps.

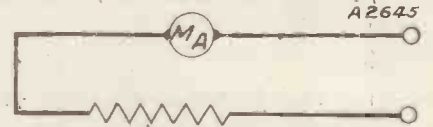
## Safeguarding the Meter

Now let us see what can be done with these simple relations. You want to use the expression  $R = V/C$  to find the D.C. resistance of, say, a choke or transformer coil. If we apply a known voltage and measure the current we have all the data required. An ordinary grid-bias battery will serve to give us quite a range of voltages, while the current can be measured by putting a milliammeter in circuit, as shown in

Fig. 2, the readings being converted to amperes by dividing by 1,000.

But we must take care not to apply a voltage that will knock the meter needle right over the scale. A resistance *R* should be included in the instrument circuit of sufficient value to limit the current to the maximum scale range whatever the value of the resistance to be measured. Again, the value of *R* can be decided by Ohm's Law. Thus if the maximum

## ALTERING THE RANGE



The range of voltage that can be measured depends on the resistance used—in this case 100,000 ohms.

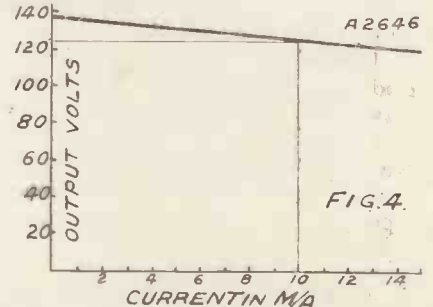
scale reading is 10 m.a., then for a testing voltage of 1.5, *R* must be  $1.5/.01 = 150$  ohms. This will protect the instrument against damage when measuring low resistances, and, when necessary, the voltage can afterwards be carefully increased in steps of 1.5 volts at a time.

## Measuring Resistance

The value of *R* must, of course, be *subtracted* from the final result. For instance, if the reading obtained with a particular coil to be measured is, say, 3 m.a. (.003 amp.), the total resistance is  $1.5 \text{ volts} \div .003 = 500$  ohms; but since this includes *R*, the actual resistance of the coil is  $500 - 150 = 350$  ohms.

(Continued on page 515.)

## THE REGULATION CURVE



When a regulation curve is supplied by the makers of a mains unit, the current flowing shows the actual voltage obtained. For 10 milliamps. this curve shows that the voltage obtained is just over 120.

# QUALITY



# DETECTORS

ONE of the most promising features of the amateur radio movement is this continued striving for better and still better reproduction.

Perfect realism may be an unattainable ideal, but while you feel that your reception can be still further improved, then you are on the right track for results worth having.

In designing a high-quality receiver one of the most uncertain factors is the detector stage, which can easily upset the whole performance. However excellent your L.F. amplifier, and however carefully your output valve may be matched to the speaker, your efforts will have been in vain if the detector cannot deliver the goods in the form of an undistorted L.F. signal.

The usual grid detector, properly handled, undoubtedly gives excellent results under certain conditions, but its high sensitivity is outweighed by its limitations. It easily overloads, producing unwanted harmonics, and heavily damps the input tuning circuit, while it cannot rectify a weak signal without distortion. The ideal detector should be sensitive, impossible to overload, and have negligible input damping.

## Power Grid Detection

Some interest has been shown in the so-called power grid detector, which is claimed to be a better rectifier for high-quality reception. As this requires very high H.T. voltage,

with a consequent large anode current, it is anything but economical.

There is also the difficulty of arranging a suitable L.F. coupling in view of the large anode current. The power grid detector is also not particularly sensitive, and smooth reaction control is not often easily obtained.

## Modified S.G. Detector

Another angle from which we can approach the problem is to specify

*"What an awful row!" That is the last criticism one would like to get of a set, because so much thought and experimenting goes to obtain quality. But too often, the L.F. and H.F. stages come in for all the attention, the detector being overlooked. Some good circuits for quality detectors are covered in this survey of the subject.*

By J. ENGLISH.

a reasonable H.F. input and a distortionless detector giving considerable L.F. amplification. From practical experience I can say that the only suitable detector scheme meeting these requirements is the R.C. coupled S.G. used as an anode detector.

This arrangement is a very close approach to the ideal detector for normal H.F. inputs, giving a considerable undistorted L.F. output. Reproduction is audibly clearer and more natural than that resulting when a grid detector is used, partly

due to the excellent rectification characteristic and partly to the absence of the iron-cored L.F. transformer.

Compared with the grid detector the input damping is marvellously small, so that you get adequate selectivity without elaborate tuning circuits. In addition the S.G. detector is economy itself, anode and screen currents being extremely low, while a super H.T. voltage is not necessary.

I have lately modified the original S.G. detector (see Fig. 1, and the article in the May number of MODERN WIRELESS), obtaining a further improvement in high-quality reproduction.

This has been achieved by using lower resistance values in the anode circuit and by more careful adjustment of screen volts. When this is done we get a very nearly perfect rectification characteristic for an anode-bend detector, the static curve obtained with one S.G. being shown in Fig. 1.

## Realistic Reproduction

Notice its sharp bottom bend, which means efficient rectification and how little curved is the rising part, which means almost ideal reproduction.

If the valve is biased somewhere about  $2\frac{1}{2}$  volts negative, it can accept without overloading quite an appreciable H.F. input, as much as you can get without an H.F. stage. When followed by a low-impedance

output valve (no intermediate L.F. stage is necessary) there is no noticeable frequency distortion, so that reproduction is exceptionally realistic, and at the high volume level necessary for adequate musical balance.

With some S.G. valves you may get better results with a slightly different resistance for  $R_3$ . Your particular S.G. may like a lower or even a higher screen voltage than it will get with a screen resistance of 2 megohms.

**Distortionless Rectifier**

A very useful component here is a low-capacity resistance variable between 0 and 3 or 5 megohms, as apart from enabling you to get the right value of  $R_3$  for any valve, it acts very nicely as a volume control when resistance is reduced. Increasing  $R_3$  above the optimum value reduces volume, but may introduce a little distortion at lower volume levels.

Now there is another type of detector, the diode, which is particularly suitable for high-quality receivers. Using only the grid and filament of the valve, we have a one-way conductor, like the crystal detector, which cannot be overloaded, and which is as near to the distortionless rectifier as we can get at present.

**Economical Scheme**

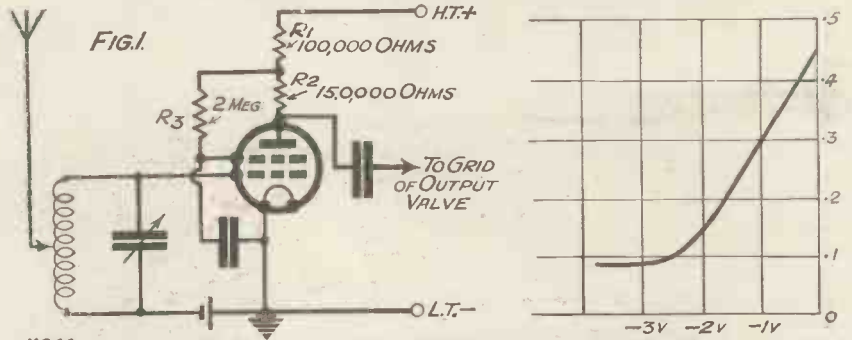
The snag about the diode, the first of all valve detectors, as we used to know it, was its insensitivity and its heavy damping of the input tuning circuit. This is no longer true now that we have available better valves and improved circuit design. In fact, there are several good reasons for making more use of diode detectors where realistic reproduction is the first consideration.

The grid detector itself is nothing more than a diode rectifier and an L.F. amplifier combined in one valve, and thus can never be better than a

compromise. Separate the two, however, and you can have the nearly perfect rectifier, the diode, plus a high-mag. distortion-free L.F. stage, neither upsetting the proper working of the other, as happens in the grid detector.

through the grid leak R, across which are developed corresponding L.F. voltage fluctuations, which are then available for amplification by following valves in the normal way. Notice that the grid condenser C prevents the rectified L.F. current from short-

**HOW A STEEP BEND CAN BE OBTAINED**



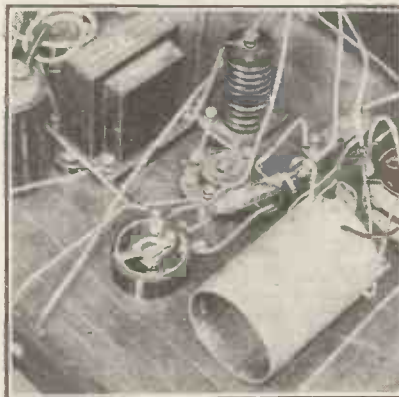
By the use of the resistance values shown and careful adjustment of screening-grid volts, a steep bend in the characteristic curve is obtained. This steep bend is very desirable for anode-bend detection.

A combination of this type which I find particularly attractive is a diode and resistance-coupled S.G. This certainly provides greater volume and far superior reproduction than the best grid detector.

circuiting to filament negative through the tuning coil.

One of the most ingenious and effective methods of coupling the diode to the following L.F. valve is the parallel direct coupling due to H. L. Kirke. Here, as in Fig. 2b, the diode grid is connected, via an H.F. filter, direct to the grid of the L.F. valve.

**VITAL COMPONENTS ALL**



The detector stage of a set is very important, and every component is vital, and care should be taken to get their values right.

It is also not an uneconomical scheme, the only H.T. current consumed is that taken by the S.G. valve, never more than a milliamp. or so, while almost any valve can be used as the diode.

**Ingenious Method**

The diode functions because as grid current only flows when the grid is made positive, the positive half-cycles of the H.F. signal produce a grid current which fluctuates exactly in sympathy with the L.F. modulations borne by the carrier-wave.

In the particular diode circuit of Fig. 2a, this grid current passes

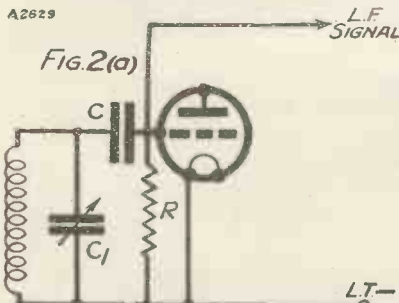
**Provision for Reaction**

The carrier-wave itself, when rectified, produces a steady current flow through R, and this develops just the right auto-bias for the L.F. valve for any L.F. input within its capacity.

As the H.F. input to the detector is no longer limited by the length of the straight portion of the anode current characteristic, as in the grid detector, you will appreciate that the diode can handle all the H.F. input you can give it without overloading.

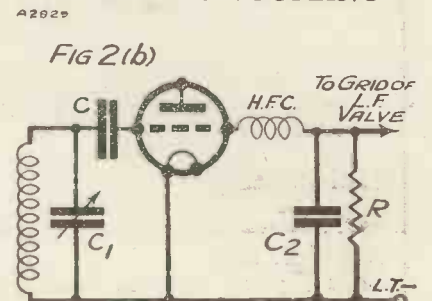
To return to the diode and S.G. combination in Fig. 3, a simple tuner is used with provision for reaction in the usual way. Even without reaction, selectivity is ample for

**A DIODE DETECTOR**



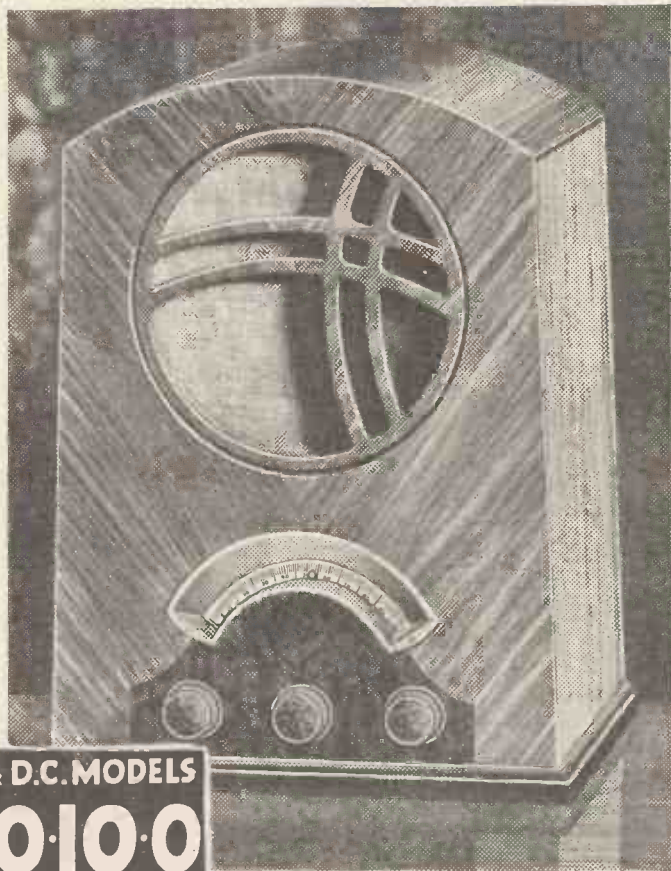
In this particular diode detector the L.F. fluctuating voltages are produced across the grid-leak R.

**INGENIOUS COUPLING**



What may be termed the parallel direct method of coupling is used here. It is a development due to H. L. Kirke.

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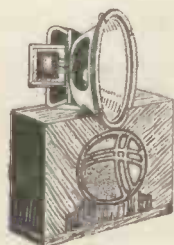
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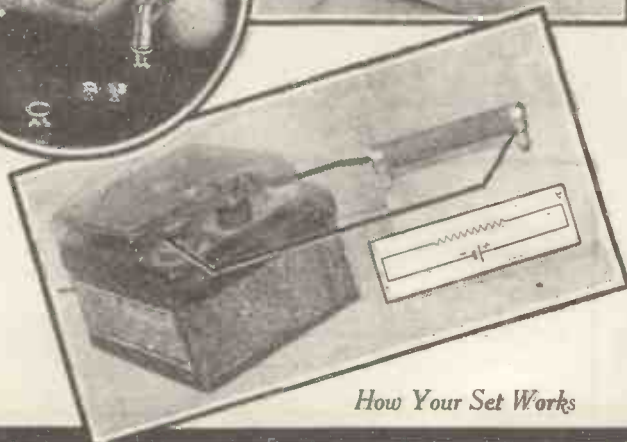
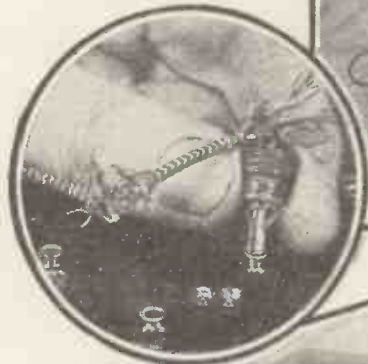
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## Using an S.G. L.F. with R.C. Coupling

entirely effective separation of two "locals" on a normal aerial.

Key components are the grid condenser  $C_1$ , which must be smaller than .0001 mfd.; the diode grid leak  $R_1$ , which should not exceed 1 megohm;

as a high-quality reproducer are to some extent lost.

During my experiments with this circuit I noticed that considerable reaction was required for full sensitivity. In fact, with the reaction control at zero, the loudspeaker output was likewise zero! The addition of capacity across diode anode and filament improved matters, but, curiously enough, disconnecting the anode entirely gave me just as much volume as before!

For local station work I myself dispense with reaction, as it adds nothing worth while either to volume or selectivity. With a small indoor aerial, some fifteen miles from the London transmitters, I find tuning with the simple circuit of

For instance, an ordinary L.F. valve, preferably R.C. coupled, can be used in the place of the S.G., this change being more suitable where you can get a large H.F. input.

Another extremely economical yet powerful circuit for similar conditions is obtained by coupling the diode direct to a pentode. This idea has much to recommend it, as, properly arranged, such a receiver will give you superlative results provided you get the right output coupling between pentode and speaker.

### Something Worth While

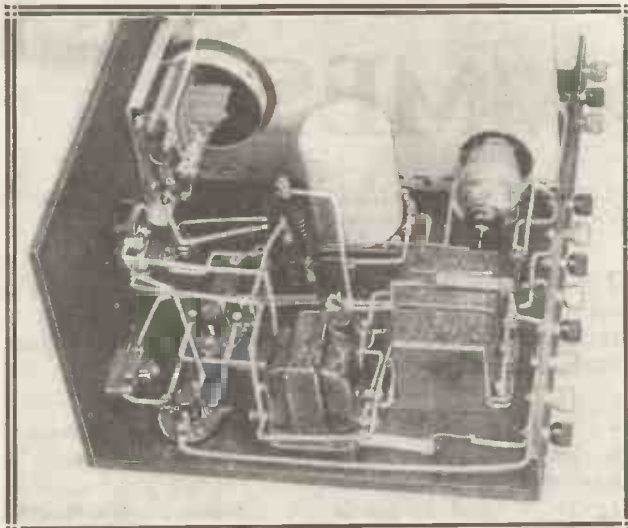
Again, if you use mains valves in any of these circuits you can be sure of achieving something really worth while both as regards clarity and balance of reproduction and wealth of volume.

### Reception Items

Konigswusterhausen usually broadcasts a concert of light music for breakfast-time entertainment, commencing at 5 a.m. (Does he?)

The Swiss regional station at Beromunster, which works on 479 metres under the name of "Schweizerischer Landessender," welcomes reports of reception. They should be addressed to Dr. Walter Gerber, Schweizerischer Landessender, Beromunster, Switzerland.

### "DIODION" USED DIODE DETECTION



The "Diodion," which was fully described in the September number of "Modern Wireless," employed a diode detector arranged on the lines of the Kirke scheme.

and the H.F. choke and by-pass condenser  $C_2$ .

This choke must be a really good one of low self-capacity, and it often pays to use two chokes in series here. The stray capacity to earth of all components associated with the diode grid should also be kept as small as possible.

As regards the S.G. amplifier itself, this differs only from the S.G. detector of Fig. 1 in the absence of the grid-bias battery and a lower value for the screen resistor  $R_3$ .

### Using a Pentode

Here again a variable component is the quickest way of finding the right resistance for an S.G. that does not take kindly to the resistance network of Fig. 3.

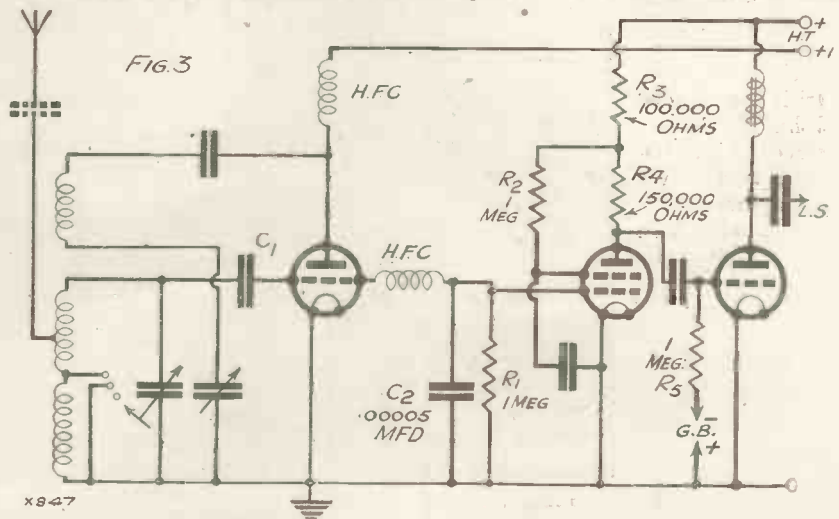
In performance, both volume and quality are very satisfying, the former being rather better than that provided by the straight S.G. detector of Fig. 1. The degree of selectivity obtainable is certainly far better than that of the normal grid detector under similar conditions.

Although the sensitivity of the combination is high, it is not quite the circuit one would use for receiving foreign stations, where its advantages

Fig. 3 (minus reaction) amply selective to separate both programmes, while going full out the output power is more than sufficient for the average size room.

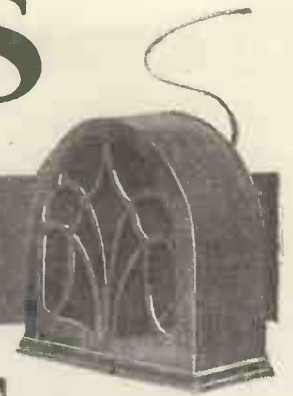
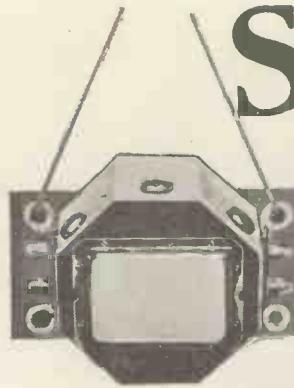
There are, of course, several modifications of Fig. 3, either of which may be more suitable to your needs than this particular arrangement.

### A THREE-VALVER FOR HIGH-QUALITY REPRODUCTION



The first valve works on the diode principle, but its anode is employed to enable reaction to be utilised. Following this detector is an S.G. L.F. stage resistance-coupled to the output valve.

# SPOTLIGHTS



# PROGRAMMES



*Murderesses of Vaudeville!—Personality for Programmes—About that Human Touch—Deported into Television.*

### Telling Him What's Watt!

WHOEVER would have thought that good, kind Mr. Watt, who provides for the listeners' lighter mood and produces those gay "Songs from the Shows," would have had the British Army up in arms against him?

Unfortunately for the Productions Department, a certain military gentleman by the name of Cannot who has tender memories of the days when music-halls were music-halls and legs were legs, accuses our friends Anona Winn and Garda Hall of "murdering" the reminiscences of the Gaiety.

\* \* \*

Though it is impossible to conceive of these charming ladies murdering anything, it is sad to realise that you cannot please everybody any of the time.

Up to now no critic has invaded John Watt's preserves with unkind words. We can appreciate his efforts to brighten the programmes, even if Cannot cannot (sorry!).

### About That Vaudeville

That big improvement you've noticed in the vaudeville programmes during October has been Lance Sieveking instilling "personality" into them. Or perhaps

you haven't noticed it—perhaps the crooners and comedians and the mimics and the ventriloquists have all seemed pretty much the same as usual? Too bad!

\* \* \*

Seriously, though, isn't it time something was done to improve vaudeville? As things are, a number of ill-assorted "turns" are strung together anyhow, with no thought for balance or correct mixing. Only the other day two "impressionists" were included in the same hour.

If Lance Sieveking really can do something to give the vaudeville programmes a complete personality, to make them a complete *table d'hôte* meal instead of a number of snacks at a sandwich counter, then he will

### THE THEATRE ORCHESTRA



"Our congratulations this month go to the B.B.C. Theatre Orchestra for all the entertainment they have given us in the past and for all we expect in the future."

have proved that he is good for other things besides producing "highbrow" monstrosities to terrify the ordinary, sane listener.

\* \* \*

And why not copy an idea from the North, announce all the "turns" at the beginning of the programme and let it go, non-stop? It's worth a trial, anyway.

### All This Sunday Business

Now that the B.B.C. has succeeded in providing far better Sunday programmes than those which are given from France by British advertisers, I hope it will not rest on its laurels.

There are other programmes from Radio-Paris besides those organised by film companies and Sunday newspapers, and those who listen to them must realise how they are exactly suited to the spirit of the one day in the week when almost all of us can listen during the afternoon and early evening.

\* \* \*

A programme of contemporary music by French composers was recently sandwiched between a "film fans' hour" and a "tea-time variety." All the music was light without being of the dance variety; marches, waltzes, and intermezzos were all represented.



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THE TIMES

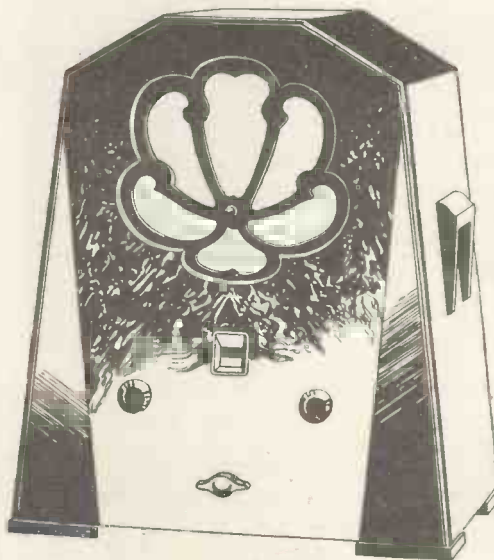
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WIRELESS MAGAZINE

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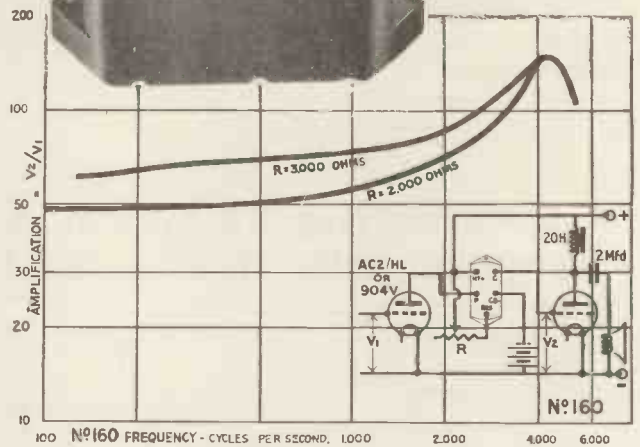
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## A New Home for the Contortionist

I suggest that the B.B.C. devotes an afternoon session every Sunday to the works of British composers, such as Percy Grainger, Victor Hely-Hutchinson, Charles Ancliffe, and the hundred and one other writers of light music.

### Hiking Through Europe

Mr. Charles Siepmann is certainly doing his best to make the Talks, for which he is responsible, one of the most entertaining parts of the programmes. I would rather hear a noisy dance band than a bad talk; but I prefer a good talk to much of the other so-called entertainment.

It certainly is a bright idea to send Vernon Bartlett hiking through Europe for our benefit; those "Consider Your Verdict" discussions are good fun (so much so that we probably don't realise in what good stead the experience may stand us one day!);

announcing or stage-management as part of the day's work and enjoyed the delightful speeches of apology and explanation which followed.

Now, when an announcer makes a mistake (did you hear "Weather will be westerly" in the news the other day?), or becomes informal for an instant, we make such a song and dance about it.

Still, there remains a little of the "public school spirit" in the B.B.C. Witness the schoolmasterly warning that the Post Office "mystery" vans were setting out and that those naughty "pirates" who owned up at once would escape a thrashing.

### New Use For Television

Those cheerful chatterers, the "Broadcasters" of the "Radio Times," continue to devote much of

listener, would be sure to meet with appreciation.

Incidentally, the ventriloquist in the vaudeville programme seems to have been superseded by the mimic. There has been a plethora of these gentlemen lately—some good, some bad, and all exactly the same as regards material.

*Verb. sap.*—or, at any rate, to the director of vaudeville!

### Our Thanks Are Due

While we listen to all the new and old stars in the programmes, do we ever spare a thought for the hard-working men who, unnoticed and unsung, make our entertainment go with a swing?

The Big Six, for example, who announce the same programmes day after day and manage to keep cheerful about it all.

Or, more especially, the B.B.C.

#### In the Programmes.

#### ANONA WINN

Although an all-British star, Anona Winn was born and bred in Sydney, Australia, and only came to England five years ago. After playing in musical comedy with George Graves and José Collins, she gave an audition at Savoy Hill in 1929. Since then she has broadcast 130 times—an average of nearly four appearances a month! She spends her spare time "doubling" for talkie stars who can't sing (this accounts for a lot of things!).

"I once visited Cardiff for a very special concert," says Anona Winn, "and found two microphones in the



studio. I sang my first song and half the second into the one indicated before the announcer found it was 'dead.' Still singing, I was pushed across the studio to the other microphone—and was then faded out as my time was up. So the 'special concert' came over to listeners as half a song!"

Anona Winn doesn't approve of studio audiences, as they tend to make a singer mix microphone technique with stage technique—with consequent disaster.

Her greatest success has been in John Watt's "Songs from the Shows," and she is appearing again in the new series now running.

and the new critics are well up to standard.

With memories of James Agate, E. M. Forster, George Allison, Dr. John Baker, M. Stephan and A. J. Alan (why not?), who can hold his hand to his heart and say that "talks on the wireless are as dull as ditch-water"?

### The Public School Spirit

"What has become of the Human Touch?" asks our old friend "Philemon" in the "Radio Times." That is what we should all like to know.

In the good old days—doesn't that make the listeners of 1922 feel grey-haired and rheumatically?—we took mechanical breakdowns, unforeseen intervals and general mistakes in

their weekly space to eulogies on Television as practised by the B.B.C. Pal the Sea Lion, Mary the Ape, and Micky Mouse-like shadowgrams have been some of the features of recent programmes, so future artistes will be in good company.

We venture to hope that in television may be found a place for all those incongruous items which are now mixed up with the vaudeville programmes.

Conjurers, jugglers, ventriloquists, girls who accompany their own singing on violins, delightful fellows who like to stand on their heads when playing the saxophone—all these might well be deported into studio BB, where their merits, lost on the "blind"

Theatre Orchestra, so ably directed by S. Kneale Kelley and Leslie Woodgate, whose work in numberless vaudeville hours has often been the best item of all.

So our congratulations go to the B.B.C. Theatre Orchestra for all the entertainment they have given us in the past and for all we expect in the future!

### A Spidery Tailpiece

I must spare a word of praise for Mr. Parker, who spoke last month on Spiders.

With commendable restraint he refrained from telling the story of the man from Aberdeen who had a craving for Yo-Yo and practised with a spider.

P. C.



# EDINBURGH'S BROADCASTING HOUSE

*With the coming of Scotland's Regional, Edinburgh has put her Broadcasting House in order, as explained here by*

*Our Special Correspondent.*

**L**AST week, finding the full-time Regional programme transmissions from Falkirk in full swing, I walked down from Princes Gardens to Queen Street, in Edinburgh, and called in at the Scottish Broadcasting House.

While Edinburgh was only a relay station and boasted of a 0.3-kw. relay transmitter they could not make full use of the three big studios in Edinburgh, and for a time there was severe criticism of the transference of the studio headquarters from Glasgow to the capital.

### *Urgently Needed*

Now Falkirk relies on Edinburgh for roughly 50 per cent of its Scottish Regional programmes; and as the new Westerglen transmitter is as big as Brookmans Park and Slaithwaite, the new studios are urgently needed.

The three Edinburgh studios provide part of the Scottish programmes, and the studios in the new (or, rather, rebuilt) Glasgow centre provide the other part.

### *Patriotic Pride*

I wanted to see how the Scottish studios compared with those in London, for, as a Scottish listener, I cannot help feeling a certain amount of patriotic pride in the way Mr. Cleghorn Thomson is keeping pace with his friends in the South.

Queen Street, I should explain, runs parallel with Princes Street, and is in a wonderfully central part of the city. There is no difficulty about

artistes getting to the studios. The Broadcasting House is the old Queen's Hall, at the east end of Queen Street. It looks like a large, grey city house, but it has been entirely redecorated inside.

### *Typically B.B.C.*

Directly I entered I felt that I was visiting London again.

Everything was so typically B.B.C. The entrance hall had been redecorated and was light oak. A commissioner interviewed me at the reception box on the left, but straight through down the hall I could see artistes busy in the ante-room of the main studio.

I remember the Queen's Hall before the B.B.C. took it over, and often went to concerts there. I asked the B.B.C. official whom I met how they had altered it for broadcasting, and

he invited me to come through and see for myself.

What a change! No wonder that since being back in Edinburgh I have heard some fine, resonant musical broadcasts. The main studio is, I should think, practically ideal.

The concert hall used to be rather cheerless and conventional. Now it is almost entirely covered with gay fabric. They have retained the stage and fitted up lights in the wings and on battens above, so that the artistes can be kept happy with gay lighting effects.

### *Just as Useful*

The ante-room, which I saw before entering the studio down the end of the hall, has been actually built into the hall, so that it cuts off a little of the space. That does not matter, as the floor area of the No. 1 studio is amply large enough for big orchestras; and our chief studio is really as useful

### WAITING IN COMFORT



This is one end of the main studio, with a glimpse of the very comfortable waiting-room as well.

# G.E.C. Radio

**SUPREMACY  
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## TWO MODELS OFFERING

## SUPERLATIVE QUALITY

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**ABSOLUTE  
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All-Electric  
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(For A.C. Mains)

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and Royalty  
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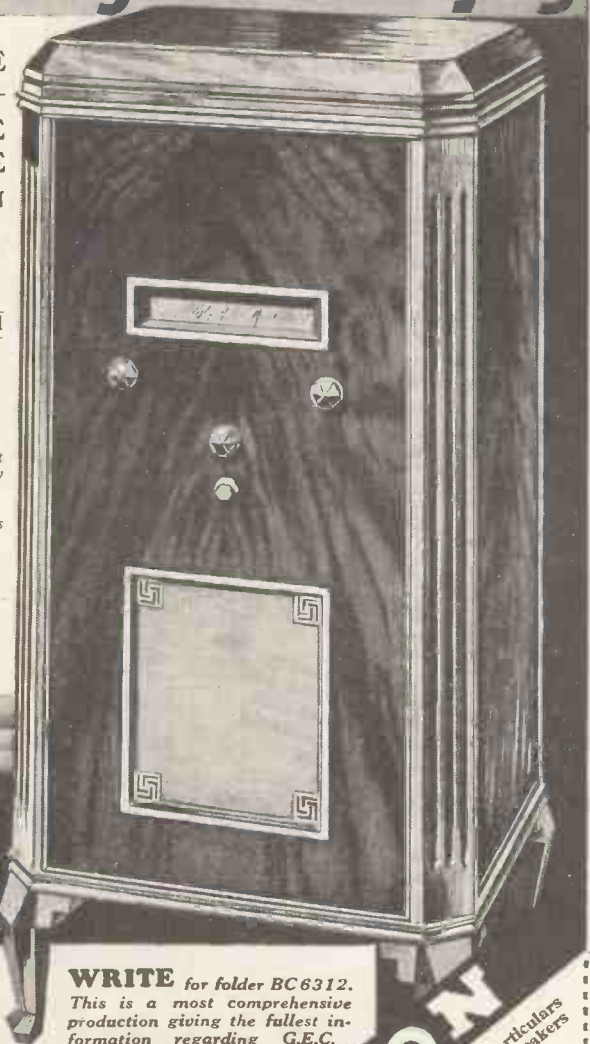
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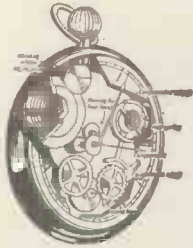
M.W.

Cut out and paste on a postcard, or  
enclose in unsealed envelope, 1d. postage.

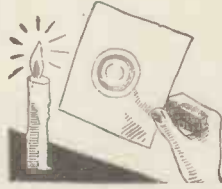
### BETTER RADIO FOR THE DISCRIMINATING LISTENER

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10,000 Things a Child Should Know!



A watch is worked by its main spring, which keeps all the wheels going, while the escapement prevents them from moving too fast.



You can prove that the whole of a candle is not alight by holding a sheet of paper in the flame. The unburnt part of the flame leaves the paper white.



A man's load on the Earth



The same man's load on the Moon

Work would be easy on the Moon, for we could all carry six times as much as we do now.



Why does the salt sprinkled on this whirling top fly off? It is hurled off by centrifugal force.

# THE WORLD OF WONDER

The greatest book of popular science and general knowledge ever published. Written in simple language, illustrated with the most remarkable collection of explanatory drawings, photographs and pictures ever brought together.

## 6<sup>d</sup> Weekly Parts

### PART 1

On Sale Thurs., Nov. 3rd

No intelligent child who glances inside Part 1 of this unique work will be able to resist its fascination. There are long articles and short articles, paragraphs, pictures and diagrams in profusion. Things to make at home, experiments which can be done with just the ordinary things of everyday life and without spending a penny.

It explains the why and wherefore of such familiar phenomena as the thunderstorm, the rainbow, the daily tides at the seaside, the regular succession of day and night, the procession of the seasons, and a thousand other things that are known to all but understood by few.

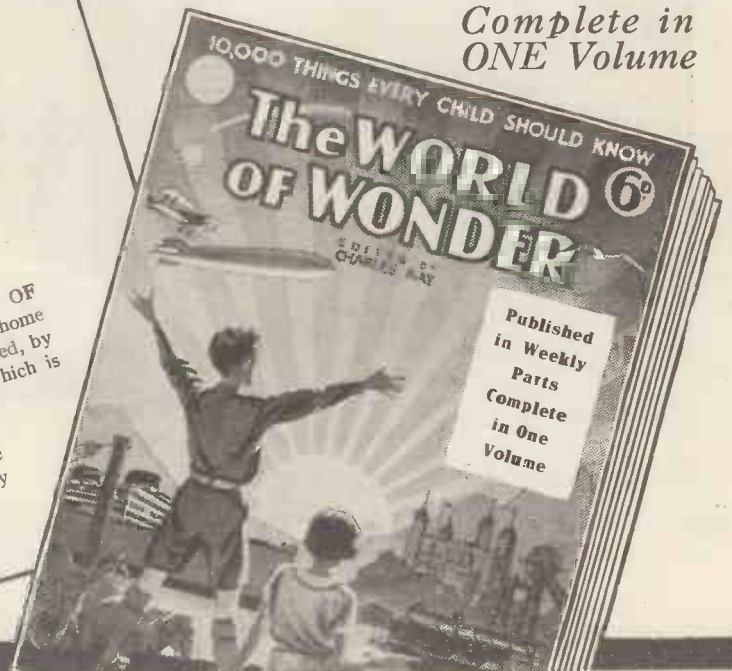
It explains how man has tamed the powers of nature, and how the many marvellous machines which he has invented are made to work. It shows the marvels of the plant and animal world; the wonders of geography and geology are explained in new and striking ways. The illustrations are wonderful. The collection of carefully worked-out diagrams and explanatory drawings, many of them full pages or double pages, is absolutely unique.

A few of the thousands of things that are explained in THE WORLD OF WONDER

- Marvels of Machinery
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- Simple Experiments with Air
- Simple Experiments with Candles
- How Earthquakes are Caused
- Why Volcanoes Erupt
- The Mystery of the Waves
- Why Kites Fly
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- Secrets of the Stars
- Different Kinds of Roots
- Optical Illusions
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The weekly parts of THE WORLD OF WONDER can be bound up at home simply and neatly as they are issued, by means of a special Self-Binder which is offered to subscribers at a very low cost. Alternatively, the complete set of parts can be bound in the ordinary way when the work is complete.

Complete in ONE Volume



as the London Broadcasting House concert hall, although not so long.

The general colour impression is of deep gold. They told me that behind the thick fabric were layers of felt, and that the roof, too, had been acoustically treated.

I like the high-domed effect. This studio seems higher than any in London.

We went out of the entrance hall again and up to the first floor. Through a little door we went to one of the galleries, which have been fitted up with chairs of the cinema variety for an audience. There is no need to have the studio audience on the same floor level as the artistes.

### *Specially Woven*

Perhaps you remember the small meeting hall in the Queen's Hall. This is now called the No. 2 studio. It is panelled with material which has been specially woven for the B.B.C. by the Edinburgh weavers. This room reminded me of one of the old Edinburgh studios. It used to be hung with gay floral curtains;

### AS COMFORTABLE AS A DENTIST'S!



The B.B.C. certainly provides nice, cosy waiting-rooms, but all the comfort in the world does not stop that sinking feeling as a speaker waits before facing the microphone

and even the marble fireplace was draped with a curtain, as there was not time to have the fireplace removed entirely. Cosy chairs were upholstered in cloth to match the studio hangings. It was all very cosy until the programme had been going on for half the evening, and then it got unbearably hot.

### *An Artistic Touch*

The new No. 2 studio is a pleasant change, although it is a little smaller

than before. Damask-patterned green and silver fabric adds an artistic touch to it.

It is used for radio plays; and in the corner I saw the door of the silence cabinet where the producer stands with the green light indicator switches to hand.

### *Heraldic Shields*

The No. 3 studio is used only for talks, and it is just like a little library. A reading desk, a small bookcase, and a cabinet gramophone add to the effect.

The window is heavily curtained, and I noticed that a B.B.C. heraldic shield is worked on each curtain!

At the Edinburgh Broadcasting House there are all the latest ideas in broadcasting, the latest type of control apparatus, and an echo-room. The echo-room is in the basement, and the entire top floor of the Queen's Hall is devoted to the engineers. Here is a "control" room in more than one sense.

I was shown that from the windows of this top floor there was a

glorious view across the Forth to the shores of Fife.

### *Just Like London*

The actual apparatus in the control section is just like that at Manchester and London.

The engineers have not only to deal with the Edinburgh programmes, but the programmes coming from Glasgow are also controlled at this point before going along the land-lines to Westerglen.

FOR THE  
OWNER-DRIVER  
A new encyclopedia, dealing with every aspect of motoring, is here reviewed.

AMONG the many important inventions of the last twenty or thirty years two have particularly appealed to the man-in-the-street—wireless and the motor car.

There is always something new to be learnt about motoring, just, as there is about wireless, and if the motorist, whether he be an owner-driver or a chauffeur-mechanic, is to be thoroughly efficient and ready for every emergency he must have the necessary technical information ready at hand.

### *Concise and Handy*

A new work, entitled "The Motoring Encyclopedia," which is to be issued weekly in about thirty six-penny parts, gives all the latest information about motors and motoring in a concise and handy form, and is an absolutely indispensable work for all who drive a car, whether their own or somebody else's.

The information is given in alphabetical form, so that whatever may be required can be turned up in an instant, and the various articles are not only clearly written by experts of many years' experience, but they are illustrated by the latest photographs and by hundreds of specially prepared explanatory drawings.

The word "encyclopedia" means "all-round education," and this book is indeed an all-round education in motors and motoring. No matter what one may want it can be found explained here in the most lucid manner.

### *The Legal Aspect*

While the book is primarily a handbook of motor mechanics, its scope is much wider than that, for it deals with touring and camping and caravanning, and the legal aspect of motoring. A set of large-scale road maps presented with the encyclopedia enables any place to be located instantly, and the nearest or the most interesting route to it discovered.

"The Motoring Encyclopedia" is absolutely indispensable to the motorist. It is the standard work of its kind. The demand for it will undoubtedly be enormous, and that makes it imperative that those who wish to have it should secure the first weekly parts at once from their newsagent.

# AT YOUR SERVICE

by  
**OUR TRADE  
COMMISSIONER**



## The Northern Radio Show

I HAVE just returned from the Northern National Radio Exhibition at Manchester, which is a northern edition of the annual show at Olympia. There was naturally much of interest to be seen on the many-coloured stands in the City Hall.

As a show the Northern Exhibition was an undoubted success, but I cannot help feeling that still more visitors would have come along if the price of admission had not been so high. Usually the entrance has cost about one shilling—it was lower than that once upon a time, I believe—with an increase to 1s. 6d. on Saturdays.

This year a flat rate of 1s. 6d. was charged, and in these days of economic trouble it was too much, especially as there were in the hall none of the "side shows" that characterised the London Exhibition.

## "Side Shows" Outside

The "side shows" took place in convenient halls in various comparatively adjacent parts of the city; there was Marconiphone Magic at the Albert Hall, and Ekco's fine show at the Paramount Theatre, some distance away from the City Hall.

In such circumstances the entrance fee should have been less, and the attendance would have been more. However, those who went had some most attractive stands to look at, and the colour schemes allowed at Manchester gave the show a very much brighter appearance than that which pertains at Olympia.

## An Ingenious Clock

Ferranti must be congratulated on their ingenuity in turning disadvantage to advantage. Many of the stands had large pillars at the corners or in the inside of the design, and several different ideas were carried out in the way of disguising these pillars, and of decorating them.

*Some trade news and views that are of interest to readers, whether or not they are connected with the radio industry. Members of the trade are invited to send items of interest, or photographs, to be included under this heading.*

Mr. J. Baggs, of Ferranti, took a look at his particularly ugly pillar, and at once decided not only to decorate it but to turn it to some real use. So he had constructed a four-face electric super grandfather clock, which supplied the correct time to pretty well the whole of the show. Congratulations!

By the way, the same firm has

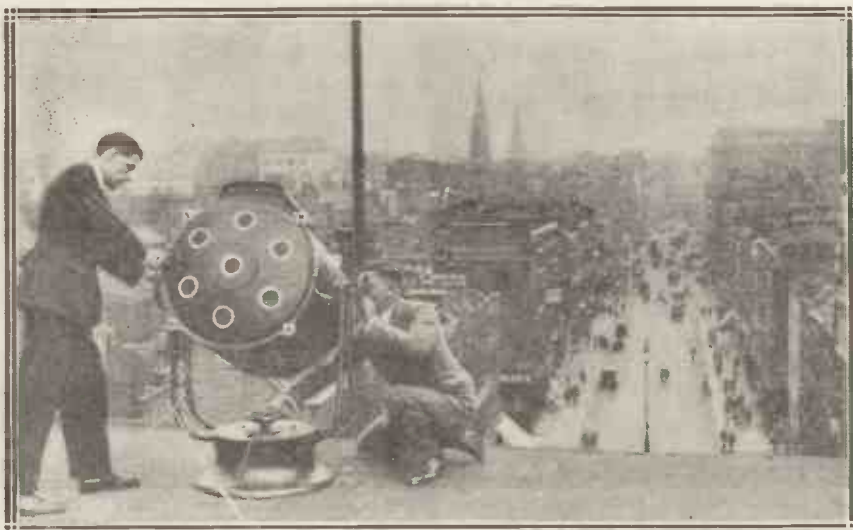
## Mr. Macnamara Ill

We regretted to hear of the illness of Mr. A. W. Macnamara, the vital force behind Telsen Electric, and trust that by the time this appears in print he will have left the nursing home to which he had to go shortly after the London Radio Exhibition

## New H.S.W. Set

Messrs. Hustler, Simpson & Webb have brought out a further example of a cheap and efficient radio receiver in the form of the "Aerodyne Mains S.G. Three," which sells for 15 guineas. Both it and the more expensive all-mains three-valver have been attracting a great deal of atten-

## "BROADCASTING" THE VOICE OF BIG BEN



Adjusting the giant searchlight speaker which broadcasts Big Ben from the roof of the Marconiphone headquarters in Tottenham Court Road, London. During the day Big Ben's quarter-hourly chimes can be heard over a large area, the speaker being switched off at night.

printed a new edition of the famous "True Road to Radio." It is a completely overhauled version of the first edition, and contains new photographs and much fresh matter. At 5s. this book is excellent value, and I am informed that it is being used at one of the well-known radio colleges as a standard text-book.

tion, both among the trade and the public.

## Record, Radio and Reality

The achievement of realistic reproduction in a radio receiver or a radio-gramophone is the aim of all set manufacturers and home-constructors. The difficulty in judging

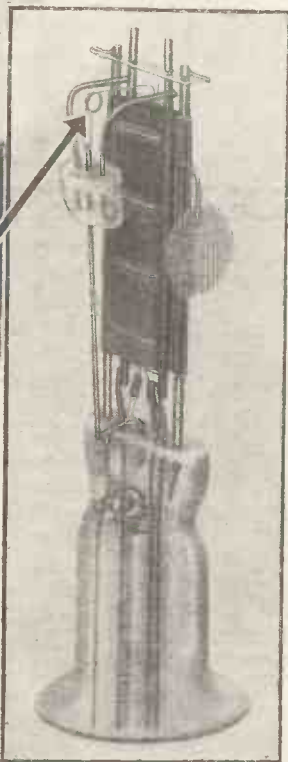


EVERYTHING **The G.E.C.** ELECTRICAL  
your guarantee

# A TONIC TO ANY SET

## OSRAM 2-VOLT VALVES WITH THE WEMBLEY FILAMENT

The filament with the highest electron emission efficiency of any Battery valve filament in the world.



NOTE —  
The OSRAM Automatic "Cushion-Springing" for damping out microphonics.

Precision in Construction means Reliability in Performance.

For full technical information WRITE for OSRAM Wireless Guide Post free on request.

### A CHOICE OF TWO HIGH EFFICIENCY DETECTOR VALVES

#### OSRAM H2

The High Amplification Detector for most Sensitive Reception in (Det.-L.F.) Battery Sets.

Amplification Factor	35
Impedance	35,000 ohms.
Mutual Conductance	1.0 m.a./v.
Price	7/-

#### OSRAM HL2

The non-microphonic high Slope Detector for Quality Reproduction in 2-volt Battery Sets.

Amplification Factor	27
Impedance	18,000 ohms.
Mutual Conductance	1.5 m.a./v.
Price	7/-

**Osram**  
2 VOLT BATTERY  
**Valves**

MADE IN ENGLAND  
SOLD BY ALL WIRELESS DEALERS

FOR EXTRA QUALITY WITHOUT EXTRA COST

Advt. of The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.

## Changing Over the Power Supply

the finished article usually lies in the fact that though record and radio can be compared fairly easily, the final and most important test against the real thing is not so simply arranged.

### Comparing Three R's

During the London and Manchester Radio Exhibitions, however, the general public have been given an opportunity by one of the well-known manufacturers, Messrs. E. K. Cole, Ltd., of comparing very closely the three R's.

In the case of the latter show the Paramount cinema theatre was used.

Erected on the stage was a model broadcasting studio, which was completely sound-proof and fitted with a double glass front.

and the performance finished via the microphone and the loudspeaker of the radio-gramophone.

After this the artiste left the studio and repeated his or her turn on the stage. Listeners were thus able actually to compare the natural voice with its reproduction by means of gramophone and radio, and to observe how slight was the difference.

### Sensational Demonstration

The artistes taking part in person in this rather sensational demonstration at the Paramount were the famous record and radio stars, Miss Elsie Carlisle and Flotsam and Jetsam.

In this connection it is of special interest to note that Mr. K. D. Rogers and Mr. G. T. Kelsey, of the

the apparatus at the Paramount Theatre, Manchester.

### Broadcasting Bertini's Band

During a short stay at Manchester, I managed to run over to Blackpool and see Bertini's famous dance-band at work in the Tower ballroom. This band and the Empress ballroom band are relayed from the Tower, Winter Gardens or Palace, not only by radio as in the case of the former, but by loudspeakers to the crowds assembled in the various large ballrooms, cafés, lounges, fairground and circus.

This is done by a series of seven powerful 40-watt (undistorted output) amplifiers, made by B.T.H. Co., and the result is exceptionally fine.

### From D.C. to A.C.

Owing to the extension of the Grid system throughout the country, a considerable number of supply companies have changed their supply to the standard voltage and frequency, and D.C. areas are in many cases being switched over to A.C., and one of the greatest bugbears in such change-over work lies in the difficulty experienced with radio apparatus.

In D.C. areas many thousands of owners of wireless receiving sets employ the mains for their source of energy, and the conversion of such sets to operate from A.C. mains is a problem which has been distracting these set owners as well as the supply companies.

The D.C. mains radio apparatus at present adopted in such areas falls into two classes:

(a) Receivers of the battery-built type which are deriving their low-tension supply from an L.T. accumulator, but their high-tension supply from the mains by means of an H.T. eliminator.

(b) The "all-mains" type of set which may, or may not, incorporate a loudspeaker and a gramophone motor.

There are thousands of sets under class (a) working in conjunction with many types of eliminators. These have various voltage tappings and various degrees of smoothing.

The supply company engaged in carrying out a change-over from D.C. to A.C. recognises that it is called upon to ensure that a consumer's apparatus

(Continued on page 518.)

### THERE'S NO FAKE ABOUT IT



In order to prove that the famous "Ekco" direct comparison's demonstrations now being given all over the country were genuine, and that no "fake" apparatus is used, Messrs. K. D. Rogers and G. T. Kelsey, of the "Modern Wireless" Technical Staff, were asked to examine the apparatus used. In this photograph they are seen with Flotsam and Jetsam and Mr. Barry Kay (Sales Promotion Manager of E. K. Cole, Ltd.) on the stage of the Paramount Theatre, Manchester.

The demonstration commenced with a record being played on a standard model Ekco radio-gramophone (Model R.G.25), and midway through this record a change-over was made to the microphone in the broadcasting studio. The artiste performing then picked up the melody

"M.W." Research and Technical Staff, were asked by Messrs. Ekco to examine the radio-gramophone used during the tests to satisfy themselves that there was no fake permitted, and that the whole show was perfectly genuine. The photograph shows the two members of our staff examining

# SOLELY SPECIFIED IN LEADING CIRCUITS INCLUDING THE "PROGRAMME PRINCE"

DESCRIBED IN THIS ISSUE.

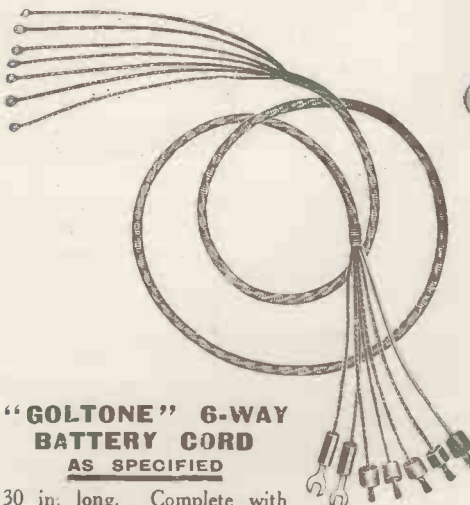
For modern receiver designs, these "Goltone" units will meet all requirements. Made in 5 types to suit every modern circuit.

**MATCHINGS—**

Special attention has been given to this point to ensure successful ranging. The maximum permissible variation is  $\pm 1$  per cent, although the average is rarely more than  $\frac{1}{8}$  per cent.

**PRICES for all Types** **5/9**

Each illustration shows coil type  
G.B.S. Two coils, type  
NOTE G.C.C. and G.G.R. are  
required for  
THE "PROGRAMME PRINCE."



**"GOLTONE" 6-WAY BATTERY CORD AS SPECIFIED**

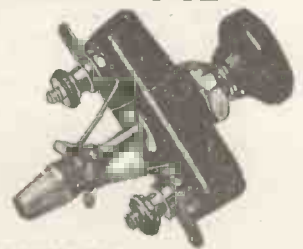
30 in. long. Complete with Indicating Wander Plugs.  
R40/41 .. 2/4 each.

The outstanding performance and excellency in finish of "GOLTONE" COMPONENTS leads to their specification in "MODERN WIRELESS" and "POPULAR WIRELESS" Circuits.

Obtainable from all first-class Radio Stores. Refuse Substitutes. If any difficulty write direct. Large illustrated Radio Catalogue sent Post FREE on request.

## GOLTONE PUSH-PULL SWITCH

An excellent well-made push-pull switch for panel mounting. Also suitable for wavelength changing.  
R26/744 2 contact  
7½d. Each.



### FREE

Two four-page folders, with numerous excellent descriptions of the various screened coils, and large illustrated Radio Catalogue, forwarded on request.





# RECENT RECORD RELEASES

## BROADCAST

SOME very humorous discs have emanated from the Crystallite Gramophone Co. this month, such comedians as Sandy Powell, Bobbie Comber, Julian Rose being responsible for records that have some really good fun on them. For instance, the first named takes us through some exciting moments in his company at a lunatic asylum. He is evidently the head official at this particular institution, and as such he comes up against some very awkward and humorous situations. Sandy Among the Loonies is a record you should hear, it is an excellent bob's worth. (895.)

Bobbie Comber provides a couple of funny songs on 896, There's Another Trumpet Playing in the Sky and Oh, It's All the Same to Me; you will like the latter especially. Third among our list of comedians is the inimitable Julian Rose, whose Hebrew characterisations are famous on record and radio. This time he is concerned with Becky Ginsberg's Wedding, a radio favourite which he here delivers most excellently, and Levinsky's Jubilee, another Hebrew story that will set you roaring. It did me. (898.)

Six best-sellers is the official description of record No. 901, a selection of dance number hits sung by Mellow and Rich; while a novelty disc of merit is that by Morrizz and Moreno, playing Ah! Sweet Mystery of Life and For You Alone on such unconventional instruments as the saw, strohviol and accordion. (903.)

I have forgotten another fine comedy characterisation that will appeal to a great many people. It is A North Country Lad at the Lord Mayor's Show, and is particularly topical, for in a few days after this appears in print we in London will be seeing this annual pageant again. (899.)

The Rhythm Rascals are again at it in the realm of dance music on the small Broadcasts, and Bidgood's Symphonic Dance Band and The Blue Mountaineers entertain us on the Super Twelves.

Singin' Sam is sure to be popular on 3426, where he sings Roll Along Kentucky Moon and In a Shanty in Old Shanty Town; while The Three Ginx are as entertaining as ever in Happy-Go-Lucky You and They All Start Whistling Mary. (3247.)

Of the serious items on the large Broadcast records I am particularly attracted by Frank Titterton on 3240, singing the Flower Song from "Carmen" and Lead Me Your Aid; and Robert Easton, whose fine bass voice comes out well in Boys of the Old Brigade and Boots. (3241.)

Lunch-time listeners will welcome the Commodore Orchestra on 3243 and 3244, which portray this popular combination exceedingly well.

## COLUMBIA

The coming of the winter months is always the signal for even more activity among the recording companies than is noticed during the summer, and this month there is a veritable galaxy of talent to draw from in the Columbia lists. A notable recording is the Berlioz Carnival Romain Overture by the Halle Orchestra, on LX172, a recording that captures all the dignity of that finest of orchestras.

Also the Don Cossack Choir have returned on DX374, where they sing Gretchaninoff's Responso II and In the Forest. This is a very welcome record, for the Don Cossack Choir is completely on its own plane and the recording is phenomenal in its way.

No organist is complete without a "storm" in his repertoire, and Quentin Maclean, the popular cinema organist, has recorded his version of a tempest at sea. From Maclean we expect something different in the way of "storms," and here we certainly get it, for in his Storm Fantasia he has cleverly worked in a story, with effects, by means of linking up different well-known melodies. The story opens with "Anchor's Weighed," then

"Three Fishers Went Sailing"; they are caught in the teeth of a hurricane and bells toll the warning "Asleep in the Deep." Sonorous pedal notes usher in "Rocked in the Cradle of the Deep," which Maclean skilfully blends with the "Fingal's Cave," and "Flying Dutchman" Overtures. The storm is now at its height; great thunderclaps clash with lashing sea and howling wind, while, like a guiding hand, is heard distant strains of "Eternal Father." An excellent organ recording. (DB909.)

It is hard to imagine Harry Dearth in songs more suited to his breezy style than Wine and Water and Why Shouldn't I? Both of which comprise his latest Columbia disc. The first is G. K. Chesterton, the author's, famous poem set to music, and it is strong stuff with a bite in it; there is a positive joy in his rip-roaring impression of old Noah.

The enchanting gaiety of waltzes from old Vienna has been delightfully captured in the record by Albert Sandler and his Orchestra announced by Columbia for October issue. One side of this record gives us Amoretten Tanz—perhaps the best known of Gungl's many waltzes, the other, Bien Aimes. Valse, by his contemporary, Waldteufel, who was almost as prolific a composer of this form of dance music as Strauss, the Waltz King. (DB910.)

The thousands who have wished for a recording of Kipling's great Recessional ("Lest We Forget") will find their desire well gratified by a new record

*A brief selection from some of the records released during the month. Only a few are discussed, but they are representative of the many brought out by the various gramophone record companies.*

of this remarkable work—so well known in connection with national memorial services. It is the familiar Blanchard setting that is used and the singers are the B.B.C. National Chorus.

The record has another value, too, for it brings also a recording of Monk's Abide with Me—again a familiar song in memorial services—that rise, to a new height of achievement. It contains a dramatic moment, when, during the third verse there falls a surprising hush, the voices almost dying down to a whisper. This suspense is maintained until within a few lines from the end, when voices, band and organ swell out in a terrific finale. Apart from being a masterpiece of choral reproduction, this record will be eminently suitable in connection with the Armistice Services this month. (DX372.)

Among music which has not lost a whit of its freshness and popularity since it was first produced is Sir Edward German's Nell Gwyn Dances, specially composed for Anthony Hope's play at the Prince of Wales's in 1900, and the subject of Sir Dan Godfrey and the Bournemouth Municipal Orchestra's latest Columbia record.

A coincidence attaches to Sir Dan's conducting of this work, for in his early days with the Bournemouth Orchestra he encouraged the Corporation to permit visits of British composers to conduct performances of their own works. The idea was adopted in 1897, and the first composer to be thus honoured was none other than Sir (then Edward) German. Everybody knows the "Dances," the cheerful, bustling "Country Dance," the graceful "Pastoral Dance" and the "Merrymakers' Dance"—they are superbly played and recorded

in the Bournemouth Pavilion—and on the fourth side is Tchaikovsky's Chanson Triste. (DB905-06.)

## H.M.V.

With the re-introduction of winter-time our thoughts instinctively turn to the fireside and the long winter evenings, and a selection of discs from the new H.M.V. list will provide an excellent foundation for entertainment during the coming months.

The chief work in the H.M.V. supplement this month is Beethoven's First Concerto in C Major, played by Arthur Schnabel and the London Symphony Orchestra. (DB1600-94.) This is the second concerto to be recorded by Schnabel, and is simpler in conception than the "Emperor," which was released two months ago. The recording is outstanding, even for H.M.V., the perfection of balance between the soloist and orchestra and the tone of the pianoforte being finely captured. Four microphones were employed when the work was recorded, and this fact no doubt contributes to this achievement. The Concerto takes nine sides, and on the tenth is the first recording to be made generally available of Schnabel as a soloist—playing Beethoven's Fur Elise.

Another new record by the London Symphony Orchestra is the Suite in G of Bach. (C2273.) Arranged by Eugene Goossens. It undoubtedly gains by the fact that the conductor is also the arranger.

If you like the "Blue Danube"—and who does not?—you will want the record of Ochs Waltz, from "Rosenkavalier." This is on one side of the two records of Strauss's opera played by the Vienna Philharmonic Orchestra. (C2294-5.) The "hall-tone" of the recording is particularly pleasing.

A fine instrumental disc this month is by the boy prodigy, Yehudi Menuhin. He displays flawless technique in Paganini's difficult La Campanella, and once again reveals himself as a master of masters. It is coupled with the lovely Song of the Bride (DB1638), from Rimsky-Korsakov's opera, "The Tzar's Bride."

An interesting pianoforte recording shows our old favourite Mark Hambourg as a composer. Although he has recorded for twenty-six years, Volkslied (B4261) is the first record in which he has figured as composer and artiste. He backs it with Rubinstein's arrangement of the Turkish Patrol.

The latest new H.M.V. orchestral record is a medley of airs of Schubert played by Tom Jones and his Orchestra, and called Schubertiana. (C2454.) You cannot fail to be familiar with the tunes, but you will be surprised how difficult it is to name them all. This disc was recorded at Eastbourne, the H.M.V. mobile van being used for the purpose, and thus the excellent acoustics of the Grand Hotel, so familiar to broadcast listeners, are clearly distinguishable.

One of the most popular red-label artistes—Gigli—is heard this month singing Marta in its original form. This melody has recently been played as a rumba, but sung in Spanish by this world-famous tenor it sets a new standard. On the reverse is Canto pe me (DA1278), a Neapolitan love song which Gigli renders with passionate abandon.

It is rare for a coloured woman singer to achieve distinction, but this has been accomplished by Marion Anderson, whose new record of two Negro spirituals, one of which is Tramping (B253), shows her as the female Paul Robeson.

The outstanding light record from this month's issue is, in my opinion, A Hollywood Party, a recording of a popular broadcast item (B4264), in which all film fans will be interested. Janet Gaynor introduces first herself, and then presents many of America's famous film stars, including Zazu Pitts, Greta Garbo, Tallulah Bankhead, Marlene Dietrich, Marie Dressler, and Gracie Fields—on a visit to the film centre.

It is difficult to believe that you are not at Janet Gaynor's party, but on top of that one has to realise that the voices are not those of the artistes themselves, but imitations of them by Florence Desmond.

The entertainment value of this disc does not, however, rely solely on mimicry, for there are sly digs at the Hollywood personalities in the dialogue that is placed in their mouths. It is a good record and one that you should hear.

Now let us turn to a real cinema and hear Sydney Gustard play two selections of old favourites, Old Timers and Old Music-Hall Memories. (B4246.) Both are excellent material for the cinema organ, and as this record was made during a public performance at the Gaumont Palace, Chester, the audience is heard lustily singing many of the tunes. If you listen carefully you can distinctly hear a cough at the end of Old Timers.

Whilst on the subject of films there are three records by Gracie Fields in this month's H.M.V. issue. Five of the six songs are from her new picture, "Looking on the Bright Side," which has just received its world premiere in London. It is debatable which is going to be her most popular song, but you will either love or thoroughly hate *He's Dead But He Won't Lie Down* (B4258), describing the virility of her sister's young man,

(Continued on page 516.)

# Another Expert who praises **FILT**



Mr. G. V. Dowding, Associate I.E.E., Technical Editor of several well-known wireless publications.

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Yours faithfully,

G. V. Dowding

Technical Editor.

GVD/MC.





# IN PASSING

## An Open Letter to the B.B.C.

**M**Y DEAR OLD CORPORATION,—As this mode of address may sound, in these days, somewhat like the beginning of a slimmer's valediction to the abnormal convexity of his waistcoat, I will change it to "My Dear Old Woman of Portland Place," which is indeed conferring greatness upon you, inasmuch as you may now consider yourself to be half-sister to the Old Lady of Threadneedle Street.

I have much to say to you, and as I am led to understand that any letter from a "listener" which is pertinent enough to stagger the departmental mind is flung to the lion-cubs of "The Radio Times," to make "fill-ups," I prefer to be cheeky on my own side

### DEAR OLD CORPORATION



"—half-sister to the Old Lady of Threadneedle Street."

of the fence, assured that my remarks will be printed unexpurgated and free from italicised back-chat by your loyal minions.

I take it for granted that as, with the exception of the engineers, accountants, and a few other specialists (mostly in the musical line), you are all more or less beginners—I can't properly say "amateurs," because you are wage-slaves like me, but that

is what I mean—you will not develop any spots on your dignity if I offer you candour instead of candy.

Probably much of my criticism will be non-constructive, but why should it not? It is your job to construct, reconstruct, or demolish according as Providence sends you enlightenment.

### Great Organisation

My word, aren't you on velvet, though? The income of an Indian prince, the power of a Mussolini, a monopoly to play with, a demand for your services which the economic blizzard has failed to contract, the Government behind you, a Charter in front of you as comprehensive as the Statutes of a modern industrial Merger, and a skin as impervious as that of a crocodile; only explosive bullets—

Somehow or other, We, your virtual creators and actual sustainers, have no hold on the master-string whereby we could have made you pipe and dance to our own tune.

This great organisation which we have brought into existence has, like Frankenstein's synthetic monster, become a master and a menace to us. We could, of course, pull the straw and sawdust out of you, leaving you a mere deflated bag, but I do not think we shall do that; we shall, as usual, compromise. As a people we have an infinite capacity for tolerance of bores of all kinds.

### A Close Eye-Witness

What a lark it is that I am writing to an impersonal Corporation! No feelings to be hurt. Years ago, when I was employed by an organisation much larger and very much more useful and important than the B.B.C., I used to blush and feel quite unhappy if I received a letter of complaint.

I would sneak up to my pallet at night, wondering wherein I had failed. One day an older and wiser man said to me: "Lord, don't bother about that; *it's addressed to the company!* Who

the dickens do you think you are? The President?"

I understand now—you can't harrow the feelings of the Port of London Authority or the Metropolitan Water Board or the B.B.C. They are entrenched in brass, discarnate, inorganic. But they each have an "Achilles' heel"—the Revenue.

Thus emboldened, I begin. You, my dear old female, have got this broadcasting idea all wrong. It's not your fault entirely, because you inherited it. With the exception of, I think, one member of your staff, I was a closer eye-witness of the birth of British broadcasting than any one of you.

### Bearding the P.M.G.

It was copied from America, and I read the report of the man who came back from America and told his employers what was being done there. I remember the day when the leading radio manufacturers bearded the clean-shaven Postmaster-General in his den and came away with broadcasting in their pockets.

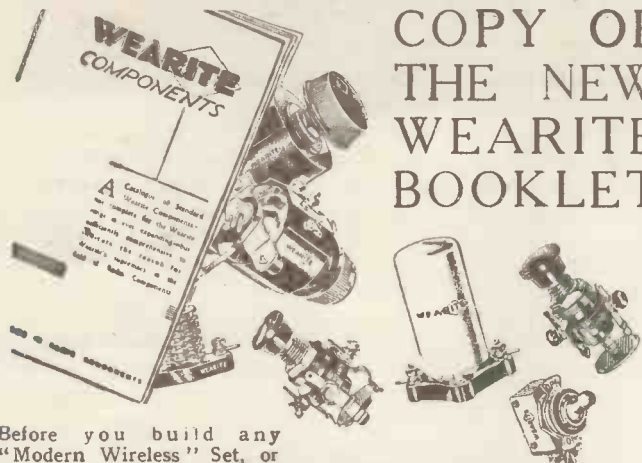
### REVENUE



"The income of an Indian Prince."

I remember, too, asking someone: "Who has got the job of running this new doings?" and the reply: "A chap called—" I thought at the time that it was spelt "Wreath," for I had never heard of him. And now, here we are in a palatial pile which was too small for us before we moved into it, and we have a private bath,

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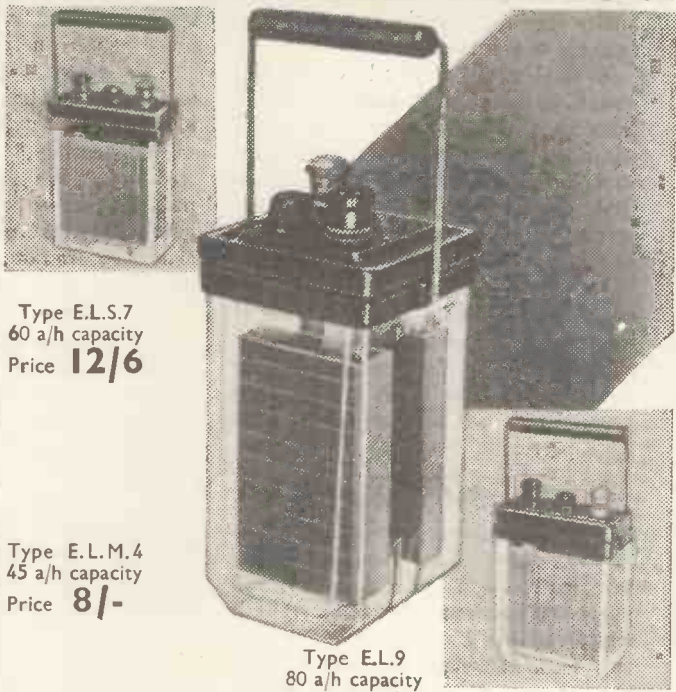
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**The R & A "CHALLENGER"**

## "Let Us Come Down to Brass Tacks"

and a Latin inscription on the wall to remind Macaulay's classic New Zealander that we were the first Director-General of the B.B.C.

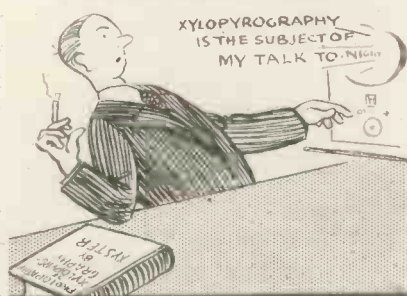
When I say that you have got the wrong notion about broadcasting I refer to your obvious selection and adaptation of Lincoln's famous dictum, for it is evident that you believe that "you can't please all of the people all of the time or some of the people all of the time," and so you have flirted with the idea of pleasing all of the people by pleasing some of them some of the time and others at other times. (I hope that you can follow this.) The result is that your programmes are as vari-coloured as your petticoat.

### Ten Bob's Worth

How far you have strayed from the original idea! That idea was entertainment, and if the old B.B. Company had announced publicly that it conceived its mission to be to give the public not what the public wanted, but what the company believed the public ought to have, why, the company would have just gone and got itself "broke."

But as for you, my charming old beldame, if ever a tail wagged a dog, you're it! I tremble to think what the programmes would be like had the

### THE SPOKEN WORD



"—neglect what he can dig out of books."

Press and the people not set up a continuous scream, and kept you on the rails, more or less.

Headed by the austere "son of the Lianse" from the land of Jno. Knox; governed by a Board which would be much more at home if guiding the destinies of Borstal; pestered by cranks of all varieties from musical monomaniacs to prematurely bearded young men who would rather talk "art" and "produce" plays than work; the victim of educational faddists and governmental imagina-

tion; the soft nest for unemployed sons of the nobility and aristocracy; bless you, you are a wonderful ten bobs' worth, in spite of all that.

You have been lucky in your engineers. The record of British broadcasting engineers is a triumph of engineering; their epitaph may well be: "We put over what they put out—in spite of what they put out." The microphones are lucky in that they are not sentient creatures!

### Popular Taste

Let us come down to brass tacks. I don't believe that there is one licence-holder who invested in a radio receiver because he wanted to be uplifted or educated.

No serious student would neglect what he can dig out of books, for the "talks" which you organise. Those "talks" are interesting because of the personality of the talker, or uninteresting because the speakers cannot "talk."

G. B. Shaw, one of the most loathsome figures which ever appeared in English print in England amongst Englishmen, could make a "talk" on "The Function of Alumina in Portland Cement" interesting—because of his personality. Dean Inge, who never learned how to speak English, would, on the other hand, sicken a pack of Liverpool dock-rats, even if he spoke on "Beer, beer, and more of it."

In a word, my revered ancient female, you are driving listeners to the Continent because you will not follow the policy of those great students of human nature, the Harmsworths, who gauged the level of British popular taste to the last millimetre.

### Songs With Choruses

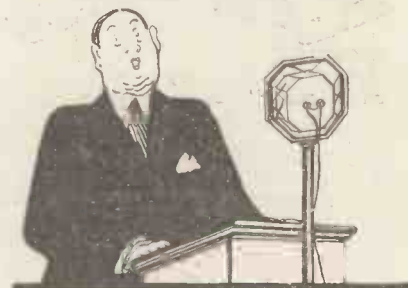
Perhaps it is deplorable, but the popular taste is below high-water level. That is why you have had to boom vaudeville and dance bands. *Hoi polloi* does not want your Bach cantatas, your expositions of the Gold Standard, and the Life of the Lobster, your Epilogues, and your literary gossip.

It wants meat, mostly raw. It wants songs, but songs with Rabelais and, perhaps, a touch of Rabelais. It wants dance music, the Bacchanalian rather than Mr. Morris's.

We refuse to be bookish, Chelseaish, prigs when we have only one life to live here.

Come down to us; we burn the midnight oil and "outwatch the Bear," when we are grinding for our examinations; we become doctors, lawyers, engineers, surveyors, actuaries, chemists, and architects. When we push aside the books and switch on the radio we want a relief—not another course of text-book stuff.

### "GIVING HIS VIEWS"



"Some of your 'uncles' are too beefy."

Do you understand? We are not mere unlettered peasants; we are the *doers* of this world, and we do not depend upon odd radio speakers for our instruction.

I beg to inform you that from the point of view of most of us the National programme is hopeless from 6 p.m. till 8 p.m. Thereafter we may be lucky—unless the National of one night is repeated in the Regional of the next.

### One More Word

This so-called alternative programme business is a wash-out—a swindle, I might say. "If you don't have it on Monday you've got to have it on Tuesday, b'gosh."

But there—I'm sick of complaining about your programmes—they are just the deplorable results of an attempt to compromise with Everyman.

"Get thee to a nunnery," and put a real human being in charge of your programmes.

One more word. Some of your "uncles" are too beefy. They should be fined down. Probably some of your health and diet experts could fetch them down to a more Gandhian-like level.

They boom at us; one in particular sounds as though he were a heavy-weight boxer giving his views on the weather, unconscious of the pronunciation expert. Mute him, there's a dear old soul.

Yours,

Xyz.





IF the year 1932 ever goes down to posterity as a period that made history, one of the reasons will be that during its progression radio critics began to fill up space in the national newspapers, to tell readers what was wrong with last night's programmes and what there is to be heard this evening.

I don't propose in this article to talk about these gentry. What I do propose to talk about are those other radio critics, surely the most popular of wireless speakers, because the most informative; those charming ladies and gentlemen who, on various days at about seven in the evening, look at the world and all its activities and tell us what's what and why.

### *Lurk in the Shadows*

These people have been neglected long enough, in my opinion. Variety artistes and dance-band men get all the limelight of publicity, but the critics lurk in the shadows. I, with customary aplomb, proceeded to track them down in order to hand on the necessary information to readers of MODERN WIRELESS.

Ernest Newman, authority on Music, came first on my list.

Rather like the conventional Mr. Punch in appearance, he has the necessary sense of humour to make one believe there is also a resemblance to that risible gentleman in his nature; but he can be serious on occasion. And the mere fact of having been a broadcast critic does not prevent him from criticising broadcasting—and ourselves.

"Listeners are fond of music," he said to me, "but they don't think

enough about it. Wireless has offered them a wide enjoyment of music, so wide indeed that within a few years they will have heard the worst and the best of the music that has been written from the fifteenth century down to the latest modern composition.

### *Too Easy*

"They enjoy Beethoven, I know, but isn't it a rather non-cultural enjoyment? Most listeners simply don't bother about the real secrets of music; they take the standpoint that they can enjoy the honey without knowing anything about the bee or the hive.

"They need to take a more intellectual interest in music, in my opinion. And there I am up against it, because broadcasting and the gramophone are tending to make listening to music too easy a thing!"

Resolving never again to listen and read at the same time, I bowed myself out.

*Harold A. Albert obtains criticisms of broadcasting from the men and women who have themselves criticised over the radio—with here and there a description of their methods that will interest all readers.*

I next tackled James Agate. This gentleman, a true wireless veteran, who has been talking on "Plays and the Theatre" from Savoy Hill since 1925, looks pugnacious and is. No, he wasn't going to tell me anything at all.

He considered broadcasting not nearly highbrow enough. Dance music should never be relayed before

11 p.m., by which hour people's brains had presumably sunk to their feet.

He could tell an indifferent play in the first act and a bad actor in two minutes. That principle could out both ways, because good plays were also recognisable at sight, as well as good actors. I gathered that he had been a weaver in a cotton mill, a shopkeeper, and a participant in the first broadcast Mass Telepathy Experiment.

After these two encounters, I quivered at the thought of facing those three literary experts, Desmond MacCarthy, Violet Sackville-West, and Clemence Dane.

### *Selection by Liking*

So I resolved to be content with Miss Clemence Dane. I asked her, first, how she managed to select books for criticism and, secondly, how she managed to criticise any at all.

"I always have on my hands about ten times as many books as I can possibly criticise in the time given," she replied, "and so the wise course seems to me to govern one's selection by liking.

"I read new books for interest, to ascertain what the contemporary world is thinking; and old books for pleasure, to compare the modernity of the present with that of the past.

### *Actual Achievement*

"It seems to me that criticism must be a compromise between personal liking and general standards. Whether I like a book or not, I always try to judge it not only on its author's actual achievement, but

also on his intention. If a man is writing about women, I try not to say 'Yes, it's interesting, but I wish he had written about men.'

Then came film critics Cedric Belfrage and Francis Birrell. The B.B.C. has experimented with multitudinous film experts, and not a few people picked almost at random out of ordinary life, but these two seem to be more or less permanent fixtures.

Mr. Birrell, being of the academic type, hates public addresses, but finds the privacy of broadcasting ideal. And he is a listener, too.

### No Rotten Eggs

"I approve entirely of the B.B.C. programmes and, though I should like to hear Italian tenors more often, I realise my taste is not the taste of most people. I like broadcast debates, too, and consider it does people good to have to listen to things they dislike without being able to throw rotten eggs at the speaker."

Thank you, Mr. Birrell. Mr. Belfrage?

producers I mean especially those who supply the money for films) the better.

"Otherwise radio, which is becoming a more and more formidable power in entertainment, will cause our cinemas to close down."

And so I arrived on the doorstep of Mr. Vernon Bartlett, who, since his *metier* lies in the world of international affairs, is the most important critic of them all—and the most popular.

Deservedly so, if his personality is any criterion.

"Broadcasting?" he flashed out. "Yes, one of the most important things in the world. It is linking up the ends of the earth and making them as familiar as the gardens of our next-door neighbours by ridding us of the barrier of language."

### Abolishing War

"It is abolishing international distrust and therefore war. At the same time it is causing me to distrust myself, for if my final aim wasn't literature, instead of politics, I'm afraid I should get horribly swollen-headed

correspondent, like myself, was also loafing very near but not exactly under the clock!"

It seemed my pilgrimage was finished—and then it struck me that Christopher Stone, the gramophone expert, might also be termed a critic, for he enables us to taste the latest records as the literary critic enables us to savour the latest books.

### Thousands of Records

A sort of route-march followed, to a little room high up in Soho Square, where the glasses over the eyes of this tubby, cheerful radio favourite scintillate at thousands of records. I whisper the name of radio.

"Radio? The cheapest, most varied and most easy of home entertainers! But give me the gramophone with the right entertainment for every mood and moment of the day. Mark my words, record-broadcasting in this country is still in its early stages."

### Only Stop-Gaps

"If there were nothing to be considered but the taste of the public,

## Some Famous Critics of Microphone Subjects



Until recently Mr. Francis Birrell (right) was responsible for the films talks.

(Right) Miss Clemence Dane used to review books for the B.B.C. audiences.

(Centre, below) Christopher Stone sets a standard of his own in gramophone record criticism.

Ernest Newman (left) has given us excellent guidance in music.

James Agate (left) takes you to the theatre, and is a delightful companion, full of wit and wisdom.

Vernon Bartlett (right) has a sort of roving commission to comment on foreign affairs from foreign capitals.

Well, he's been to Hollywood, and become famous and successful.

"I believe in the cinema as a potent force," he declares, "and as an artistic one. But the cinema has the whole world as a subject, and taking the cream of our cinema brains and cooping them up in studios is sheer idiocy."

### More Than a Craze

"The film is a new art form, something more than a mere craze. The sooner producers realise this (and by

through the flattering letters people lavish upon me.

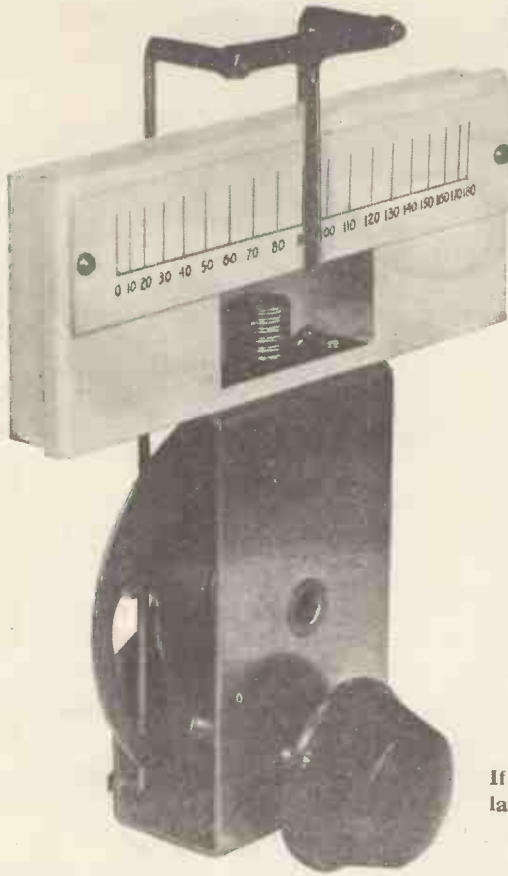
"It is the insulting ones that enable me to keep a sense of proportion. One correspondent was so unpleasant, in fact, that I promised to meet him under the clock of a certain railway station and, if he was not bigger than I, to knock him down."

"On the suggested day I stood very near, but not exactly under the clock, and, since nobody was there, eventually went away. But possibly my

records might form the principal programmes instead of forming stop-gaps between more important items as is the case to-day. Now my nine-valve, super-het., all-electric, automatic-record-changing and stopping gramophone—"

Thank you, Mr. Stone!

So my tour finished in Soho Square. As a result I shall listen with a greater understanding in the future to those men and women who have the responsibility of telling us what we ought to think!



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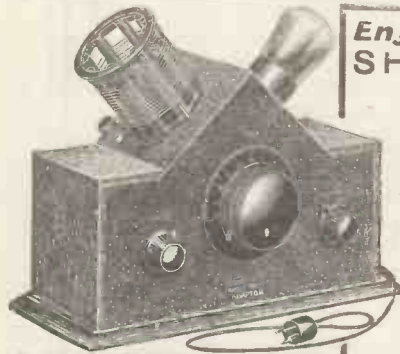
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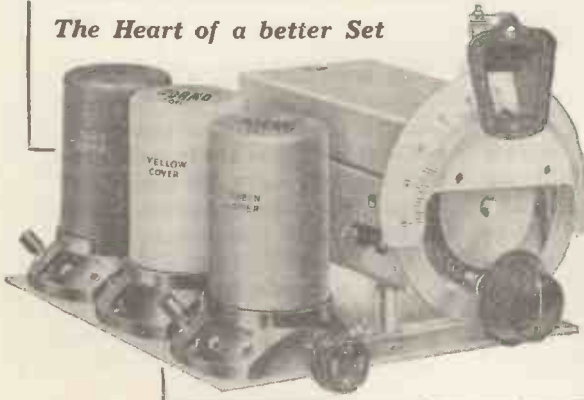


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# TROUBLE TRACKING



**T**HIS month I want to say a few words about valve overloading —I am reminded of this by some tests I carried out a few days ago.

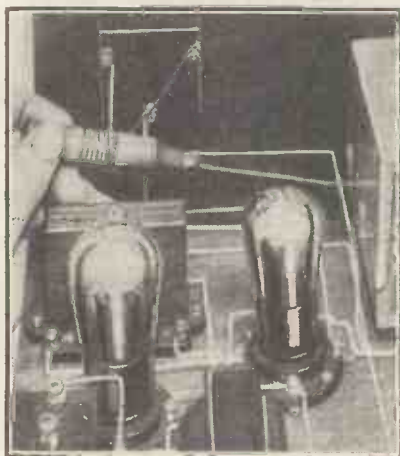
Most of the valve makers are now supplying highly efficient power valves, which have a steep slope, give a whole heap of magnification, and need mighty little grid bias. Now, these valves are undoubtedly efficient, but in practice they need careful treatment if the best results are to be obtained.

For instance, I was trying out a three-valver with one L.F. stage, and the usual tuned H.F. There was a pre-detector volume control, since the S.G. valve was a variable-mu. The output valve required  $7\frac{1}{2}$  volts grid bias at 120 volts H.T., and I endeavoured to work a small P.M. moving-coil speaker with this combination.

## Valve Overloading

The results on the distant stations were excellent, because it was here that the high magnification of the valve was shown to its best advantage, but on the local there was a different story; the problem there was to adjust the input to the valve so that

### DON'T FORGET THIS!



If your set incorporates a "ganged" condenser always see that the small trimmers are properly adjusted, otherwise the circuits will not be in tune. This adjustment should preferably be carried out on a weak station.

there was no overloading on the "peak" passages. I found this to be a task needing some considerable skill, and it took me about half an hour before I could find a position on the volume control that would give me a reasonable sort of volume without the usual "dither" and roughness indicating valve overloading.

## Margin of Safety

This just shows that with one of these steep-slope valves one has to be extremely careful to adjust the input to the grid of the last valve to a nicety, and I am afraid that many of the

*Every month the Chief of the "M.W." Query Department discusses some of the common difficulties which can often be so troublesome. This time he deals with steep-slope valves and volume controls.*

complaints that I hear of concerning rough reproduction are solely due to the fact that the sets in question have no volume control, or alternately these controls are not adjusted correctly.

As a matter of fact, in order to obtain a margin of safety without the need for such a critical adjustment on the pre-detector control, I substituted for the steep-slope valve a super-power taking about 12 volts grid bias at 120 H.T. This I found gave me the output I wanted without appreciable overloading.

## Pre-Detector Control

While on this subject of volume controlling I would again like to stress a point which I have mentioned in previous articles, and that is the importance of adjusting the volume prior to detection. The variable-mu valve provides us with a convenient means of doing this, with little or no complication, and those who have an ordinary S.G. valve can easily fit a pre-detector control by joining a potentiometer, having a resistance of about 20,000 ohms, across the aerial

circuit, joining the aerial lead to the slider.

The reason I am stressing this matter is because in sets of the battery-operated type, particularly those in which an ordinary grid-leak rectifier is used at an anode voltage of something in the neighbourhood of 60, much of the distortion which occurs on loud passages is due entirely to detector overloading.

## Poor Selectivity

In fact, if the set is used within a few miles from one of the powerful Regional transmitters, the S.G. valve will be called upon to handle more energy than it is capable of dealing with. Trouble will creep in here, and more especially poor selectivity is liable to be the result of this super-abundance of energy. The pre-detector type of control obviates this, although, of course, its advantages are not so marked in those cases where the listeners are some considerable distance from a powerful transmission.

## Predicting the Future

Those who have mains receivers, and to whom H.T. is not a commodity which must be cut down to a minimum, actual detector overloading is not so much a matter to be guarded against, because a mains design normally makes use of a power grid detector stage, which will handle a comparatively large input without distortion.

Even so, I think it safe to predict that the pre-detector volume control will eventually oust the type of control that has held sway for many years, namely, the potentiometer across the secondary of a transformer, or as a grid leak in an R.C. amplifying stage.

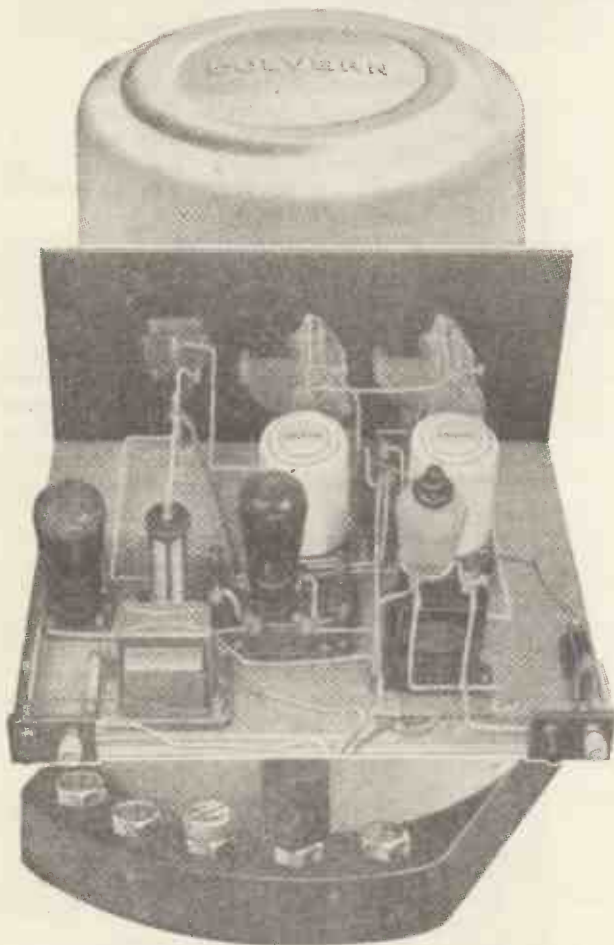
I am now referring only to those sets which have an S.G. stage, and not to the simpler types, such as a det. and L.F. or detector and 2 L.F.

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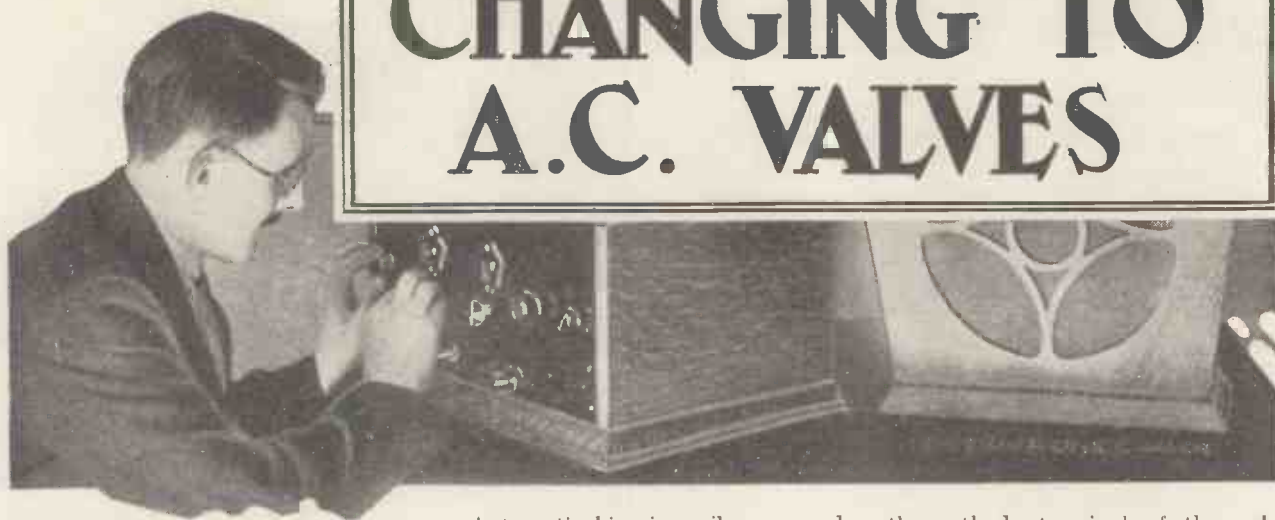
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# CHANGING TO A.C. VALVES



SOMEHOW an indirectly-heated valve seems much more complicated than one of the battery-operated variety. But this is only because we are more used to the latter. In actual fact the indirectly-heated valve is technically simpler and should, therefore, be the more readily understandable.

## Denuded Terminals

Fitting these valves is really simplicity itself. First of all you disconnect the wires joining the filament terminals of each valve holder, and also the wires from the L.T. battery.

Having done this, you may find that there are still one or two wires going to the filament terminals of each valve holder. These must be transferred to the cathode terminals (centre-pin connection) of each valve holder. All you have to do now is to re-wire the denuded filament terminals with twisted flex of a fairly stout gauge, which is taken to the 4-volt tapping on the power unit, and to connect all the cathode terminals together. That is all.

## Detector Connections

You will note that the return leads of all circuits now go to the cathode. The point that may puzzle you is that this also applies to the detector, which, when you used battery valves, had its grid leak connected to the positive end of the filament, and therefore got a positive bias. This is quite correct as, owing to the different conditions prevailing in an indirectly-heated valve, grid current begins to flow at a more negative value of bias, and the valve therefore works exceedingly well with no—or to be more correct, zero—bias.

Automatic bias is easily arranged. You must find out from the maker's pamphlet what current the valve passes at the H.T. voltage you propose to use. You then divide this figure into bias wanted multiplied by 1,000. That's simple enough. The answer is, of course, the resistance required in ohms, and all you have to do is to choose the nearest value commercially available.

If you wish to use a spaghetti, remember that these are often wound with very fine wire. It is consequently

*It is quite a practical scheme to change many battery sets to mains sets using indirectly-heated A.C. valves. A separate power-pack is used to supply L.T. and H.T., the alterations being carried out along the lines described*

By C. COLEMAN

necessary to see that the spaghetti chosen is capable of handling the H.T. current passed by the valve. This latter figure you have already found out.

The method of using automatic bias is particularly useful in cases where the set is sometimes used with a gramophone pick-up, as the resistance can be included in the detector circuit so that, when shorted, the detector gets zero bias and rectifies.

## Fitting Bias Resistances

On the movement of a switch the short-circuit is removed, the valve gets two or three volts negative according to type, and the pick-up is thrown across the circuit all ready for use.

This is how an automatic bias resistance is fitted. All connections to

the cathode terminal of the valve holder of the valve in question are removed and connected to one end of the bias resistance. The other end of this resistance is taken to the cathode terminal instead.

## Curing Instability

Do not forget that if you are troubled by instability it may be due to the improved characteristics of the valves. This is a case where better decoupling is called for. You will find that if you have used H.T. batteries before you now have considerably more voltage at your disposal. The simplest method, therefore, of increasing decoupling is to replace the decoupling resistances with others of higher value.

An output filter will also help, and, personally, I would advise everyone using mains drive to use one, as there are many other advantages of doing so.

## Delayed Action

By the way, the colour of the cathode-cum-filament combination during operation is a rather reddish-orange, so don't be alarmed when the valve lights up. There is also a rather bright spot right at the top. These valves take between six and twelve seconds to begin operating, and to one not in the know the sudden blare from the loudspeaker if the set has been left tuned is rather alarming.

There is a lot more that could be written about the indirectly-heated valve, but there is no reason why you should experience the slightest trouble. If you want to change over to mains, now is the time to do it. Valve prices are down, and if you buy new H.T. batteries now they will deteriorate whether you use them or not.

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Whatever fault develops in any radio set, it cannot long elude the vigilance of an "All-in-One" Radiometer. Simply connect each component in turn to the "All-in-One" Radiometer and instantly the sensitive finger of the wonderful instrument points where the trouble lies.

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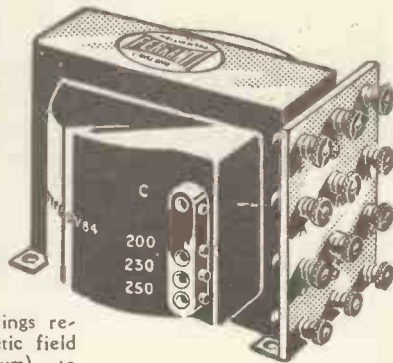
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Arrangement of windings reduces external magnetic field (which produces hum) to minimum. Liberal rating giving temperature rise far below that dangerous to insulation. Rigorously tested under actual load conditions.

**TYPE EV 4.**—For use with the full-wave Rectifying Valve, Marconi-Osram type U 10, Mullard type DW 2, or Cossor type 506 BU, to give a D.C. output when smoothed of 250 volts 60 milliamps. Price **25/-**

**TYPE EV 5.**—For use with the full-wave Rectifying Valve, Marconi-Osram type U 12, Mullard type DW 3, or Cossor 442 BU, to give a D.C. output when smoothed of 200 volts 115 milliamps. Price **27/6**

**TYPE SV 4.**—H.T. and L.T. Transformer. For use with U 10 or DW 2 valve. Output 240 volts 35 milliamps, 4 volts 1 amp. for Rectifier, 4 volts 2 amps. for Indirectly-Heated Valves, and 6 volts  $\frac{1}{2}$  amp. for Output Valve. Price **27/6**

**TYPE SV 10.**—For use with large Power Amplifiers using U 14 Rectifier. Output: H.T., 400 volts 120 milliamps; L.T., 4 volts 2.5 amps. for Rectifier, 5.25 volts 1.6 amps. for 2 LS 5A's, and 4 volts 3 amps. for Indirectly-Heated Valves. Price **90/-**

**TYPE SV 13.**—For use with the full-wave Rectifying Valve, Marconi or Osram type U 12, to give a D.C. H.T. output of 330 volts 120 milliamps, 4 volts 2½ amps. for filament of Rectifier, 4 volts 6 amps. for Indirectly-Heated Valves. Two 4 volt 1 amp. windings for two separately biased PX4 Push-Pull Output Valves. Price **87/6**

**TYPE SV 14.**—For use with two full-wave Rectifying Valves, Marconi or Osram type U 14, to give a D.C. H.T. output of 440 volts 160 milliamps, one winding giving 4 volts 5 amps. for filaments of two Rectifiers, one winding giving 4 volts 6 amps. for Indirectly-Heated Valves. Two 4 volt 2 amp. windings for feeding the filaments of two Push-Pull separately biased PX25 or PP5/400 Output Valves. Price **98/6**

**TYPE SV 84.**—H.T. and L.T. Transformer. For use with U 12 Valve. Output: 250 volts 70 milliamps, 4 volts 2½ amps. for Rectifier, 4 volts 5 amps. A.C., and 4 volts 1 amp. A.C. L.T. windings, centre tapped. Price **36/-**

**TYPE EM 3.**—For use with Westinghouse Metal Rectifiers, types H.T. 5 or H.T. 7, to give various D.C. outputs up to 200 volts 28 milliamps according to the Rectifier used. Price **22/6**

**TYPE EM 6.**—For use with Westinghouse H.T. 8 Metal Rectifiers, D.C. output 250 volts 60 milliamps. Price **22/6**

**TYPE SM 2.**—For use with Westinghouse Rectifiers types H.T. 5 and H.T. 7. Gives same H.T. outputs as EM 3, and also provides 4 volts 6 amps. A.C. Price **26/-**

**TYPE SM 34.**—For use with Westinghouse Rectifier type H.T. 8. Gives same H.T. outputs as EM 6, and also provides 4 volts 5 amps. and 4 volts 1 amp. A.C. Price **30/-**

Types SM 2, SM 34, and SV 84 Mains Transformers are specially suitable for use in connection with Super-Heterodyne Receivers.

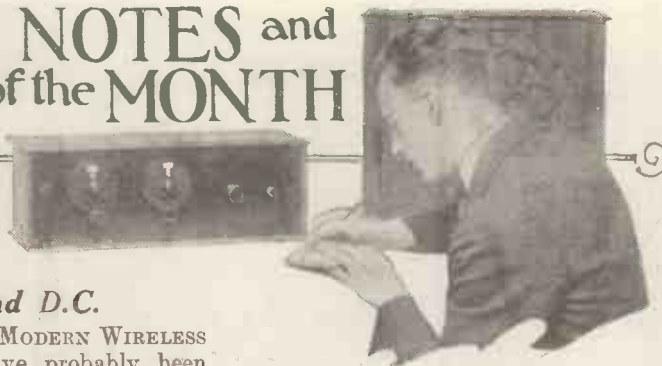
Write for leaflet W.522/1, which gives full details of all models.

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# RADIO NOTES and NEWS of the MONTH



## A.C. and D.C.

A GOOD many MODERN WIRELESS readers have probably been irritated in the past—and are likely to be irritated again in the future—by the change-over in electric light supply in various districts from D.C. to A.C. There is no doubt that this changing of electric supply causes a deal of trouble, expense, and annoyance; but this is chiefly because the householder concerned is ignorant of his rights.

### Controlling Commission

Now, the Electricity Commission is a body which exists for controlling such changes and, under power granted by the Electricity Supply Acts of 1882-1908, is able to stipulate than an electric supply company wishing to make a change from, say, D.C. to A.C. current supply, must

make good any alterations, replacements, etc., which become necessary in, for example, your house when the change is made.

### The Deuce!

Supposing you have built yourself a very nice D.C. electric gramophone, or a D.C. radio-gramophone, and after a few months' enjoyment of the instrument you are informed (or even perhaps you are not informed) that your D.C. will, on a certain date, be changed to A.C. In the writer's case this happened not so long ago, and he was not informed of the impending change. Consequently, one day when the power was switched over to A.C. there was the deuce to pay!

## Limited Liability

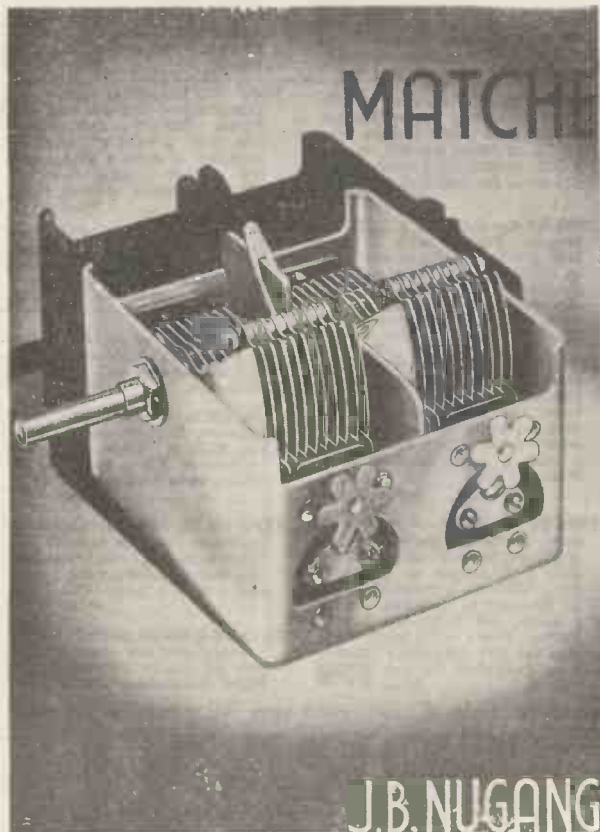
Listeners should remember that financial loss on approved apparatus due to the change-over must be borne by the Electric Supply Company. This condition is invariably imposed upon all Electric Supply Companies, who are subject to the Acts of Parliament mentioned above, although there is a clause which limits the extent of the supply company's liabilities.

## Notice to Consumer

This clause deals with the giving of notice of the supply company's intention to change the current supply, in order that the company may be relieved of liability with regard to any apparatus which may be installed after the serving of the notice regarding the change of supply and before the actual change of the supply. The listener should note, however, that no such notice may be served upon the consumer less than one month and not more than six months before any change in supply is put into operation.

## P.O. and Pirates

According to the "Daily Telegraph," since the Post Office detective vans (Continued on page 514.)



MATCHED TO WITHIN 1/2 of 1% + HALF A MICRO-MICROFARAD

A rigid chassis that is all one piece—not merely a framework bolted together. A one-piece chassis so strong that there can never be the slightest distortion in use . . . this is the chassis of the J. B. NUGANG.

Trimmers to each stage inside the chassis are operated by external starwheels. Vanes wide spaced and of heavy gauge. Special rotor bearings ensure permanent accuracy and give remarkably free movement. Capacity .0005.

Supplied semi-screened as illustrated or fully screened with lid.

Capacity without trimmers: Minimum 20 m.m.f. Maximum 520 m.m.f. Capacity of trimmers: 70 m.m.f.

### NUGANG

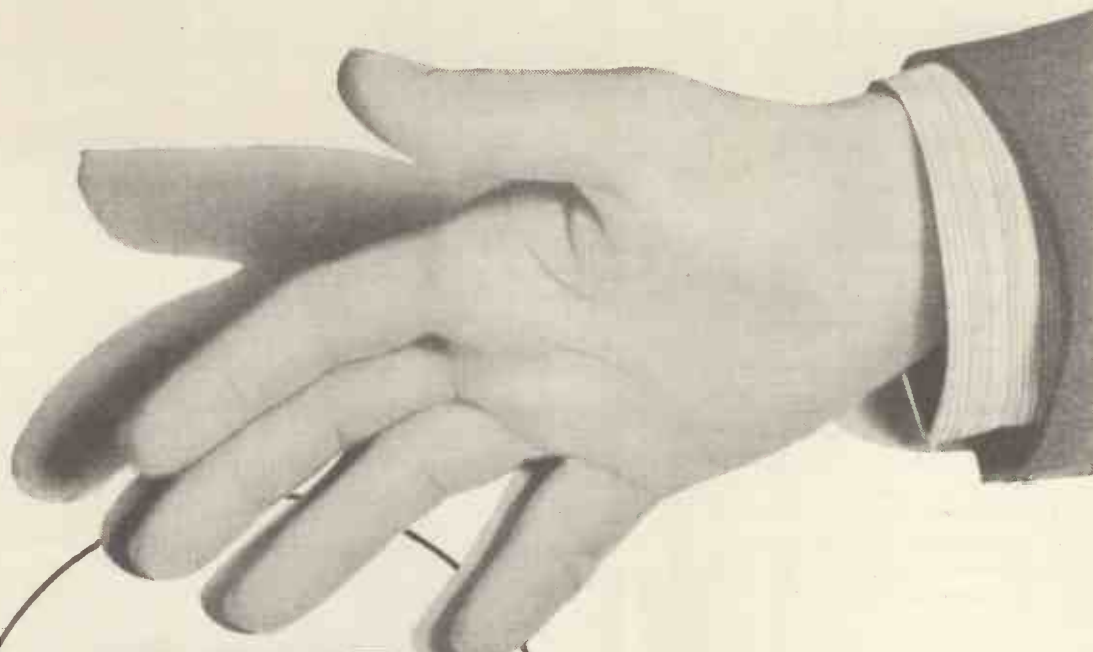
	Semi-screened	Fully Screened
2-gang	14/-	2-gang 16/-
3-gang	21/-	3-gang 23/6
4-gang	28/-	4-gang 31/-



# PRECISION INSTRUMENTS

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**IT PAYS TO ADVERTISE**

Issued by the Institute of Incorporated Practitioners in Advertising in conjunction with the Federations of Master Process Engravers and Master Printers, etc.

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**RADIO NOTES AND NEWS OF THE MONTH**  
—continued from page 512  
\*\*\*\*\*

began their hunt for London's radio pirates on October 11th, more than 100,000 new wireless licences have been taken out at post-offices in the metropolis. At the time of going to press the campaign is still being ferociously waged, and it is quite likely that many hundreds of thousands of still recalcitrant pirates will be caught in the net before the end of the month.

**Telephone Talk**

The Assistant General Secretary of the Union of Post Office Workers recently took umbrage on behalf of telephone exchange girls at a satirical and somewhat inane sketch broadcast by the B.B.C. Part of the dialogue parodied telephone girls' conversation in a way which suggested that they had very slight acquaintance with the proper pronunciation of the King's English.

**Too Sensitive ?**

Nevertheless, all the bother which was aroused seems to indicate that telephone girls lack a sense of humour themselves, for what would happen if every politician got annoyed because of the cartoons of Low and Poy ? There is no doubt that the B.B.C. sketch was an exaggerated parody, and as such was reasonably good fun, and certainly not intended to give any offence.

The joke is that all these little bust-ups in the papers provide the B.B.C. with first-rate publicity !

**Lady Snowden**

There have been many rumours lately about Lady Snowden, for her term of office as a Governor of the B.B.C. expires on the last day of this year. There are lots of reports floating about as to who will take Lady Snowden's place, but, as a matter of fact, everything points to the possibility that she will be re-elected to the Board.

It is certainly to be hoped so, for she is undoubtedly the most hard-working member of the Board, and it is difficult to think of any other woman to-day who could more successfully fill her position.

**Governors' Duties**

It is worth while remembering here that the Governors of the B.B.C.

receive £700 a year, and although the present members of the Board are fairly active in their interest in the welfare of the B.B.C., there is no doubt the B.B.C.'s Charter is curiously vague on the subject of the Governors' duties.

One clause rambles on in this way :  
 " . . . shall meet for the dispatch of business and shall from time to time make such regulations with respect to the summoning notice, place, management, and adjournment of such meetings, and generally with respect to the transaction and management of their business as they may think fit."

becoming bankrupt or of unsound mind. Well, we know one or two potential lunatics whom we should very much like to be transferred to the B.B.C. Board.

**Salary Facts**

Just to remind you, the Chairman of the B.B.C. gets £3,000 a year, the Vice-Chairman £1,000, and the three other Governors are the only members of the B.B.C. who have their salaries fixed by the Government, i.e. £700 a year. The Director-General, Sir John Reith, was appointed by the Postmaster-General, but any subsequent Director-General would have

**NEWS IN THE MAKING**



Representatives of leading radio firms recently visited Allied House, the Manchester headquarters of Allied Newspapers, Ltd., and are here seen in the telegraph department receiving a message from the London office of the "Evening Chronicle" and "Daily Dispatch."

Now, can you make head or tail of that ?

**What They Can't Do**

There are several conditions attached to the Governors' work, and here are one or two things which they can't do :

- Raise their own salaries.
- Become bankrupt or of unsound mind.
- Absent themselves from the meetings of the Corporation continuously for six months without the consent of the Corporation.
- And so on, and so on.

**Would It Stop Them ?**

Judging by the way the Charter is worded, if you become a member of the B.B.C. Board, by some magic influence you are prevented from

to be appointed by the Governors in solemn conclave.

**A Sunset Globe**

A wonderful illuminated globe which shows the time and the sunset in any part of the earth all the year round, and which is covered with painted pictures showing scenes of exploration, of animals, of great events, of earthquakes, etc., is a unique present which was given to Sir John Reith by the President of the National Broadcasting Company of America.

It occupies a place of honour in Sir John's room at Broadcasting House, and is probably one of the most unique presents of its kind in the world.

I understand that Sir John spends many hours—from time to time—examining this fascinating gadget.

## MAKING SIMPLE MEASUREMENTS

—continued from page 482

Next, suppose we require to use this milliammeter as a voltmeter. If we make its resistance 1,000 ohms it will show approximately 1 milliamp. for every volt across its terminals, since  $1 \div 1,000 = .001$  amp. That is, we can use it as a *direct reading* voltmeter for any voltage within its scale range in milliamps., e.g. our 0-10 m.a. instrument becomes a voltmeter reading 0-10 volts. But we can also increase the scale range in any way desired by making the resistance higher and multiplying the readings by convenient factors.

### Multiplied Readings

Thus making the resistance 10,000 ohms the instrument will read 1 m.a. for every 10 volts and 10 milliamps. for 100 volts. Evidently the voltage in this case corresponds to the scale reading *multiplied by 10*, the range being 0-100 volts. Lastly, by making the resistance 100,000 ohms we again multiply the readings by 10; 1 milliamp. now being equivalent to 100 volts across the terminals. (Fig. 3.)

### Eliminator Voltages

With such a high-resistance instrument it would be possible to measure with fair accuracy the voltage across some of the output tappings of a mains unit. I do not say that the results would be anything like correct for detector and similar tappings where we already have very high resistances in circuit, but they would be quite good enough for, say, the power stage.

Since, however, eliminator voltages fall with the load, a voltmeter reading is no certain indication what the anode voltages might be for particular valves and grid-bias values.

### Total Resistances

A far better method would be to measure the plate current in each stage and compare it with the specified values for the grid bias used. If a "voltage regulation" curve of the eliminator is available, the voltage corresponding to any given current can afterwards be readily obtained, as shown in Fig. 4. for a current of 10 m.a.

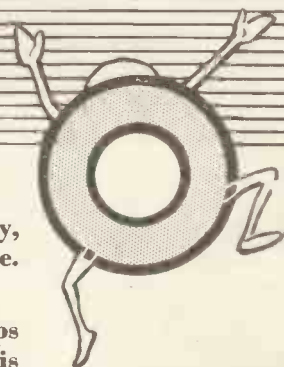
To ascertain the *total* resistance of a voltmeter, you multiply the "ohms per volt" figure, quoted by the maker, by the *maximum* scale reading.

# WHY ROB YOUR SET OF THE H.T. IT DESERVES ?

When you throw away an old H.T. Battery, you throw away voltage you cannot use. You are wasting money.

The Lively 'O' H.T. Accumulator stops waste—definitely! From the moment it is charged, up to the time it needs recharging, it is full of power-giving life—full of powerful energy—full of punch! No self-discharge—no leakage—its "Air-Spaced" cells are leakage-proof. The Lively 'O' H.T. Accumulator gives you constant voltage. Smooth, silent current—power that never varies. Isn't that the kind of H.T. supply you've always wanted? Your dealer stocks the Lively 'O' H.T. Accumulator.

Oldham & Son Ltd., Denton, Manchester. Estd. 1865, and at London, Glasgow, Belfast & Dublin



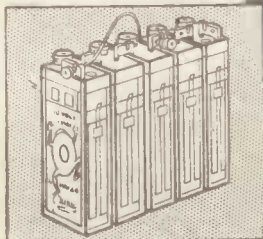
# The Lively 'O'

## H.T. ACCUMULATOR

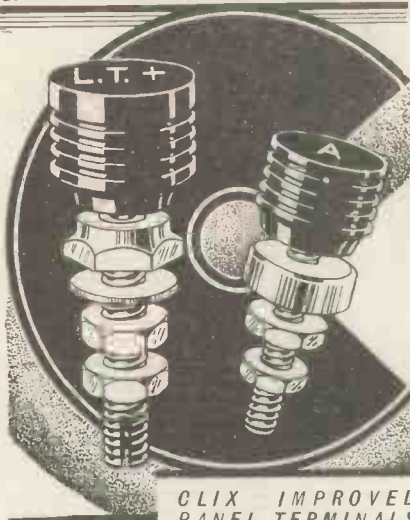
### TWO TYPES

Standard 10 volt unit capacity 2,750 milliamps . . . 5/6

Extra large capacity 5,500 milliamps (10 volt unit) . . . 6/9



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CHEAPEST PERFECT CONTACT



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Prices:  
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*YOUR Picture Paper.*

**RECENT RECORD RELEASES**  
—continued from page 500

aged 103, who is conveniently named Septimus Brown. I strongly advise you to hear it. On the other side is the theme-song of the film, a lively number called Looking on the Bright Side of Life.

Gracie displays her unique talent in After To-Night We Say Good-Bye, and I Hate You (B4260), and You're More Than All the World To Me (B4259), the latter being backed with 'Appy 'Ampstead, which is not from the film. In this last one she effectively exchanges her Lancashire accent for Cockney, and the atmosphere of the song is fully obtained with the authentic recording of a fair organ and crowd noises.

"Jack's the Boy" is reckoned one of the funniest British films that has ever been made, and Jack Hulbert's record of his two songs in the film, The Flies Crawled Up the Window and I Want to Cling to Ivy (B4263), is equally amusing. It was made impromptu at Monte Carlo whilst Jack was in a bathing costume.

His "schoolboy" French at the beginning of the first song is reminiscent of some of his most popular broadcasts.

Another light vocal record is worth mentioning—that of the well-known cabaret and revue star, Frances Day, singing Ooh! That Kiss. (B4266.)

Happy-Go-Lucky You, Broken-Hearted Me and Masquerade, by the same band. Another two outstanding tunes which will be very popular, and this is one of the best records which Syd Lipton and his Grosvenor House Band have recorded. (6188.)

When the Band Goes Marching By and Watch the Navy. Reginald Dixon (Whirlitzer organ), recorded at The Tower, Blackpool. Reginald Dixon is now recording exclusively for Zonophone, and this record is a typical example of his playing which is so popular with listeners-in. (6189.)

The Poacher's Son (Parts 1 and 2). A very clever and amusing ventriloquist record by Johnson Clark of a broadcast turn I enjoyed recently. (6191.)

**Likely to be big "Hits"**

Moonlight on the River and We Just Couldn't Say Good-bye. Sam Browne has made an excellent record of these two numbers, which are likely to be amongst the biggest "hits" of the season. The instrumental accompaniment is particularly attractive. (6192.)

Post Horn Polka and The Warrior, by Harry Mortimer with Foden's Band. A record of outstanding merit. The playing of Harry Mortimer is a fine piece of recording and the record should appeal to all tastes. (6193.)

My Girl's Fine and Dandy and H'lo Baby, by Max and Harry Nesbitt. These great Non-Stop Variety stars have made two light and humorous numbers. The imitation of a baby crying in "My Girl's Fine and Dandy" (6199) is a fascinating piece of artistry. Let's have more of these two, please.

K. D. R.

**THE DECEMBER ISSUE OF  
"MODERN WIRELESS"  
WILL BE A SPECIAL  
CHRISTMAS NUMBER**

Packed with seasonable fare, as well as all the usual brilliant features, including a big **WORLD'S PROGRAMMES Supplement.**

**NO INCREASE IN PRICE 1/- ON ALL BOOKSTALLS DECEMBER 1ST.**

The rumba-like accompaniment by an unnamed orchestra—Ray Noble's (?)—is very intriguing.

There is a large batch of H.M.V. dance records, Ambrose and his Band contribute three, comprising five fox-trots and a waltz; the latter, called Masquerade (B4231), being the most tuneful and excellent for dancing. This number and Wrap Your Arms Around Me with Nothing But a Lie (B4232) have not the conventional "At the May Fair Hotel" on the labels, for they were recorded at Monte Carlo, where the band has been playing at the Beach Casino.

**Zylophone Hornpipe and Applause**

Ray Noble excels himself in two comedy records: Watch the Navy, a nautical one-step complete with zylophone, hornpipe and applause, which was provided by four hundred gramophone dealers who were up in London for the Radio Exhibition and were in the studio when the record was made, and When the Band Goes Marching By, when the same body impersonated a cheering crowd.

Finally we have four American ones recorded by seven of U.S.A.'s leading bands. Each has its own distinctive features—Gene Kardos' Band uses two pianos in The Roses Are Red and I Can't Believe It's You (C6227); Gus Arnheim and Ruby Newman have vocal trios in their arrangements of You've Got Me in the Palm of Your Hand (B6228) and If I Could Call You Sweetheart (B6234); whilst Leo Reisman introduces some polished violin playing into You Gave Me Everything But Love.

Ted Black's interpretation of We Were Only Walking in the Moonlight is likely to be regarded as the authentic one of this number, which is becoming a hit on this side of the Atlantic. I like them all.

**ZONOPHONE**

Here are the records I have specially picked out from the Zonophone list.

A Great Big Bunch of You and Marta are two popular numbers excellently played by Syd Lipton and his Grosvenor House Band. By the way, "Marta" is one of the big "hits" of the season. (6181.)

**CUTTING OUT THE  
BIAS BATTERY**  
By H. A. RAMPTON.

"FIT and forget" is a very bad slogan to apply to a bias battery. Yet unless one goes to the trouble of taking regular voltage measurements of G.B. and H.T., it is one that many of us unconsciously adopt.

A bias battery does not have to supply current, only a voltage, and therefore it does not run down. It deteriorates, and thus the voltage falls, but not very quickly.

**A Method to Try**

A battery, then, is not an idyllic method of providing a bias voltage on the grid of an output valve. There is another way, and a very good way. On mains sets it is quite common, but until the last year or so it has been impracticable with battery-

(Continued on page 517.)

**CUTTING OUT THE BIAS BATTERY**

—continued from page 516

operated sets. I refer to "automatic" or "free" G.B.

If your output valve needs less than 10 volts bias, or if you have an H.T. voltage higher than 120 volts available, this is a method you should certainly try.

**Resistance and Condenser**

The scheme is this. You have first to get a resistance (of the spaghetti type if you like) and a condenser of at least 1 mfd. Connect the resistance in the lead that goes to the negative socket of the H.T. battery.

The connections of the condenser are simpler still, since one end is connected to one end of the resistance, and the other end is connected to the opposite side of the resistance.

There is one more connection. The grid-bias negative plug must be taken to the negative H.T. plug. The original G.B. positive plug is no longer wanted, and may, with the bias battery, be removed from the set.

Since valves vary, sets vary, and circuits vary, the value of the resistance will depend on your own particular receiver. It is purely a question of how much H.T. current your set takes. If you know, or have a milliammeter—a reliable one—the deed is done. If the last valve is a pentode you must count in the screen current as well as the anode current. The current taken by all the other valves must be added on, and if your set is a normal one, you won't go far wrong if you reckon 2 milliamps. for each valve, whether H.F. or L.F. or detector.

**—And a Bit Over**

Thus an S.G., det., pentode might give you 2 plus 2, plus, shall we say, 8 milliamps. for the pentode and another 2 for the screen. That's 14 milliamps. total.

How much bias? Let us say 6 volts. In every case this bias figure must be multiplied by 1,000; in this case resulting in 6,000.

What we do now is to divide this by the total H.T. current previously found; 14 into 6,000? Comes out at 428 and a bit over. Well, this 428 is the figure we want, and we choose the nearest value of resistance available, which happens to be 500 ohms.

**GRIP**

Here are some tests with various well-known types of wander plugs. Starting from a small socket, each plug was pushed into progressively larger sockets until no contact was made, the force needed to remove the plug from each size of socket being measured in ounces.

In each case the "Bowspring" showed itself the better plug. Here is an example.

Socket diameter.	Grip of Bowspring	Grip of typical "split-pin" Plug.
.127"	65 oz.	20 oz.
.133"	36 oz.	2 oz.
.134"	28 oz.	No contact

The "Bowspring" continued to make contact until a socket size of just over .144" was reached.

The "Bowspring" gives strong pressure over a far wider range of diameters than any plug we have so far tested.



Strong spring and wide self-adjustment. Side entry, with Belling-Lee patent grip for flex. 12 indications and 6 plain colours.

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List and cost of parts given in detail for each set. Ask your Radio Dealer for this splendid book.

STRATTON & Co. Ltd. (E.) BROMSGROVE STREET, BIRMINGHAM. LONDON Service Depot: WEBB'S RADIO STORES, 164, Charing Cross Rd., W.C.2

**EDDYSTONE SHORT WAVE MANUAL**

**HAIG'S FUND HELPS**

**IN SO MANY WAYS**

Here are but a few of the benevolent services of the British Legion for distressed Ex-Service men and their dependants:

- £3,594,348 spent in relieving distress (3,568 voluntary benevolent committees)
- 2,166 families assisted to emigrate.
- £75,000 spent in Housing Scheme for disabled.
- £163,443 advanced to finance employment schemes.
- Sanatorium and Training Settlement maintained for tuberculous ex-service men (total population 700).
- Thousands of men placed in employment annually.
- 270 disabled men permanently employed making popples.
- 16,909 men set up in business.
- £75,800 granted to St. Dunstan's to help blinded men.

1932 is a very difficult year for the men who served 1914-18, so PLEASE PAY VERY GENEROUSLY for your Poppy on REMEMBRANCE DAY—NOVEMBER 11th, and if possible, send a donation to Capt. W. G. Willcox, M.B.E., Organising Secretary, Earl Haig's (British Legion) Appeal Fund, 26, Eccleston Square, London, S.W.1.





## FOR FIVE VALVE A.C. RECEIVERS

Heyberd MW.1 Mains Unit is especially suitable for A.C. Receivers of from 3 to 5 valves. The components are carefully chosen and matched to give perfect, noiseless power. Units are housed in neat metal cases, finished in bronze. Incorporating Heyberd Mains Transformer, Double Chokes, 16 mf. Block Condensers and Westinghouse Metal Rectifier. Safety fuse can be inserted or removed without removing the metal case. Control panel recessed in top of unit.

**HEYBERD MW.1 MAINS UNIT**  
 ALTERNATIVE OUTPUTS: 50 ma. at 200 v. or 30 ma. at 150 v.  
 TAPPINGS: 40/120 v. Var. S.G., 175 v. and 200 v. fixed.  
 L.T. 4 v. 5 amps. supply for A.C. Valves.  
**PRICE . . . 127/6 . . . COMPLETE**  
*Guaranteed Three Years without breakdown.*

This model, and many others, is fully described in the new Heyberd Handbook. Also details of Mains Transformers, etc.



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## AT YOUR SERVICE

—continued from page 498

works as efficiently after the change-over has taken place as it did before. At the same time the supply company realises that it would be inadvisable and uneconomical to alter the consumer's apparatus in any way.

To meet the special circumstances, the General Electric Co., Ltd., has given close study to all the factors involved, and has solved the problem by developing units which will allow existing receiving apparatus to be continued with satisfactory results.

### A Conversion Unit

The company came to the conclusion that owing to the wide variety of eliminators that are employed, it would be impracticable to replace these by alternatives of the A.C. mains type, and that it would be considerably more economical to substitute a unit which would give the equivalent of the original D.C. supply.

Accordingly the Geophone BC1534 A.C. to D.C. Conversion Unit has been designed specifically for such a purpose. This unit is capable of giving an output up to 30 m.a. of smooth D.C. supply, eminently suitable for feeding existing D.C. eliminators and in general giving more silent operation than was originally obtained with the D.C. mains supply.

It is constructed on standard eliminator lines, an Osram U.10 valve being employed as a rectifier. The primary of the mains transformer is arranged to accommodate 200-250 volts, and the D.C. output is controlled by tapings on the H.T. secondary of the transformer feeding the anodes on the rectifier valve.

The unit is housed in a black crystalline enamel container, is neat in appearance, and complies in all respects with I.E.E. Regulations.

### Delay Action Switch

In class (b) it is usually extremely difficult to re-wire an instrument for operation on A.C. mains, and it is once again more economical to employ a unit which will generate a supply equivalent to the original.

For this purpose the BC1533 A.C. to D.C. Conversion Unit has been designed. It is capable of giving an output up to 350 m.a. smooth D.C. supply, and of running radio receivers consuming up to 75 watts.

This, in general, covers all sets

employing 1-amp. valves, such as the Osram indirectly-heated series, and the output is adequately smoothed. The circuit employs two Osram GU1 rectifiers, and is suitable for 230 volts 50 cycles input. A special delay action switch is incorporated which prevents the rectifiers being loaded before they attain full working temperature.

The two units referred to cover the vast majority of radio requirements.

### New H.M.V. Appointment

I was very pleased to hear of the announcement that followed the resignation of Mr. Ailin Green, of the Gramophone Company, namely, that the company has appointed Mr. Richard Arbib as Manager of the Press Department as from October 1st, 1932.

When H.M.V. entered the straight radio field last year Mr. Arbib, who had been in the service of the company for some years, took over the technical side of their press activities, and has been responsible for the dissemination of technical news since then. And no more live wire in that regard could we wish to see.

He will now combine this work with his new duties, and will be pleased to give every possible assistance to the press in providing reliable and authoritative news of the Gramophone Company's activities in the radio, gramophone, and record fields.

I wish him luck in his added activities, and am sure no man could be found better capable of filling the post.

## MODERN MANUFACTURING METHODS

A Visit to Hayes

How highly-specialised and successful the methods of the up-to-date radio manufacturer have become is not generally realised. But some very interesting facts and relative figures were recently disclosed by the English manager of The Gramophone Co., Ltd.—Mr. Richard Haigh—when introducing H.M.V. policies and products for the 1932-33 season.

At their extensive factories at Hayes, Middlesex, the company generate more electricity per day than is used in a town the size of Reading. Four thousand large trees are felled yearly for the cabinets alone.

A medium-priced radio-gram, composed of about 2,500 separate parts,

(Continued on page 519.)



**RECEPTION WRINKLES**

—continued from page 519

When a mains pentode is used it should preferably not be placed in very close proximity to the output transformer or choke.

Owing to its high magnification, the pentode is unsuitable for use after two L.F. stages. Overloading is bound to result.

Pentode users will generally do well to use an impedance-equaliser across the output choke or output transformer primary. It may consist of an .01-mfd. fixed condenser in series with a 25,000-ohm variable resistance.

**THE B.B.C. IN PICTURES**

A New Book Reviewed

SOME weeks ago the wireless correspondent of a daily newspaper announced that the B.B.C. was prepared to arrange conducted tours for those listeners who wanted to see Broadcasting House.

Since B.B.C. officials had no knowledge of this announcement, they were rather disturbed by the overwhelming number of applications which resulted. As a result, however, the edict went forth from Portland Place that, for the present at any rate, no tours of Broadcasting House could possibly be undertaken.

The disappointment of listeners will be somewhat lessened by the publication of an extremely interesting and very well designed book under the title of "Broadcasting House."

About thirty pages of letterpress tell the reader all he will want to

know about the design, the equipment, the lighting, the ventilation, and the hundred and one other details of London's home of broadcasting, and the rest of the book—some 100 pages—is given over to copious illustrations.

There are photographs of the studios, offices, and control-rooms; coloured prints of the more important designs; and most pleasant plans of each floor.

Acknowledgements are made, in a special appendix, to everyone who

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NEXT MONTH**

**It will be the  
CHRISTMAS  
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—packed with radio information and enjoyment.

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was in any way connected with the building; and not the least instructive part of the book is a table giving the dimensions, acoustic properties, and reverberation times of every studio.

The reader will find "Broadcasting House" a worthy addition to his bookshelves. What is more, he will feel that he now knows everything that there is to be known about one of the most modern and utilitarian buildings in the world.

P. C.

\*("Broadcasting House," published by the British Broadcasting Corporation. 5s.)

**MICRO-MESH VALVES**

Results of a Test.

FOR some months now we have been carrying out tests on both the life and characteristics of the new Standard Micro-Mesh valves. Three of these have been undergoing the examination, and all have come through with flying colours.

The valves concerned are the indirectly-heated A.C. types H.L.A.1, P.A.1, and the rectifier R.1. They have the following characteristics, which we found varied very slightly from specimen to specimen; in fact, the standardisation of the valves is excellent.

The H.L.A.1 has an impedance of 10,000 ohms and an amplification factor of 80. This gives a mutual conductance of 8, an exceedingly high value, making the valve an excellent detector or first amplifier.

On test in a receiver this valve transformer coupled to the P.A.1, gave ample volume for all purposes, considerable volume-controlling being necessary on powerful transmissions. The P.A.1 has an impedance of 1,050 ohms, with a mutual conductance of 12, a truly astonishing figure.

This implies that the valve has to have but a small input for it to be fully loaded on the grid, and the amplification factor of the valve ensures a large power output. The anode current is round about 40 milliamps., and the grid bias 11 to 15 negative at 200 volts anode potential.

The third valve, the rectifier R.1, delivers 250 volts double-wave rectified, and is fitted with a 4-volt heater, taking a current of 1 amp. Like the other two valves, it is of the indirectly-heated variety, and will deliver a smooth output of some 60 milliamps. These valves make a very fine trio.

**INDEX TO ADVERTISERS**

	PAGE
Belling & Lee, Ltd.	517
British Blue Spot Co., Ltd.	Cover iii
British Insulated Cables, Ltd.	490
Burne-Jones & Co., Ltd.	507
Carrington Manufacturing Co., Ltd.	507
Clarke, H. & Co. (M/cr.), Ltd.	485
Colverna, Ltd.	509
Dubilier Condenser Co. (1925), Ltd.	509
Edison Swan Electric Co., Ltd.	Cover iv, 503
Electradix Radios	516
Earl Haig's Appeal Fund	517
Ferranti, Ltd.	415, 489, 511
Ferraro Co.	507

	PAGE
General Electric Co., Ltd.	493, 497
Gilbert, J. C. (Cabinets)	518
Gramophone Co., Ltd.	416
Graham Farish, Ltd.	501
Hayberd, F. C., & Co.	518
Institute of Incorporated Practitioners in Advertising	513
Igranic Electric Co., Ltd.	481
Jackson Bros.	512
Lectro Linx, Ltd.	516
London Elec. Wire Co. & Smiths, Ltd.	Cover ii
Motoring Encyclopedia	414
Oldham & Son, Ltd.	515
Peto-Scott Co., Ltd.	519
Pickett Bros. (Cabinets)	516
Pifco, Ltd.	511
"Practical Radio"	486

	PAGE
Reproducers & Amplifiers, Ltd.	503
Stratton & Co. (Eddystone)	517
Taylor, M.	516
Tunewell Radio, Ltd.	519
Varley Products	490
Ward & Goldstone, Ltd.	499
Westinghouse Brake & Saxby Signal Co., Ltd.	413
Wilkins & Wright, Ltd. (Utility)	507
Wright & Weaire, Ltd.	503
"Wonders of the World"	494

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# SCRAP YOUR OLD SPEAKER and get

**NOW** that it's getting dark early and the fireside seems the cosiest place, listening-in begins to take up a larger share of your interests.

Make sure that you are getting the best from the wireless programmes. Your old speaker has probably earned a rest. Its voice has lost its purity: it stutters and stumbles. Retire it from active service and get a modern Blue Spot.

Blue Spot 100U (or in oak cabinet 100D) will make a vast difference to your pleasure. Its performance is equal to all but the dearest *moving-coil speakers*. It reproduces the *whole* musical range with fidelity and clarity. It can be used with battery or main sets—quite small ones—because it is sensitive even to small inputs. And it can be used with normal or Pentode valves without the addition of a matching transformer. *No speaker* at any thing round about the same price can compare with 100U for quality and performance. Don't, therefore, take chances with "cheap" moving-coil speakers. Write for Catalogue No. M.W.22.U.

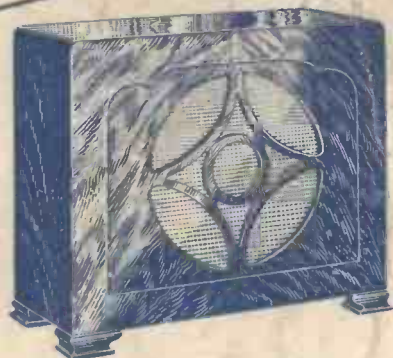
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**32/6**  
mounted on chassis

OR

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**52/6**  
oak cabinet



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MADE**



## BLUE SPOT RECEIVERS

Don't neglect to get full particulars about the Blue Spot Battery Four Valve and the Blue Spot All-Mains Five Valve (A.C.). These are the most modern sets in Europe. Catalogue M.W.22.R is free on request.

—there's nothing  
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**BUY A MODERN BLUE SPOT SPEAKER**  
*and get the full value of the programmes*

# FACTS YOU SHOULD KNOW

## ... ABOUT THE MAZDA RANGE OF POWER OUTPUT VALVES

LOOK  
FOR "EDDY"  
IN YOUR  
DEALER'S  
WINDOW



A good receiver, whether battery or mains operated, can be made or marred by the power valve. Each type of Mazda Power valve has been designed to give its most efficient performance under specific conditions. Here is a guide to the selection of the correct Mazda Mains Power Valve for your particular purpose.

**THE AC/P**—a low consumption power valve for operating balanced armature speakers. It is sensitive to comparatively small inputs, and will give good results on anode voltages as low as 150V.

**THE AC/P1** will handle a bigger signal input and will satisfactorily operate a moving coil speaker. It requires 200 volts H.T.

**THE PP5/400** is a heavy power output valve capable of fully loading a large moving coil speaker. The anode current at 400 volts is 60mA with 30 volts bias.

For Battery operated receivers there are the following:

**P220 and P220A**, both capable of giving ample volume with a reasonable input. The former valve is particularly recommended where economy of anode current is a consideration.

Full details of these and other useful Mazda types will be found in the Mazda catalogue, sent FREE on request.

**Mazda valves are fitted by all the leading receiver manufacturers. All good radio dealers stock them.**

The amazing

# MAZDA

THE  
BRITISH  
VALVES

100%  
BRITISH

Designed by British Engineers

The Edison Swan Electric Co. Ltd.



155 Charing Cross Rd. London. W.C.2

Mazda Radio Valves are manufactured in Great Britain for

The British Thomson-Houston Co. Ltd., London and Rugby.