

**DROITWICH AND YOUR SET—SEE PAGE 39**

# Popular Wireless

**AND TELEVISION TIMES**

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1934.

RADIO  
CONTROLS THE  
TRAFFIC  
ON THE SHORT  
WAVES  
MAKING A  
RADIO  
PHONOFIDDLE  
EVERY  
WEDNESDAY  
PRICE **3<sup>d</sup>**

## *The* **DOUBLE-PENTODE THREE**



*And*  
**How to Stabilise  
your set**

THIS SEAL



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

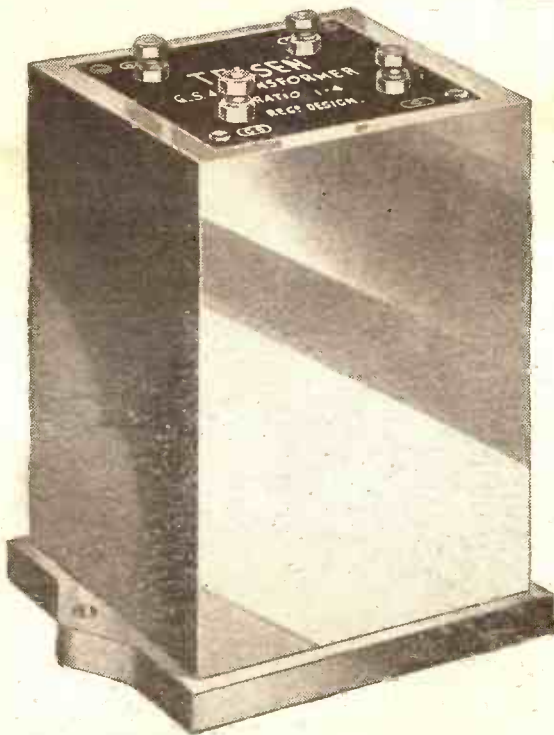
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**TELSEN**  
RADI OM ONENTS

# POPULAR WIRELESS

## AND TELEVISION TIMES

MANAGING EDITOR: N.F. EDWARDS.

TECHNICAL EDITOR: G.V. DOWDING ASSOC., I.E.E.

PLAIN ENGLISH  
RADIO PIRATES  
AMERICAN STATIONS  
POLICE WIRELESS

### RADIO NOTES & NEWS

FRENCH  
BROADCASTING  
POWERFUL VOYELS  
ON THE FRONTIER  
THAT HALF DIME

**Going Strong.**

BY the time you read these Notes Manchester's Radio Show will be swinging along towards its grand finale (it ends on the 22nd), and everybody will be getting quite used to tuning in Droitwich. *What a station!*

Instead of casting a programme lightly over Britain, like a mantle, Droitwich has slapped a full-length long-wave plaster over every nook and cranny of the country. The Plaster of Paris was nothing to this!

**Hearing Wireless Without a Set.**

SOME weeks ago I reported the curious case of an American rancher who could hear radio without a set; and now a visitor to Droitwich tells me that he has distinctly heard music coming straight from one of the masts there when the station was testing.

This, however, doesn't count, because engineers often hear such effects near a powerful transmitter, and they have worked out the reason for it—something to do with leakage across insulation.

Apparently the rancher's case was quite different, but I am still lacking further information about his curious gift at the time of writing.

**Plain English.**

NOW that the gap in the morning programmes has been filled in and we can be sure of all-day reception from the B.B.C., there is a demand for an alternative to dance music after 10.30 p.m.

Dance music is not everybody's choice; in fact, a writer in "The Saturday Review" says: "The numbers played are for the most part beneath contempt. They are devoid of melody and have no musical value at all. Some of them have no rhythm either, and sound merely like an orchestra of pneumatic drills conducted by an anthropoid ape."

This may or may not be true, but it's certainly plain English!

**No Licences.**

PURSUE their anti-pirate policy, the Post Office officials in the Birmingham district scored a striking victory in The Last Round-Up. It resulted in fifteen residents on one estate being fined at the Birmingham Police Court for working sets without licences.

Fifteen men on one estate (*Yo! ho! ho!* and a bottle of rum!) is probably a record in the fight against "pirates."

**Secretaries, Please Note.**

HOSPITAL secretaries and others who are in close contact with the seamy side of life will enthusiastically hail a suggestion from Mr. E. A. James, of "Longfrie," St. Peter-in-the-Wood, Guernsey. He has a big pile of old "P.W.'s" which he will gladly send post paid to any deserving institution that applies for them.

"I've learnt a great deal from these books in the past, and would like to help someone else to do the same," he says. *That's* the spirit which this old world wants nowadays.

**"UNCLE LEONARD"**



Leonard Henry, who is here seen tuning-in on his Portadyne receiver, needs no introduction. A B.B.C. star comedian for many years, he has broadcast in revue, musical comedy, vaudeville, the Children's Hour, surprise items, and comic opera. Asked what his hobby was, he replied, "Work"! Likes music (ancient and modern), listening to intelligent conversation, soccer, summer and cold meat and pickles. And dislikes the few minutes prior to a broadcast, the word "definitely" and himself after a party.

Once concluded his part in a serious Elizabethan drama with the line: "Where is our cousin, King Spilip of Fain?"

**Who Thought of Reaction?**

AFTER all these years they are still disputing as to whom should go the credit for introducing reaction to the radio set.

Way back in 1917 the Institute of Radio Engineers in Philadelphia awarded its medal to Major Armstrong for his work in this field; but he returned the medal recently because the U.S. Supreme Court had affirmed an award to Dr. Lee de Forest against Armstrong's claim.

Now the engineers—who ought to know—have decided not to accept the proffered return of the medal, and have reaffirmed their admiration of Armstrong's work. So where are we?

**Remarkable Long-range Reception.**

THE West Middlesex and East Bucks Branch of the Anglo-American Radio and Television Society will resume meetings in Uxbridge on October 3rd at 8 p.m. Full particulars from Mr. Leslie W. Orton, "Kingthorpe," Willowbank, Uxbridge.

Mr. Orton tells me he has heard American stations on medium waves on at least two days each month of 1934—January to August inclusive—and he's pretty sure of getting them for the rest of the year.

He has also verified Cairo recently!

**Slow Morse Practice.**

THE Irish Radio Transmitters' Society provides Morse practice for its members on Sundays, from 11 a.m., on 84.2 metres. There is a general call to all Irish stations, and then an automatic machine sends slow Morse under call sign E1GF.

Reports welcomed by D. O'Farrell, Esq., Park House, Booterstown Ave., Co. Dublin.

**"Robert" Radio.**

THE cat-burglar profession and the whole smash-and-grab industry are definitely peeved about the latest radio news from Scotland Yard. It has been decided there to construct a new and powerful police wireless station, costing some ten thousand pounds; and it is to be capable of keeping 500 cars in constant touch with any illegal acquisitions that may be going on. The station is to be erected at Grove Park, Camberwell.

(Continued on next page.)

# AN AERIAL SIX-AND-A-HALF MILES LONG!

## New Channel Crossing.

EXPERIMENTS have recently been carried out by P.O. engineers with a view to an ultra-short-wave telephony service to the Channel Isles.

If all goes well a station in Guernsey may be working before Christmas with an English terminal station, probably to be situated on the Dorset downs about 250 feet above sea level.

The wavelength will be between 5 and 7 metres.

## French Evolution.

THE French radio business, though still anæmic, is improving. Quite a number of new stations are to come on the air, and a National Radio Orchestra of eighty tip-toppers has been formed to elevate the programme quality.

But the anti-interference law, requiring silencers to be fitted on domestic electric motors, etc., still hangs fire. It seems that



Madame, having overcome her prejudice against the vacuum cleaner, is dead against hanging any condensers or what-nots on it, just because the neighbours can hear it on their sets!

## In Passing.

ABOUT one-fifth of all the American motor-cars sold this year either have wireless sets as standard equipment or have portables installed.

The B.B.C. pays getting on for £2,000 per week to the Performing Right Society for copyright fees, etc.

## Beromunster's Breather.

WRITING in praise of the punch behind Beromunster on 539.6 metres, W. R., of Ripon, asks if it is true that this sturdy Swiss is to decrease his power.

If he does it will be for a mere breather, for some months ago they were working at Chelmsford on new equipment for him, designed to bring his 60 kilowatts up to 100. And when he yodels on that full power his "neighbours"—Athlone and Budapest—will have to look to their laurels.

## Home to Roost.

AN invention for stabilising planes, especially when taking off or landing, has recently been simplified to a press-the-button basis. And no sooner has that been done than somebody suggests it will be admirably adapted for a wireless-controlled aeroplane, enabling it to carry a load of



death-dealing bombs, drop them where desired, and return safely to its base without any-

body being on board.

That's a fine way to use radio, isn't it?

If ever they test this infernal device I hope the bomb release acts when the plane is exactly over the head of the chap who suggested the scheme!

## Those Decibels.

REQUESTING me to put on my Number 8 hat for a moment, H. T. N., of Norwich, asks for a proper but understandable definition of a decibel.

He can get the proper definition in a technical glossary; and he can read an understandable explanation of that in "P.W.," No. 605 (page 899). But he can't lure me further on the subject, for decibels are neither Notes, News nor good Red Herrings—and if the latter are to get past they must be of the First-Quality, Well-Wrapped variety!

## News from India.

AT a recent sitting of the Standing Finance Committee of the Legislative Assembly (*Yes, Standing Committees do sit!*) an expenditure of £22,500 or thereabouts for the erection of a broadcasting station at Delhi was approved.

## BROADCASTING BREVITIES

During the second quarter of 1934, 149 SOS and police messages were broadcast Nationally and 28 from Provincial stations.

In the case of the National broadcasts, 107 were in respect of illness, of which 71 were successful. Forty messages called for witnesses of accidents, and of these 23 were successful. Two were special or crime messages, and neither of them met with success.

A new cinema organ comes into the Midland Regional programme for the first time on Monday, September 24th—namely, that at the Ritz, Nottingham, which, with its 220 "tabs," is one of the largest cinema organs in Europe. The player will be Jack Helyer, organist at the cinema.

One of the most critical letters yet received at Belfast arrived in the B.B.C. office there recently. It was from a listener who expressed himself "disgusted" with a certain programme. Its contents were duly noted. In the afternoon it was followed by another letter from the same writer, entirely withdrawing his first remarks, apologising, and requesting that the original letter might be destroyed!

It is to serve the Urdu-speaking area, including the Punjab and United Provinces. And the authorities say that if they can pull in the necessary rupees and annas they will soon push out the song and dance that India is waiting for.

## Car Radio to the Rescue.

A LUCKY coincidence saved two American broadcasters a spot of bother. They were motoring from New York to Toronto, and at the Canadian frontier the immigration officers were dissatisfied with their credentials.

Suddenly the radio in their motor-car began to deliver one of their own numbers, which made matters worse, for the officials thought that the two were impostors. Then the announcer stated that the items were electrical recordings, which explained a lot, and so the men from the Land of Liberty were admitted to the Land of the Maple.

## Pin-head Wireless.

APPARENTLY my recent mention of the American pin-head wireless set has brought to light a British counterpart. It has been constructed by Eric Oliver, of 44, Albert Street, Burnley Road, Sowerby Bridge.

I have not seen it, but I am told that the midget can bring in Moorside Edge quite clearly.

It is a crystal set, needing phones, but the tuning, detector and terminals are all on the pin head!

## Tit for Tat.

HEARING that a six-year-old visitor had an amateur transmitting station of his own, the engineers of W A B C recently wrote out a pass for him and conducted him all over their imposing building.

When he left the little man staggered them all by taking out a book and writing a pass for them to look over his station.

He explained that, as a professional courtesy, the usual charge of half a dime would be waived.



## Jerusalem.

JERUSALEM is now coming into the radio limelight. A station which is to be erected seven miles north of the city has already been ordered from Marconi's. Wavelength—same as North Regional.

Incidentally, Mr. V. Grose, of P.O.B. 347, Jerusalem, would like other readers, with experience of Palestine conditions, to advise him on a set for keeping in touch with England. All-electric, costing, say, £25, and not necessarily too noisy, as his flat is of moderate size.

Some of you fellows are sure to have had experience out there, so write P.O.B. 347 and give Mr. Grose the benefit of it.

## World's Longest Aerial?

WHO has the longest aerial in the world? Mr. P. H. Smith, of Bushkill, Pa., raised this question when he disclosed that he is using a wire six and a half miles long.

It appears that he lives right out in the country, with no electrical interference near. And he was never really satisfied with the size of his aerial until he hit upon the happy idea of using the telephone line which links him to his neighbour.

Properly erected and insulated, it picks up everything; and he doesn't have to traipse across country to check it over, because a call to the neighbour will soon prove that the wire is O.K.!



# Solving the DROITWICH Problem

BRITAIN'S giant radio station in the middle west of England has arrived with a vengeance. Its powerful voice penetrates the whole of the country, from Land's End to John o' Groat's. Not with the same intensity, of course, but with certain exceptions, where conditions are unusually bad, Droitwich gives yeoman service to everyone with a radio receiver worthy of the name.

In fact, so well does the new arrival do its job that many receive a superabundance of energy from the towering masts at Wychbold, where the transmitter is situated.

Birmingham, the Potteries, the Black Country, the Welsh Border, Gloucester, Cheltenham and scores of other places and areas would say thank you to the B.B.C. for a reduction in power. They are getting too much for some of the sets in use.

This is not a criticism of the B.B.C. and the new station. Modern radio receivers of the superhet type can easily cope with the gigantic power put out by the Droitwich transmitter, and many other sets, too, can separate Radio-Paris, Eiffel Tower and other long-wavers, from the new 5 X X.

### Swamping on Old Receivers.

But there are hundreds and hundreds of sets, built in many cases long before Droitwich was thought of, let alone commenced, which cannot do anything with the long-wave broadcaster. It simply swamps them, spreading well over the long-wave band.

Those are the very bad cases, of course, and there are others where the voice of the giant can be heard over a limited amount of the long waves, but sufficiently strongly to make the reception of the other stations mentioned, and perhaps Huizen, impossible while the Britisher is on.

The locality of these sets, as well as their design, has much to do with the trouble, of course. People in the north of England or in Kent are not likely to be seriously troubled, and we have had no complaints from them as yet. If they are bothered they should read this article; and incident-

The new British giant long-waver replacing Daventry has brought with it both better quality and greater power. But it has also introduced acute interference and swamping problems to thousands of listeners, and to aid them we give below a selection of remedies that will enable them to cut out the new arrival and hear other long-wavers that are at present swamped by him.

ally their sets must be very poorly designed or of extremely old vintage.

But those living in the closer areas, as indicated in the beginning of this article, are not having so rosy a time when the

the sets would have to be very old in design or else very badly made.

Most receivers can either be adapted to meet the new conditions by small circuit alterations, or else have additional stages fitted, with special tuning circuits to enable the owners to cut out the unwanted Droitwich and to receive the other programmes on the same waveband.

So this week and next we are going to discuss at some length a number of panaceas for the trouble that has put so many listeners in a quandary.

First of all we will deal with the simplest remedies, leaving the more elaborate for next week. But at the outset it must be clearly understood that what may be one person's remedy may not be any good for another. Thus one method may work with one set, and it may require another before a second receiver is rendered immune from the onslaughts of Droitwich.

The easiest method of increasing the selectivity of any set (other than portables with frame aerials) is by adding a series condenser in the aerial circuit. This condenser will cut down the spread of the received station and allow programmes on nearby wavelengths to be received.

### Overcoming any Volume Reduction.

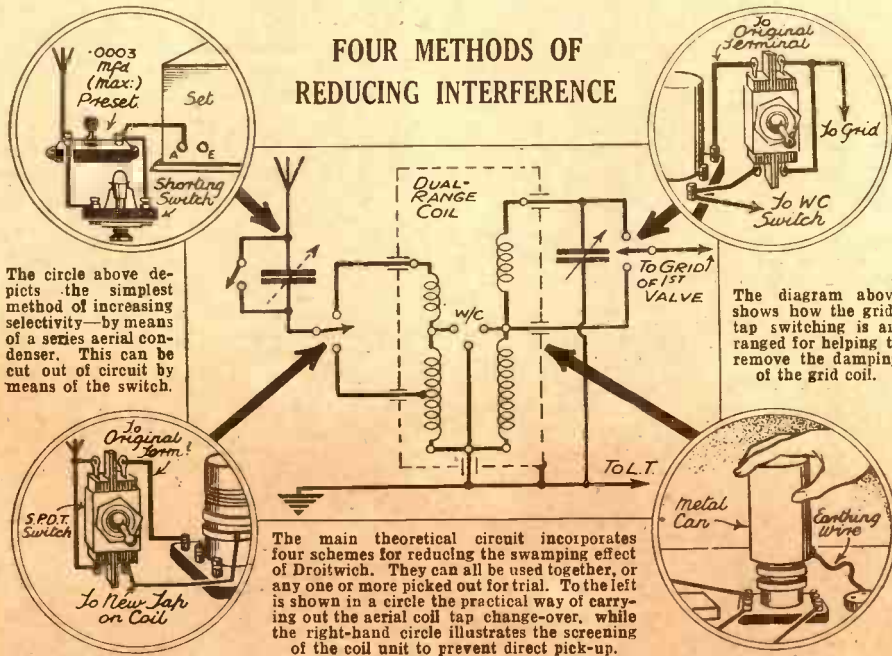
Such a condenser will inevitably reduce also the strength of the stations, but that reduction can often be nullified by the use of reaction

or a "turning up of the wick" of a multi- $\mu$  S.G. valve.

The condenser should be variable in capacity, and can take the form of a preset placed on the baseboard, or a variable of the solid dielectric type fixed on the panel. As it will not be required when the set is tuned to the medium waveband, it is as well to wire a switch across the condenser so that it can be short circuited when not required. The theoretical positions of the switch and condenser are shown in the left-hand top corner of the big diagram on this page, while the practical connections for the scheme are depicted in the top left-hand circle.

(Continued on next page.)

## FOUR METHODS OF REDUCING INTERFERENCE



The circle above depicts the simplest method of increasing selectivity—by means of a series aerial condenser. This can be cut out of circuit by means of the switch.

The diagram above shows how the grid-tap switching is arranged for helping to remove the damping of the grid coil.

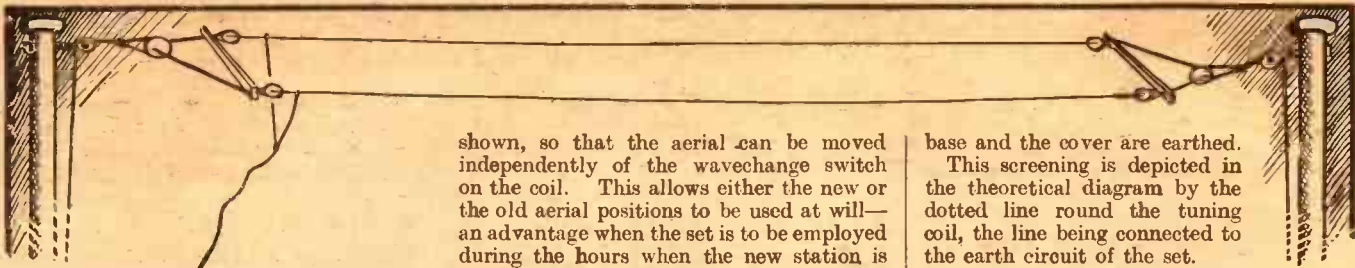
The main theoretical circuit incorporates four schemes for reducing the swamping effect of Droitwich. They can all be used together, or any one or more picked out for trial. To the left is shown in a circle the practical way of carrying out the aerial coil tap change-over, while the right-hand circle illustrates the screening of the coil unit to prevent direct pick-up.

new station is being used, and when it eventually replaces Daventry completely the fat will be fairly in the fire.

### New Sets Not necessary.

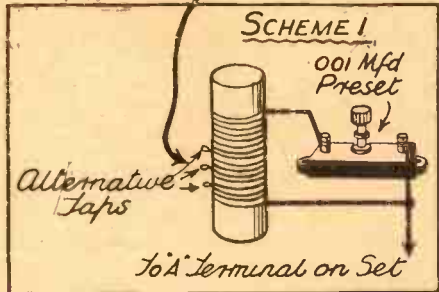
Now what are these unfortunate listeners going to do? Will they have to build new sets in order to cope with the new conditions? Must they scrap their present receivers, and expend more money, lots of it, in order to be able to stem the radio flood that is swamping them on the long waves?

Unless their sets are absolutely beyond hope, they certainly need do nothing of the sort. And to be so beyond assistance



shown, so that the aerial can be moved independently of the wavechange switch on the coil. This allows either the new or the old aerial positions to be used at will—an advantage when the set is to be employed during the hours when the new station is not working.

base and the cover are earthed. This screening is depicted in the theoretical diagram by the dotted line round the tuning coil, the line being connected to the earth circuit of the set.



**Reducing Grid-Circuit Damping.**

And now for number three. Here we do a similar sort of thing with the grid coil, and we move the grid down the coil to reduce the damping on it, especially where the first valve is the detector, so that greater selectivity can be acquired. Again a switch is used, to alter the position of the grid connection at will, and a tap is made on the grid winding of the coil, the position

On this page we see four more ideas, all completely different from the four we have just discussed, and necessitating no alterations to the circuit of the set.

Scheme No. 1 consists of a simple form of wave-trap, which is connected, as shown, between the actual aerial lead-in and the aerial terminal of the receiver.

It consists of a coil of wire of about 100 turns, wound on a former of about 3 to 4 inches diameter, and across the whole of the coil is connected a preset condenser of .001-mfd. capacity.

The circuit on the previous page shows in all four remedies for the Droitwich trouble, all of them being shown at once. But it is not suggested that you will need all four, though they could be applied together if the worst came to the worst. But such a requirement would mean that the set really needed something other than the schemes represented here.

In such a case something of the order of the remedies shown on this page would be preferable. But we have grouped the four ideas together so that you may have a good relative idea of what is happening when they are applied, and the four circles with the arrows show the different systems in practical form.

**Tapping the Long-Wave Winding.**

The second method of increasing selectivity on the long waves is that shown in the bottom left-hand circle, and is the use of a tapping on the long-wave section of the aerial coil of the set.

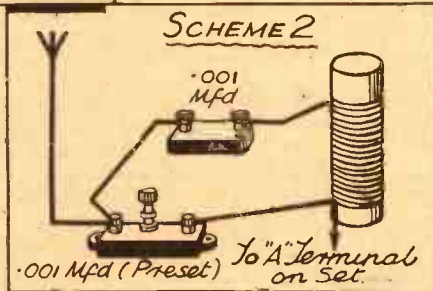
This may or may not be possible, according to the type of tuning coil used; but if it is possible to tap the long-wave winding of the dual-range coil about half or two-thirds the way down, and to rewire as per sketch, it is likely to be useful if you are swamped by Droitwich.

By the use of a single-pole change-over switch, wired, as shown, the aerial of the set can be fed either into the coil in the usual way (that is, to the top of the primary winding, or to a tap on it as arranged by the coil makers), or it can be fed into the long-wave section via the tap that is made specially for the purpose.

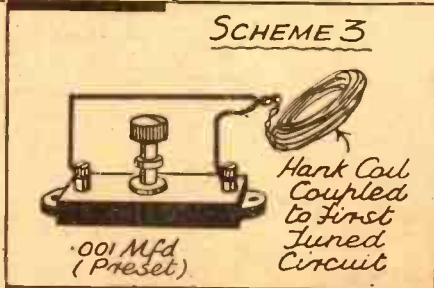
**The Operation of the Switch.**

The aerial will have to be fed into the long-wave section only when the set is to be used on long waves; otherwise it will be impossible to receive the medium waves, for the aerial and the long-wave portion of the coil will be effectively out of circuit when the set is switched to "medium."

Thus we place a change-over switch, as



In many cases of interference a simple wave-trap will be found useful in reducing the trouble.



The scheme shown above is a particularly valuable one, and has been proved over many years to be most efficacious.

being found by experiment in accordance with local requirements.

In the diagram the "tap" is shown taken to the junction between the medium and long-wave windings of the coil, and as this place is often brought out to a terminal in modern coil design it should be an easy task.

**Screening the Tuned Coil.**

The fourth remedy, shown on the first page, is one that is particularly simple in many cases where unscreened coils of the normal vertical type are used. It is a remedy that will be useful to those who live fairly close to the new transmitter, but it will best be used in addition to one or other of the schemes shown in this article.

It is the very simple expedient of screening the tuning coil so that direct pick-up of the powerful wave from Droitwich is cut out. A screen can be made of any convenient piece of metal, a cocoa tin or a sheet of copper or aluminium.

It should be arranged to go well over the coil, and should not run any closer to the windings than need be, while it is a good plan to make a metal base, too, to slip under the coil, making sure that both the

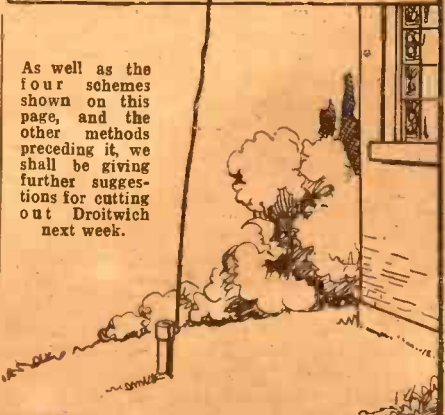
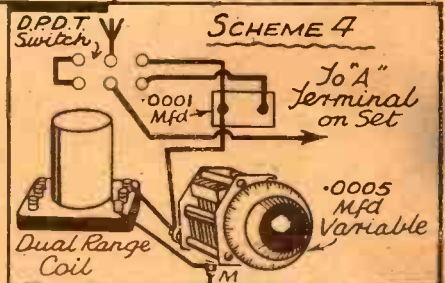
**How the Trap Works.**

The idea is to tune the coil to the wavelength of the unwanted station—that is, Droitwich; so if you have a long-wave coil handy you could use that instead of winding one for yourself.

The aerial is tapped into the coil, as shown, and the taps are altered till the most efficient arrangement is found. In use, as in the cases of the other traps shown on this page, one tunes on the set into the wanted station as loudly as possible, and then tunes on the wave-trap alone till the unwanted station is at its minimum.

After that the wave-trap is left tuned to that station, and usually can be left in circuit, for it will not prevent the Droitwich station from being

(Continued on page 60.)



As well as the four schemes shown on this page, and the other methods preceding it, we shall be giving further suggestions for cutting out Droitwich next week.

# Stabilising Your Set

## COMMON TROUBLES AND HOW YOU CAN REMEDY THEM

PROBABLY most constructors have, at one time or another, been troubled by a receiver being unstable. This may have been quite slight, possibly only causing "ploppy" reaction control, or it may have been very pronounced.

In general, the tendency towards instability becomes greater as the number of valve stages increases. For example, a simple detector and output two-valve rarely gives trouble, although if a pentode output stage is used it may do so.

It follows quite naturally that, as the number of valves becomes greater, the possible causes and remedies of instability increase.

### Two Main Forms.

Generally speaking, there are two main forms of instability: that is, H.F. (or instability in the high-frequency stages) and L.F. (instability in the L.F. amplifier).

Instability of any kind is due to some part of the A.C. voltage developed in the anode circuit of a valve being fed to the grid circuit of the same or another valve in a preceding stage.

For example, reaction as commonly used with a leaky-grid detector is genuine

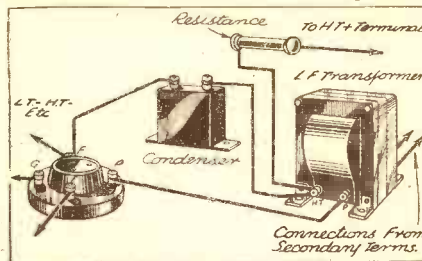


By C. ROBINSON

coupling between unscreened coils. Insufficient screening and lack of H.F. or grid-bias-feed decoupling may also cause the trouble.

Before deciding that some modification of the H.F. amplifier is necessary, the wiring contacts and joints should be carefully examined. For example, any connections to a metallised chassis should be inspected and the grid and anode leads should be made as short as possible.

## STOPPING "MOTOR BOATING"

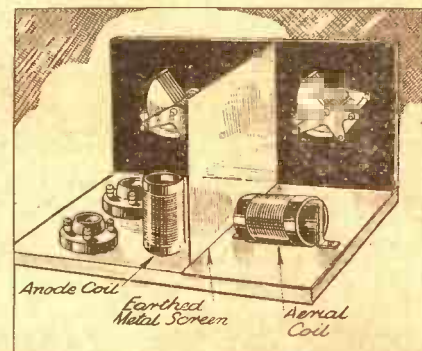


If your receiver is unstable, try these schemes: Top diagram: How a detector stage can be decoupled with the aid of a 2-mfd. condenser and 25,000-ohm resistance.

Left: The connections for decoupling an H.F. stage. The values for the resistances and condensers are given in the text.

Right: Reducing the leakage of H.F. currents into the L.F. stage. In obstinate cases an extra H.F. choke and condenser can be added (dotted lines) after removing the lead X.

Bottom: Placing the aerial and anode coils (if they are unscreened) at right angles and using a vertical screen.



If these points pass muster, the addition of by-pass condensers, and possibly also decoupling resistances in the anode and screening grid H.T. leads, is the first step.

The condensers should be of the non-inductive type, and between .1 and .5 mfd. Ordinary metallised resistances may be

## A PRACTICAL ARTICLE THAT ALL CONSTRUCTORS SHOULD READ

used, and their values should be between 1,000 and 5,000 ohms.

If valves of the battery variable- $\mu$  type are used in the H.F. stages, it is desirable to decouple the grid-bias feed, particularly if there are two H.F. stages.

This is effected by inserting a 50,000-ohm resistance between the grid-coil terminal and the slider of the volume-control potentiometer. The condenser which connects to the grid-coil terminal and earth serves as the decoupling condenser.

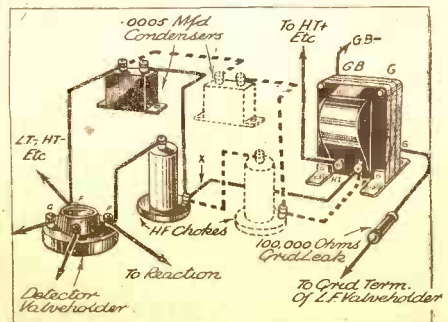
It is desirable, and sometimes essential that all decoupling condensers used in the H.F. stages be of the non-inductive type.

### Improving the Screening.

If the provision of decoupling does not sufficiently stabilise the H.F. amplifier, some drastic improvement of screening will be necessary. If unscreened-type tuning coils are used, a single vertical screen is sometimes the only screen between the coils.

Unscreened coils should always be arranged at right angles to each other. For example, suppose two coils are used: the first should be arranged vertically, the second horizontally, or vice versa.

## REDUCING H.F. LEAKAGE



In a set of this kind screening can be improved by using an earthed metallised baseboard. In this case the coil windings should be spaced at least  $\frac{1}{2}$  inch above the baseboard.

When screened coils are used, screening can be improved by enclosing the grid, anode, tuning coil and reaction leads in screening sleeving.

### Use Low-capacity Sleeving.

Special low-capacity screening sleeving is now available, and each individual piece of sleeving should be separately earthed.

It is often of advantage to use screened H.F. chokes in H.F. stages, as the earthed screen assists in obtaining stability.

Instability in the L.F. stages of a receiver may be due to the same causes as H.F. instability, except capacitive coupling between grid and anode circuits. L.F.

(Continued on page 59.)

instability. In this case, however, it is beneficial instability and, what is more important, controlled.

When one or more high-frequency amplifying stages are used, H.F. instability may be experienced. This may show itself as a continual whistle, irrespective of the tuning settings.

### H.F. Instability.

On the other hand, it may only be evident on long waves or at the lower ends of either waveband. A tendency to howl or motor-boat at any point on either wave-range, particularly when reaction is increased, is a definite indication of incipient H.F. trouble.

H.F. instability may be due to coupling between the grid and anode circuits of one or more valves, due to the capacity between grid or tuning-condenser leads.

It can also be caused by magnetic

I HEAR the B.B.C. friends of Mr. Christopher Stone are planning to give him a farewell party after his last B.B.C. broadcast about the middle of October. This party promises to be a notable occasion. It will not be broadcast. Mr. Eric Maschwitz will be master of ceremonies.

#### Music Director Wanted.

The other day I met a very worried B.B.C. chief who confided to me that his main cause of anxiety was his inability to find a suitable Music Director to succeed Mr. Victor Hely Hutchinson at Birmingham. Many Midland listeners have been hoping that Mr. Joseph Lewis would be appointed. This would mean Joe Lewis' return to his first hunting ground, because it was at Birmingham that he established his reputation as a very successful conductor of popular broadcast music. I think it unlikely, however, that Mr. Lewis can be spared from London. Another name suggested is Mr. Carruthers, formerly director of the B.B.C. Orchestra at Glasgow, when that was organised on a full scale. Yet another name is Mr. Aylmer Buesst, who is now acting as principal assistant to Dr. Adrian Boult in London. I put my money on Mr. Buesst if he will take the job.

#### "Crashing the Mike."

"The latest fashionable sport" is the description now being given to the practice of "crashing the mike," to which vogue has been given by opponents of British Fascism. The B.B.C. prefers to pay little attention to these interruptions. I happen to know, however, that not all of those concerned take the matter so lightly as is suggested by the official attitude. For instance, Mr. Gerald Coek, the Outside Broadcast Director, who is responsible for all occasions outside the studio, is much concerned. He sees grave danger ahead. In General Elections, or, indeed, in any circumstances of general excitement or tension, "crashing the mike" may become a nuisance, if not a positive danger to law and order.

#### Northern Ireland a Region.

The elevation of Northern Ireland to the status of a B.B.C. Region proceeds apace. Preparations are well advanced to enable the new transmitters to reflect Regional consciousness and the best musical and artistic material of Ulster. Transmitters are being constructed as rapidly as possible, but will not be on the air until well on in 1935.

#### Sir John Reith in South Africa

In a few days Sir John Reith will be disembarking at Cape Town to begin his tour of inspection of the broadcasting of the Union of South Africa. Already his visit is causing much public interest and a good deal of controversy. It is perhaps only natural that the existing broadcasting stations, their managements and the general proprietors should be a little alarmed and anxious about their own future. The precise

terms of reference under which Sir John Reith will work have not yet been published, but I understand that his brief is a wide one. He will be expected to give an analytical account of existing conditions and to suggest to what extent and how these should be altered in the interests of efficiency.

#### Television Committee's Report.

At its present rate of progress the



Henry Hall listens to Igor Stravinsky, the famous high-brow composer, playing over one of his own compositions.

## FAREWELL TO CHRISTOPHER STONE

### NEWS AND VIEWS ABOUT BROADCASTING

P.M.G.'s Television Committee, presided over by Lord Selsdon, will not report until late October or early November. The trend of the discussions points to a conclusion

persuaded to carry on the 30-line transmissions twice weekly for the time being. But it will be a year before there is any striking development of the television service.

#### "Greater Grimsby."

Those who are unable to hear the running commentary by Bernard Stubbs, of "The Yorkshire Post," on the opening of the new fish dock at Grimsby, on the morning of Thursday, October 4th, will be able to listen to an electrical recording of the broadcast the same evening as part of a North Regional feature programme, entitled "Greater Grimsby."

The fish dock occupies an area of 35 acres and has taken four years to complete. The opening ceremony will be performed by Sir Henry Betterton, who, accompanied by the Mayor of Grimsby and other municipal officials, will embark at the Royal Dock in a trawler to the new extension.

After the breaking of a tape by the prow of the vessel a speech will be broadcast from the new quay, and listeners will hear two hundred schoolchildren sing "The Fishermen of England." After the ceremony the Bishop of Lincoln (the Rt. Rev. F. C. Nugent Hicks) will conduct a short service on the quayside.

"Greater Grimsby," the feature programme of the evening, will trace the history of the town from mediæval times to the beginning of the Great War. There will be further reference to the new dock and to the mine-sweeping operations of the Grimsby trawlers during the War. Efforts are also being made to include an account of his work by the skipper of a Grimsby trawler.

#### Lord Crawford to Broadcast.

The Manchester Medical Society, one of the oldest and most important medical societies in the country, will celebrate its centenary with a dinner at the Midland Hotel, Manchester, on Wednesday, October 3rd.

Arrangements have been made to relay some of the speeches, and listeners will hear the Earl of Crawford and Balcarres, Chancellor of Manchester University, proposing the principal toast, that of "The Manchester Medical Society," and the response by Dr. E. Bosdin Leech on behalf of the Society, of which he is President.

#### Eisteddfod Echoes.

More echoes of the Royal National Eisteddfod of Wales:

On Saturday, October 6th, William Morris will read extracts from the poem which won him the Chair at the Neath "National," when, as listeners will remember, the subject set was Arthur's Cave.

On the same day Cory Workmen's Silver Prize Band, winners of the first prize in the Class A competition at Neath, will play in the studio, and with the band will be Trevor Anthony (bass), who won the chief bass solo competition.

#### LISTEN TO THESE NEXT WEEK

"Scrapbook for 1910": In the fourth of his Scrapbook programmes Leslie Baily will assist listeners to recall to mind some of the most interesting events of the year 1910.

Musical comedy was at its zenith. The first aeroplane flight from London to Manchester had been made. Pelissier's Follies were at the height of their fame. The pursuit of Mr. Robinson took place. King George V ascended the throne, and the Olympic was launched.

At that time the Olympic was the largest ship in the world, and looked upon as a wonder of the ocean. Yet it is barely a quarter of the size of the new Cunard-White Star liner No. 534. All these events will be recalled in this microphone medley—"Scrapbook for 1910."

(London Regional, Monday, September 24th, and National, Tuesday, September 25th.)

Launching the New Cunard Liner: This great new ship will be launched at Clydebank on Wednesday, Sept. 26th, and the launching ceremony will be performed by her Majesty the Queen. In addition to the actual ceremony listeners will hear speeches by his Majesty the King and Sir Percy Bates, Chairman of the Cunard Steamship Company. Also a full description of the scene at the shipbuilding yard will be given. As in all Royal broadcasts the special gold microphone used by the King will be employed on this occasion.

that will hand the whole problem back to the B.B.C., the money to come from the Treasury's present share of the licence revenue. This is why the B.B.C. has been

competition at Neath, will play in the studio, and with the band will be Trevor Anthony (bass), who won the chief bass solo competition.

O. H. M.

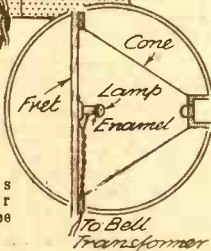
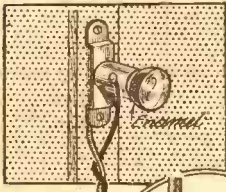


# A PAGE of Recommended WRINKLES

## LIGHTING THE CONE.

I RECENTLY thought of the following idea, which both makes a set quite distinctive and serves a useful purpose: i.e. to prevent the set from being left switched on.

I mounted a torch bulb centrally behind the loudspeaker fret in such a way that it would shine on the cone. Previous to insertion the lamp was partially enamelled so that no direct light would escape.



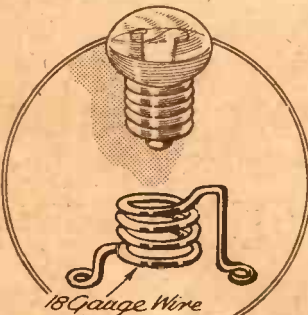
With this scheme your set will not be left on.

A small notch was cut out of the cone to enable the wire to be led to a valve holder. As my accumulator is usually somewhat overcharged, the extra drain keeps it in good condition.

In a mains set the bulb would be connected to a special bell transformer or across the heater connections of the set. In my opinion, this device is considerably more effective than the usual signal lamp, and gives one's set a fascinating appearance.

## A HANDY LAMPHOLDER.

A HOLDER for a dial lamp can be improvised neatly and simply from a few turns of wire. The wire should not be hard-drawn, but pliant, so that it can be wound tightly with the fingers all round the grooves of the lamp thread.



A lampholder may be made in this way for nothing.

This will leave a coil into which the lamp will screw in and out with a perfect fit. It will be a surprisingly firm affair if the wire is thick as well as soft. No. 18 gauge connecting wire should do the trick.

## ONE GUINEA FOR THE BEST WRINKLE!

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

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

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

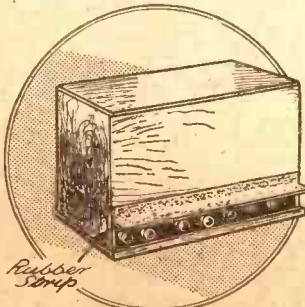
The best Wrinkle in the issue dated September 15th was sent by Mr. E. L. Parker, 6, Trafalgar Road, London, S.E.15., to whom a guinea has been awarded.

The ends of the wire, after the turns have been made, are bent out to whatever form is most convenient for mounting in the set; and each terminates with a loop to take a screw for fixing.

One of these fixing screws will, of course, act as a terminal for connection with L.T. current. The remaining connection is easily made by contact when the "nipple" of the lamp reaches another provided terminal.

## SAFETY FIRST.

A STRIP of rubber or felt, about 1 1/2 inches wide, glued along one edge and fitted above the terminal strip, will prevent a serious short and

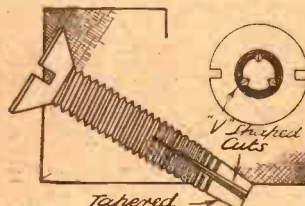


The rubber strip prevents terminals being shorted.

perhaps burnt-out valves should a mislaid pin or piece of wire fall off the cabinet and lodge across the terminals.

## A TAP FOR EBONITE.

NOT having a tap suitable for cutting a thread for certain screws which I wanted to fix into an ebonite panel, I decided to make one. One of the screws was taken and fixed in the vice, and three "V"-shaped cuts made along the thread and a little deeper than the bottom of the pitch. These cuts were made equidistant around the circumference.



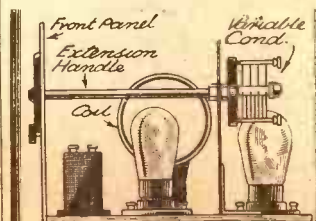
How to use a bolt for tapping ebonite.

Then about 1/4 in. at the end of the screw was tapered to allow for insertion in the holes to be tapped. Turning the tap with a screwdriver with an oscillating action, but gradually working down, cut a very fine thread, and the waste was provided for in the longitudinal cuts.

The file used was a small die-sinker's file having teeth right to its end; but a small, cheap saw-sharpening file of triangular section, with the plain piece at the point snapped off, should be quite as effective for this job.

## CURING HAND CAPACITY.

A LOT of unnecessary space is wasted in a short-wave set by extension handles. This can easily be overcome by having two panels, i.e. one at the front and one at the back, and the components mounted between them.

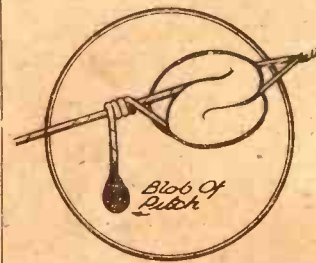


A space-saving scheme you can adopt when using extension handles.

The front panel may be of fancy wood, and the back of metal, so that it acts as a screen for the H.F. components placed on that side.

## PROTECTING THE INSULATION.

IF you have an insulated aerial wire of the copper-stranded type it is worth while taking the extra precaution of sealing this up at the end.



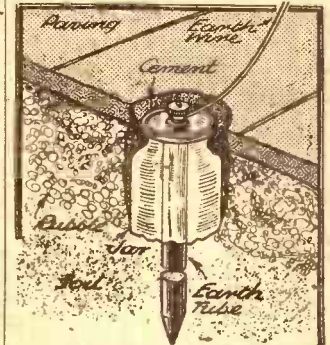
Keeping damp out of insulated wire.

Otherwise dampness may easily penetrate along the inside of the covering.

So instead of leaving just a cut end exposed to the atmosphere, dip the tip of it into some hot pitch or tar. A blob of wax, or rubber solution, or thick paint—anything like this will do.

## AN EARTHING TIP.

DIFFICULTY is often experienced in making a wireless earth connection through concrete or paving stones, but the following idea will overcome this difficulty: Get hold of a glass jar about 3 in. diameter and knock out the bottom of it.



A jar with the bottom knocked out is used for this scheme.

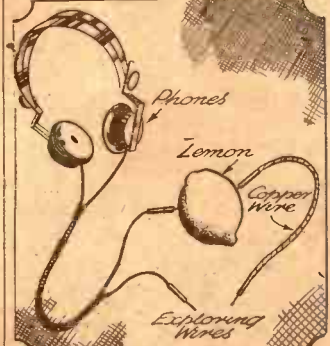
Then dig a hole through the paving and set the jar into the hole, as shown in the sketch. Pack earth and stones round the jar and finish off with cement. Then drive the earth tube down through the jar. This method of earthing the tube enables the jar to collect all moisture and rain, and it also avoids an untidy jagged hole.

## A NOVEL TESTER.

CONTINUITY testing may be carried out on chokes and transformer windings, etc., with phones and a lemon in series in place of the usual battery.

An orange—or, in fact, any citrus fruit—will do.

One prong lead of the 'phones is thrust in the fruit; a piece of clean copper wire is stuck in near by this, serving as the second electrode of the fruit battery, as illustrated. When the exploring ends are brought together a distinct click is heard in the 'phones.



The lemon provides the current.

# **S.T. 600**

## **DEMONSTRATIONS**

Mr. John Scott-Taggart is anxious to test and demonstrate his S.T. 600 throughout Britain.

Readers who desire to hear this set in their own homes and on their own aerials should

### **WRITE IMMEDIATELY**

to Mr. Scott-Taggart, care of "Popular Wireless," Tallis House, Tallis Street, London, E.C.4., stating their present type of set and results obtained.

Nearly all the letters so far are from highly satisfied builders of previous S.T. sets. Mr. Scott-Taggart now wants especially to hear from readers who are suffering from swamping by the B.B.C. or from poor results on foreign stations.

It does not matter at all what set you are now using. Mr. Scott-Taggart will make

### **APPOINTMENTS WITH READERS**

for an evening's test, and all he wants is a table, a chair, an aerial and an earth for an hour or two; nothing else.

It makes no difference how near you are to the B.B.C. or how hopeless you regard your situation; in fact, Mr. Scott-Taggart desires to do tests very close to all the B.B.C. stations.

Mr. Scott-Taggart is setting off on his

### **GREAT TOUR OF THE COUNTRY**

by car at once. Therefore write immediately, and do not refrain from writing because you think everyone else will be writing.

.....

**THE S.T. 600 IS GOING TO CREATE  
RADIO HISTORY**

**ON OCTOBER 24th.**

**HERE IS YOUR CHANCE TO HEAR IT  
IN ADVANCE!**

# ON THE SHORT-WAVES

## OUR SPECIAL SECTION for SHORT-WAVE ENTHUSIASTS CONDUCTED by W.L.S.

I HAVE made a short break in my series of circuit articles, as I intimated last week, for three excellent reasons. First, I want those who have made up the one-valver to stick to it for a while, and not to go rushing into something else.

Secondly, I have a matter of some little importance to deal with this week. Thirdly, even a poor scribbler like myself must take a holiday sometimes. These notes are being written in one of the few quiet places left in England, and, frankly, I just can't be bothered to sketch out circuit diagrams for anybody!

### "After the Jam, the Powder."

And so to business. I receive a good many letters of all sorts, some all fair, some all kicks, but often I get letters that are obviously fair all round, and such a letter (and a very lengthy one) is the subject of this article. The writer asks me to keep him anonymous—even to the extent of his initials—and he assures me that the views expressed are those of a dozen

short-wave practice. Why, then, are you apparently afraid of telling us anything about it? You write too often as if all your readers were novices. So we were once; but d'you imagine that when we have gone past the novice stage we cancel our order for 'P.W.' and take no further

Readers Are Saying' might be buried.' There's some truth in that, but I'm not quite so repentant as I might be, since so many people tell me that "What Readers Are Saying" interests them more than anything else. But I do intend to introduce more variety into the second page of this section, as and when I return (if ever) from this short holiday.

### THE READER'S POINT OF VIEW

W. L. S. halts his description of the new progressive short-wave receiver to discuss some of the criticisms and suggestions put forward by readers who have written to him.

### A New Design.

This captious critic of mine winds up as follows: "I feel that you were responsible for starting me off on short-wave radio, as you must have been in hundreds of cases. Well, now it's up to you to keep me interested in it, and

interest? Please, W. L. S., whoever you are, give us a fair deal. Go on with some baby-talk for the newcomers, but don't go and spoil the whole show by turning your back on the old 'uns."

That's kick No. 1. Readers may remember that I said something on this very subject a week or so ago. I am not going to devote, in future, quite so much space to the real novice, and I hope my well-meaning critic will notice the change in this direction.

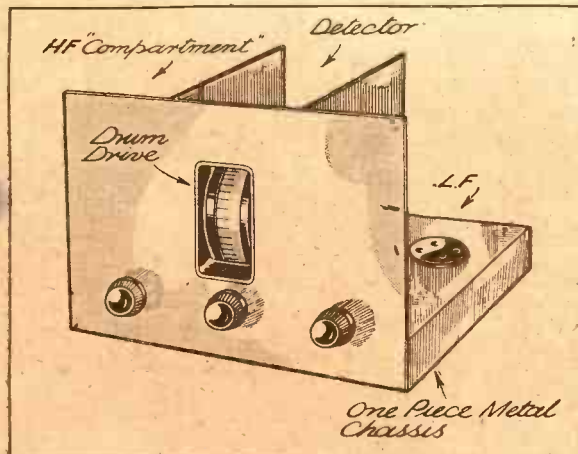
Here's another one: "Please try to get more variety into your second page if you can manage it. We all chuckled

at the same time to go on introducing others and keeping them interested."

Curiously enough, I had already planned to say a few words this week about a more modern type of layout than the good old conventional panel-and-baseboard. The diagrams on this page show a suggestion for a compact chassis-built three-valver.

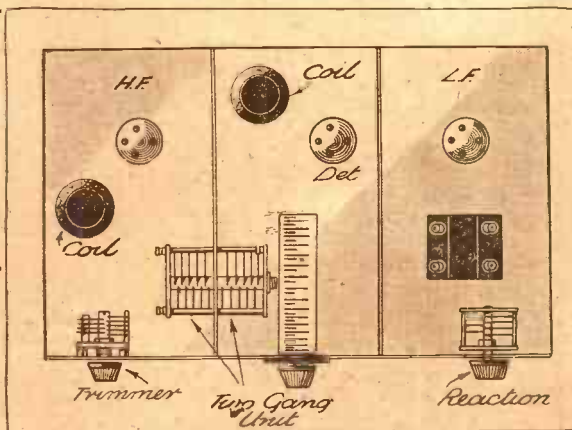
Note that three separate compartments are provided, and that drum-drive control, with the two-gang condenser mounted sideways, is used to take advantage of the shape of the thing.

It may be a bit American in its general effect, but that's not always a disadvantage! All the small bits and pieces may be comfortably packed away under the



### A MODERN LAYOUT

Here is a suggestion for a three-valve all-metal layout that will appeal to many constructors.



members of his local club, and have been put together after much deliberation.

He says some very nice things about me, which I shall not quote. After the jam, however, comes the powder, and I feel that it is so completely justified that I must take it.

To start with, he says that I am deliberately being too "conservative." "We all know," he writes, "that you are perfectly up to date and au fait with modern

with glee when you came out with two pages, but we find the second of them is getting a little bit monotonous. We don't all want to know that X. Y. Z., of Wigan, has such a darned awful receiver that he reports conditions bad when A. B. C., of Cliftonville, finds them good.

"Short-Wave News we don't criticise; but some of the stuff about 'What

chassis, if it is made about 1½ inches deep, and a very neat top deck results.

I should be interested to see readers' designs for their own special purposes.

ON THE SHORT WAVES—Page 2.



QUITE a number of new stations have appeared in the more recent lists of short-wave stations, but surprisingly few of them seem to be actually heard in this country. This is one of the chief reasons that made me decide to refrain from publishing regular lists in "P.W."

The following stations, however, have been "reported" by readers during the last fortnight, and this short list will serve as a guide to what is "on the air" at present. Several of the better-known stations have been purposely omitted.

Those who can tune up as far as 85 metres will find an interesting transmission on 84.67. This is from Mozambique, CR 7 A A, who may be heard on Saturdays from 7.30 till 9.30 p.m. Just below him, according to one reader, is Ponta Delgada, CT 2 A J, who is listed on 83.3, but actually seems to be working still farther in the amateur band—on about 81 metres.

Wayne, N.J., W 2 X E, is reported as a good transmission on 49.02 metres nowadays, in addition to his better-known pitch

TO the British amateur transmitter, and to the would-be transmitter or "three-letter man," the Show and the R.S.G.B. Convention are synonymous. Ever since the introduction of the Annual Convention of the R.S.G.B. it has been held during the Show, generally over the last week-end.

This year saw the Ninth Convention, and the celebration of the R.S.G.B.'s Twenty-First birthday, and, as one can imagine, the "ham" had a good time. The amateur transmitter of to-day is very often commercially engaged in radio, and pays a visit to Radiolympia for business purposes. The R.S.G.B. stand forms a rendezvous for all such men, as well as for others who are just visitors.

This year a very comprehensive display of short-wave transmitting and receiving gear was staged, practically every bit of it having been built and designed by amateurs. There were high-power and low-power transmitters, receivers for general short-wave work, five-metre transmitters and receivers, and frequency meters. All were representative of the amateur work that one sees to-day in the "shack" of any licensed transmitter.

#### Field-day Films.

The meeting on the Friday evening took the form of a *Conversazione*, at which many members met each other in person for the first time, although they may have been acquainted "over the air" for years. Some films of the National Field Day stations were shown, including a most commendable effort from one of the Scottish districts, which showed real film technique in places.

of 19.64. Others worth looking for in the 49-metre band are Singapore, Z H I, on 49.9, who has been reported by one reader only; Vancouver, V E 9 C S, on 49.43, who is almost as "rare"; and Calcutta, V U C, on 49.1. The latter transmits on Saturdays from 7 till 10 p.m., and on most other days from 4.30 till 7.30.

Until recently V K 2 M E, on 31.28, has been the only Australian station worth listening for. Now, however, we have regular transmissions from two other Australians. V K 3 M E, Melbourne, works on 3.15, on Saturdays from 11 a.m. till 1 p.m., and may only be heard when G S B is not active. V K 3 L R, Lindhurst, works on 31.29 metres, on all days except Saturdays, between 9 a.m. and 1 p.m.

G. W. G. (Ipswich) reports a station announcing himself as Budapest, just below W 8 X K, on 25.27 metres. Was this a relay or the real thing?

A project is under way which, it is hoped, will result in the building of a broadcasting

### FINDING THE CAUSE



Electrical interference, from all sorts of machinery and even motor-car ignition, is specially noticeable on short waves. The photograph shows apparatus that would delight the short-wave fan—a Siemens interference-detecting set which permits of complete portability.

Three shots in quick succession are worth mentioning: the puzzled operator scratch-

## THE R.S.G.B. CELEBRATES

The famous Radio Society of Great Britain is twenty-one this year, and the Annual Convention that has just been held was, naturally, a more than usually enthusiastic gathering.

ing his head over the missing volts; a cloud of smoke that suddenly wafted its way across the front of the transmitter; and two reserve "ops." making a lightning dive into the river from the other side (presumably in response to an SOS!)

Here is an idea for short-wave clubs. A film of a day's activities is a valuable possession.

Saturday opened with a Business Meeting at which several suggestions—some very good, others very bad—were put forward by members. This occupied the morning, the afternoon being taken up by Technical Talks, after the Presidential Greetings had been delivered by Mr. A. E. Watts. (By the way, Mr. Watts was responsible very largely for the founding of the British Empire Radio Union, and it was gratifying to find a large number of Empire members

station in Suva, capital of the Fiji Islands. It is hoped that it will be possible to relay programmes of native music to New Zealand and Australia. Perhaps such a relay to Great Britain is not too much to hope for.

The B.B.C. has now issued an official reply to criticisms from East Africa of the Empire transmissions. It appears that much of the dissatisfaction that has arisen has been due to the fact that East African listeners have been trying to receive Daventry while he was not actually radiating for the benefit of African listeners; in other words, the directional aerials have been largely responsible for the little "spot of bother."

#### 5 X X Masts for Short Waves.

This is a strong argument in favour of the adoption of an "omni-directional" system, which we all hope to see when the 5 X X masts are put into use.

It is interesting to note the statement of a leading manufacturer to the effect that the Empire transmissions have given an impetus to the sale of British receivers overseas, even when those receivers are not intended for short-wave work. Those of us who wanted to see a regular short-wave transmission from this country right back in the "dark ages" always maintained that nothing but good could result from it.

The Colombo relay station has been a great success, and has enormously advanced the growth of radio in Ceylon. Let us hope that this scheme of re-radiating short-wave programmes will show some interesting developments in the next few years.

present. Eight or nine Dominions and Colonies were represented.)

Incidentally, an announcement from the G.P.O. to the effect that all amateur bands were being slightly widened, in recognition of the way in which the amateur had behaved himself, was a fitting birthday present. The "tolerances" which the G.P.O. originally imposed at the ends of our various bands have now been reduced to practically nothing at all.

The evening, as usual, saw the grand finale—the Dinner. One of the distinguished guests was a gentleman well known to "P.W." readers—none other than "P. P. E." himself. After paying a sincere tribute to the work of the amateur, he went on to point out how very valuable the work of a large body of experimenters could be.

Even if the individual was not a skilled technician, he said, the volume of "mass evidence" that could be piled up was of enormous consequence.

A few random remarks on his recent visit to the U.S.A. were both illuminating and amusing, and he was rather impressed by the various uses to which the ultra-short waves were going to be put over there.

#### Visitors from Europe.

Visitors from the Empire and from Europe spoke with due effect. Quite a gathering of Belgian amateurs, headed by their President, M. Paul de Neck, and a large group of Dutch transmitters were present. Among the latter were the two operators of the well-known PA-oASD. A very pleasant week-end, with an augury of still better things to come. W. L. S.

# How to Make A RADIO PHONOFIDDLE

THE many thousands of readers who have seen my introductory article in the June 23rd issue of "P.W." must have wondered what a phonofiddle had to do with wireless, and, at the same time, thousands more must be anxious to try out the scheme, as I have done. For their benefit I now propose to give details of how to proceed.

First of all, to those who are familiar with jap violins, I wish to say that the radio phonofiddle is not the cigar-box-and-broom-handle type of instrument, nor is it an unsightly looking contraption, but a really well-made, attractive and professional-looking instrument.

As I said in my first article, this can be worked from your existing set of the

A short while ago we published a photograph and short description of an unusual violin built by a reader of "Popular Wireless." This created such interest that we have asked the designer for further details which are provided below.  
By W. S. MITCHELL.

and let you have it in no time, and the cost will be but a few pence, while it will save you a good deal of time and labour.

Now turn the narrow side facing you, and mark from the commencement of the finger-board, as in Fig. 2,  $\frac{1}{8}$  in. at each side inwardly; take a long rule and draw a line down the bow pit right out to the edge. What is to be done now is to plane down to these lines so as to taper the neck, thus giving a more graceful appearance.

### Polishing the Wood.

This done, you will have to recess the wood to suit the pick-up as described earlier in the article, and, when dry, clean up carefully, glass it and match up with the stain and polish, and the violin is complete with the exception of the special fittings for the swivel needle, which is made from the old-fashioned gramophone sound-box—that is, the arm piece and pivot rest attached to the disc.

dried sufficiently it will have to be polished with shellac.

By applying the shellac to the violin with a wad of cotton wool saturated with the varnish and covered with a nice piece of linen, with a to-and-fro movement, you will soon see a nice polish. You can carry on this process until you have a polish like a mirror. Next, the finger-board can be blackened by rubbing on some waterproof Indian ink and slightly polishing it. Then screw a tiny round-headed brass screw at top of finger-board, so that the slot will run in line with the finger-board. So much for the woodwork.

### The Final Steps.

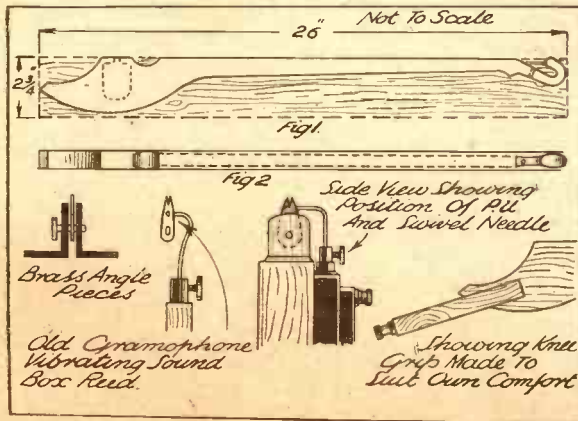
You can now fit finally the pick-up as described earlier in the article, and, when dry, clean up carefully, glass it and match up with the stain and polish, and the violin is complete with the exception of the special fittings for the swivel needle, which is made from the old-fashioned gramophone sound-box—that is, the arm piece and pivot rest attached to the disc.

If you follow the sketches you will find them self-explanatory.

Complete the violin from the P.U. terminals. Take two leads and fix to the two terminals on the knee rest, and all is ready for trying out. But don't forget that, like all other violins, if not properly mastered, you will get all sorts of cat calls and the like.

It must be played with the same skill and feeling as required for an ordinary violin.

## THE MAIN CONSTRUCTIONAL DETAILS



The dimensions of the 'fiddle and the method of fitting the pick-up unit are shown in this sketch.

detector and 2 L.F. stages, where pick-up attachments are incorporated, and the volume and quality will depend entirely upon the power of your own amplifier and, to some extent, on the way in which you play it. However, I imagine that is generally understood.

I propose that we proceed now to tackle a most interesting and fascinating piece of work. To begin with, we will choose a suitable piece of wood about 26 in. long; oak, mahogany, or any other piece of hard wood will do. This will cost but a trifle.

### The Preliminary Shaping.

Plane the broad and narrow side of the wood and draw to shape as in Fig. 1; fairly near the shape will do, as a slight variation either in the length or shape of the wood matters very little. You now cut out with a fret or keyhole saw, or, better still, let your joiner run it round with his band saw. He will do this for you

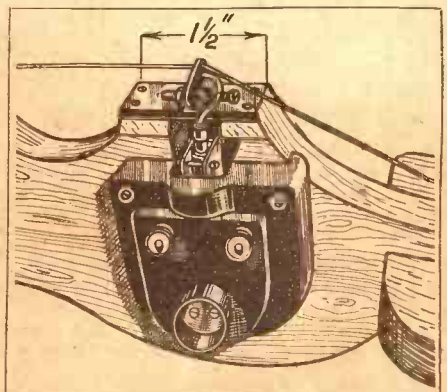
a hole so as to fit the violin pin, which you can make yourself or purchase cheaply. The hole has to be tapered from the back, so that the pin has a nice tight fit.

The next thing is to make a knee rest, but I would prefer each one to experiment with this so as to suit his own comfort. You will see the idea in the diagram. This can be screwed or glued.

A rasp is required now to round off the square edges of the wood at the back of the neck to ensure smooth movement of the hand when playing.

When it is perfectly round a good glass-papering is necessary. When you are perfectly satisfied that it is smooth enough we shall make a start staining and polishing the instrument. This is the stage when you will begin to appreciate the look of the violin, for it certainly will look thoroughly professional. The staining is done by soaking a pad of linen with bitumen stain and rubbing it into the wood as evenly as possible and allowing it to dry. Then when it has

## FITTING THE PICK-UP



A close-up of the pick-up attached to the phonofiddle. Note how the wire string is passed over the "needle."

A volume control could be fitted so as to be worked by a small foot pedal in order to increase or decrease according to your music.

I now await reports, and wish you all the best of luck.



## RADIO CONTROLS THE TRAFFIC

LONDON readers will have been interested of late in the autogyro hovering over London, but they would have been even more interested if they could have seen the observer in the front cockpit with his little Morse key strapped to his right knee.

This is not, of course, the first time the autogyro, aided by two-way radio communication, has been used in connection with traffic control. Habitues of the Epsom racecourse on Derby Day will already be familiar with the invaluable aid given by this type of machine in quickly relieving congestion at some important junction in one of the approaches to the course.

### Compact and Light Gear.

So successful was the scheme on these occasions that Scotland Yard is now experimenting with the idea of extending the principle to traffic control, and also for other police purposes such as the catching of smash-and-grab raiders, who are so often successful in eluding their pursuers in a crowded city. The Marconi transmitting and receiving equipment is an important link in the chain, for it enables the necessary hundred-per-cent reliability of communication with the ground police to be achieved.

It will be appreciated that there is little room in the small cockpit for elaborate radio gear, and consequently the instruments are specially designed for compactness and light weight. Actually, the total weight of both the transmitting and receiving panels, together with the batteries and all accessories, is no more than 70 pounds.

### A Powerful Combination.

As the photograph on this page shows, the apparatus is installed below the dashboard of the observer's cockpit; the Morse key, for continuous-wave telegraphy, is employed, being conveniently placed on his right knee. Two P625 valves are used in the transmitter, one being a master oscillator and the other acting as amplifier in the magnifier circuit.

The receiver is a straightforward three-valve arrangement, consisting of an S.G. high-frequency valve, detector and low-frequency amplifier. The types of valve utilised are one S410 and two of the L410 type.

An interesting feature of the apparatus is

that only one high-tension battery is employed. This is a 240-volt unit, and has a tapping at 120 to supply the receiver.

The power supplied to the anode of the second valve of the transmitter is 4 to 5 watts, and a 6-volt accumulator is used to light the filaments of the transmitting valve. This accumulator, incidentally, is also used for the valves in the receiver.

The properties of the autogyro, of both flying quite slowly and of being able safely to come low enough to enable details on the ground to be discerned clearly, render

### A POLICE MESSAGE



The heading photograph shows the Marconi-radio-equipped autogyro at Croydon Aerodrome. A close-up of the apparatus, packed away in the cockpit, is seen in our other illustration, where the observer is busy transmitting his message to Scotland Yard by means of the Morse key strapped to his right leg.

it ideal for the purpose. It will be appreciated that a police car on the ground, linked by radio with an autogyro, could make a pair of most formidable weapons with which to fight the motor bandit.

For instance, it would be of little avail to the escaping criminals to double down a side turning, and traffic blocks would serve them but slightly in making a get-away.

As a matter of fact, the value of aircraft collaborating with ground police in this

way has already been demonstrated with a Fox Moth, a machine of normal type. Details of these tests were given in POPULAR WIRELESS recently.

It requires but little imagination to see how much more useful the autogyro could prove in awkward circumstances. Indeed, it may not be long before every large city will have its own machine regularly hovering over the busy thoroughfares.

The police autogyro was also used recently for crowd control on the occasion of the Black-shirts and Anti-fascist demonstrations in Hyde Park. But the noise of its engine when it was flying low was not very welcome to the speakers. A. S. C.

## SONGS AND THEIR WORDS

Many Interesting Talks—The Foreign Legion—Perfectly Balanced Singing, etc., etc.

"HALF an hour with Effie Atherton, Ronald Hill, Van Denys and Greta Keller." Not a very high-sounding programme title, is it? Yet such is the reputation of these artists that we tuned in to hear them, confident that we should be well entertained. What is the secret of their success, collectively? Chiefly, I think, because theirs is a swift production. We are kept listening. There is a variety of good tunes, too, the best being "Only One More Night," "Moonglow" and Greta's little Viennese songs.

You note that I say good tunes. If I described the words I should call them rubbish. The words of the type of song I am alluding to are always unworthy of the tunes. This is surprising. A broadcast artist is only what he sounds. A stage artist is often what he looks. The broadcast artist, then, who sings a funny or a sentimental song should see to it that his song sounds sensibly funny or sensibly sentimental.

What I object to in a song is the inclusion of a line just because it rhymes with the preceding one. Often it has no meaning whatever and is totally irrelevant. One reason why I like the old music-hall type of song is because the words were considered as important as the tune. To-day, words don't seem to matter.

### Some Welcome Talks.

Now that talks are few and far between, when we are treated to one we invariably like it. "Dr. Henry Coleman on "Choral Music" is a case in point. It was an interesting and helpful talk, particularly to listeners who have leisure time, are musically inclined, but have no opportunities to combine the two.

The League of Nations talks haven't the drawing power of some. Yet I suppose we listen to them more from a sense of duty than anything else. Sir Arthur Salter was unfortunate in the third talk of the series in having to follow a talk by someone who butted into the second News Bulletin that evening on a topic connected with the British Association.

There were some surprising revelations in the ex-Foreign Legion man's talk about the Foreign Legion. Well, it is nice to know the truth, though it is rather startling to be told that everything we have hitherto read or seen on the screen about the Foreign Legion (or at any rate the brutal aspect of it) is a pack of lies. "The Foreign Legion," he said, "may not be a bed of roses, but it is certainly not a hell on earth."

Tom Farndon's talk on Speedway Thrills was good. I like these Saturday evening sports talks. I also like the sports bulletins of the same evening, although they irritate me sometimes. For instance, I was irritated by one recently because I had to wait an eternity before the football results came along. Cricket, walking, golf, sculling and racing, all were exhaustively dealt with first. Yet Saturday is football's great day. It beats me!

(Continued on page 60.)



# ONE ONLY

The Benjamin 7-pin Valveholder is one only of the very complete range of radio components for the Constructor who requires efficiency and reliability before everything else.

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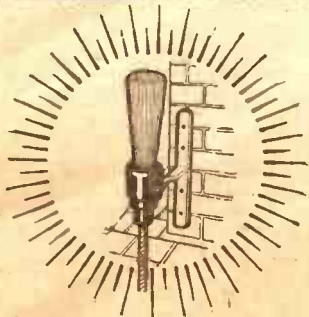
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Neater, and far more efficient than the old-fashioned, ugly pole aerial. Enables you to tune in stations never heard before on your set, increasing volume and reducing interference. Is non-directional, designed for modern congested wavelengths. Just the aerial for flat-dwellers.

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### POST THIS COUPON NOW

Messrs. H. Clarke & Co. (M/CR.), Ltd., Patricroft, Manchester. Please send me FREE copy of Folder 95, telling me how to run my battery set from the Mains.

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## "THE ORCHESTRA WILL PLAY..."

When a band strikes up in a B.B.C. Programme how many individual instruments can you recognise on your set? Here are some details concerning the various orchestras that will help you to pick out the players

**V**IOLIN, flute, clarinet, trumpet, trombone—how many of the instruments can you recognise when an orchestra broadcasts?

It is not easy, except for the skilled musician. But if the quality from your loudspeaker is good enough it is very entertaining to try to identify individual instruments as they rise to prominence in the work that is being played.

In even the smaller orchestras, such as the B.B.C. Theatre Orchestra, thirty or so musicians are employed, playing over a dozen different types of instruments. So your set's reproduction and your own ear for music must be really good if you are to get them individually distinct!

### Can You Pick Them Out?

The smallest of the regular B.B.C. orchestras is that known as "Section C." When next you hear it announced, why not try to analyse its instrumental balance?

There are forty players in this particular combination. Does your set distinguish the various instruments they play?

About half of "Section C's" forty players are "strings." There are six first violins, four seconds, four violas, four cellos and three double basses.

The other instruments are flutes, oboes, clarinets, bassoons (two each of all these), four horns, two trumpets, three trombones, one timpani and one harp.

That makes fourteen different classes

of instrument to listen for in this one combination, "Section C." The larger B.B.C. orchestras have tuba and percussion instruments also. And it has to be a good loudspeaker to do justice to them all!

"Section B" is a much larger orchestra, comprising seventy-nine players as against the forty in "Section C." Both sections together, one hundred and nineteen players in all, make up the full B.B.C. Symphony Orchestra. No wonder it sounds majestic!

It may be wondered where "Section D" and "Section E" come in if the

### PURE REPRODUCTION



In order to bring the orchestra "to life" as far as possible dual-matched loudspeakers are used in the H.M.V. "High-Fidelity 15-valve Autoradiogram" shown above.

full orchestra consists of the two first-named sections. Like "B" and "C," Sections "D" and "E" together total one hundred and nineteen players, and are, in fact, alternative divisions of the B.B.C.'s full orchestral strength.

In "Section D" there are seventy players and in "Section E" forty-nine. Playing together, these two sections would make the full B.B.C. Symphony Orchestra, just as "Section B" and "Section C" would.

It should be realised, however, that each section is quite complete in itself. Its number of players and the balance of its instruments are designed to do justice to the particular type of music which is entrusted to it.

And it will be noted that there is no "Section A"; the full combination of "B" and "C" or "D" and "E" is always referred to as "The B.B.C. Symphony Orchestra."

### The Full Combination.

Its international renown must be very gratifying to the B.B.C., for it is barely four years old, having made its debut in the first of the B.B.C. Symphony Concerts at the Queen's Hall on October 22nd, 1930. And now France has paid us the compliment of forming an eighty-strong orchestra on similar lines.

In musically-minded Germany a broadcast by the B.B.C. Symphony Orchestra is considered quite an event. The sheer drilled efficiency of the huge combination inspires admiration.

And this is what you hear when you listen to the full B.B.C. Symphony Orchestra—twenty first violins, sixteen second violins, fourteen violas, twelve cellos, ten double basses, six trombones, five each of flutes, oboes, clarinets, bassoons and trumpets, eight horns, one tuba, two timpani, three percussion and two harps!

Try to visualise them next time you hear the announcer say "The orchestra will play..."

### NEW VARLEY COMPONENTS.

**V**ARLEY have produced a new range of iron-cored tuning coils which are known as the Varley "Duo-Nicore." They are extremely compact, and are little larger than H.F. chokes of normal dimensions.

And yet they are very efficient, and that is due to the fact that they employ the new iron-core technique. By this means they are able to assume efficiencies considerably superior to air-cored coils of larger sizes.

### Ingenious Coupling Adjustments.

With standard variable condensers they cover 200-550 and 900-1,900 metres, with switching of a simple kind not integral with the coils themselves.

Besides ordinary aerial and H.F. transformer types, these Varley "Duo-Nicore" are made in types suitable for all kinds of superheterodyne circuits. There are, for example, oscillator coils for mains and battery heptodes and for triode-pentodes, in addition to

### FOR THE HOME CONSTRUCTOR

Some Items of Interest to All Set Builders.

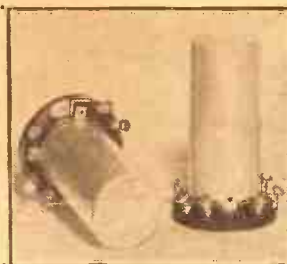
intermediate transformers for 110 and 450 kc. The I.F. transformers are similar in appearance to the tuning coils, but on each a coupling-adjustment screw projects through a slot on the side.

An important feature of value which practical constructors will appreciate is that the coupling can be adjusted after trimming with negligible effect on this.



### JUST OUT!

The two Varley components described in the text. On the left are the superheterodyne coil units, while on the right are the "Duo-Nicore" tuning coils.



The trimming is done by means of two concentric controls at the top of the component.

Varley superhet components have always been entirely satisfactory, and so it goes almost without saying that these new productions are in every way excellent.

### "RADIO SERVICING SIMPLIFIED."

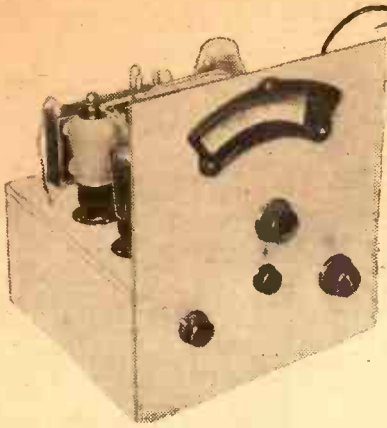
**T**HIS is the title of an extremely useful new book published by the Automatic Coil Winder and Electrical Equipment Co., Ltd., of Winder House, Douglas Street, London, S.W.1, at the modest price of 2s. 6d. (or 2s. 9d. post free).

It is written in simple language, and there are many photographs and diagrams.

Every aspect of fault-finding is covered, and there are chapters on valve, resistance and condenser tests, and inductance and capacity tests, supplemented by clear graphs for determining values.

"Radio Servicing Simplified" should prove as useful to the home constructor as to the service man, and we advise both classes of readers to secure copies.





# The DOUBLE-PENTODE THREE

The question of cost of operation, apart from the price of a receiver, is one that affects the battery-set user very closely. It is so easy to run up a considerable yearly bill on H.T. consumption alone, and it needs special care if that bill is to be kept within reasonable limits. Here is a set design that should appeal to a large number of home constructors owing to its inexpensive operation.

DESIGNED AND DESCRIBED BY THE "P.W." RESEARCH DEPARTMENT.

**T**HERE are two forms of economy—the real and the false. The trouble is to decide whether any particular money-saving scheme you have in mind belongs to the former or the latter.

It may be decided that it is desirable to cut down the cost of this or that, to reduce the expenditure in the one or other sphere, and in some cases it is easy to see exactly what the reduction will mean to you in pounds, shillings and pence. In others, the real state of affairs may be masked by an apparent saving only.

This is very often the case where radio is concerned, for in this realm it is easy to economise falsely, especially when it comes to the construction of a receiver.

### Choosing the Components.

We do not mean that one is apt to build blindly the wrong set, ending up with a receiver that is either useless or goes only half-way towards what is required. But rather do we refer to the usually false economy that is so apt to take place when the choosing of the components for a set is carried out.

This economy-of-choice process can occur at two junctures in the life of a receiver. The first is when the cost of parts is allowed to govern the actual type of set to be built; and the other is when the cost of the components is combed and sifted after one particular design has been chosen.

Let us take the two cases in order. In the first place, the economy (generally false) comes about in this wise: It is decided that a new radio receiver is desirable, and it is also

decided that it must not cost more than so much to make. Moreover, it must not be too expensive to run—a feature that is always in the mind of the prospective battery-set builder.

With the cost fixed in mind, the would-be constructor usually casts around for a circuit that will give him what he requires in the way of stations and power, at the cost he has marked down as his maximum.

And he often fails in his quest by only a narrow margin. What happens is that he finds a set design that will suit in everything but price, but this latter is just a little more than he can afford. The alternatives are to find another set that is within the price, or to reduce the cost of the design he fancies by some means or other.

The first alternative may prove to be a real economy, or it may be a false one, but the latter is almost certain to prove false.

If, in the first case, a second design is found that is cheaper and gives practically all that is required, and gives it efficiently,

then the economy is real. If it merely gives its results with less efficiency—for instance, less selectivity or poorer quality—then the economy is false. It would be better in such an instance were the owner to choose a set that was less pretentious in its performance, but that carried out its more limited tasks really well.

In the second case, the trouble comes when a design is slightly altered technically to allow of the use of inferior components or fewer parts (decoupling is often omitted) in the hope that economy will result. In this case the design is made subservient to the components on hand, or to those considered to be of sufficient price.

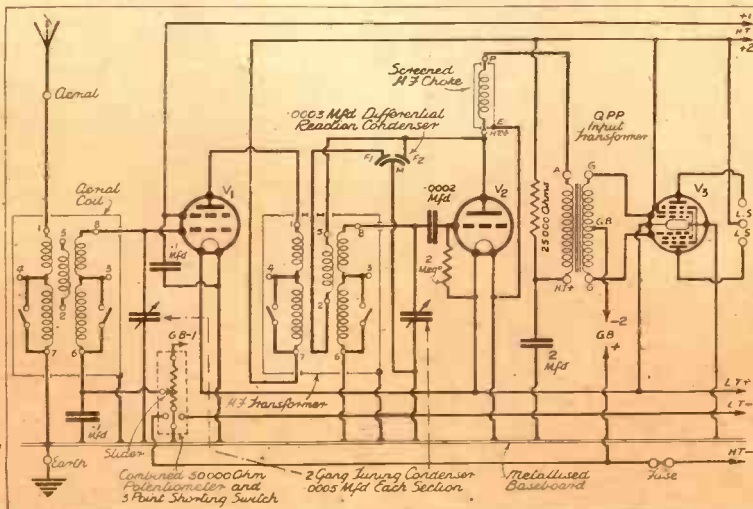
### Cutting Down Cost.

This type of economy is very closely allied with the second main form we mentioned—that of reducing the cost of a particular design, not by altering it in some circuitual way, but merely by using inferior components in an effort to cut down the cost to that desired.

Such a procedure must almost inevitably prove a bad investment. It cannot be too strongly condemned, for a set design stands or falls by the parts the designer has chosen. It is for him to consider the ways and means when he is designing the set, and it is for the set builder to choose or totally reject any design according as it satisfies all his needs or falls short of his requirements in one way or another. And one of these requirements is obviously that the cost shall be within the desired limit.

(Continued on next page.)

## MULTI-MU S.G. AND Q.P.P. OUTPUT



The circuit of the receiver shows at a glance how sensitivity and selectivity are achieved with the minimum of cost.

### FEW PARTS

- 1 Polar Minor 2-gang tuning condenser, each section .0005 mfd.
- 1 Polar "Arcuate" drive for above (marked in degrees).
- 1 pair Telsen matched screened coils, type W.287.
- 2 Clix 4-pin valve holders, chassis-mounting type.
- 1 Clix 7-pin valve holder, chassis-mounting type.
- 1 Telsen screened H.F. choke, type W.341.
- 1 T.M.C.-Hydra 2-mfd. fixed condenser, type 25.
- 2 T.C.C. 1-mfd. fixed condensers, type 250.
- 1 Dubilier .0002-mfd. fixed condenser, type 620.
- 1 Graham Farish 2-meg. "Ohmite" grid leak.

- 1 Graham Farish 25,000-ohm "Ohmite" resistance, in vertical holder.
- 1 Graham Farish .0003-mfd. differential reaction condenser.
- 1 Bulgin combined 50,000-ohm potentiometer and 3-pt. shorting switch.
- 1 Varley Q.P.P. input transformer, type D.P.30.
- 1 Peto-Scott "Metalex" (both sides) chassis,

- 5 Clix indicating terminals.
- 1 Peto-Scott plywood panel, 11 in. x 10 in. x 1/8 in.
- 2 Peto-Scott terminal strips, [4 1/2 in. x 1 1/2 in.]
- 5 Clix wander-plugs.
- 2 Clix accumulator spades.
- 1 Felling & Lee wander-fuse.
- 1 coil B.R.G. "Quikon" connecting wire.
- Screws, flex, etc.
- 1-yd. length Goltone screened sleeving.

### ARE USED

## INEXPENSIVE TO CONSTRUCT AND ECONOMICAL TO OPERATE

## THE DOUBLE-PENTODE THREE

(Continued from previous page.)

Remember that in radio, as most things, you cannot have a bit of everything and expect to get high-class results. It is better to have a few really good points than a lot of mediocre features. If you want selectivity, sensitivity, plenty of power, ease of control, good quality, etc., for a ridiculous figure, you will inevitably be disappointed. You can get a little of most, without reaching perfection in any, or you can have a very high degree of one or two of the requirements, forgoing the others. To get *all* you need in superlative degree necessarily means a high cost.

We are spending rather a lot of time stressing the point of economy because we do feel that there is often a great deal of misapprehension about the whys and wherefores of radio sets where the cost question is concerned.

### A High Degree of Selectivity.

But we do not want you to feel down-hearted about it. It is wonderful what a high degree of efficiency in a number of departments can be achieved with careful design and at a reasonable cost.

It is to obtain as much as possible at as low a cost as is feasible without sacrificing efficiency that we have designed the Double-Pentode Three. This set is not the last word in everything that a set could be. Such a claim would be ridiculous. But it is an example of what can be done in the way of moderate economy in construction and a high degree of saving in running costs.

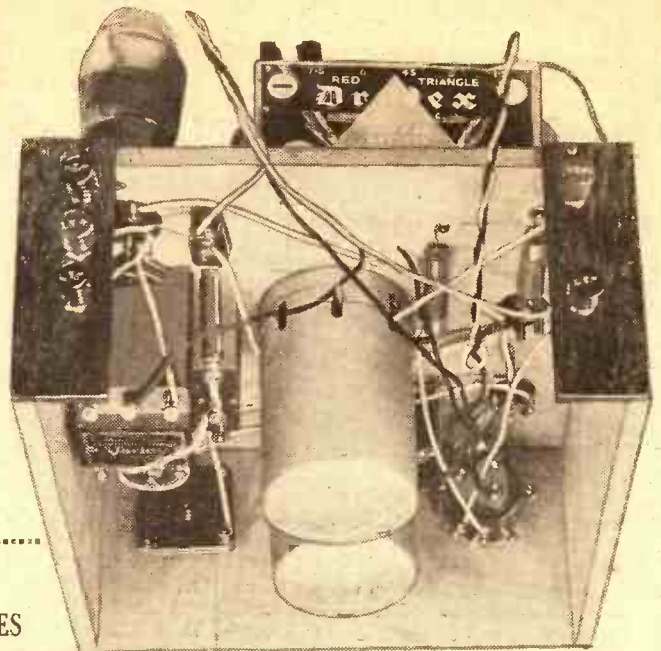
But it must be recognised that all the economy that is advisable *has been made*, and that constructors should attempt no further price cuts by the use of components other than those specified in the list of parts.

And now a few words about the Double-Pentode Three. Firstly, it is a set that belongs to the "pay-for-what-you-use" fraternity; in other words, the output stage is quiescent, and the power drawn from the H.T. battery is in direct ratio to the power of the reproduction.

## VALVES AND ACCESSORIES

Make	S.G.	Det.	Output.
Cossor	220V3	210HF	—
Dario	TB452	TB282	—
Hivac	VS215	H210	QP240
Marconi	VS24	HL2	QP21
Mazda	S215VM	HL2	—
Osram	VS24	HL2	QP21
Tungsram	SV220	HR210	—

W. B. "Stentorian" Standard Model loudspeaker.  
120-volt G.E.C. H.T. battery.  
9-volt Drydex grid-bias battery. 16 $\frac{1}{2}$ -volt required for Q.P. 210. (See text next week.)  
2-volt Lissen L.T. battery.  
Electron "Superial" aerial wire.  
Graham Farish "Filt" earthing device.



An unusual view of the set, showing the under-chassis layout and most of the wiring.

The result of this is that on a local or other strong station the anode current consumption of the S.G. valve is automatically reduced as the volume of reception is reduced by means of the potentiometer.

Thus in this stage we can say that we pay in direct ratio according to the degree of sensitivity we need in the high-frequency stage of the set. Quite a fair scheme, isn't it? We pay for our power, and for our sensitivity for distant-station getting just as we require it.

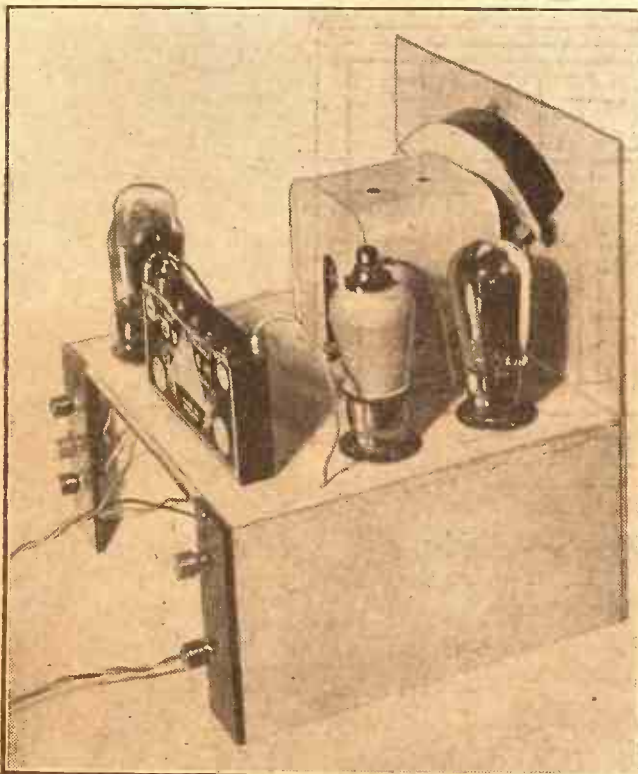
The detector stage is of the normal type; transformer coupled to the output valve. Selectivity is of the usual order obtainable with two tuned stages, though the judicious use of reaction in conjunction with the multi- $\mu$  volume control can greatly increase it. In this regard the selectivity of this set is greater than that of the ordinary S.G. detector circuit, which has not the S.G. volume control.

### Perfect Stability Ensured.

Simplicity in construction and operation have been borne well in mind in the design of the Double-Pentode Three, and the use of the "Metaplex" chassis construction has enabled a very high degree of screening to be obtained, with the result that perfect stability and the maximum efficiency from each stage have been ensured.

Both the tuning coils are screened, and so is the H.F. choke in the detector anode circuit; while the above-and-below base-board wiring enables short leads to be maintained with greater ease than the normal type of single-storey construction.

But we will say more about the constructional details of the set next week. Suffice it here to add that the receiver is designed with the object of meeting the needs of the majority of battery users, who require good selectivity with fair station-getting properties (the set will get a round dozen or fifteen without trouble at good strength on the speaker) and a peak power of output that is comparable with that given by many mains receivers, yet with remarkable economy of H.T.



A clean upper deck is achieved, with ample space for the grid-bias battery.

Such an arrangement immediately reduces the running costs of the set to nearly half what they would be were the same power of output to be obtained with an ordinary output valve.

The special double-pentode valve (a Q.P.P. type) automatically looks after the H.T. question, and, unlike the old method of using two separate pentodes for Q.P.P., (quiescent push-pull) it requires no tricky matching of bias voltage and anode currents.

### Volume Control.

At the other end of the receiver is another *real* economy scheme that acts both as an H.T. saver and as a volume control. It is nothing more or less than the multi- $\mu$  S.G. valve, with a potentiometer control across the bias battery.

# Every set a SHORT WAVE set with the BRITISH GENERAL

ALL WAVE TUNER

This famous coil covering all wavelengths from 14.5 to 2,000 metres still remains the most successful of all all-wave tuners.

Its remarkable popularity is due to the superb workmanship, reasonable price and above all its unequalled efficiency.

Easy fixing and simple tuning.



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**9/6**

British General Manufacturing Co., Ltd., Brockley Works, London, S.E.4. Telephone: Lee Green 5055.

From all dealers or direct.

# AMPLION

## "RADIOLUX" RECEIVERS—RADIOGRAMS

These new models enhance the Amplion reputation for quality, reproduction, appearance, sustained service and entertainment value.



### "RADIOLUX" SUPERHET

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

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

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

A.C. MODEL. H.P. Terms: £1 6 6 Deposit and 12 payments of £1 1 0. **12 GNS.**

D.C. MODEL, 190/265 volts. H.P. Terms: £1 8 0 Deposit and 12 payments of £1 2 9. **13 GNS**

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



### "RADIOLUX" SUPERHET RADIOGRAM

A very remarkable instrument with all the outstanding features of the "Radiolux" Superhet Receiver mentioned above.

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

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

H.P. Terms: £2 17 9 Deposit and 12 payments of £1 15 0. **21 GNS.**

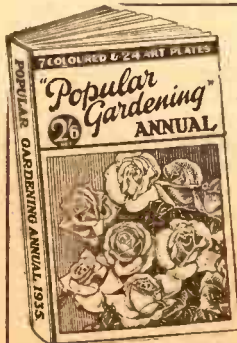
"Radiolux" Radiogram. 36" High. 23" Wide. 19" Deep.

Amplion offer the finest "Superhet" value in radio entertainment that it is possible to secure. The name Amplion is your guarantee of quality, performance and craftsmanship.

Descriptive Literature "P" on request.

## AMPLION (1932) LTD.

82-84, ROSOMAN STREET, ROSEBERY AVENUE, LONDON, E.C.1.



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No enthusiastic gardener should be without a copy of POPULAR GARDENING ANNUAL for 1935. Solutions to many of the problems which beset his path will be found within its pages, as well as a host of instructive features on making a water-lily pool, trellis, crazy paving, garden steps, etc., and many other useful features

### POPULAR GARDENING ANNUAL

On Sale at all Newsagents and Booksellers 2/6

## MODERN RADIOGRAM CABINETS ON H.P. TERMS



CASH PRICE **69/6** OR C.O.D.

Specifications of Two Models in our Range.

"Westminster" 3' 3" high, 2' 8" wide, 1' 4" deep. Made to take all makes of pick-ups (turntables, motor and speakers); also sets up to 18" x 8". Holes will be drilled or vignettes (free of charge). Side cupboards will take both 10" and 12" records. Complete with chromium handles and guaranteed clock. Supplied in walnut, oak and mahogany at one price.

H.P. Terms: Deposit 15/-, 6 monthly payments of 10/6.

"Windsor" 3' 3" high, 20" wide, 1' 4" deep. Taking all accessories as "Westminster" model except clock and side cupboards. Both models are fitted with hinged motor-boards. Supplied in walnut, oak and mahogany at one price.

H.P. Terms: Deposit 10/-, 6 monthly payments of 6/-.

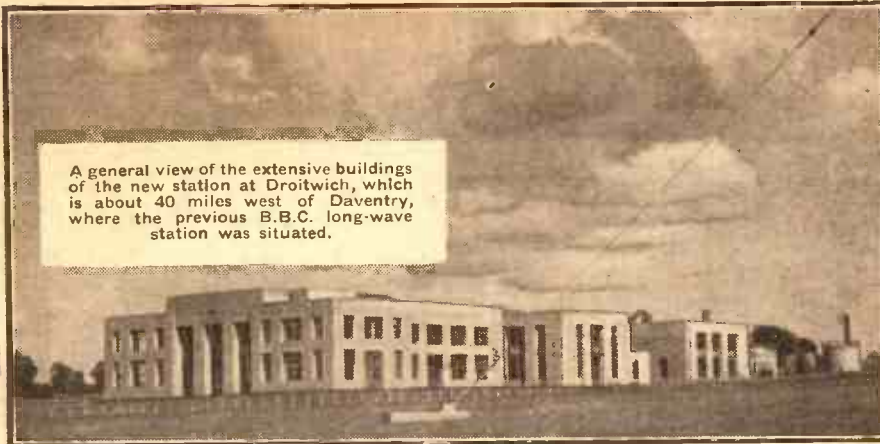


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W. S. WILKIN NELSON MEWS, SOUTHBEND, ESSEX. Phone: 4330 (Dept. A).

Carriage Paid.

Catalogue Free.



A general view of the extensive buildings of the new station at Droitwich, which is about 40 miles west of Daventry, where the previous B.B.C. long-wave station was situated.

ALL the papers have lately been full of Droitwich—its enormous power, its intricate apparatus, its unique efficiency.

But nobody seems to have noticed that underneath that imposing exterior Britain's Super-Station is a friendly fellow, full of interest to the non-technical listener.

When I turned in off the main Birmingham-Worcester road to give "P.W.'s" compliments to Droitwich, I decided I could take all the vaunted technical stuff for granted—the B.B.C. locality tests prove more than any inspection ever made. So, instead, I looked for the *real* Droitwich—for the individual touches and incidental trimmings that give a station a character of its own.

#### That Tall Mast.

And my luck was in, to begin with, for the engineer was an old friend whom I hadn't seen "since we won the war together," as he cheerily put it! He showed me round with enthusiasm.

"Pity we can't go up the mast," he said, "but the lift's out of action to-day. Take us three-quarters of an hour to walk up.

"The view's gorgeous at 700 ft. It's half as high again as any other B.B.C. station's. Bit breezy, of course, and the top is often cloud-wrapped.

"That half-way platform? Oh! That's an aircraft light. Three in all: one half-way up the mast, one right at the top and one on the short post at the foot, to warn pilots.

"No, we don't use neon or fog-piercing lamps. Just a three-hundred-watt cluster in each.

"It was a bit of a job to keep H.F. from escaping down the lamps' supply leads, but that covered-in choke got us over that difficulty.

#### Ploughed-in Earth.

"Complicated earth system? Well, yes—but we've none of those buried-on-edge plates which used to be thought necessary. Just a huge radial network of wires. 'Smatter of fact, we *plough* them in, so the wires lie in the furrows just under the surface. (An ordinary farm plough, but it makes a grand job of the earth!)

"We don't worry about lightning, because the spark gaps at the mast foot and lead-in take care of that. They're

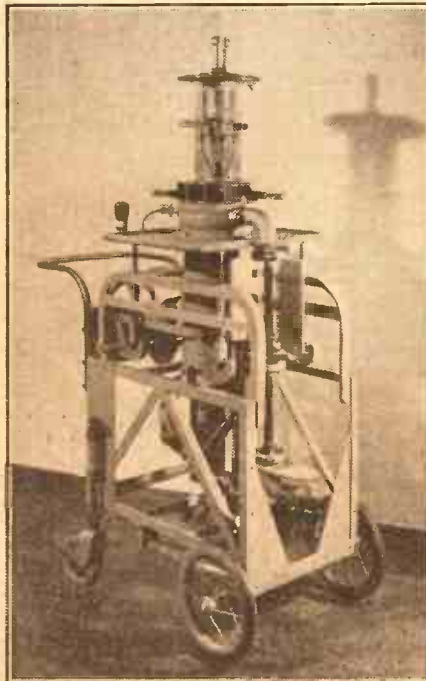
## MY VISIT to DROITWICH

by  
P. ROBERT BIRD

Some intimate details of interesting items that make up the "personality" of the new high-powered long-waver.

straightforward air gaps, an inch or two apart, and in thundery weather you can see them sparking away quite happily.

#### THE VALVE PRAM



When a valve burns out, a new one is lowered by a pulley arrangement on to this special pram, which protects it from shock and vibration while it is rushed over to the transmitter.

"We have put in two aerial transformers, though, in case of a burn-out, and that's something that none of the other stations has got.

"Good-looking transmitting plant, isn't it? That chromium steelwork gives a fine finish. See those Klaxon horns over the machines—if anything blows out they raise the very devil of a row until the engineer puts it right. No Silence Zone about them if anything goes wrong!

"The whole job is 'mains-driven.' We only use batteries for lights and odds and ends when the machines aren't running. And each valve's filament has its own little generator, whose life-work is to supply that particular valve with L.T.

#### Completely Self-contained.

"A breakdown in the electricity grid system wouldn't matter two hoots to us—we have our own power-house in the building; and enough oil in the underground tanks to run the station for months, if need be. In fact, we are completely self-contained here, with studio and all.

"You must have a look at the valve room and see our rubber-tired pram! When a valve burns out we lower the new one down by this pulley arrangement, put it in the pram specially made to hold it free from vibration and shock, and trundle it over to the transmitter in next to no time!

"Break a valve—whew! What a riot there'd be! I don't know what they cost, but I do know that the price of one would buy me a much better car than the one I'm running now.)

"Got to go already? Why, we haven't seen anything yet. But drop in again some day, and we'll go over the whole job together with a fine comb. You'd love it, for when you get to know Droitwich it's a grand station!"

## THE SPEAKERS THAT SPOKE TOO LOUD!

By G.T.K.

DURING the opening days of the recent Scottish Radio Exhibition an amusing incident occurred in connection with the B.B.C. theatre which provided the engineers with a pretty problem and in the solution of which an unconscious but striking tribute was paid to the sensitivity of the new W.B. "Stentorian" speakers.

It appears that from the very first day of the Show serious interference with the performances inside the theatre was caused by the demonstration of the speakers on the various stands, and as a temporary measure the engineers found it necessary to cut down the output from the amplifier supplying the various speakers.

There followed an inquest to find out how the trouble might be minimised without entirely rebuilding the walls of the theatre itself, and upon investigation it was found that if the main feed lead to the W.B. "Stentorian" speakers was

(Continued on page 61.)

# SPECIFIED

FOR THE P.W.  
**DOUBLE  
PENTODE  
THREE**

Thirty-six years of specialised engineering go to the design and construction of every Varley product. That is why the Q.P.P. Input Transformer illustrated was specified in the "Double Pentode Three." The designer knew that he could depend on Varley. Follow his advice and use the Q.P.P. Input Transformer in your "Double Pentode Three."



**Q.P.P. INPUT TRANSFORMER**  
List No. D.P.36 - - 13/6

# Varley

(Proprietors: Oliver Pell Control Ltd.)

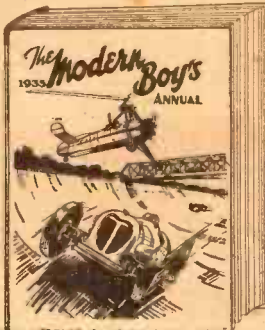
Advertisement of Varley (Oliver Pell Control Ltd.), Bloomfield Road, Woolwich, S.E.15.  
Telephone: Woolwich 2945.

## Missing Death by Inches!



**T**HUNDER of engines, scream of tyres—the crash of two-mile-a-minute racing cars in awe-inspiring collision! Read in MODERN BOY'S ANNUAL about the world's most amazing perils—eye-witness accounts of thrills and hairbreadth escapes at high speed! See the photos gathered from all parts of the world of these death-defying contests.

There's a thrill in every page of MODERN BOY'S ANNUAL—the book that tells the up-to-date boy all the things he wants to know about the latest wonders of the modern world. Ripping long complete stories, coloured plates, and dozens of first-class illustrations. Make sure of your copy!



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ANNUAL - 6/- Net.**

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## British Made RADIO VALVES

for **2/9** each post free

Special clearance  
of  
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Send P.O. immediately!  
Only 5,000 available!!

Any valve replaced free of charge if  
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SCREEN-GRID  
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Made by one of Britain's  
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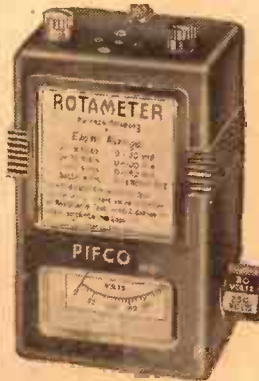
**RADIO & ELECTRICAL WHOLESALE SUPPLY**  
Dept. A.P. 6 Conduit St., Regent St., London, W.1. Mayfair 3163



"Good...that's found  
the fault...  
what a good thing  
I bought myself a  
**PIFCO**

## ROTAMETER

A whole night's job becomes but a few minutes' work with the Pifco ROTAMETER. For quick tracing of troubles there is nothing like it. It tests and checks everything, even itself; any one of eight dials being brought into view by turning the octagonal knob at the side of the instrument. Convenient in size and of amazing accuracy, over 100 tests are possible with this mains or battery radio testing instrument.



Finished in black  
bakelite, complete  
with leads in  
silver-lined case.  
Price .....

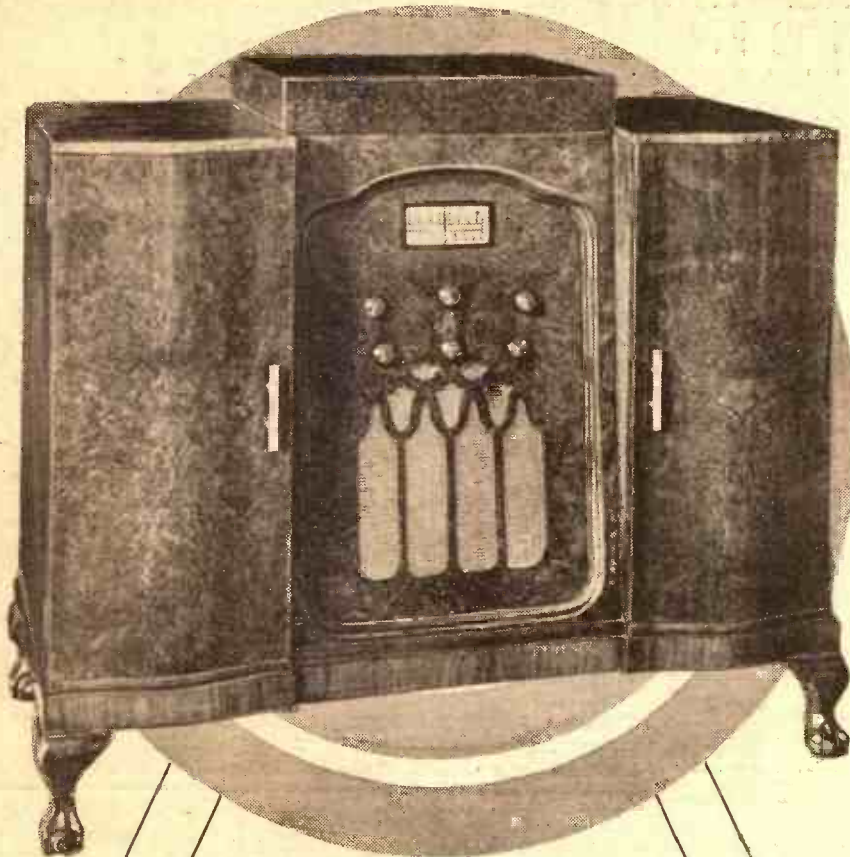
**29/6**

- ROTAMETER  
9 SEPARATE METERS IN ONE.**
- 1-0-8 volts. For low-tension voltage test.
  - 2-0-30 volts. For grid-bias voltage test.
  - 3-0-250 volts. For high-tension voltage test.
  - 4-BATTERY TEST.
  - 5-0-20 m.a. For individual valve test.
  - 6-0-100 m.a. For testing current taken by total valves in set.
  - 7-0-250 m.a. For testing current taken by total valves in set.
  - 8-FILAMENT & RESISTANCE TEST (4,000 ohms). For D.C. and Rectified A.C.
  - 9-Plug-in test for valves.
- Ask your dealer to show you one now or write for fuller details to **PIFCO LTD., SHUDEHILL, MANCHESTER,** and 150, Charing Cross Rd., London, W.C.2.

## PIFCO ROTAMETERS

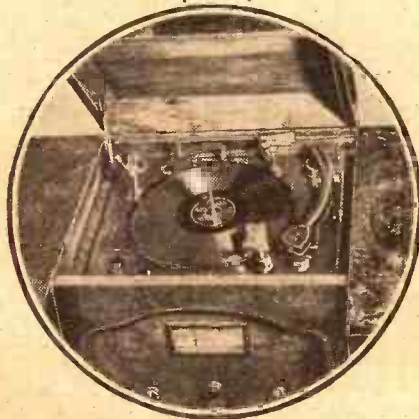
**PIFCO ON THE SPOT WILL TRACE YOUR TROUBLES LIKE A SHOT**

# "NO PARKING"!



A PINNACLE OF PERFECTION—  
JOHN SCOTT-TAGGART'S FAMOUS

## SUPER-GRAM DE LUXE



... there's no need to "park" on the local station with this magnificent instrument when, by the turn of a knob, you can pick your entertainment from the finest that Europe has to offer!—S.T.'s SUPER-GRAM DE LUXE is the most powerful home-constructor instrument that has ever been designed. And S.T. tells you more about it in the

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AND TELEVISION REVIEW.

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HOW TO OBTAIN BETTER RADIO,  
RAPID FAULT LOCATION,  
HOW TO MAKE A TWO-VALVE  
ALL-WAVE RECEIVER,  
ROUND THE DIALS,  
OBTAINING THE FULL REGISTER,  
THE GERMAN RADIO SHOW.  
THESE, AND MANY OTHER FINE  
FEATURES ARE ALL TO BE FOUND  
IN THE OCTOBER NUMBER OF

BRITAIN'S

LEADING RADIO MAGAZINE—

# THE WIRELESS CONSTRUCTOR

AND TELEVISION REVIEW

ON SALE EVERYWHERE.....PRICE 6D.

# RADIOTORIAL

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

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

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

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

## QUESTIONS AND ANSWERS

### WANTED—A GOOD ONE-VALVER.

W. P. (Wolverhampton).—"I am on the look-out for a simple one-valve set and wonder if you have published anything suitable. It is for occasional use in a room remote from the rest of the house, and one capable of bringing in only a few stations is desired.

"As I have a three-valver in the house itself, will one wireless licence cover both sets?"

For getting several foreign stations with restricted aerial facilities, one of the best sets was the famous old "Chitos," which is shown on "P.W." Blue Print No. 23. It does not, however, cover the long waves. "P.W." Blue Print No. 47, the "Wavechange One," is a neat set for headphones, with good long-range capabilities, and covering long waves also.

And the "M.W." Blue Print No. 1, the "Change-Range One," is another efficient single-valver, with efficient long-short waveband switching. They use plug-in coils and are easy to build. The blue prints are 7½d. each (including postage 1½d.), and are obtainable upon application to our Technical Queries Department.

The use of two sets at the same address, with one licence, is permitted under the conditions you will find printed upon the licence form, and if you have any doubt as to how they apply in a special case the local postmaster will advise you.

### MORE INTERFERENCE TROUBLE!

P. D. (Macroom).—"I keep a 5-valve battery superhet for demonstration purposes, and about three weeks ago an electric supply company ran their cables at a distance of about 15 feet from my premises—overhead, of course.

"Now the local supply company are running their power station to supply current until the new company are ready to take over.

"Reception is ideal all day and well into the night while the local power station is not working, but immediately the power is switched on in the streets the noise in my set is appalling.

"Again, at about midnight, when the power station closes down, all the static dies down and reception becomes a pleasure.

"Could you suggest what is the cause of the interference and what remedy you would suggest?"

"My aerial is about 45-ft. high, and at its fullest end is certainly 30 yards from those cables. It runs at right angles almost to them and enters my house at the back, about 35 ft. from their nearest point, the lead-in being about 35-ft. high and dropping down perpendicularly almost to a window not far from the set."

Is the noise a continuous humming sound, or is it more like a constant succession of crackles, roars and splutters?

If it is a regular hum, the position of the new wiring relative to your aerial, earth, etc., is at fault. But from what you say about it, and from the angle of lead-in, etc., we do not think it is a hum, nor that the

position is wrong. It seems far more likely that there is faulty insulation, or some similar cause of sparking, somewhere near, and that this is what is causing the disturbance.

A defective wire, switch, lamp, or anything similar, which has developed a "dud" contact will cause splutters and crackles all the time it is operating, and is liable to affect sets in the vicinity over quite a large area.

In Britain the Post Office engineers will assist in locating and overcoming the interference at the source. It is generally fairly easy to find and cure such a source of disturbance, but it needs the co-operation of the various parties concerned.

This is generally willingly given, so we should try to get the company's engineers interested. If you give them all the assistance you can, with details of times of occurrence and so forth, they may be as glad as you will be to find what is causing the noises.

## ABOUT YOUR CONTROLS



Most listeners expect too much from a tone control. It is usually only a by-pass for taking out certain frequencies.

Obviously a high-note by-pass is capable of filtering away heterodyne interference and similar high-pitched effects. But it should be remembered that it is equally interfering with the wanted sounds of the frequency band over which it operates.

Remember, too, that most tone controls do not "bring up the bass." They take away the "top," and thus emphasise the bass merely by a deficiency of the higher notes.

So in general tone control is a "two-edged" advantage, and should be used sparingly.

### HEADPHONES AND LOUDSPEAKER.

G. C. (Abingdon, Berks).—"Re your reply to S. R. A. (Luton) on page 556 of your August 11th issue. Can this set meet the requirements to give simultaneously really good headphone strength and quiet loudspeaker reception? And is it economical to build?"

"The writer has a hearing disability (occasioned by war service) and must have the 'concentrated' reception for himself of (presumably) earphones, while the set would be used simultaneously by the other two members of the family in a smallish room, and very close to the main street.

"I have no knowledge of wireless, so is it possible for me to put such a set together myself, by means of screwdrivers and pliers, and into working order, from the description in your issue of June 23rd, 1934, or would you supply the diagrams, etc., in my case?"

(Continued on next page.)

## acknowledged THE WORLD'S BEST



The most popular and efficient type of fixed resistance for all general purposes. Better than wire wound. All values 50 ohms to 5 megohms.

Ohms	Milliamps	Ohms	Milliamps
100,000	3.5	10,000	12
80,000	4.24	5,000	20.25
60,000	5	4,000	24
50,000	5.5	3,000	29
40,000	6	2,000	35
30,000	6.75	1,000	40
20,000	8	Other values pro rata	

Heavy Duty type, approximately double the above ratings.

## OHMITE RESISTANCES

1/6 EACH (1½ watts)

HEAVY DUTY TYPE 2/3 (3 watts)

Vertical and Horizontal Holders 6d. each.

# GRAHAM FARISH PRODUCTS

Have you had your copy of "Radio Contact"? 3d. at all dealers, or 4½d. post free from—  
GRAHAM FARISH, LTD., Bromley, Kent.

## RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from previous page.)

That particular set is very suitable to provide what you are after—and it requires only a very slight modification to give "half-strength" on headphones, if you want these less powerful than the loudspeaker.

It will give full-strength on headphones and on loudspeaker without any modification whatever.

If you can handle screwdriver and pliers you can get it going quite easily from the description we gave in our June 23rd number, without extra diagram or anything. (Many who have never built a set before reported it went magnificently as soon as finished.)

We should build it exactly as described, and have your headphones ready, in addition to the loudspeaker.

As soon as it is going well on the loudspeaker, switch off and undo the — loudspeaker terminal's wire.

Put one of the 'phone leads on to this — terminal instead, and the other 'phone lead must then be joined to the loudspeaker wire you took off the — terminal. (This is called wiring the 'phones in series with the loudspeaker.)

Switch on, and the programme will be heard in both loudspeaker and 'phones. Incidentally, you can have the 'phone leads lengthened by flex to any reasonable length, if you use good quality flex and care in use.

If you find when connected thus that the 'phones are much too loud for comfort, you can work them from the first valve only. All you need is an extra 2-terminal block and a .0002-mfd. condenser.

But before buying these, try the arrangement for strength, as follows:

Switch off and disconnect H.T.— Undo the P terminal on the L.F. transformer, and wire the 'phone lead to the terminal, and the other 'phone-lead to the wire (as before). Connect H.T. again, switch on and listen.

If strength is now right, you can make that arrangement permanent as follows:

Mount the terminal block halfway between the other blocks. Fix the condenser behind it, and wire one side to one terminal and the other to the other.

Finally remove the wire from choke to P terminal and join the P terminal to one of the new pair, and the choke to the other one.

These are then the 'phone terminals for permanent use.

### OUT OF TRIM ON THE LONG WAVES.

M. T. (Belfast).—"Thanks to the clear instructions you gave, I have had far better results since I have been able to manipulate the trimmers on my condensers, and I could notice the improvement on each trimmer in turn. But I am still in trouble.

"I find that if I trim on the medium waves, that, unfortunately, holds good for medium waves only.

"Consequently, when I go to long waves, although I can get good reception, if I re-trim I get Moscow and the more distant stations far better. But that second trim throws me out on the medium waves!

"So either I have to re-trim every time I change over, or else I have to put up with results which are weaker on one waveband than they need be.

"How can I get over that?"

Your coils are not quite accurately matched, and that is what is causing your trouble. No re-trimming or tinkering is usually effective, as the whole point of matched coils is that the manufacturers make the coil units of such inductive values that the one trimming adjustment holds good over both wavebands.

The only thing that the owner of matched coils can do is to make sure he does not give one of the matched windings an accidental knock which throws its inductive value out. Rough handling is likely to alter the position of the wires, or spacing, and cause the trouble which you are experiencing.

But once the balance is disturbed the coils have to be matched together again, and that is usually a job that only a manufacturer can carry out—in other words, new coils!

### TESTING A SWITCH.

W. B. (Martlesham).—"How can I test a switch which is totally enclosed so that I cannot see what happens inside?"

"It has three terminals, and I think it is for wavechanging. But not being used to wireless parts I am not sure which terminal I should connect to earth, etc.

"I have tried unsuccessfully to see inside, and I am afraid that it will break if opened farther."

There is no need to see its action, as a battery and a loudspeaker (or 'phones) will tell you exactly what is happening inside it.

Join one side of the battery (any sort, flash-lamp, or grid-bias or a few volts of H.T.) to one of the loudspeaker terminals. Then fit a flex lead to the vacant loudspeaker terminal and another one to the other side of the battery.

If you touch the two leads together momentarily you will get a loud click in the loudspeaker. But if you keep them apart, no click! So that enables you to test from terminal to terminal!

To do this, join one of the test leads to one of the switch terminals. Touch the other test lead on the same terminal—loud click, proving contact. Touch it on the next terminal—probably another loud click, proving contact. Touch it on the third terminal—same result.

Now operate the control knob of the switch and try each terminal again, noting in this case the absence of clicks. Ordinary wavechange switches join all the terminals together in the one position and separate them in the other (long-wave) position. You can thus prove the switch is O.K. without actually seeing its "works."

### DIFFERENTIAL REACTION AND AUTOMATIC VOLUME CONTROL.

P. G. L. (Newcastle-on-Tyne).—"I have been trying to get bias for automatic volume control from a Westector connected to the anode circuit of an ordinary (grid-leak-and-condenser) detector.

"I had it arranged as follows, but it was unsatisfactory:

"A 100,000-ohms resistance across the Westector, and both joined to earth (red end of Westector).

"Other side of these two to plate of det., through .001-mfd. condenser.

"I tried to take off the A.V.C. voltage (through a 250,000-ohms resistance, by-passed by a .1-mfd. condenser) from the junction of

the .001 mfd. with Westector and the 100,000-ohms resistance.

"Was that right? And if so, have I been spoiling my chances by using differential reaction?"

Your connections were in order, but you will have to get rid of differential reaction, as the earthed plates of this are probably by-passing the energy you want. Even when this is done you may find it necessary to experiment with values, etc., as the attainment of A.V.C. is not merely a matter of hooking up components in the correct manner, but is dependent upon the relative degrees of amplification in use and required for the control of the set's input.

### HOW TO FIT A RADIOGRAM SWITCH.

R. R. N. (Gravesend, Kent).—"At the time it was published it said 'A radiogram switch can easily be added if required.'

"Can you give me the right connections? My set is an S.G., detector and 2 L.F. circuit, working a moving-coil L.S."

You do not say if the set is run from batteries or mains, so we will presume the former.

You will need a single-pole double-throw switch, like the Bulgin type 886, and if the detector valve holder is near the panel you can mount the switch on the panel.

If, however, the valve holder is at the back of the set, put the switch on a terminal strip there, or mount it on one of the little brackets sold for the purpose, working it by an extension rod carrying the control knob.

Disconnect the leads wired to the grid terminal of the detector valve holder, and join them instead to one of the outer terminals of the radiogram switch.

Its centre or "moving-arm" terminal must be connected to the grid terminal on the valve holder.

To the remaining outer terminal of the switch join one of the pick-up leads. The other goes to the negative grid-bias plug, and is usually given  $1\frac{1}{2}$  volts negative bias.

## SOME NEW TUNING COMPONENTS

### FERROCART "COLPAK" UNITS.

THE new Colvern "Ferrocart" Tuning coils lend themselves most admirably to "pack" construction, in view of their extreme compactness. It is, therefore, good news that they are to be obtained embodied in this form.

The accompanying photograph illustrates the type "H" Colpak tuning unit. This is more than half a complete set in effect, for it contains three matched "Ferrocart"

coils, a triple-gang condenser and radiogram and on-off switching. The whole is built into a substantial chassis and is all ready to drop into position.

Messrs. Colvern, Limited, of Romford, the manufacturers, supply free diagrams and instructions for building their pack into either a mains or battery set as desired. All you have to do is to send them threepence for postage, saying whether you want the mains or battery diagrams.

The advantages of using a pack of this nature must be obvious to all. There is not only the great saving of component assembly and wiring, but also a much better chance of getting optimum results than when separate parts are used in a similar design of set.

The reason is, of course, to be found in the matching of coils and condensers and the expert testing carried out by the manufacturers.

### FOR SHORT-WAVE ENTHUSIASTS.

THERE are several points about the British Radiophone short-wave condensers which will commend them to critical S.W. amateurs. In the first place, they are fitted with excellent slow motions.

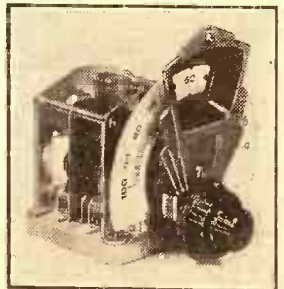
Needless to say, the drive assumes a very considerable importance on the short waves where such failings as backlash and harshness are felt much more keenly than on normal broadcast reception.

### "Delightfully Smooth Control."

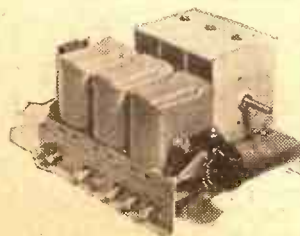
But the British Radiophone drive, with its ball-bearing and precision mechanism, gives a delightfully smooth and effective control.

The condenser itself is built on to a porcelain base, and the amount of solid dielectric within the field is negligible. The pigtails are of the sprung, non-inductive type. The construction of the condenser is sound throughout, and substantial brass end plates and stout brass vanes are employed.

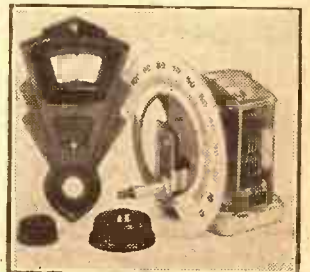
A dial light is fitted. Both single and double types are made.



A two-gang short-wave condenser made by British Radiophone.



The Ferrocart three-coil "Colpak" type H.



The Radiophone single condenser for short-wave work.



# STABILISING YOUR SET

(Continued from page 41.)

instability is generally due to inadequate decoupling or to attempting to obtain a very high overall amplification.

Using ordinary three-electrode valves of battery or mains types, it is not wise to use more than two stages following a leaky-grid detector. If a diode detector is employed, a further L.F. stage can sometimes be added.

With modern valves it is not generally advisable to use more than one step-up L.F. transformer. In battery sets it is best to use resistance-capacity coupling in one stage and a transformer not exceeding 4-to-1 ratio in the other.

When two L.F. stages are used in a mains-type receiver it is advisable to employ resistance-capacity coupling in both stages.

### A Scheme to Try

It should be remembered that as the frequency becomes lower the effectiveness of a decoupling condenser decreases. So if a modification is made in order to improve the amplification of low notes given by a receiver it may be necessary to improve the decoupling.

This can be done by using higher resistances or condensers of greater capacity. Increasing the capacity of the condensers is generally the preferable remedy, as using higher resistances causes a greater loss of H.T. voltage.

Apart from the possible necessity of adding decoupling devices or improving the decoupling already provided, there are other ways by which L.F. instability can sometimes be remedied. One important point refers to L.F. transformer connections.

Although transformer terminals are usually marked Plate, H.T., Grid and so on, these markings need not always be rigidly adhered to.

This does not mean that the primary terminals may be connected to the components usually connected to secondary terminals. It is, however, quite permissible to reverse the connections to the primary terminals—that is, Plate and H.T.

### Overcoming H.F. Leakage


In the same way the connections to the secondary terminals of a normal L.F. transformer may be reversed. It is often found that reversing the secondary or the primary connections of an L.F. transformer will remove quite severe motor-boating or instability, and it is worth while trying this before applying other remedies.

With receivers having ordinary H.F. stages or of the superheterodyne type an effect similar to instability can be caused by H.F. currents leaking into the L.F. stages.

This is usually due to the H.F. choke in the detector-anode circuit being inefficient or too great a faith being placed in the effectiveness of the choke alone.

Connecting a fixed condenser of about .0005 mfd. between the end of the H.F. choke farthest from the detector anode and L.T.— will be of assistance in preventing H.F. leakage.

Inserting a grid-leak-type resistance of 100,000 ohms in series with the grid lead of the valve following the detector will also assist in preventing H.F. leakage.




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**W.B. STENTORIAN STANDARD** (On left.) For Power, Pentode and Class B. Yours for 2/6; balance in 11 monthly payments of 3/-. Cash or C.O.D. Carriage Paid, £1/2/6.

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## SOLVING THE DROITWICH PROBLEM

(Continued from page 40.)

received when the set is tuned into its wavelength. If such a thing did happen a switch to cut out the wave-trap could easily be connected, and the trap cut out when Droitwich programmes were required.

The second scheme shown is another form of trap—one that is usually very efficacious. It consists of a coil of about 100 turns or so, and across it are two condensers in series. The fixed one is of .001-mfd. capacity and the other is a preset of the same maximum capacity. The aerial is tapped into the circuit between the two condensers, and the aerial terminal of the set is connected to the trap at the bottom end of the coil.

### Obtaining an Aerial Tap.

In use the two condensers form a method of providing the aerial tap, and the preset condenser is adjusted till the unwanted station is tuned out or reduced to a minimum, the set being tuned to a nearby wavelength on the long waves.

The trap will not affect the operation of the set on the medium waves, and can be left in circuit.

The third scheme is a very simple one, and will be found extremely easy to try. It consists of a tuned hank of wire that is laid over the tuning inductance of the set to form an absorption trap. The action is that when the hank of wire, which should be of about 150 turns and of suitable diameter to slide over the tuning coil in the set, is tuned to the wavelength of the unwanted station it will absorb the energy from that station that is in the tuning coil of the set, and thus leave the set free to be tuned to another wavelength.

The proximity with which the hank is applied to the coil on the set, of course, determines the effectiveness of the trap. It is not practicable when the set employs a screened coil.

In use the hank of coil is applied to the tuning coil, and the preset condenser is varied till the maximum removal of the Droitwich station is experienced.

### A More Elaborate Scheme.

The last of our methods this week is one that is a little more elaborate, but which can easily be applied by anyone who has a variable condenser and a dual-range coil.

It consists in building on a small panel and baseboard a unit for addition to the existing set externally. The idea is to add a tuned circuit to the set to act in conjunction with the present tuning arrangements as a band-pass aerial input scheme.

The dual-range coil is set for long waves, unless it is desired to use the scheme for medium waves as well, when a wavechange switch on the coil, or separately fixed, must be used.

Then across the coil is placed a variable condenser of .0005-mfd. capacity, and to the top of the coil is connected a small condenser through which connection is made to the aerial terminal of the set.

The switch allows the aerial to be fed to the band-pass arrangement, or direct to the receiver, according as the added selectivity is required or not.

When the extra coil is used the aerial tuning on the set is used in the same way as usual, but the new unit must also be tuned

at the same time. The tuning will be found to be remarkably sharp, and it should be possible in many instances to cut out the troublesome station with little bother.

When the medium waves are required, if the dual-range coil on the unit is not wired up to a switch for wavechanging, it will be necessary to switch over the aerial for direct feed into the tuning arrangements of the receiver, thereby cutting out the selectivity unit.

### Cutting Out the Unit.

An ordinary double-pole double-throw switch is used for the purpose, and the unit should be so placed that it is not near the tuning coil in the set, unless the latter, or the coil in the unit, is screened. If they are both screened, so much the better, for any inductive feed between the two circuits will militate against the success of the scheme.

Do not forget that the connections of the variable condenser in the unit should be such that the moving vanes go to the end of the coil that is to be taken to earth. This is clearly marked in the diagram.

The earth terminal on the set is used for the attachment of the unit to earth, it having a common earth with the receiver.

There is one thing we have not mentioned in connection with the cutting down of the strength of the Droitwich station. That is the simple procedure of shortening the aerial or of erecting an indoor aerial. Such a remedy may or may not work, according to the set used with the aerial and the locality. But the aerial alteration should be tried, and, incidentally, an overhaul of the earth would not be amiss, to see that the lead is not too long and that the connection to the ground is good. A high-resistance earth will be a great drawback when selectivity is required.

## SONGS AND THEIR WORDS

(Continued from page 48.)

Apart from the week's big music, distinguished performances in a smaller way were those of the Celebrity Trio, who played popular music, and the B.B.C. Orchestra (Section C), supported by Frank Gale (baritone). The Celebrity Trio is a perfectly balanced combination. In this respect I cannot recall a better. Frank Gale gave a remarkably fine rendering of the Fowler Bold and Papagena songs from Mozart's "The Magic Flute."

We are inclined, I think, to take the singing in the Epilogue and the morning services rather as a matter of course. The same applies to most church music broadcast. Listen critically to the next Epilogue. And the morning service, too, if you have the chance. Note the perfect balance and the blending of the voices. In the psalm-singing listen especially to the "pointing." It's perfect.

Individual performances that impressed me recently were Cicely Hoyo's soprano solos (her voice has unusually good quality) and the cornet and horn solos relayed from the municipal bandstand, Rhyl. The cornet especially always comes through well. I wish we had more of these solos.

All the interest that one might have had in the broadcast of Charles McEvoy's play, "The Likes of Her," was lost in the babel of no.3 that dominated the play. The essence of broadcasting is sound. Sound can be pleasant and unpleasant; and although both types may be realism, an excessive amount of the unpleasant will spoil a broadcast. Well, that's what I felt about Howard Rose's production. An auditorium can cope with raucous shouting better than a small living-room. The dramatic interest in "The Likes of Her" tended to pale into insignificance. C. B.

## THE SPEAKERS THAT SPOKE TOO LOUD!

(Continued from page 54.)

disconnected, full volume could be put through the other speakers in the Kelvin Hall without discomfort to the audience in the theatre!

Thus, on the first Saturday evening, the W.B. stand, which was in the neighbourhood of the theatre, was dismantled and moved to the far end of the hall, after which full volume was again supplied from the main amplifier and the W.B. "Stentorians" were once more permitted to live up to their name—this time, fortunately without disorganising the Exhibition arrangements.

It is the claim of the makers that W.B. "Stentorian" speakers give practically twice the output of ordinary types from the same input. After the Glasgow incident there certainly isn't very much doubt about it, is there?

### Greater Earthing Efficiency.

I have just received some descriptive literature relative to the "B.I." copper earthing rod, a product of British Insulated Cables, Ltd.

By an ingenious fin-shaped method of construction this new earth rod has something like 50 per cent greater surface area than the more orthodox cylindrical arrangement of similar diameter and weight, and it is therefore claimed to make better contact with the earth into which it is driven.

Although I have not yet had an opportunity of testing one, I must confess that it appeals to me tremendously on the score of mechanical considerations, and I have little doubt that the maker's claim is well substantiated in practice.

These new earth rods, which are made from solid-drawn, high-conductivity copper, are, in my opinion, extraordinarily reasonable in price, and they are supplied with a strong clamp ring for the connection of the earth lead. They are made in two sizes, 18 in. and 24 in., and the prices are 1s. 6d. and 1s. 10d., respectively.

### A Useful Booklet.

The Erie Resistor people—whose products are deservedly popular because of their extreme reliability—have just produced a catalogue describing their complete range of components. But it is something much more than just a straightforward catalogue, for in it is contained one of the most comprehensive treatises on the subject of resistance that I have yet seen outside an expensive text-book.

Erie's, in forwarding a copy of this latest effort for my perusal, have asked me to state that they are prepared to send copies to all "P.W." readers who care to forward a 1½d. stamp to cover postage.

Take my tip and get one! It is a booklet that you will be constantly referring to. Write now, and address your application to the Radio Resistor Co., Ltd., 1, Golden Square, Piccadilly, London, W.1. And don't forget to mention that you are a "P.W." reader!

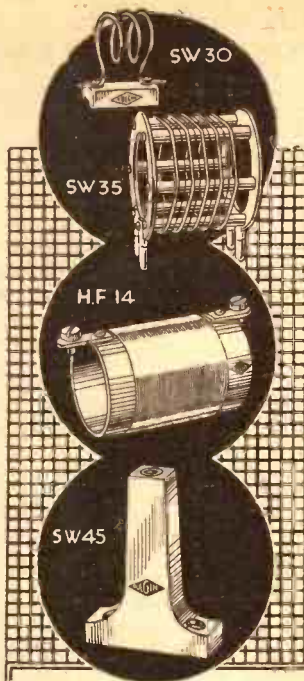
### Death of John T. Mould.

I deeply regret to announce the death of Mr. John T. Mould, a prominent figure in the radio world, and a director of the Igranic Electric Co., Ltd.

Mr. Mould, who was 73 years of age, had been associated with the electrical industry for over 40 years, and his passing will be keenly felt both by the Radio Manufacturers' Association—of which he was a vice-president—and by the radio industry as a whole.

His kindly, understanding disposition endeared him to the hearts of all with whom he came into contact, and by his manifold services in the cause of better radio he will long be remembered as the character who saw in broadcasting something far greater than just a source of entertainment, who visualised, in fact, the great ideal of the consolidation of the home life of the community.

I am confident that my readers will wish to be associated with a "P.W." expression of sympathy to all those who are intimately affected by this irreplaceable loss.



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 List No. S.W.30, 5-9 m., 2/3. List No. S.W.31, 8-15 m., 2/6.  
 List No. S.W.32, 13-25 m., 2/9. List No. S.W.33, Coupling, 2/3.

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New types of skeletonised and low-loss construction. With reaction winding, aerial to be tapped to grid coil.  
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Holders for above, List No. S.W.40, Price 1/9 per Pair.

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# IMPROVING YOUR REACTION

And other suggestions for obtaining the best results from your receiver.

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

### Incorrectly Placed Winding

IT often happens that you have a set which is only just powerful enough for your requirements, which means that you have to be very careful about the adjustments so as to get the best out of it all along the line. This in turn generally means that you have to adjust the reaction control whenever you change the tuning, so as to keep the set in the most sensitive condition.

This is very inconvenient and is usually due to the reaction circuit being wrongly arranged; for instance, the winding may be in the wrong position or the capacity of the reaction condenser may be unsuitable, and so on.

### Try a Series Resistance.

In such a case what you want to do is to connect a resistance in series with the reaction winding; I cannot say the exact value of the resistance (it depends on circumstances), but you can try resistances between 100 and 500 ohms until you get the best value for your conditions. By the way, this resistance should be non-inductive, and a metallised one is most suitable.

This resistance has an effect also upon the question of the capacity of the reaction condenser, and if you use a resistance getting on for the higher limit mentioned above you may have to use a somewhat higher-capacity reaction condenser than you did previously.

### Class B Transformer Ratio.

People often wonder why, with an ordinary valve, a step-up ratio transformer is used, whilst with a Class B valve a step-down transformer must be used.

The input impedance—that is, the grid-filament impedance—of a valve is relatively high with a low-frequency valve not passing grid current. We want to match this to the anode circuit impedance of the preceding valve, and that is why we have to use a step-up low-frequency transformer. The ratio between the secondary and the primary of this transformer should be the same as the ratio of the impedance of the grid circuit and the impedance of the preceding anode circuit.

### A Question of Grid Current.

With a Class B valve, however, since this passes grid current, the grid-filament impedance is lower than the anode impedance of the driver valve, and therefore we have to use a step-down transformer.

Between a screened-grid and a detector valve we generally use a 1 to 1 coupling, and you see why, because a screened-grid valve has a high anode impedance, whilst

the grid impedance of the detector is relatively low, since it passes only a small amount of grid current. As a rule, these two impedances come out somewhere about the same value, so that we do not want much step-up or step-down, and this is why we compromise for all-round purposes on a 1 to 1 ratio.

### Two Speakers.

Readers often tell me that they use two speakers—sometimes more—in different parts of the room and get a very nice "round" effect. The idea of using dual speakers, for the purpose of covering the range from bass to treble is, of course, very well known, but usually the two speakers forming the pair are mounted close together. This idea of using two or more speakers in different parts of the room is quite different and is designed to give an "all-over" effect to the sound reproduction, rather than to cover the scale of audio frequencies.

### The "All-Over" Effect.

As a matter of fact it sometimes works remarkably well and I have many times tried this experiment. A good deal seems to depend upon the type of room and even upon the furnishings in the room. Anyway, if you have a spare speaker which is doing nothing particular, it is interesting to connect it up and put it a good distance from the first speaker, say at the opposite side of the room. The sound seems to come from everywhere at the same time and you get rid entirely of that "directional" or "local" effect.

Whilst you are at it you can also try the effect of switching the second speaker on and off. When you have got used to it being on, and then you switch off, you will be surprised how the sound immediately seems to recede into the corner or wherever the first speaker is placed. This experiment brings out the effect in a most striking way.

### Fit a Pilot Light.

Most commercially-built sets nowadays are fitted with a pilot light to illuminate the dials. This not only adds very much to the appearance of the set, but is actually a great practical advantage, because often enough you will be tuning the radio in a room with a shaded lamp, and it is difficult, if not impossible, to see the graduations on the dials.

### Supplying the Current.

If you have a set, whether a home-made or commercial set, which is not fitted with a pilot light, it is a good plan to fit one for

(Continued on next page.)

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## IMPROVING YOUR REACTION

(Continued from previous page.)

yourself, and the job is quite easy. All you want is a 6-volt motor-car bulb (which can be bought in a well-known stores for 6d.) and a current of about 1/2 amp. to feed it. If yours is a battery-driven set you can take this current from low-tension accumulators, more particularly if you have the means of re-charging the accumulators yourself. If, however, yours is a 2-volt type of accumulator and has to be hauled round to the local garage every so often for charging, you had better use a 2-volt flash-lamp bulb which consumes only about 1/4 amp. In any case, if you put a switch in you only need have the lamp on whilst you are actually tuning, so that the drain on the battery can be practically negligible.

### A Handy Transformer.

For those of you who have electric mains handy, or who have an all-electric set, I should recommend a little fitment which I believe is called the All-Nite-Lite, and manufactured, I think, by the B. T.-H. company. This is a tiny transformer enclosed in what is virtually a slightly

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enlarged electric-light adaptor and one end of it plugs into the ordinary electric-light socket whilst the other end takes a 6-volt motor-car bulb, the transformer reducing down from the mains voltage to the 6-volts.

### Watch Mains Hum.

If you use any transformer, either this or any other type, for stepping down the voltage for a pilot light, you must take great care what you are doing with the leads, otherwise you will get mains hum and interference in the set. In a mains set a pilot light can often be run from one of the secondaries of the mains transformer already in the receiver.

### Armchair Control.

The popularity of "armchair control" is increasing. These armchair control devices have been on the market for a considerable time, and their advantages are now becoming more and more recognised. I daresay everyone of you, when you come to think of it, has felt the inconvenience of having to jump up from your chair and go to the set to turn the volume control up or down (generally down). The need for adjusting the control arises not only with different items on the programme coming through, but also even from time to time at different parts of the same item. Again, somebody may start a conversation, which is difficult

to carry on if, say, a dance band is coming through, and again you have to jump up and "turn the wireless down."

### A Great Convenience.

All this is got over completely by fitting the armchair control device, which has a length usually of 12 feet of flex, the control knob being adapted to be under your hand when you are sitting in a chair. In this way you have the whole thing at your finger ends without having to budge out of the chair. You can, in fact, go on reading a book—lots of people read books while the wireless is playing, although it always strikes me as rather curious—and alter the loudness to suit your fancy as you go along. And if a talk comes along you can even turn down to zero—in other words, shut off!

I recommend these armchair or distant controls to all those of you who have not yet tried them. They are a real convenience.

### Where Does Distortion Occur?

When distortion occurs in the set, the first place you put your finger on is the output stage. It is true that distortion often occurs in this part of the receiver, but at the same time it can also originate much further up the scale, as it were, that is, in one of the earlier stages, so that it does not do *always* to assume that the output stage is at fault.

However, assuming that the trouble is in the last stage, one of the most usual causes of it is connecting the loudspeaker directly into the anode circuit of the last valve. This means that the resistance of the speaker, which in some cases may be as much as a couple of thousand ohms, serves to drop the voltage actually applied to the anode of the output valve.

### Voltage for Last Valve.

Now, as a rule, the anode of the output valve requires all the voltage which you have available—and a bit more besides would usually be an advantage—and so you see what a drawback it is to have this voltage actually reduced before it reaches the anode. When the valve is working with insufficient anode voltage you get what is known as "bottom-bend distortion," that is, the valve working on the wrong part of its characteristic curve.

Quite apart from all this, the anode current passing through the windings of the loudspeaker may bring the core near to magnetic saturation and cause "blasting" on certain notes.

### Output Choke Unit.

Both these troubles can be got over by using a choke output. In addition to this it is important to remember the question of the matching of speaker and output valve, especially where moving-coil speakers are concerned. With the choke output, since the D.C. resistance of the choke is (or should be) very low, the voltage drop is very small and the anode of the output valve gets practically the full voltage available. The choke and coupling can be provided in a convenient unit, and this is a very useful accessory with a battery receiver. Not only does it improve the stability in a set where high-frequency amplifying stages are used, but also it may prolong the useful life of the H.T. battery. In some cases, even the reaction control is greatly improved. For general purposes, the choke should have an inductance of about 30 henries.

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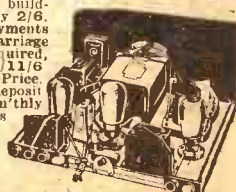
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(Continued from foot of previous column.)

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**INDEX TO ADVERTISERS**

Amplion (1932), Ltd. ....	53
Benjamin Electric, Ltd. ....	49
British General Manfg. Co., Ltd. ....	53
British Institute of Engineering Technology	60
Bulgin, A. F., & Co., Ltd. ....	61
Central Equipment, Ltd. ....	49
Clarke, H., & Co. (M/cr), Ltd. ....	49
Eastern Radio Co. ....	60
Fluxite, Ltd. ....	61
General Electric Co., Ltd. ....	Cover iv
Graham Farish, Ltd. ....	57
Hayberd, F. C., & Co. ....	62
Heraud, E. J., Ltd. ....	61
London Radio Supply Company	60
Mason, E. ....	60
Modern Boy's Annual ....	55
New Times Sales Co. ....	63
Peto-Scott Co., Ltd. ....	59
Pickett Bros. (Cabinets) ....	60
Pifco, Ltd. ....	55
Pix Invisible Aerial ....	62
Popular Gardening Annual ....	53
Radio and Electrical Wholesale Supply	55
Telsen Electric Co., Ltd. ....	Cover ii
Thriller Library ....	62
Varley Products ....	55
Wet H.T. Battery Co. ....	60
Wilkin, W. S. ....	53
"Wireless Constructor" ....	56

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