POPULAR WIRELESS, February 23rd, 1935. REGISTERED AT THE G.P.O. AS A NEWSPAPER.

THE B.B.C.'s WAVELENGTH CLEAN-UP

Popular Wireless

AND TELEVISION TIMES

MORE ABOUT THE "NU-TUNE" THREE

★ ★

"P.W.'s" LISTENERS' SERVICE

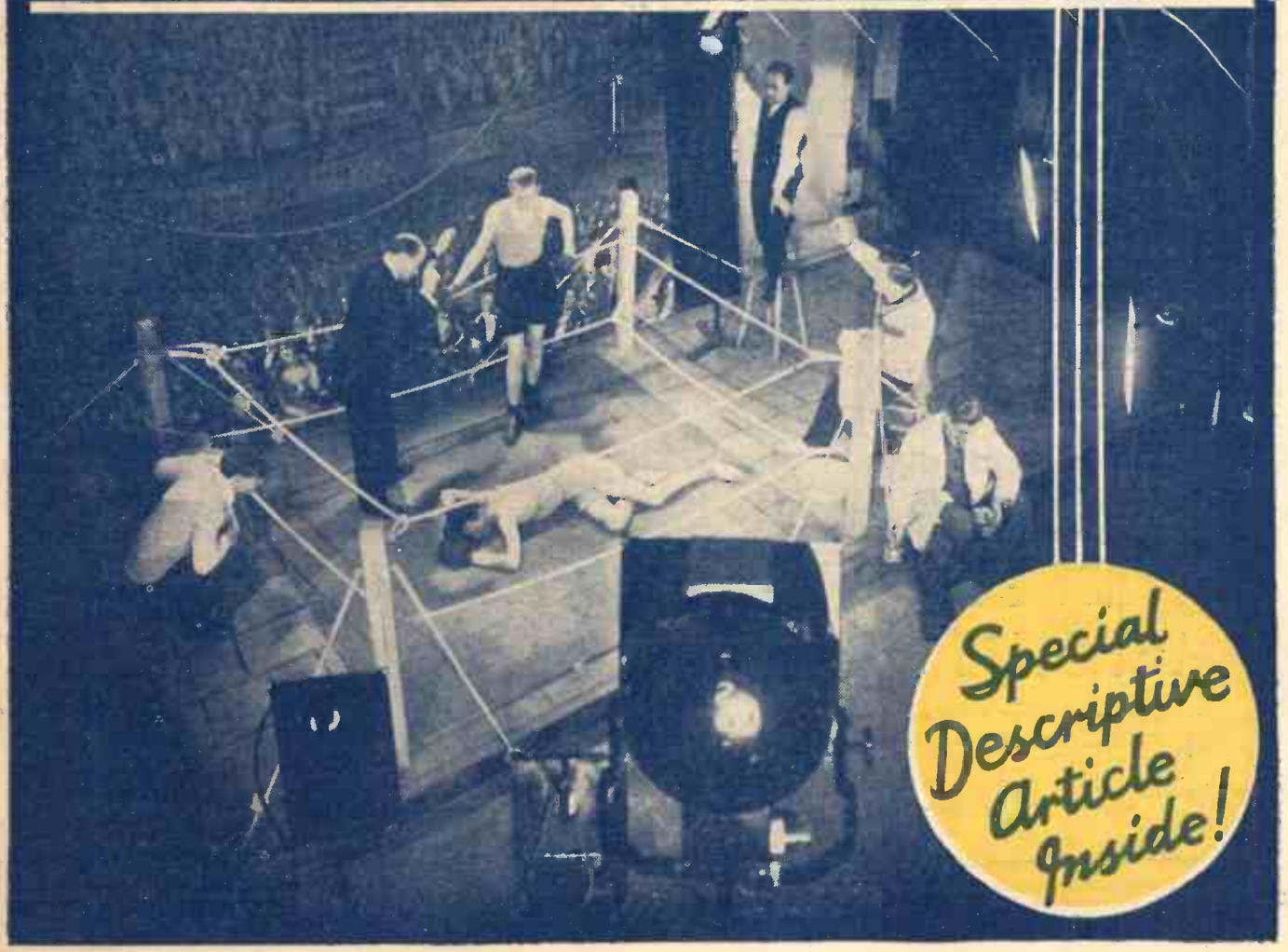
★ ★

PRACTICAL TIPS FOR ALL

EVERY WEDNESDAY PRICE 3D.

No. 664.
Vol. XXVI.
February 23rd, 1935.

All about the NEW TELEVISION



Special Descriptive Article Inside!

POPULAR WIRELESS AND TELEVISION TIMES

MANAGING EDITOR: N. F. EDWARDS. TECHNICAL EDITOR: G. V. DOWDING ASSOC. I.E.E

DARK HAPPENINGS
EAVESDROPPING
HEARD HALIFAX ?
"HIGH SCHOOL"

RADIO NOTES & NEWS

CHEAP TELEVISION ?
"COLD" COMFORT
"TIME, PLEASE"
LETTING OFF STEAM

A New Trick.

THE Gramophone & Radio Dealers' Association (to whom be glory) issues a warning—reaching gale force in Surrey and adjacent counties—to all listeners.

It seems that the sylvan delights of Guildford and Epsom have been marred by a dark man (wearing glasses, no hat, well dressed and about 5 ft. 8 in. in height) who is over-fond of radio. What happens is this: A fake order is given for two sets to be sent to some large house. When the delivery man toils up the path, perspiring, with one on his shoulder, thieves are waiting to steal the other set from the van.

Dealers, note and beware the dark stranger.

The Balham Mystery.

SALUBRIOUS Balham is not the sort of suburb that one expects to gain contumely and revilement. But officials of the G.P.O. have been—well, cursing Balham—politely, of course, as befits Government officials—over this radio "eavesdropping."

It seems that an apparently ordinary wireless set in the neighbourhood of High Road, Balham, has been accidentally picking up 'phone conversations of a confidential nature against the wish of all concerned.

Conscientious telephone officials examined the neighbouring lines; the set was provided with a new aerial; a new earth and the usual dodges were tried, but all in vain. I mention the matter in no anti-Balhamitic spirit, but as an instance of the pure cussedness of which a wireless set can be capable when it feels awkward-like!

All in the Game.

WHEN George Bernard Shaw broadcasts there is sure to be a shindy, and his latest appearance before the mike caused the very father and mother of a row! Personally, I was always terrified of "G. B. S." until, years ago, the Editor of "P.W." ordered me to interview the great man *against his wish!* Phew! What a task!

For the benefit of "P.W." readers I had to brave his Irish wrath, since he had determined not to be interviewed about broadcasting. After one of the most hectic evenings imaginable I did my duty, secured a few words and even had a warm handshake from "G. B. S." on his door-step.

At one stage of my chase he nipped into a cinema in the Strand, and I secured a seat next to him in the hope of catching him off his guard. All in vain, for he did not say one word to his companion during the whole performance; but, anyhow, I can (and do!) say I once spent an hour at the "flicks" with "G. B. S."!

OUR COVER PHOTOGRAPH

During a recent demonstration of the Baird process of high-definition television a boxing match was staged and the scene was televised by means of the intermediate-film method. The photograph on the cover this week depicts the scene at the Crystal Palace studio where the "contest" took place. The "audience" consists of a backcloth behind the ring. The process photographs on 17·5 mm. film the vision and sound, develops the film and runs it through the television transmitter with a time lag of only 30 seconds.

War on Interference.

SOME interesting sidelights on the war against interference were revealed recently by Mr. C. McDonald, of the P.O. Engineering Department, who was formerly engineer-in-charge at the famous old Leafield Wireless Station.

Mr. McDonald stated that during the past twelve months 11 officers in the Birmingham area had cleared 1,600 cases of interference and investigated 60 complaints of oscillation.

The three vans specially equipped for this work had done a mileage of over 20,000 in six months.

Trolley buses are the greatest bugbears, and cases had been found in which overhead conductors such as telegraph wires picked up the interference and re-radiated it as much as half a mile away from the source.

Chance for "DX-ers."

THOSE ardent long-distance fiends who angle for transatlantic stations should give ear on 322·4 metres, a shade above the Brussels No. II dial reading, after that energetic station has gone to bed. If their luck is in they may hear programmes from the new station at Halifax, N.S., which came on the air at Christmas.

He is sporting a power of only 1 kilowatt, but so many lower-powered Americans have been received in this country that I should not be surprised if someone picks up Halifax. In that event drop a line to the Station Director, Halifax C H N S Radio Station, Halifax, Nova Scotia. That worthy will be delighted to know how his programme was received on this side.

The Old School.

HOW many "P.W." readers, I wonder, have wireless memories long enough to reach back to a Paris medium-wave station in 1922? There was only one—good old "Ecole Superieure." (And those were the days when it really was a "High School.")

On the technical side those Paris students of 1922 demanded instruction in wireless, so a broadcasting transmitter was installed, public concerts were given and thus British listeners were provided with a real foreign programme on medium waves.

Paris at that time already had two good long-wave stations—the old warrior station, Eiffel Tower (in "civvies" then, but with a military bearing and a passion for time and weather reports), and "Radiola."

This latter has now developed via "Radio Paris" into "Paris National," and Eiffel Tower is to reappear shortly on medium waves. In the midst of all this bustle and preparation for France's Regional Scheme (the Ferrie Plan) up pops old Ecole Superieure and celebrates its thirteenth birthday. Let's wish him many happy returns.

(*Continued on next page.*)

HUGHIE'S BIRTHDAY CAKE

Hughie Green, chief of the famous "gang," recently celebrated his fifteenth birthday. To mark the occasion the "gang" gave him the birthday cake which you see above. Portions of the cake were afterwards distributed at the New Cross Empire, where Hughie was appearing.

HEARING DROITWICH WITHOUT A RADIO SET!

"Home, James!"

THE ways of homing pigeons have always been a source of admiration and wonder; but even in these scientific days nobody seems able to account for the success with which they find their way.

Homing aeroplanes, which perform much the same kind of trick, are not surrounded by any such aura of mystery! Marconi's, who were pioneers in wireless direction finding for aircraft, recently announced their acquirement of exclusive rights in two further important patents—Smith & Meredith's Radio Azimuth and Simon's Radio Range and Direction Finder.

The homing device is to be further developed so that it will, where beneficial, be able to provide a pilot with visual, as well as with aural, indications of his correct course. In America, where the Simon Radio Range and Direction Finder was invented, it has already proved of the greatest value in aiding landings in conditions of bad visibility.

A Pretty Problem.

THEY tell me that residents of Barnt Green, near Birmingham, find themselves in the curious position of not needing wireless sets to hear the programmes, since they can receive the Droitwich transmissions on their telephones for nothing.

This suggests a pretty quandary for the telephone engineers and other postal officials. How is Droitwich to be kept off the line when somebody calls up the butcher about those sausages he promised to deliver in time for lunch? And what happens if, instead of the subscriber you want, you get a loud solo voice from Droitwich obstinately affirming: "I hear you *call-ing* me"?

All very interesting scientifically, no doubt, but hardly what you expect when you accept that poster's invitation to "Come on the 'Phone."

£5 Television.

AMID all this talk of television, names of new inventors keep cropping up. It is with particular interest that I draw attention to a Hungarian lady—Rosi Biborka.

Mlle. Rosi lives in Budapest—is, in fact, an undergraduette at the university there. She was recently wondering how the heck to win her doctor's degree, and while puzzling out a thesis she hit upon a novel notion for transmitting moving images by wireless.

She patented her invention, and claims that the receiving apparatus can be made for a mere fiver or so, and there are no expensive transmitters needed.

It sounds almost too good to be true, my practical mind assures me; but the romantic half of me believes and hopes that the future may indeed be rosy for Rosi.

Dr. Radio.

THAT prince of anonymity "A Harley Street Doctor," has been telling the world in general that wireless can now cure the common cold.

This also seems too good to be true, but the wise man affirms that ultra-short waves have definitely signed the death warrant of the ubiquitous Ah-*tish*-ooo!

How? By the clamping of two electrodes on the patient's body—for example, over the nose and at the back of the head—and the generation of H.F. impulses between them, for fifteen or twenty minutes, until the trouble-making germs desist, curl up and die.

IN BIRMINGHAM NEXT WEEK

Dr. ADRIAN BOULT, who will conduct the B.B.C. Symphony Orchestra of a hundred and nineteen players in a concert at the Birmingham Town Hall next week (**National, Wednesday, February 27th**), has only recently returned from America. During his visit he conducted the Boston Symphony Orchestra with such great success that Koussevitzky, the permanent conductor of the Boston Symphony Orchestra, in a burst of enthusiasm, cabled Broadcasting House as follows:

"Delighted to congratulate B.B.C. Orchestra on magnificent success of your conductor, Dr. Boult, with the Boston Symphony Orchestra."

Dr. Boult was born in 1889 and was educated at Westminster School; Christ Church, Oxford, and at Leipzig Conservatoire. He was President of the Oxford University Musical Club, 1910, and joined the musical staff of the Royal Opera in 1914.

Dr. Boult conducted the Royal Philharmonic Society from 1918; taught at the Royal College of Music from 1919; conducted the Liverpool Philharmonic Society, London Symphony, and Queen's Hall Orchestras and the Russian Ballet at the Alhambra in 1919. He also conducted the Birmingham City Orchestra for some years. Is exceedingly popular among musicians and all who know him.

Most of the large hospitals are said to have employed the method successfully; but it is not so popular as a couple of aspirins and hot milk, because the necessary valve costs £60 or so!

"Who Frew Dat Brick?"

TO recommend a wireless set is permissible in all walks of life. To press it importunately upon others is not unknown, especially in the zest for sales.

But to *throw* a wireless set at a gentleman—to pick it up, lean back with it and then launch it as a missile through intervening space, that, surely, is something new and strange enough to relate.

Verily, truth is stranger than fiction, for there is even more in the incident than you might imagine. It was a colourful and true-blue adventure, since the gentleman for whom the set was intended—the assignee, so to speak—was a policeman. And the set scatterer, the lavish broadcaster of broadcast receivers, was a smash-and-grabber escaping pursuit.

G.P.O. Progress.

THE above heading may suggest mother-in-law, chamber music or a variety of other stubborn facts, according to your pet aversions; but what it really refers to is the new G.P.O. "wireless signal" to be given from a speaking clock. This has been designed to inform telephone subscribers of the time by giving them the hours, minutes and seconds, correct to one-tenth of a second, at any time.

When the subscriber asks the time he will be switched through to the clock, which will do its own announcing and give a service of astronomical accuracy, with hourly checking from Greenwich Observatory.

I believe that this is the first time in history that the fleeting moment has been exposed to such an indignity on a large scale and scientific basis. Any Tom, Dick and Harry will now be able to check up on Father Time's movements, aided by the very stars in their courses.

Fiery Eloquence.

BROWSING through my postbag the other day, I was startled to come across a letter in which a naughty reader had let himself go without that nice distinction that is usually maintained between the written word and the blood-curdling epithets of everyday rough-and-ready speech.

It appears that certain forcibly described trolley buses pass right in front of his adjectival door. And the unprintable noises they cause in his curiously active set make him want to bash it with a coal-hammer that has been struck by lightning.

This distressed gentleman omitted to give me his address, but I don't suppose he wanted a reply—merely an outlet! Let us hope that the experiments now being carried out with interference stoppers in his locality will be successful.

Keeping Up to Date.

IT is no secret that the modern newspaper usually keeps an alert eye on wireless activities. At some of the head newspaper offices radio sets are kept constantly tuned in. But I believe that the "Daily Telegraph" is the first of the great newspapers to install a *television* receiver.

Possibly the time will come when all the great newspapers will link up so closely with other forms of disseminating news that we shall hardly remember those days when some papers were radio or television conscious and others were not. Meanwhile, it is good to know that, coinciding with the fresh public interest in visual programmes, the "Daily Telegraph" has taken steps to make the breakfast-table news of television developments both authentic and up to the minute.

ARIEL

The B.B.C.'s Wavelength Clean Up

WHY, just because the new Midland Regional took the air, was it necessary to make February 17th a sort of general post among six B.B.C. wavelengths ?

As you saw from the schedule of changes published in " P.W.," four B.B.C. stations got higher wavelengths, while two suffered declines.

Midland Regional and North National are the wavelength losers, by which I mean that their wavelengths have been lowered. While Scottish Regional, West Regional, Belfast and Newcastle all gain by being allotted higher wavelengths.

Let us take Midland Regional first, since that is, in a way, the focal point of all the changes. You can take it that, in a general way, what Midland Regional has lost on the wavelength swings it is making up on the power roundabouts.

Midland Regional Will Not Suffer.

In addition, Droitwich is much nearer to its main service area—Birmingham and district—than Daventry is.

All told, then, the new Midland Regional does not look as though it will suffer very badly from its wavelength decline. The only people who may possibly have a grouse are those living in the north-east of the Midlands.

They are now farther from the source of Midland Regional signals than before, and may, because of the shorter wavelength, suffer some loss of signal strength—in spite of the 50 kilowatts power.

But then these listeners are specially favoured in being more or less within the service areas of two Regionals—Midland and North. The B.B.C. has not forgotten that Nottingham, for example, is a big and important city. It is one of the points that may start an outcry, though it is hard to see what more the B.B.C. could do. It must always think of the greatest good for the greatest number.

Less Certain Ground.

When we come to North National, the second station to lose by the clean-up, we are on less certain ground. North National had an exclusive wavelength—and not a bad one, at that. It has lost this 296·2-metre channel to Midland Regional, and shares 261·1 metres with London and West Nationals.

The B.B.C. admits that this synchronisation is in the nature of a grand experiment. If it succeeds, as there seems to be every hope it will, then the medium-wave Nationals are safe for quite a while. There was every intention, you remember, of shutting down these three stations now on 261 metres.

Have you wondered why the B.B.C. should swap round a number of their wavelengths ? Are you annoyed because your dial calibration has been upset ? Then read this explanation of the recent wavelength changes in B.B.C. stations.

By ALAN HUNTER.

The reason that has not been done is not that Droitwich has fallen down on its job, but simply that the B.B.C. is not quite satisfied about industrial interference on long waves.

The problem is to decide whether, under average town conditions, industrial interference, electrical apparatus of all types, forms too great a background to the long-wave signal. For it is well known that interference from electrical apparatus is much more serious on long waves than on medium.

So that, indirectly, the permanency of the synchronisation of the three medium-wave Nationals depends largely on whether Droitwich can beat the background.

You see, thousands of people on the fringe of the reliable range of, say, North National will find, with synchronisation, that the signal is " mushy " and below entertainment value. These listeners will be forced up to the long waves to get a good National programme—and possibly for the first time will encounter industrial interference.

How It Should Work.

We all know that synchronisation reduces the effective service areas of the stations sharing the wavelength. At the same time the bulk of medium-wave National listeners—whether to London, West or North—are the townsmen. These folk, being relatively near the source of the radiation, ought still to be able to enjoy a mush-free medium-wave National programme.

The fringe listeners—and the genuine country folk—are the ones likely to suffer, if indeed anyone does suffer. Take my case. I live in a village some 60 miles from Brookmans Park. London National is a poor signal at night. I have to tune up to Droitwich for a really enjoyable National programme.

But just because I'm in a village there is no industrial interference. So that I, one of those forced to use the long-waver, am in the best possible position to do so. And so it must be with thousands of other country people.

By synchronising all three medium-wave English stations the B.B.C. releases a much-needed wavelength for Newcastle. Even with its present low-power transmitter Newcastle takes on a larger service area with its change from the international common wave of 209·9 metres to 267·4 metres, an "exclusive" previously held by Belfast.

Much Wider Range.

It happens that Newcastle, being right up in the north-eastern corner of England, fares rather badly at night-time from long-wave Droitwich. Its low-power medium-waver, having been on an international wavelength, has had a service radius free from mush of only five or six miles.

With an exclusive wavelength a much wider range can be expected. This is not the whole of the story, of course, for in due time Newcastle will blossom into a fully fledged Regional with a power of 50 kilowatts. The exact

(*Continued on page 820.*)

KEEN LISTENERS

The famous Houston Sisters are keen listeners as well as keen broadcasters. Here they are whiling away a spare moment by listening to one of the new Model " 369 " Cossor Universal receivers.

WHY NOT PREPARE FOR TELEVISION NOW?

SOME DETAILS OF A FINE SHORT-WAVE KIT SET BY PETO-SCOTT

STUNNED by the sensationalism of a certain section of our daily Press concerning television, the average broadcast listener to-day is left with a pretty problem in sorting out the future of broadcast entertainment.

Will he have to scrap his present set? What will take its place? When is the orgy of obsolescence likely to commence? So far as the ordinary broadcast listener is concerned, the present position is likely to remain unchanged in any way for at least the next five years.

Why, then, all this talk about short waves?

First and foremost, because through the medium of short waves the way is open these days to reception on a world-wide basis. One tires of Europe. Even if there were no heterodynes and no crackles, and if every station transmitting therein could be received on a par with the local, one would still tire of Europe, except, perhaps, for an occasional escape from the locals.

That is because Europe has a limit. With a really good set it might be possible to hear every station from the Baltic to the Levant and from Ireland to the eastern fringes of Rumania, but beyond that, as a regular thing, no. It can't be done.

No Limit to Reception.

With short waves there is no such limit. One minute you can be listening to Europe; the next you may be sampling the programmes from America or Australia. It's a hobby that is just teeming with fascination, and it knows no bounds.

So much for short waves generally. But that doesn't end the story.

Those of you who read the report of the Television Committee will have noted that the forthcoming experiments are to be made on the *ultra*-short waves. Well, there is no doubt where the daily papers got their ideas about existing sets being scrapped when television commences on the new system.

And they just missed the boat!

Have no fears: your present set will serve you in good stead for many years to come. But—and this is the point—television is bound to come on a wholesale scale one of these days, and if you want to enjoy the fascination in the early days *build a short-waver now!*

Perhaps you don't see the connection? Well, it's just this. Short-wave reception at the best of times is very different from ordinary broadcast reception. It is not that it is difficult: it's just *different*. But ultra-short-wave reception, the technique recommended by the Committee for television, is different again. And the finest steppign-stone from the broadcast to the *ultra*-short waves is via the short waves.

These thoughts have been brought to mind by a particularly fine kit set for short-wave reception, the New Discovery H.F.P.3, which has been submitted to us for test by The Peto-Scott Co., Ltd. Although this set is a really first-class short-waver—a set that will bring in the ends of the earth by night or day—we can see in its design tremendous possibilities for the future.

Two Sets Will be Needed.

When television does commence on the high-definition principle the chances are that most ordinary listeners will require two sets—one for sound and one for vision, for both are to be sent out on ultra-short waves.

UNLIMITED ENTERTAINMENT

". . . One minute you can be listening to Europe, the next you may be sampling programmes from America or Australia . . ."

The vision receiver will require a new technique to avoid the possibility of distortion in the picture, but the sound receiver—well, this new set of Peto-Scott's, with one or two very minor alterations, would be absolutely the ideal thing short of a superhet.

Getting Outside of Europe.

That fact alone constitutes a most excellent reason why you should obtain a kit of parts and build it *now*. But the other and more immediate reason is that it will free you from Europe and will provide you with undreamed-of fascination. And in the process it will give you an invaluable insight into the technique required for the future when television comes along.

The set is available ready-built from the Peto-Scott Company for those who prefer not to tackle the constructional work. But why not tackle it yourself and thereby equip yourself with the necessary knowledge to make the few minor alterations which will be necessary when television comes along? Afraid you might slip up?

Have no fears. We admit that it is a very professional-looking job, but with the kit as supplied to us it is virtually impossible to go wrong. It is just like building a Meccano model.

The chassis and panel are drilled ready to take the components; nuts and bolts, wires and flex are all included in the kit, and there is a full-size blue print from which to obtain all the necessary information. As a matter of fact, detailed instructions are also enclosed.

It is a three-valve battery set with very modest power-consumption characteristics, and it will, of course, work from batteries such as are used for an ordinary broadcast set. There is one screened-grid H.F. valve, a detector and a pentode-output valve, and the circuit incorporates a clever throttle-control reaction scheme.

With the kit, which we built up strictly in accordance with the instructions supplied, we have been obtaining some exceptionally good results. What has particularly impressed us is the ease with which the set can be operated.

As you will see from the photograph on this page, there are only two controls. One is the main tuning control, and it is fitted with a really excellent slow-motion dial, and the other is the reaction control.

There are two main things about any short-waver of this type for which the listener should particularly look out. One is the "slowness" of the slow-motion dial, and the other is the way in which the set changes to the oscillating condition.

An Ideal Tuning Dial.

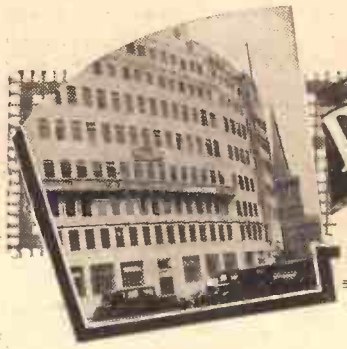
In the case of this Peto-Scott set the dial is absolutely ideal, and as for reaction—well, the difficulty is to know when the set has changed into the oscillating condition. That is just as it should be; but, alas, it is not often encountered these days.

In our practical tests of this fine set we found it possible without any appreciable difficulty to receive stations from all parts of the world, most of them at loudspeaker strength.

Reception conditions are apt to vary, of course. They varied quite considerably during the week that we had the set in use; but there is almost always something interesting to be heard on the loudspeaker, and more often than not the "Yanks" seem to find their way across.

Incidentally, during our tests we found that the two sets of coils cover from about 13 to 96 metres, which includes practically every short-wave station of any importance at all.

Why not send for further details to the Peto-Scott Company at 77, City Road, London, E.C.1? They will gladly send you literature. And, by the way, although the cash price of the kit is £4 15s., it is available on generous hire-purchase terms for those who prefer this system of buying.



P.W.'s LISTENERS' SERVICE

The most comprehensive weekly guide to modern receivers

AN H.M.V. HIGHLIGHT

This recent H.M.V. release is one of the finest 12-guinea all-electric superhets on the market. It is known as the Model "441," and it is built into a beautifully finished cabinet of walnut and macassar ebony.

The facilities of the "Popular Wireless" Listeners' Service, which is the recognised medium for information and guidance on all matters connected with commercial receivers, are shortly to be extended in a way which will be of instant appeal both to manufacturers and to readers alike. Watch out for the great new feature, full details of which will be announced on this page as soon as the necessary arrangements can be completed.

IF IN DOUBT, CONSULT THE LISTENERS' SERVICE.

It is the only feature of its kind in the country.

HAVE THE WAVELENGTH CHANGES AFFECTED YOU?

THE recent reshuffle of wavelengths of six of the B.B.C. stations will have affected most listeners whose receivers are calibrated in station names, and so far as these stations are concerned the readings will no longer be applicable.

It is fortunate, however, that the industry as a whole has taken prompt steps to overcome the inconvenience likely to be caused to listeners in consequence of the changes, and most of the leading manufacturers announce that new scales are either ready or are at present in the course of preparation for fitting to existing sets.

The stations affected by the rearrangement are the North National and the Midland, Newcastle, Belfast, West and Scottish Regionals, and all of these stations are shown in their correct positions for the new conditions in the dials which are being produced.

In this connection here are the plans at present announced; and although the following list does not cover all the various makers, it should be pointed out that many of the manufacturers do not adopt station-name calibration, and their sets in consequence are not affected.

New Scales Now Available.

EKCO. New scales for existing models in the course of preparation. Prices are to be very modest and will vary slightly in accordance with types.

ATLAS. New scales, which can be fitted in less than five minutes, will be available at an early date; and although prices have not yet been fixed, it is anticipated that they will be very reasonable.

G.E.C. The most recent of the G.E.C. models are not affected because the B.B.C. stations are indicated only by the word "British." New dials for other models, however, can be obtained through local G.E.C. dealers (who will fit them). The price of these new dials is 2s. 6d.

KOLSTER-BRANDES. Revised dials, which are to be low priced, are in the course of production and will be released at an early date.

MARCONIPHONE. Consult the local Marconi man, who will be able to make the alteration. The new dials cost 2s. 6d., and a small charge for fitting will be incurred.

PYE. New dials, which have to be fitted by the local Pye agent, are available at 1s. 6d. and 2s. 6d., according to type. A small fixing charge may be incurred.

R.I. The local R.I. dealer will be able to supply and fit revised scales.

H.M.V. Most of the H.M.V. range of receivers and radiograms are calibrated in station names as well as in wavelengths, but pending the possibility of further slight readjustments in station positions it is understood that no plans have yet been announced by this company.

THIS WEEK'S TRIPLE-TEST SET

Miss Kathleen Kelly—who features in the new British film, "Lend Me Your Wife"—is an ardent Marconiphone enthusiast. Her latest acquisition is the Marconiphone Jubilee Model "287," which is the subject of our Triple-Test report this week.

DON'T LET THE TELEVISION REPORT DETER YOU!

SO much has been said and written concerning television that is definitely detrimental to the interests of the radio industry that some sort of authoritative guidance for listeners would seem to be called for in this particular section of "P.W."

We all have cause to acclaim the findings of the Television Committee, and the future prospects of broadcast entertainment consequent upon their enterprising and courageous recommendations are rosy indeed. *But television as a nation-wide service is not here yet, nor is it likely to be for some long time to come!*

For that very reason we earnestly entreat you not under any circumstances to let the recent sensational and, alas, in some directions, misleading statements which have appeared deter you from buying a set now because of fears that it may be rendered obsolete with the commencement of high-definition broadcasting later in the year.

The Committee has wisely decided that the time is now ripe for a start to be made, but the Postmaster-General himself has emphasised the fact that this highly interesting experiment will not interfere in any way with our present broadcasting system for many years to come.

Ordinary Sets Still Needed.

Remember that, so far as the commencement of television is concerned, there will be only one station available, or perhaps we should say only one *programme* available, and that in consequence, and even assuming you are prepared to pay from £50 to £80 for a ready-made television receiver, *it will be necessary to resort to an ordinary broadcast receiver whenever a change of programme is desired!*

In any case, in accordance with the Committee's recommendations, television broadcasts will probably be limited in duration to a few hours a day, so that at all other times existing types of broadcast receivers will be essential for broadcast entertainment.

View the future with optimism by all means, but do not let the failure of a certain section of our daily Press to treat the report unsensationally cast doubts in your mind. If, prior to the publication of the report, you had intended buying a new set, then go ahead and buy it! That one, and probably the one after it, will have been discarded long before they are likely to become obsolete in consequence of television.

And there is another important point. Prices of commercial receivers generally to-day are lower than they have ever been before, but far from going even lower there are strong grounds for thinking that the autumn will see several increases. Although we have been unable to obtain official statements to bear out this contention, we are convinced from what we have heard that our injunction to buy now is well founded. Where there is smoke there is usually fire!

"AN ENTIRELY LIKEABLE OUTFIT"

Read what an ordinary listener thought about the Marconiphone "287."

MR. G. E. CLARKSON, of 75, Gleneagle Road, S.W.16, was our chance-chosen critic this week for our Triple Test of the new Marconiphone "287" receiver.

I first met Mr. Clarkson at the ice rink where we both happened to be learning to skate at the same time. I "met" him as we made a simultaneous grab for the hand rail!

The second time I met him was the day before our test, when I took the liberty of calling and asking him if he would like to try out one of the latest radiograms.

"I should, very much," he said. And so eight o'clock the next evening saw us all ready for the big event.

"Why, it's one of the very latest Jubilee models!" was Mr. Clarkson's first comment when he saw the radiogram. "I've seen them in the shop windows and have wondered how they perform."

A Fine Cabinet Design.

Years ago, before the advent of the S.G. valve, Mr. Clarkson used to make his own sets, and at present has a small mains receiver. So we expected to find him rather a critical critic, and he certainly put the receiver through its paces.

"The cabinet design is one of the best I have seen," he remarked. "It is modern without being flashy."

This is certainly quite true, for its low build and refined appearance harmonise most effectively with modern styles of furniture.

"Well, let's put it on the air," we remarked after judgment had been passed on the exterior, and, suiting the action to the word, we turned the switch to medium waves.

In a few moments music began to come through as the set warmed up. It was rather faint, but Mr. Clarkson showed that he was no stranger to sets by immediately reaching out and turning up the volume control.

"Ah, that's better!" he exclaimed, listening attentively to the reproduction. But he did not pass any comment on it for the moment.

"Try the tuning and other controls for yourself," we urged. No sooner said than done! And the first knob to which Mr. Clarkson gave attention was the tone control.

"I personally like it towards the bass end," he said, turning it round: "but it certainly has a wide range and should enable anyone to get just the particular tone that appeals to him."

Plenty of Programmes.

Then he turned his attention to the tuning, and, after pausing at one or two stations for a few minutes, he remarked that the quality appealed to him especially. He called our attention to the wonderful reproduction of the double bass that came over in one of the programmes.

"It certainly brings in enough stations," Mr. Clarkson said when he had been carefully up the medium waveband and back again. "I think, though," he continued, "it is a pity the set is calibrated only in wavelengths and does not give station names."

This is a criticism which is really based on personal opinion, because when station wavelengths are altered, as in the recent case of the British stations, the calibration is immediately thrown out and a new "dial" is needed.

But to return to our test. "What is the idea of this?" our critic asked, pointing to the silent-tuning knob. We explained that it removed all inter-station noises and weak stations from between those of real programme value.

This proved a point that appealed greatly to Mr. Clarkson, who tried it out carefully on both medium and long waves. "An excellent refinement," was his verdict.

Finally, we put a few records on for Mr. Clarkson, which seemed to confirm his opinions on the quality.

"The silent tuning and the fine quality are the two biggest features of an entirely likeable outfit," was the comment as we brought the test to a close and departed into the cold night to find my car and speed homewards.

A. S. C.

WITH PYE AND PIPE

Harold Ramsay, leader of the famous broadcasting band, enjoys a little leisure with two favourites in his dressing-room. The set is a Pye portable.

FREE H.M.V. RECORDS

Sorting some of the albums of classical records which are to be given away with "His Master's Voice" Radiograms during this year to celebrate the Jubilee.

"WORTHY OF A GREAT OCCASION"

—Our Music Critic.

I SUPPOSE all of us, no matter from what angle we view broadcasting, are looking forward with eagerness to the Jubilee programmes in May. From the purely musical standpoint I am expecting great things of the B.B.C. during that period, and so it was particularly interesting for me last week to receive one of the special Jubilee sets built by Marconiphone to try.

Its name is well chosen, too, for the powers of reproduction seem to be worthy of a great occasion. Plenty of high notes—I was very glad to hear those—and a bass reproduction that really does give the drums and bass viol a chance.

There is a tone control on the instrument, but I found that it was only necessary to use it when listening to foreign stations or to one of the more-distant British transmissions.

Excellent Reproduction.

The quality of music provided by the new Marconiphone set is undoubtedly of a very high order; the whole reproduction sounds "freer" than it does in many cases, with the result that the violins, the brass instruments and the percussion sections of the orchestras come through much more alive. This is so whether the set is used on radio or on gramophone.

I listened to the Sunday evening music from Bournemouth and the Fred Hartley Quintet with unusual relish, for the latter orchestra, particularly, was brought to life. The twang of the double-bass string as it was plucked, the slight reediness of the saxophone and the bite of the bow on strings that characterises the violin when heard properly were all present in their correct proportions.

On full orchestral reception the side drums were exceptionally well brought out, while tympani were clear cut and realistic. Certainly the receiver is a good one from the musical point of view.

The gramophone side is also very good; the pick-up seems to give the right proportions of bass and brilliance to provide an impression of good balance.

Testing The Gramophone Side.

A test record that I often try on sets that I am asked to listen to is one of Ravel's "Bolero," and on this the set came through with flying colours. The monotonous beat of the drums was realistic, while the shrillness of the violins and the brass instruments' blare were sufficiently well reproduced to satisfy even my critical ear.

Other records I tried were those of banjo solos, one by Eddie Peabody, and a couple of clarinet solos with guitar accompaniments. These usually find out the weak spots in the top end of the musical scale. Crisp reproduction and no "hang-over" are required, and with the Marconiphone I seemed to get both those essentials to real enjoyment of this type of record.

The Marconiphone Jubilee "287" is a good set—of that there is no doubt; and I should be treating the designer unfairly if I did not say that I thoroughly enjoyed listening to it.

TECHNICAL TESTS

Number Fifteen:

THE MARCONIPHONE JUBILEE MODEL "287" RADIOGRAM

THERE are certain outstanding events in our lives which serve to mark the passage of time far more vividly than a mere consideration of months and years.

So far as we of the technical staff are concerned, when, in years to come, we have occasion to cast our minds back to nineteen hundred and thirty-five, we shall think of it instinctively as the great Jubilee Year ; and then, because our subconscious minds are apt also to mark the passage of time in terms of technical progress, we shall probably think of Marconiphone. Who knows, we may also have occasion to think of it in terms of television. But that remains to be seen.

But we shall think of Marconiphone simply because, to the technical mind, at any rate, any recollection of this memorable year will be impossible without thinking also of a range of receivers which have, undoubtedly, made commercial radio history.

Our Expectations Were Justified.

How very fortunate that Marconiphone should so opportunely have completed their months of laboratory preparations for these new models in time for the Jubilee celebrations ! How appropriate, too, that a firm with such long-standing traditions, and with such distinguished associations, should adopt this enterprising scheme !

To be frank, from the moment we heard that Marconiphone were producing a range of receivers which were to be associated with the historic occasion of his Majesty the King's Jubilee, we anticipated something rather remarkable. Little wonder, therefore, that we should have made arrangements forthwith for one of them to be submitted to us for test.

Our introduction will have made it clear that we were not disappointed. With the particular model submitted to us—the Jubilee Radiogram Model " 287 "—the results were very remarkable indeed, and certainly in keeping with the greatness of the occasion.

As the name implies, it is a radiogram, and it is an all-electric model for operation on A.C. mains. But that is a most ordinary description of a very extraordinary design, for, as far as it is possible to assess anything in radio as " the last word," this instrument certainly falls into that category. And to think that people talk about existing types of sets being obsolete by the end of the year ! What rubbish !

Here is an instrument that will be in the front rank, not just until Show time, but for many years to come. And that applies, television or no television.

Let us get this television business right. It's coming—of course it's coming—but think only of its limitations for the next two or three years, at any rate, and you will then realise how very desirable it is going to be to have a really good broadcast set to fall back on.

Television is only an experiment. Perhaps a rather elaborate one, so far as the ordinary listener is concerned. But the whole position is going to be reviewed again when the B.B.C.'s Charter expires in 1936. And until then, and doubtless for some time after, the existing broadcasting facilities on medium and long waves will remain unaltered.

So that for many years to come you will want a broadcast receiver of the conventional type. You will probably always want one, but it doesn't do to look too far ahead.

However, to get back to our subject after, we hope, having cleared the air of some of the present television myths, this Marconiphone " 287 " certainly is an astonishing set—or perhaps we had better say radiogram—in many more ways than one.

It is a little difficult to try to isolate which, of all the features that are to be found in this design, was the one that impressed us most. But, bearing in mind that our tests are conducted from the point of view of the ordinary listener, and that all our observations on special features are based upon their practical utility from this angle, perhaps the special form of Q.A.V.C. incorporated is the greatest talking point of the lot.

Let us explain it.

Most sets these days incorporate automatic volume control, simply because distant-station reception with this feature is often greatly improved. Without it stations may fade, and you can never be certain whether they are going to stay with you for long.

Quiet Tuning Between Stations.

A.V.C., properly applied, overcomes that great disadvantage ; but, unless certain precautions are taken, it introduces a snag. Very briefly, the idea behind A.V.C. is that when a station tends to become weak through what is known as fading, the set quite automatically adjusts the volume level to compensate for that diminution in strength ; and similarly, when the strength of the incoming station rises, the set output, through the function of the A.V.C., is correspondingly reduced.

In other words, A.V.C. levels out the rises and falls in volume, and enables you to hear distant stations at constant volume, irrespective of atmospheric changes.

But—and this is where the snag arises—since the function of A.V.C. is to increase the sensitivity of the set when the station becomes weaker, it goes on increasing it until it reaches maximum, when there is no station there at all. Unfortunately, therefore, the set is inevitably at its maximum sensitivity *in between* stations, and that means to say that when tuning round for stations you have to put up with a miniature bombardment—crackles and bangs of a most distressing kind which tend to make one feel that distant-station reception is not worth while.

But you never feel like that about it with the Marconiphone Model " 287," for the " fireworks " can be completely dispensed with by the movement of a single switch. And then, when you hunt for distant stations, the set is so very quiet in between stations that you might have just grounds for doubting whether it is actually switched on.

It is that which makes it such a joy to handle, and there is another great advantage about it. There is little doubt—and we write from experience—that this set will receive every station in Europe with ease, such is its amazing sensitivity. But when all is said and done, who really wants to ? Many of them are heterodynod, and others are unsatisfactory from various points of view, and the ideal would seem to be to have a set that would pick out the good ones automatically ; a set that would save you the fag of sorting them out, and, in consequence, could be operated successfully by other members of the household.

Such a set is the " 287 " ! You adjust the volume below which you require all stations to be rejected, and the set does the picking and

(*Continued on page* 823.)

A QUALITY PRODUCT

THE "287" IN BRIEF

GENERAL DESCRIPTION.—Five-valve seven-stage all-electric superhet radio-gramophone for operation on A.C. mains. (Note.—This set is one of a series of three which has been released by the Marconiphone Company in connection with the forthcoming Jubilee Celebrations. It is known as the Jubilee Model " 287.")

CIRCUIT ARRANGEMENT.—The five valves are arranged in the order: non-radiating electron-coupled heptode frequency changer, variable-mu I.F. amplifier, double-diode triode (combining the functions of demodulation, automatic volume control of special type and first L.F. amplifier), pentode output and rectifier. The circuit is band-pass coupled, and special precautions have been taken in the design to obviate " image " reception.

CONTROLS.—Four in number, consisting of main tuning, tone and master switch (all on motor-board) and volume control, which is mounted on the front. Set incorporates a " quiet-action " control (fitted at rear), and is provided with a switch on the motor-board to put it in and out of action. Gramophone section is provided with a speed regulator and automatic and hand brakes.

SPECIAL FEATURES.—(1) " Electron-trigger " device for the suppression of inter-station background noises ; (2) tone-compensated volume control ; (3) remarkable sensitivity and selectivity ; (4) new type of illuminated tuning scale with anti-parallax knife-edge pointer ; and (5) 2-watts undistorted output.

MAKERS.—The Marconiphone Co., Ltd., 210, Tottenham Court Road, London, W.1.

CASH PRICE AND HIRE PURCHASE TERMS.—22 guineas, or £2 deposit and 24 monthly payments of £1; alternative rates of £2 2s. 0d. deposit and 12 monthly payments of £1 17s. 8d. are available.

B.B.C. TELEVISION TRANSMISSIONS

LATEST NEWS FROM THE "BIG HOUSE"

THERE will be no regular service transmissions of high-definition television before the beginning of October this year. When started there will be two hours' transmission nightly, half by each system, with special transmissions for the trade during the day. Both sound and vision will be put out on ultra-short waves of the order of 7 to 10 metres. When there are a lot of stations established one of the medium waves of the broadcast band will be released to provide sound for all the television transmissions.

* * *

B.B.C. Television Director.

As exclusively forecast in "P.W.," Mr. Gerald Cock has been appointed the first Television Director of the B.B.C. Mr. Cock's former job of Outside Broadcast Director will be filled by Mr. Shuster, Mr. John Snagge moving up "one" also.

It is interesting to note that television is promoted from a "section" to a "branch." This means that the Television Director, Mr. Cock, will be on the same grade of rank and seniority as Mr. Eckersley, the Director of Entertainment, and Mr. Siepmann, Director of Talks.

* * *

Site of Television Transmitter.

No site has yet been chosen for the television transmitter. There is a possibility that the B.B.C. will acquire the Crystal Palace installation of the Baird Company, adding the E.M.I. equipment as required there.

* * *

Government Committee on B.B.C.

The Government has decided to set up a Departmental Committee to investigate the B.B.C. and make considered recommendations for changes of the constitution after the expiry of the Charter and Licence on December 31st, 1936. The members of the Committee have been chosen by the Prime Minister on the advice of the P.M.G. They are to be announced shortly in the House of Commons.

* * *

Mr. Graves for Newfoundland.

Mr. Cecil Graves, the Empire and Foreign Director of the B.B.C., who has been away ill for some months, will be well enough to do light duty by the middle or end of April. The Administration in Newfoundland has asked that the B.B.C. send him out there to advise on broadcasting, and it is likely that he will take this on as a combined health cruise and business visit.

Some months ago the American and Canadian broadcasters sent a joint mission to Newfoundland to attempt to capture control of broadcasting; the visit of Mr. Graves will offset this expedition, or, at least, it is hoped in Downing Street that it will.

* * *

B.B.C. Variety Reorganised.

In order that Eric Maschwitz, the Director of Variety at Broadcasting House, may have more time to devote to creative work, and not be hampered by administrative details, Mr. A. H. Brown, formerly Variety Executive, has been appointed manager of the department. This is part of the new plan to apply stricter censorship and at the same time to improve the quality and range of the product.

* * *

Summer Alternatives.

The B.B.C. is considering whether to repeat this year the practice of curtailing drastically the alternative programmes during the summer months. There was a good deal of discontent last year, particularly in the trade, and I prophesy with confidence that although the full alternatives may not be given, the curtailment will be substantially reduced. This will be good news for listeners.

HARRY ROY, the well-known dance-band leader, who broadcasts regularly from the May Fair Hotel.

Listen To These Next Week:

NATIONAL, Tuesday, February 26th: "The Lottery Ticket," a farce; and "The Siege of Lucknow," a melodrama. These are two successful plays that were staged about fifty years ago. They will also be heard in the Regional programme the following day (February 27th).

MIDLAND, Friday, March 1st: The second of the topical series, "At the Langleys'." On the following day, Saturday, The Regional Revellers, presented by Mason and Armes, will give one of their entertaining programmes.

NORTHERN, Wednesday, February 27th: A variety relay from the Palace Theatre, Huddersfield. The bill includes Herbert Cave and Lilian Denton (vocal duettists), Reg Radcliffe (xylophone), Jack Herbert and Cyril Halton (cross-talk comedians) and Gladys Clark (whistling vocalist).

SCOTLAND, Saturday, March 2nd: An eye-witness account of the Scottish League match between Airdrieonians and Queen of the South will be given by Arthur McInally.

Studio Opera Again.

It has been definitely decided to restore studio opera to its former place of honour in the programmes. It was practically suspended five years ago, and has been greatly missed by listeners. The new plan will provide about five studio operatic productions a month for the next five years. Relays from Covent Garden, the Old Vic and other places will continue, but perhaps in less number.

* * *

The Microphone Tours.

Outside Broadcast officials in the North are continuing to find good material for their series of microphone tours programmes, and the next, arranged for Monday, February 25th, will deal with the new Parcels Post Office at Liverpool. This is the second largest in the country, and there many thousands of parcel postbags are handled every year *en route* for destinations in all parts of the world.

More than seven million parcels are handled in Liverpool every year, but so rapid has been the development of the parcels post service that there are former officials, now retired, who remember the days when parcels were conveyed to the railway for the night mail on a single handcart, and when the parcel mail between Liverpool and Manchester was carried by a horse-drawn coach.

I understand that one or more of these former officials will be prevailed upon to come and reminisce before the microphone on February 25th.

* * *

Midland Parliament.

Two new speakers will represent the employers' side in the next session of "Midland Parliament" broadcasts on Thursday, February 28th, when, under the chairmanship of Sir Charles Mander, the whole field of insurance for unemployment and pensions will be surveyed. This survey will include the possibility and desirability that State insurance should be supplemented by insurance organised by industries themselves.

Mr. George Jones and Mr. Isaac George will again represent the side of the employees, but Mr A. P. Young and Mr. Herbert A. Buckler are new to this series of broadcasts.

Mr. Young is manager of the B.T.H. works at Rugby, and is the author of a recent book on the planning of industry. He has also given the Mather Lecture for the Textile Institute.

Mr. Buckler is managing director of three companies producing knitted articles, but he is better known for his interest in lawn tennis, in which sport he is captain of Leicestershire. He is also a member of the Lawn Tennis Association, the governing body of the game.

* * *

A New Septet.

Jack Hill, the well-known Midland broadcasting pianist who plays both "straight" and syncopated music, has written the whole of the programme to be performed by his own septet, a new combination for light music. Midland Region, March 1st.

(*Continued on page* 818.)

ON THE SHORT WAVES

Conducted by W.L.S.

IF you were so unfortunate as to know one or two friends of mine who drop in occasionally and make sarcastic remarks you would no doubt be "let in" on a little private joke.

Every time I happen to mention that I am trying a new receiver one of them remarks: "Yes, and it's better than anything you've ever built before!" This has long passed the proportions of a joke; it is a tradition. But what can I do about it? It's perfectly true!

The reason, of course, is not that each new receiver uses some marvellous circuit that renders every predecessor useless. It's certainly not that the number of valves increases each time, or I should be using about 400 of them by now.

Get Rid of the Dirt.

It is simply that a new receiver *always* works better than an old one, even if it uses the same circuit, same parts, same batteries and all; and the moral of this little business lies in the words you see in the heading.

It is absolutely useless to deny that home-constructed receivers deteriorate—and the short-wave breed seem more prone to the habit than the others.

Dirt *must* be the principal explanation. It gets between the condenser vanes, it lies about on the baseboard and it gets into all those dry joints that the average amateur solderer leaves about the place.

I guarantee that if you who are reading this were to take your present receiver to bits, clean up all the parts, brush the baseboard and rig it up again with fresh wire for connections you would find results noticeably improved when you had finished.

Use a Cabinet.

Well, there is one thing easier and better than taking your receiver apart for periodical decarbonising, and that is to build it so that the operation isn't necessary. Build it *well* in the first place. I've seen a few home-constructed sets, and it is my painful duty to record the fact that the average level of workmanship is *rotten*. Sorry, readers, but it is, really.

I have had sets sent to me for test, and have simply packed them up and sent them straight back, accompanied with a long letter. What is the good of testing a reader's set that is wired up with short lengths of dirty D.C.C. wire, often with twisted joints where he couldn't find a piece long enough to bridge a gap?

Add to this the use of ancient and worn-out components, sometimes held down by one screw and sometimes by none at all, and you are beginning to produce the grand and glorious mixture that turns up occasionally.

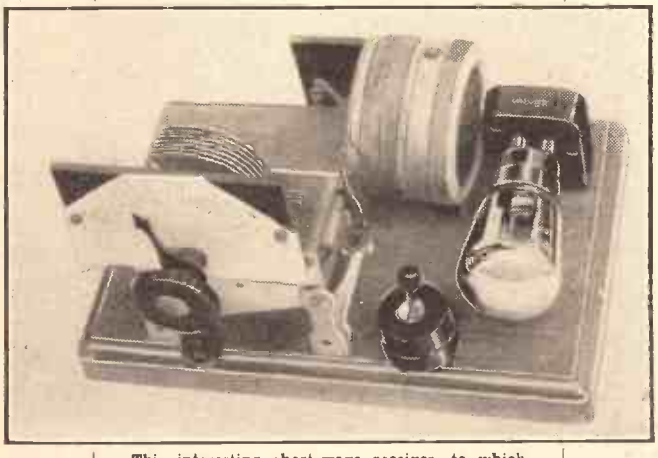
Do, for the love of Mike, make a *job* of it. Take a pride in the construction of the set and in its appearance. Make all your joints tight or solder them really well, and then rush the thing into a cabinet, even if you only improvise one out of cardboard.

KEEP YOUR SET CLEAN

There's no gainsaying that the results from most short-wave sets deteriorate as they get older. W.L.S. puts his finger on the reason in this article and offers the constructor some sound advice.

There's some excuse for an experimenter like me. I may be playing around with a circuit for weeks before I settle down to its final form, and it's inevitable that things should get a bit untidy; but when you are copying a cut-and-dried design you should do it properly first shot. If you don't—well, you must take the results, such as they are, without slanging the designer for exaggerating the possibilities of the set.

OF 1923 VINTAGE



This interesting short-wave receiver, to which W.L.S. refers in the article on this page, was built in 1923. Note the "low-loss" coil, horizontal valve mounting and calibrated dial.

Don't Waste Any Energy.

Yes, readers, your usually genial W.L.S. feels like preaching a little sermon, and it has come out at last. I don't care two hoots what the technicians say, but I lay down, very firmly, my opinion that unless the workmanship in a set is first class, then something will be missing from the results.

Every little micro-watt that is wasting its time heating up dirty joints is wanted in the headphones. One here and one there won't make any difference, but how they add up!

Just cast your eye over the funny bit of goods illustrated on this page. That was once a pukka short-wave receiver—the apple of someone's eye. It worked, and probably it still would. But I've seen receivers built in 1934 that probably wouldn't give any better results.

Take the Receiver to Bits.

So here are a few little pointers for you. Take your set to bits for cleaning (if your conscience so impels you) and make a new one out of it. Wipe away all that mess of Fluxite round the soldering tags on the valve holders; clean your variable condensers with a pipe-cleaner dipped in petrol or methylated spirit. Fit new pig-tails, if they need it.

Get rid of all the dirt round the drive of the slow-motion dials; fit a new L.T. switch, preferably of the quick-break type. Throw away anything that really is too hopelessly old, including the ebonite panel, especially if it has suffered from sunstroke.

(Incidentally, it's remarkable how many panels are beautifully shiny on the front and all green and "oozy" at the back where the sun has caught them through the window.)

New Valves and Batteries.

I might add, in the case of real veterans, that new valves may make a wonderful difference. New H.T. batteries certainly would in the case of one or two that I can think of. Old headphones, too, would account for some of those reports of weak signals that pour in.

Boiled right down to one word—depreciation—several short-wave troubles are easily accounted for, and yet people won't see it. The man who expects his 1929 set to give him good service in 1935 wouldn't expect the same from a 1929 car. True, it would take him there and bring him back, but not in a way that would compare with a similar model built this year.

Don't think I'm "rubbing it in" too hard. I'm only doing it because I have seen with my own eyes that it's really necessary. It isn't a question of encouraging you to spend a lot of money on new components, because your own are probably quite serviceable when they are spruced up a little.

ON THE SHORT WAVES—Page 2.

Points from the POST-BAG

AN overflowing bag, and not much space. Brief style, short queries, quick replies. F. W. (Saltash) confirms my observations of severe "echo" on many short-wave stations during January, especially on 19-metre band. He also mentions hand-capacity troubles, prevalent below 25 metres *with* an earth, above it *without*. Moral—use a readily detachable earth connection.

M. S. (Harlow) volunteers to keep a "long-period log" on any station I choose (providing he can get it). Suppose you start, from now, on W 1 X A Z, M. S. If you prefer it take W 8 X A L on the 49-metre band.

An "S.G." Detector.

E. P. W., who asked, through these columns, for communications from B. R. S. listeners, reports several replies, ages 15 to 59! Now he reports good results with an S.G. valve as detector, with screen and plate connected together, used, naturally, as a triode. He finds sensitivity superior to that of the average triode.

E. P. W. has also started a long-period log on Radio Coloniale, 25·6 metres. In the course of an overflowing letter he mentions the pestilential people who leave their cars warming up just as a good DX station is coming in. I've got 'em on the list, E. P. W. Several of my neighbours will find their ignition keys missing one of these days.

Owing to the fact that this section was unavoidably held out for two weeks, I'm afraid I'm too late with the news of the special broadcast from H B 9 B, which took place on January 13th. The Radio Club of Basel, Switzerland, gave a special transmission for members of the I.S.W.C. I hope lots of readers heard it. Sorry, F. A. B., that I couldn't get it in in time.

A long letter from H. H. A. (Middleton) gives a summary of conditions on the various bands, as drawn up by himself and several helpers. I hope to publish it next week, with comments.

W. K. C. (Hucknall) reports that he was badly worried by hand capacity until he hit upon that universal cure—an untuned S.G. stage. *But*—it cuts down signals by 50 per cent.

TO REDUCE NOISE

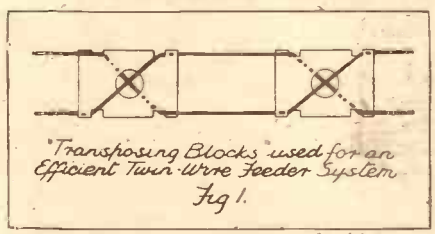


Fig. 1.—Twisted flex is often used for feeders in "noise-reducing" aerial systems. It is preferable, where possible, to use "transposition blocks" of the kind shown in this diagram. One block should be placed at every eighteen inches or two feet, and the feeders may be either of rubber-covered flex or rigid bare wire.

Can't see that at all, W. K. C. You mustn't expect much amplification, but it shouldn't be actually on the negative side! Are you sure the valve is O.K.? And have you tried various voltages on the screen? And have you remembered to by-pass the screen to earth?

W. K. C. is yet another "long-period" volunteer, and I'm allotting him W 3 X A U on the 49-metre band. I'm going to call all these logs in about June.

G. H. (Southampton) wants identification of a Spanish-speaking station working just above W 3 X A L—on about 49·27 metres. I think it might be La Paz, Bolivia (C P 5), on 49·34.

R. J. A. (Holloway) volunteers to keep a long-period log on one station, and chooses P R F 5, Brazil. He hopes to do a graph extending over one or two months. Will someone else please follow this same station and do the same thing—preferably someone up North? The comparison should be interesting.

J. M. D. (Chingford) is sadly bothered with a "tunable hum" on a certain eliminator that he likes to use with his short-waver. Round about 37 metres there's a horrible burble that he can't kill at all. Increasing the smoothing has no effect whatever. I think the judicious placing of *H.F.* chokes at all strategic points would probably cure it.

One-Valver.

A. C. S. (Wallsend) has a one-valver of which he is very proud, but wants to know if I *really* recommend him to add an S.G. stage. Yes, I think so, A. C. S. It should give you that very feeling of stability that you say is missing from the set at present. You won't have to "freeze on to the dials" quite so much.

J. M. W. (Aberdeen) has only one grouse about his set. When he touches the grid terminal of the detector valve holder the set screeches! Don't touch it, J. M. W., then you'll be all right.

If any reader happens to have kept a log on W 8 X K (19·72 metres) last summer I should be very grateful if he would let me look at it, as I have one from P. N. N. (Loughborough).

R. W. R. (Southport) is a strong advocate of the *tuned* S.G. stage. He finds stability, selectivity and signal-to-noise ratio all improved. He inquires whether I think it possible to design a straightforward detector stage which (presumably without an earth connection) is stable and free from hand capacity at all frequencies.

Yes, R. W. R.—I'm pleased to say that I possess one. I *never* use an earth, and I can always grab hold of the metal box in which the set is housed while receiving a signal. It's perfectly strightforward and all a matter of layout.

Note to correspondents, by way of finale: The longer you make your letters, the longer will it take me to find time to answer them.

A 5-METRE AERIAL

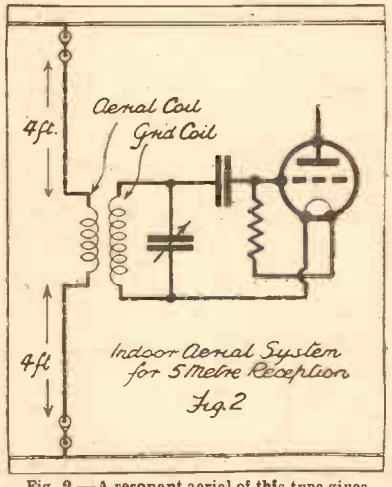


Fig. 2.—A resonant aerial of this type gives excellent results on the 5-metre band, and may generally be accommodated indoors. As a refinement the coupling between the two coils may be loosened and the aerial coil, as well as the grid coil, tuned.

F. W. (Saltash) has forwarded me a cutting from "West Australian Wireless News," in which a gentleman named "Super-Wasp" quotes a few facts about the Lyndhurst station, V K 3 L R.

The station was opened last March for the purpose of making the National programmes available to listeners in the remoter areas of Australia. The site is about 25 miles south-east of Melbourne, and the station is housed in the same building as V K 3 X X—the P.M.G. Radio Laboratories. The call-sign 3 X X is only used when transmissions of an experimental nature are being put out.

From the hours of transmission given, the station should be heard here at almost any time between 6.15 and 10.30 a.m. on 31·28 metres.

Surprise Meeting.

The secretary of the Anglo-American Radio and Television Society makes the following announcement: On March 6th, from 7 till 10 p.m., the West Middlesex and East Bucks Branch of that society is holding a "surprise meeting." I'm not giving away anything, or it wouldn't be a surprise.

Every reader of "P.W." is welcome (so long as they don't *all* turn up). No charges, but if you are going please notify Mr. Leslie W. Orton, "Kingsthorpe," Willowbank, Uxbridge.

Conditions continue to be fairly good, and at the moment of writing are showing distinct signs of improvement. A welcome newcomer (to most of us) has been W 3 X A U on 31·28 metres. These transmissions have been logged by quite a number of readers, in spite of very definite statements that the station is not using that wavelength now.

Nairobi and Bombay.

Nairobi, V Q 7 L O, is coming up in strength in the early evenings, and remains fairly consistent until the "close-down," in the region of 8 p.m. South African amateurs are good lately at that time on the 40-metre band, so that one might expect to receive both Nairobi and Johannesburg on the 49-metre band during the evenings.

V U B, Bombay, is another station that is improving rapidly. His wavelength is 31·36 metres, and he is reported as being best between 2.30 and 4 p.m. Listen for him next week-end.

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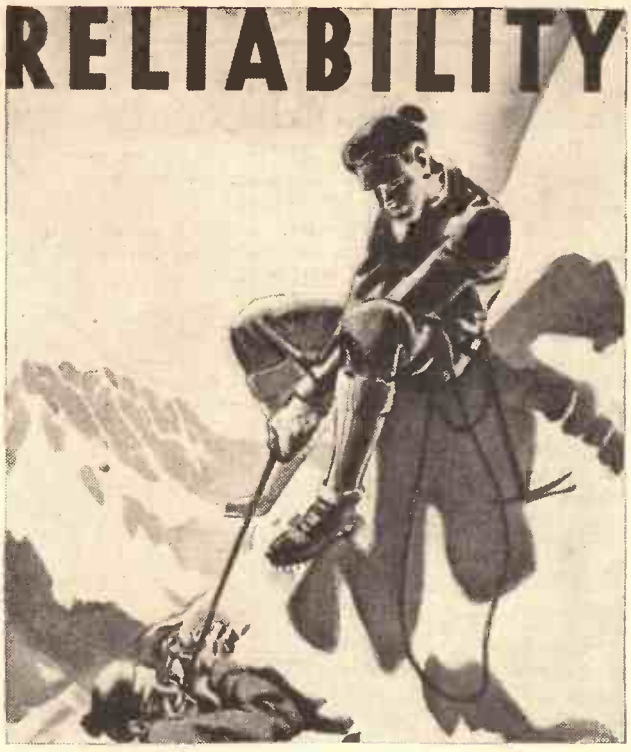

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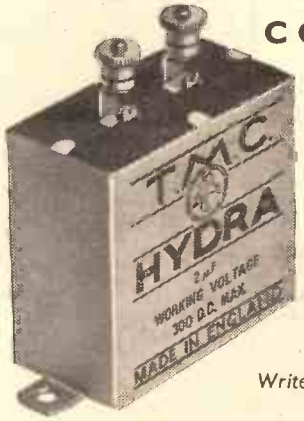

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All about the NEW TELEVISION

DETAILS OF THE LATEST BAIRD SYSTEM INSTALLED AT THE CRYSTAL PALACE.

An Exclusive Article By
L. H. THOMAS

★ ★

THE high-definition television transmissions bear as little resemblance to the present 30-line television put out by the B.B.C. as a modern gramophone record bears to an early phonograph cylinder.

The Baird apparatus installed at the Crystal Palace represents the very latest in modern design, and gives an insight into the probable layout and appearance of a television transmitting station of the future.

The Two Wavelengths.

Transmission is carried out on two ultra-short wavelengths, the vision signals being radiated on 7·0 metres with a power of 10 kilowatts, while the sound transmission employs only half a kilowatt on the wavelength of 8·5 metres. The aerial used for "vision" is an omni-directional system mounted practically on the top of the South Tower of the Crystal Palace, while the sound, at present, is radiated from a directional di-pole at a rather lower level.

Two entirely separate transmitters, of course, have to be used. The half-kilowatt sound transmitter is actually one of the earlier experimental vision transmitters, and, having been designed for vision, it naturally gives very high-quality output.

The 10-kw. transmitter is claimed to possess a modulation-frequency range from 10 to 2 million cycles. The enormous band-width necessary to accommodate a transmission of this type is only available on the ultra-short waves, where we have a band of 20 million cycles between 5 and 8 metres. Full technical details of the transmitter are outside the scope of this article, as it is with the vision side that we have to deal.

An Ingenious System.

The 180-line images are transmitted by two distinct methods—direct projection and the "intermediate-film" method. "Close-ups," head-and-shoulder images and three-quarter-length pictures are transmitted directly from the spotlight studio, in which the subject being televised is scanned by a brilliant spot of light interrupted by a 180-hole scanning disc. The light is generated by a tremendous arc taking a current of 200 amperes, and the light passes back from the subject to a bank of large photo-electric cells.

Outdoor scenes and large studio scenes, naturally, could not be directly scanned by this method without tremendous complications, and it is for these that the intermediate-film system is employed.

An ordinary cinematograph-film record (incorporating both sound and vision, as in the case of talking films) is taken, and in one large piece of apparatus the film is developed, washed, fixed, dried and passed through the scanner. After this the emulsion is washed off, the film dried again, recoated, dried once more and fed back into the camera, so that a continuous strip of film may be used over and over again.

The total delay between the "shooting" of the film and the transmission by television is roughly 30 seconds.

ULTRA-SHORT-WAVE AERIALS

The Baird ultra-short-wave transmitting aerials on the South Tower at the Crystal Palace. The aerials on the balcony are for sound and vision, while that on the top of the Tower is for high-power ultra-short-wave vision transmission.

It is interesting to note that the film passes straight through the scanning "gate" at a steady speed of 25 pictures per second, without the intermediate-"shutter" action necessary for the projection of talking pictures. The scanning disc has 90 holes arranged in a circle—not a spiral—and the "gate" is at the top. Thus we have the light spots flying across the film horizontally, while the film is moving downwards. The scanning disc rotates at 50 revolutions per second; thus in one second the light spot flies across the aperture 4,500 times. During this period 25 pictures have passed downwards, giving us 180 horizontal scanning lines to each picture.

Since the sound is also recorded on the film, an ordinary standard "sound head" is incorporated in this intermediate-film scanner. Its output is fed to the amplifiers associated with the "sound" transmitter, while the output of the photo cell mounted behind the scanning gate is fed to the "vision" amplifiers.

The synchronising pulses superimposed on the picture are also generated in the same apparatus. Although the whole thing is, naturally, fairly bulky, it could easily be transported in a van, but the reader is doubtless wondering how the two separate outputs are fed to the transmitter, when the scene being televised is remote from the station itself.

Use of Micro-Waves.

The answer is "micro-waves"—yet another development of the astonishing ultra-short wavelengths. A small micro-wave transmitter, working on a wavelength only a few centimetres long, was demonstrated to me at the Crystal Palace, and I was allowed to test its directional properties by "training" it on the receiver. A deflection of a few degrees made all the difference between strong signals and nothing at all.

Such a transmitter could be set up at any point within visible range of the main transmitting station, where its signals would be received, amplified and fed into the big transmitter.

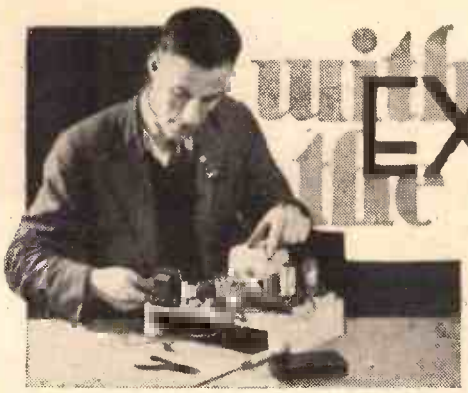
Another system of which we are likely to hear much in the near future is that which utilises the "electron camera." This extraordinary piece of apparatus has no moving parts except the projector mechanism, and can televise pictures at 25 per second, having any degree of definition between 100 and 500 lines per picture. Full details of this "electric eye" are not yet available, as experimental work is still being carried out with it. I was shown, however, a film scanned in 400 lines by this method.

Superimposing a Background.

An interesting scheme employed in one of the Baird Company's studios is the "back projector." The artists perform in front of a screen, on to which is projected (from behind) a suitable scenic background. This is done by means of a cinema projector operating in synchronism with the main cameras, and the whole is re-photographed to give a realistic combined effect.

So much for the details at the transmitting end. The next link, of course, is the ether, which is indispensable but quite beyond our control. At the receiving end we require either two receivers or a specially designed single receiver which will pick up both the sound and vision

(*Continued on page* 818.)



with the EXPERIMENTER

"THERE ARE DIALS AND DIALS"

THERE are certainly dials and dials. Crimes and crimes, as Strindberg said. I would go further and say that there are dials and crimes—dials that are dials and dials that are crimes.

Crimes against eyesight. Against common sense. Against the inevitable march of Progress.

Forgive the Old Bailey touch this week. I am rather wrought up about some of the dials I have come across lately; that's all.

I'm wondering if you feel as I do about the matter. And whether your memory of dials goes back as mine does—to the days when a variable condenser was an awesome piece of laboratory apparatus, or a most weird contraption assembled at home from bits and pieces.

The Earlier Types.

Curious thing is, you know, that the latest in dials is more than a little reminiscent of the earliest types. But then history, as we are always told, is for ever repeating itself.

I mean, right back in the beginning—circa '21—the scale was fixed, the pointer moved around it. Somewhere between then and now the scale gained a roving disposition, and began to move around a fixed datum line. Very small apertures hid all but a wee bit of tuning scale as it moved behind. Myoptic listeners might well be excused for going cross-eyed in trying to see exactly where they were with some of these affairs.

You don't remember, I suppose, those ivorine scales we used to stick on the ebonite panel for the tuning condensers. They were crude, but they could be seen. Which was a tremendous advantage over some of the later ideas.

To the outer end of the tuning-condenser spindle we used to screw and lock a sizeable pointer, which would traverse in a semicircle the 180 degrees of our ivorine scales.

Fortunately, many makers of condensers and sets have come back to the full-vision scale. I have been trying out some sets, not to mention more than one condenser scale, wherein the right type of tuning scale or dial has been adopted.

A Good Example.

And what is the right type of tuning scale, or dial? A scale, or dial, that can be seen all the time.

The sort of tuning scale that brings gladness to my Experimenter's heart is that shown in the photograph of Mr. Scott-Taggart's famous "Super-Gram de Luxe."

My nice large horizontal scale is fixed, then. In front of it, operated by the tuning-condenser knob—through a cord and pulley, most likely—moves a hair-line cursor.

And how is this paragon of scales calibrated? That depends. At least it must be marked in medium and long wavelengths. Funny how even in that simple business it is possible to go wrong, though.

I mean in the divisioning of the wavelengths. Sometimes the steps are too big. A minimum separation of 25 metres is necessary, perhaps, in order not unduly to crowd the medium-wave scale. But a maximum of a 50-metre step is equally important on the medium waves, for if it is larger you never quite know where you are.

Should stations be marked? I really am in two minds about this. At first sight of a station-marked dial all my hard-baked conservatism revolted against it. Ridiculous, I thought. It will never be accurate, with stations changing about all the time.

"THE SCALE I LIKE"

Typical of good modern condenser-scale design is this wide-vision, wavelength-calibrated scale used by Mr. Scott-Taggart in his famous "Super-Gram de Luxe." It has 10-metre markings on the medium-wave side.

But experience has mellowed that contention, until now I am almost "sold" on station-marked scales. Mainly because, to my intense surprise, I have found them accurate enough to go by. So far as the chief foreigners are involved, anyway.

And under this Lucerne Plan stations don't change about very much. A short time ago the Germans had a bit of a general post, you remember, and on February 17th six B.B.C. stations changed their wavelength locale. These are upheavals that can be readily side-tracked with interchangeable scales, which many set makers are willing to supply for a small charge.

Yes, let us have outstanding stations, by all means. So long as they don't entirely push the wavelength markings out of the picture.

And yet it seems only yesterday we were arguing on the relative merits of 100 or 180 degrees for divisioning the scales!

Then some Smart Alec pointed out that you couldn't refer to 100 degrees for half a circle; they were divisions at 100 or degrees at 180.

For Short-Wave Work.

I wasn't the S. A., don't worry. Nor did I join in the battle over wavelengths or kilocycles. But I did make a mental note that anyone who argued on a scientific basis instead of a broad human basis was in error in this matter.

Mind you, for short-wave working I still want my scale in 180 degrees. I don't want any help from wavelength calibrations, because, knowing the short waves, I realise that they would probably be wrong, and therefore worse than useless.

Finally, we come to the frightfully topical question of whether we want our tuning dials to be just tuning dials, or do we want them to tell us everything about the set's controls?

Some of the latest commercial sets have extraordinarily complete guides to the "innards." Their scales show which waveband is in circuit, whether the tone is high or low, which way the volume is increased and when the signal is exactly in tune.

Do we want all this? I suppose that, given a year of such luxury, we should howl if any one indication were dropped. My own feeling is simple. Give the layman every possible help to overcome the inherent mystification of wireless—not being able to see the wheels going round.

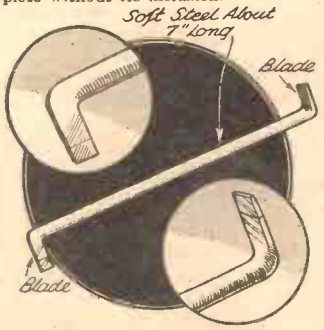
Whether we hard-boiled Experimenters want to be led by the hand in this way is another pair of boots.

"The Experimenter"

RECOMMENDED WRINKLES

A USEFUL TOOL.

DESPITE the fact that the mechanical-minded constructor is in possession of almost every size of screwdriver available, the awkward positioning of certain screws encountered during the construction of a receiver prevents any of them being put to a practical purpose. In such cases the double-ended type of driver shown in the diagram will prove invaluable, and no tool chest can be regarded as complete without its inclusion.



The most awkward of screws give way to this gadget.

The actual construction is by no means difficult. Apart from the metal, which should be a piece of soft steel about 7 in. long by a ¼ in. in diameter, no other material is required.

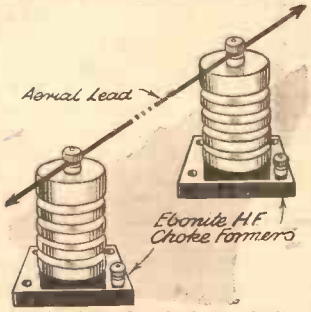
The blades, which are bent at each end, must be at right angles. To facilitate the bending they should be heated to a bright red in a fire and shaped whilst still hot. When the metal has cooled sufficiently the blades can be filed to the sharp edge necessary for driving purposes.

The next step is to harden and temper the steel. The hardening is effected by again heating the two ends, but this time to a dull red, and then immersing in cold water. Before tempering, the blades and part of the shaft must be thoroughly cleaned with emery cloth, then heated in a gas flame until a bluish tinge is attained. At this stage they must again be dipped in cold water, when the tool will be ready for use.

STAND-OFF INSULATORS.

AT such times when it is found necessary to run the aerial some distance to the receiver the use of insulating pillars as a means of preventing aerial losses are often desired.

In some instances ordinary porcelain insulators are employed, but as



An ideal use for obsolete or faulty H.F. chokes.

these have an untidy appearance inside the house a much neater arrangement can be devised by utilising old H.F. chokes.

The usual type of H.F. choke is wound on an ebonite pillar, and once the wire has been stripped the skeleton will be found to be ideal as a substitute for a stand-off insulator. The base, which is already provided with a platform drilled for baseboard mounting, is suitable for wall fixing, whilst the top terminal can be employed to hold the aerial lead-in, as shown in the diagram.

HIDING UGLY WIRES.

THE aerial lead-in, the earth lead and an indoor aerial especially may be camouflaged by painting over the cable a colour in some harmony with the colour of its background.

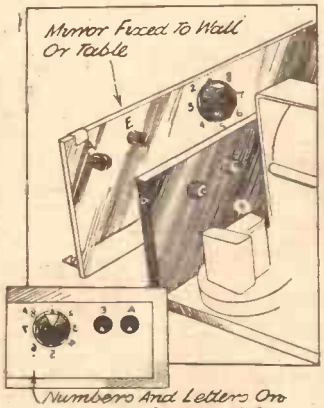
This means breaking off one colour and starting with another, to suit ceiling, wallpaper, door or carpet, as the case may be.

Even the wires outside the wall to earth and aerial will look all the better for an appropriate painting.

If twin flex for a loudspeaker extension needs to be recoloured, don't take any leakage risks through using an oily brush. A quick-drying paint is safest here.

SEEING WHAT YOU ARE DOING.

TO obviate the trouble of turning my set round to read the names on the back terminals, I have fixed a narrow strip of mirror to the wall behind the cabinet. By glancing down at the mirror I can tell which is E and A, etc., without taxing my memory;



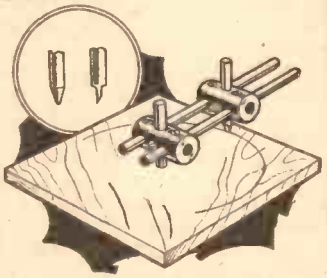
You'll have no more fumbling with terminals and leads if you adopt this scheme.

also the controls on the terminal strip can be adjusted by sight, without fumbling for the knobs and probably getting shocks into the bargain.

Of course, the lettering is reversed; reading is done from right to left instead of left to right, but this is soon mastered. A home-made dial on the tone control of the S.T.600 can be read with this mirror. Two brass strips hold the glass in position.

AN EASILY MADE DISC CUTTER.

A USEFUL disc cutter, more rigid and effective than some commercial articles, may be quickly constructed from two No. 63 "Meccano" couplings and four axle rods. One rod should be filed to form a cutting edge, as shown.



This cutter is assembled entirely from "Meccano" parts.

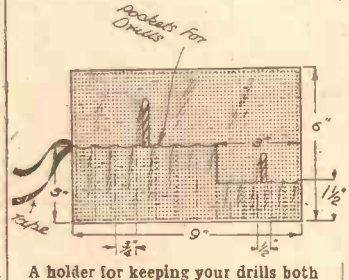
In use, drill a centre hole, ⅛ in. diameter, set the cutter to the desired radius and describe a circle. Cut halfway through, and then cut from the other side of blank.

For use as a permanent tool make the cutter from suitable silver steel and harden.

A HANDY DRILL ROLL.

TAKE a piece of flannel or baize, 9 in. square, and cut out along its bottom edge a rectangular piece, 3 in. by 1½ in. Appeal to one of the ladies of the domicile to hem this on the sewing machine, and, if you can prevail further on good nature, give the following instructions:

Fold the material up from the bottom edge, along a line 3 in. above and parallel to the bottom line, and sew down each end, thus forming a pocket with a step in it. Now sew vertical lines down this pocket ¾ in. apart in the deeper portion and ½ in. apart in the shallower portion of the pocket.



A holder for keeping your drills both bright and always handy.

Now you have a nest of pockets which will hold your drills most conveniently—the larger drills in the deep pockets and the finer ones in the shorter recesses. It is handy to keep the centre punch here, too.

With the tools in place the top is flapped over and the whole rolled up and tied with a piece of tape which is stitched at its middle to the outside edge of your roll. A little oil sprinkled over the roll will aid in keeping the drills bright.

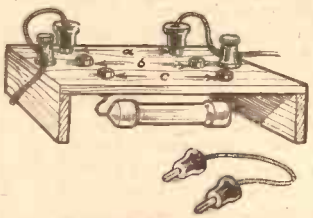
A SIMPLE RESISTANCE BOX.

THE accompanying diagram should be fairly self-explanatory. This resistance box consists of a baseboard to suit one's own requirements, supported on two strips or battens.

Six sockets are tightly fitted in holes drilled in the baseboard and held in place with blobs of solder. These sockets may either be bought or obtained from a "dud" H.T. battery. A wire-ended resistance is soldered between each of three pairs, as shown.

Not more than 6 links, each with a plug attached, are needed to give any one of 14 different values as tabled below. (Combinations of 4 resistances will give 48 different values.)

The values suggested for a good range are 10,000 ohms, 20,000 ohms and 40,000 ohms. This device might also be



This resistance box will prove as useful to the home constructor as a quite expensive instrument.

very useful if incorporated in a set built at home, easily enabling different values of decoupling or anode resistance to be tried.

Connection	Resistance	Connection	Resistance
a‖b‖c	5,714 ω	a+b	30,000 ω
a‖b	6,666 ω	c	40,000 ω
a‖c	8,000 ω	a‖b+c	46,666 ω
a	10,000 ω	a+c	50,000 ω
b‖c	13,333 ω	b+c	60,000 ω
b	20,000 ω	a+b+c	70,000 ω
b‖c+a	23,333 ω	—	—
a‖c+b	28,000 ω	—	—

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 1s. 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?

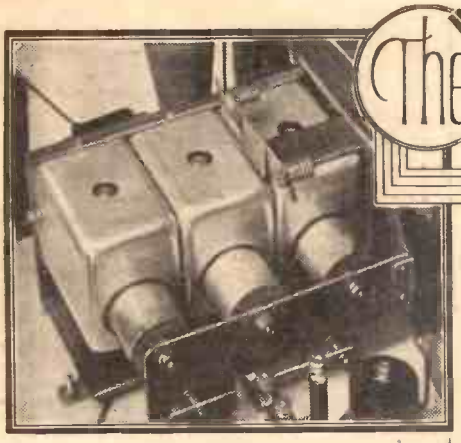
The best contribution in our last selection of Wrinkles, published on January 19th, was sent by Mr. J. Blackburn, 21, Buck Street, Colne, Lancs.

INSERTING SCREWS.

MANY ideas have been put forward for the easy insertion of small screws in awkward places. The following is about as simple as any I know:

Cut a strip of drawing-paper, or any fairly stiff paper, about as long as the screwdriver. Push the screw through the end of the paper, or make a hole and push the screw in after so that the screw is held fast.

Bend the end of the paper and use to insert the screw in the hole. The screwdriver is then easily applied, and the paper is torn away as soon as the screw is felt to enter.



The NU-TUNE THREE

PERMEABILITY TUNING—SIMPLE CONSTRUCTION

Further details about the remarkable receiver introduced last week. The operation of the set is extremely easy, but readers will welcome the following article about such matters as alternative valves, battery adjustments and so forth.

By THE "P.W." RESEARCH DEPARTMENT

FIRST of all, a few words about the valves for this outstanding receiver. As you will observe from the list, we give a very wide choice to the constructor.

Now, all the different makes of similar types will not be exactly equal in characteristics. But that fact need be the cause of no worry at all. It may so happen that the differences, regarded theoretically, are in cases apparently rather considerable.

But we can assure our readers that the difference in practice will for the most part be so slight as to be quite negligible. So don't think that you will lose a station or two if you happen to pick on a certain particular valve or valves.

Select freely from the list and accept from your dealer those mentioned which he has in stock. On the other hand, do not use any others. We have made the list just as comprehensive as we feel able, and so it is quite as much a guide as what not to buy as what to buy.

But there is this point to remember. Upon the valves selected will depend the size of grid bias battery. Any of the different pentode valves can be accommodated by a nine-volter, however. Several of those mentioned will need only four-point-five volts.

The S.G. Valve.

This does not apply to the variable-mu screened-grid valve. Curiously enough, this will almost certainly require more than the output valve.

The majority of the makes mentioned need no more than nine volts, but there is at least one which will require the services of a larger G.B. battery than that. It demands fourteen volts grid bias or thereabouts.

The exact value will, of course, be given in the literature accompanying the valve, but it is just as well to ask your dealer whether or not the S.G. valve you choose will operate satisfactorily with a bias obtainable from a nine-volt battery.

It should, perhaps, be mentioned that there will be little current consumption, so that the battery will not require renewal except at rather infrequent intervals.

This, unfortunately, does not apply to the H.T., although the "Nu-Tune" is far from being greedy in this respect.

Alternatively to a battery, a mains unit can be used to supply the H.T. The "Nu-Tune" is a very stable set, so that, given a mains unit of good design, no motor-boating or other such trouble is likely to be experienced.

Using an Extension Speaker.

There is no output filter in the set, but in view of the fact that practically all modern loudspeakers are fitted with their own transformers it would have been wasteful to have included one.

If it is desired to employ an extension loudspeaker, then an output choke-condenser filter or transformer would be needed so that the H.T. did not flow round the extension wiring.

There is ample room on the baseboard to fit a filter, although many may prefer to have it outside the cabinet, leaving the loudspeaker terminals as they are for connection direct to the near speaker with its transformer.

For the extension speaker the transformer of this could be detached and placed at the set end, though in this case it would be necessary to use pretty low-resistance wire for the extension wiring, and for that reason it is not a scheme strongly to be advised.

There is not much that need be said about the aerial and earth. For the latter the best thing that can be done is to have an efficient buried earth, with a short, thick lead running to it.

There is nothing which can beat this, especially if the earth tube or plate is buried fairly deeply in moist soil. But a water-pipe earth is generally very good, particularly if connection can be made to a main pipe running straight in from the street.

Clips can be purchased for joining the earth lead to it, but a soldered connection will be more desirable if it can be made efficiently. It is difficult to solder to a water pipe, because the heat applied during the process tends so quickly to dissipate.

Job for a Plumber.

If possible, one should get a plumber to make the connection, using for the lead a stout, stranded wire such as is employed for aerials. The plumber will probably wrap the wire round several times and sweat the turns on with the aid of a "Tinker's Dam," or whatever the thing is called, with which a neat bulge of solder is built up round a joint.

Good results will be obtained with the "Nu-Tune" on an indoor aerial consisting of wire run round the room behind the picture-rail or under the linoleum. But very much better results will be obtained with an outdoor aerial, and this is a point to be remembered now that we are facing the summer months.

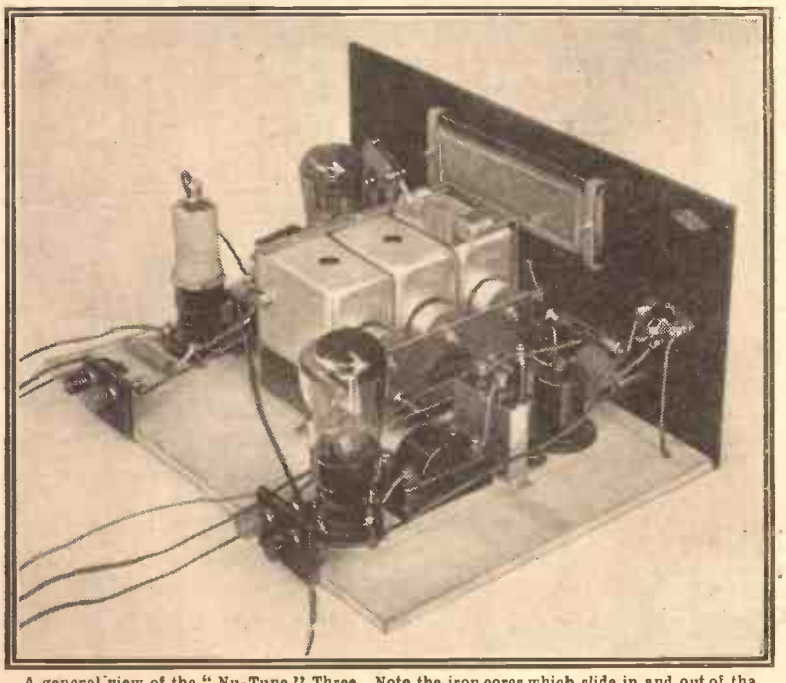
During the dark winter evenings the European stations come over so strongly that an aerial of "hat-pin" dimensions will provide something of a pick-up. In the late spring and in the summer the

(*Continued on next page.*)

BATTERIES AND LOUDSPEAKER

H.T.—120 volts.: G.E.C., Drydex.
G.B.—9-16½ volts: Drydex.
L.T.—2 volts: Exide.
LOUDSPEAKER.—W.B. "Stentorian."

NO VARIABLE CONDENSER IS REQUIRED



A general view of the "Nu-Tune" Three. Note the iron cores which slide in and out of the coil centres, controlled by the tuning knob on the panel.

The "NU-TUNE" Three

(Continued from previous page.

conditions change, and it is then that those who have erected good outdoor aerials experience the full benefit of them and are still able to receive many stations which are lost to others having similar sets but poorer aerial conditions.

Many constructors will want to put their "Nu-Tunes" into cabinets. Several alternatives are offered to them. The panel size is a standard one, and there are plenty of suitable cabinets to be bought.

We will say nothing of those who are able to make their own cabinets, because no doubt they will have their own particular ideas as to the design it should follow.

Console Cabinets Available.

We must not forget to point out that there is no reason why constructors should restrict themselves to the simple form of cabinet shown in the photo last week.

For those who desire to use a cabinet in which both batteries and loudspeaker can be contained, as well as the set itself, there are many attractive designs from which to choose in the catalogues of Messrs. Peto-Scott and others.

There are some who always like to have the set self-contained. On the other hand, many constructors prefer to have at least the loudspeaker separate from the set.

	S.G.
Cossor	220V.S.
Hivac	V.S.215
Marconi	V.S.24.
Mazda	S.215VM.
Osram	V.S.24
"362"	V.S.2
Tungsram	—

There is much to be said for either point of view, and it is fortunate that both schools of thought can satisfy themselves so easily—at least, in the case of the "Nu-Tune."

And now for the operation of the receiver. As we said last week, there is nothing at all abnormal about this. Anyone who has handled the controls successfully of an ordinary kind of valve set will find himself at once at home on the "Nu-Tune."

There are five knobs on the front panel, but two of these can be dealt with very quickly. That is, first the on-off switch, and second the wavechange switch. The purpose of the on-off switch must be as well known (and widely appreciated!) as the use of a knife and fork, and much the same surely applies to wavechanging.

The Reaction Control.

Among the three remaining controls are volume control and reaction. Generally speaking, the reaction should be left at its minimum setting (as far round in an anti-clockwise direction as possible), unless a station cannot be heard loud enough without moving it.

The reaction should not be used as a kind of alternative volume control. It is purely and simply a "booster" control. When the volume control has been turned right up and the station has been tuned in as sharply as possible with the one tuning control, and there is still not quite enough volume, then the reaction can be brought in to apply the final touches.

When a very weak station is being angled for, then the reaction must be as fully applied as the occasion warrants. There will always be a certain sympathy between the tuning and reaction controls.

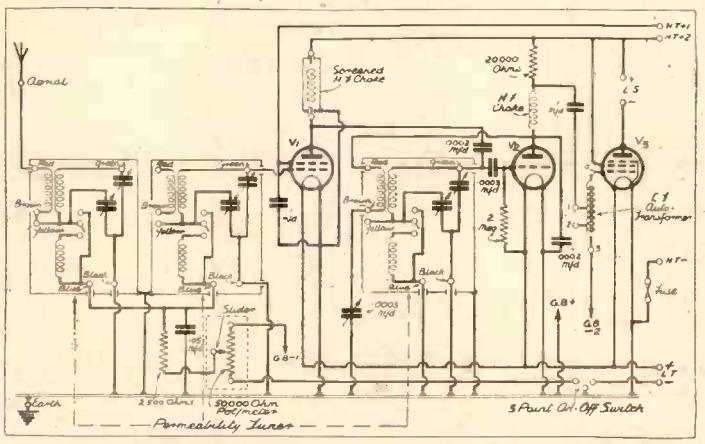
This does not apply to the volume control, which is quite independent. But as the tuning is altered so it will be necessary slightly to readjust the reaction.

Not that you will often, if ever, need to do that with the "Nu-Tune"; it possesses far too much inherent amplifying power for it to require "on-edge" reaction in order to pull in the stations.

BUILD WITH THESE PARTS

1 Varley permeability tuner, type B.P.100.
2 Benjamin Vibrolder 4-pin valve holders.
1 Benjamin 5-pin valve holder.
1 Bulgin H.F. choke, type H.F.12.
1 Bulgin screened H.F. choke, type H.F.8.
1 T.M.C.-Hydra 1-mfd. fixed condenser, type 25.
1 T.M.C.-Hydra ·05-mfd. tubular fixed condenser.
2 Dubilier ·0002-mfd. fixed condensers, type 670.
1 Dubilier ·0003-mfd. fixed condenser, type 620.
1 T.C.C. ·1-mfd. tubular fixed condenser, type 250.
1 Polar "Compax" ·0005-mfd. reaction condenser.
1 Bulgin 50,000-ohm potentiometer, type V.C.36.
1 Bulgin 3-point on/off switch, type S.13.

THE CIRCUIT OF THE "NU-TUNE" THREE



The six "variable condensers" shown across the coils in this diagram are the trimmers and are incorporated in the coil unit. Once set they do not have to be touched. The long-wave and medium-wave inductances are separately trimmed, as was explained last week.

1 Graham Farish "Max" L.F. transformer.
1 Graham Farish 2-meg. "Ohmite" grid leak.
1 Graham Farish 20,000-ohm "Ohmite" resistance in vertical holder.
1 Graham Farish 2,500-ohm "Ohmite" resistance.
1 Peto-Scott "Metaplex" baseboard, 14 in. by 10 in.
1 Peto-Scott ebonite panel, 14 in. by 7 in.
2 Peto-Scott ebonite terminal strips, 2 in. by 1½ in.
4 Clix indicating terminals, type A.
5 Clix wander plugs.
1 Belling and Lee Wanderfuse.
2 Clix spade tags.
1 Coil B.R.G. "Quikon" connecting wire, screws, flex, etc.

A BRILLIANT PRODUCTION

Our radio critic has a few words to say about "Berkeley Square," and also some other recent broadcasts.

LIKE most "illogical" plays, "Berkeley Square" had points around which it was impossible to get. I am always anxious to discover in these plays what the big idea behind it all is. In the case of "Berkeley Square" I can't help feeling that the author only wished to create an amusing situation—that of a modern young man, steeped in family tradition, stepping into the shoes of an ancestor whose life he attempts to live, only in his own way. Perfectly illogical, of course. The author finds this amusing, and so the play he makes out of it is at once justified.

A 90-Minutes' Discussion.

"Berkeley Square" monopolised a lot of my time this week. First, there was the 75 minutes' broadcast. Then followed a 90 minutes' discussion on it with the family. All of us were left guessing. Scores of queries were raised. Did the original Peter Standish really have a love affair with Helen Pettigrew? If he didn't, as some suppose, why did Helen die at 23? Again, was Marjorie Frant a reincarnated Helen? And so on.

In the end we decided that none of these things mattered. Nor should they be investigated. One had just to accept the illogicality of the situation and enjoy the fun. Fun there was. I was greatly amused whenever I heard Peter unconsciously quoting Oscar Wilde. I was no less amused at Peter's meeting with Sir Joshua Reynolds, and particularly when he reproved anexalted personage for blowing his nose with his fingers.

Det.	Output
210 H.F.	220 H.P.T.
H.210	Y.220
H.L.2	P.T.2
H.L.2	Pen.220
H.L.2	P.T.2
H.L.2	M.E.2
H.R.210	P.P.220

* * *

There were some beautiful scenes in "Berkeley Square," besides dramatic pathos of the rarer kind. All the dialogue of the play is excellent. The cast that performed it was brilliant, as usual. There wasn't a weak spot anywhere, but special mention must be made of Carleton Hobbs, who played the Peter Standishes with complete understanding. I also liked Peggy Ashcroft's Helen, and I was always ready for more of Tom Pettigrew (Peter Mather). But perhaps it isn't fair to single out individuals for bouquets. One each, or none at all, would be fairer.

* * *

Once again I feel impelled to laud the efforts of the Effects Department in this broadcast. The effects were very apt, and, what is more important still, they were just at the right strength. Often they were no more than a suggestion.

An All-American Variety Bill.

I tuned in to "Transatlantic" with the determination to be critical. If this all-American variety bill is typical of average American variety, then all I can say is that British listeners have nothing whatever to grumble at where home variety is concerned.

"Transatlantic" was Variety with a capital V all right. It was all remarkably polished. There wasn't a hitch. Everything moved as on oiled wheels, particularly the talkie part of it.

(*Continued on page* 815.)

TELEVISION JOTTINGS

Some general notes on the conditions under which future television reception will take place, together with some information on 30-line reception.

THE home constructor who has decided that he will turn his energies towards television when the new transmissions start has been given quite a lot of food for thought. Among the things he wants to know are these: Shall I want *two* short-wave receivers? What sort of aerial shall I need for them? How do I get on if I haven't got mains? And what is it all going to cost?

All very pertinent questions, too. Let us answer them in turn. First, it does not seem likely that two separate receivers will be necessary. Several schemes for receiving the sound and vision on the same apparatus are being perfected at the moment, though whether they will be available to the home constructor we cannot say.

The Aerial is Simple.

It may possibly be easier to use two separate sets, since the vision receiver will necessarily be on the elaborate side, while the "sound" receiver can be quite simple and straightforward.

As for the aerial (or aerials!), that is simple. On the second page of the Short-Wave Section in this issue you will find an interesting scheme for a 5-metre receiver, with a collector of the "split vertical" type, and this may easily be adapted for use on wavelengths between 6 and 8 metres. If there is not room for the full length of wire (two separate quarter wavelengths) the system may be loaded with a larger inductance at the centre and tuned.

Probably we shall mostly be dealing with such strong signals that any odd length of wire hung outside the window will be quite efficient enough.

The query about mains doesn't produce quite such an encouraging answer, but then those unfortunate enthusiasts who are still without them never *have* had much of a time with television! Whether mechanical or electrical scanning is used, I'm afraid they will have a rather thin time.

Running a cathode-ray tube from batteries is no joke; but then neither is the business of running a motor to drive a scanning disc or mirror drum!

The Home Constructor.

As far as cost goes, the situation will be similar to that of the radio pioneers. Pioneers always have to pay, and the price of apparatus comes down later on, when their good work has encouraged more and more people to take up the new science.

Complete television receivers, naturally enough, will never be able to sell at the same price as cheap broadcast receivers. It's fundamentally impossible, since they have to do all that a broadcast receiver will do, and a lot more as well! But I venture to suggest that the day of the "medium-priced" home televiewer is not so far away as the Jonahs appear to think.

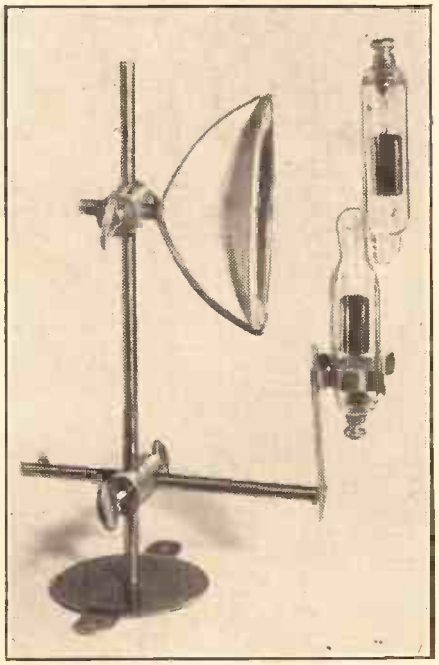
Last week I remarked that I should like to see a complete cathode-ray "scanning unit" marketed. The average home constructor quite enjoys the idea of building his own short-wave receiver, but is rather frightened of the unknown terrors of double-time-base circuits. He will be looked after, and need not worry at all.

I can say definitely that complete kits of parts for cathode-ray scanning units will be available (some of them quite soon), and that the prices will not be prohibitive.

On the theoretical side there is still less to worry about. Anyone who can understand the action of the ordinary thermionic valve should find the operation of the C.R. tube a perfectly straightforward business. We are simply dealing with a beam of electrons "shot from a gun" and deflected horizontally or vertically as we wish.

But I must not start theorising here, as I have plenty of that to do within the next few weeks, when I shall start the A B C of the cathode ray.

FOR BRIGHT PICTURES



The "T.I." lamp, with its stand and reflecting mirror. The pictures obtained with this outfit are much brighter than those given by an ordinary neon-tube light source.

Even at this late hour, by the way, comes news from America of the new systems of mechanical scanning. One of them makes use of fluorescent screens; one is described as "a quasi-mechanical system with only one moving part," whatever that may mean; and yet another makes a novel use of a large glow-discharge tube and a single rotating mirror.

Nothing Below 180 Lines Considered.

The significant part of all this is that nothing below 180 lines is even being considered in connection with all these systems. It seems to be assumed in the States that mechanical scanning will enjoy a huge vogue, even on high-definition systems.

If I might make a very strong recommendation it is this—that everyone who hopes to become a keen "looker" when the new transmissions commence should start getting used to the short waves right away.

This summer there will be hundreds of amateur transmissions on the 5-metre band, and if you start building a 5-metre receiver quite soon your time won't be wasted. I am already under way with a superhet for 5 to 10 metres, and although, at present, it is only in the supremely untidy stage that these things have to pass through it will be quite presentable before long.

As soon as I am satisfied with it I shall build it up in permanent form and describe it in detail. It should then be equally suitable for the preliminary tests on 5-metre amateurs and for use on the sound and vision programmes.

Electrical Interference.

There are two important points, both of vital concern to the amateur, which I have not yet seen raised by anyone but himself. First is the matter of electrical interference on the ultra-short waves. Anyone living close to a main road knows how devastating the noise from the ignition systems of passing cars can be, even on 20 metres.

Luckily for us all, it is not necessarily any worse on 5 metres—in some cases it is much better—but man-made static, in all its thousand-and-one forms, is going to be a very real problem.

The other problem is concerned with the way in which the 6-metre wave will "soak" through. Sorry for the crude term, but that is the only way to describe it. 5-metre amateurs have always found that dead spots occur in the most unexplainable places. Signals sometimes disappear within the space of a few feet, reappearing on either side.

Higher Power Will be Used.

Naturally, very high power will be used for the television programmes, but when one is getting near the limit of the station's range things are bound to be very tricky indeed. When we carried out our tests from the Crystal Palace North Tower in 1933 we had some very curious reports. The general characteristic throughout the real "service area" of 25 miles or so was that signals were either "R 9" or completely absent.

True, we weren't able to use an omni-directional aerial for those tests, and I know, from the map in Capt. West's room at the Baird Television Co.'s offices, that the "coverage" obtained by their high-power transmitter has been very satisfactory.

"House-to-House" Tests.

The people I am thinking of, however, are those who live at the bottom of some of those precipitous little hills in South (and North) London. Probably it will be necessary to arrange some "house-to-house" tests while the preliminary experimental work is being carried out.

Now, just to show that I am not neglecting the 30-line enthusiasts, I want to say a few words about that subject. I have recently been using both a "T.I." lamp (as shown in the photograph on this page) and a "white-line" lamp on the B.B.C. trans-

(Continued on next page.)

TELEVISION JOTTINGS

(Continued from previous page.)

missions. I have not been projecting through a disc, but viewing directly, and the increase in illumination gives an almost unbelievable improvement.

Using a condenser lens of about two inches focal length, and arranging it so that the lamp produces a circle of brilliant illumination behind the scanning disc, one can view the transmissions in broad daylight or with the full room-lighting switched on.

Less Eye-strain.

For the first time I have been able to make use of the full outpit from my receiver, which, naturally, over-modulated a neon tube most hopelessly. The brilliant bluish-white illumination causes far less eye-strain than the dull orange glow of a neon tube, and if one doesn't mind the inconvenience of providing a separate H.T. supply for the lamp the conversion is decidedly worth while.

In any case, as you will probably be dealing with cathode-ray tubes one day, a little preliminary experience in working with high voltages won't come amiss!

I shall very shortly be covering the whole subject of cathode-ray scanning, and, naturally, this may be adapted equally well to the existing 30-line transmissions and to the future short-wave television. **L.H.T.**

A BRILLIANT PRODUCTION

(Continued from page 812.)

But where was the humour? American radio humour must be milk-and-water stuff.

* * *

A show I very much enjoyed was that hyphenated concoction called "Concert-Variety"—that is, until it became too serious. The B.B.C. Variety Orchestra was in a very merry mood and played some remarkably descriptive music. A notable addition to the orchestra was Charles Smart at the organ. I also liked one Ray Warren, who sang in a way that reminded me of Bing Crosby and Hutch. An unusual turn was Nellie Norway's hand-bell solos.

* * *

A small pat on the back is owing to the Glasgow Corporation Gas Department Band for the delightful 45 minutes it gave us. But what a name! It will never win fame with such. No offence to Glasgow or its Gas Department intended.

* * *

Geraldo and his Orchestra must be marvels. How they keep that non-stop programme of music going without a breather beats me. Really, there seems no limit to some men's powers of endurance!

* * *

The recent epidemic of Outside Broadcasts—all of a sporting nature—has given me immense pleasure. I know I have a passion for them. Lionel Seccombe, in his commentary on the big fight, moved at a terrific pace and without a single crash. He was enough to make the French lawn-tennis commentator green with envy. Then there were the Rugger Internationals. Capt. Wakelam gave us all the thrills. Both these gents, with George Allison, are without peers at this game of commentating.

* * *

There are no signs yet of Stanelli and his Hornchestra falling into disfavour with listeners. I always think there's something terribly comic about that "instrument" of his. And the patter's good.

* * *

Firemen and fire-engines are still good subjects for comedians. Robb Wilton's sketch is as full of laughs as any of its predecessors.

C. B.

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 specialties 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

HOW TO CURE PLOPPY REACTION.

C. G. G. (Hardcastle).—"In accordance with the hints you gave I have been trying to cure reaction ploppiness. The biggest help was the wiring of a potentiometer across L.T., taking the grid leak to the slider instead of to the L.T. wiring direct. This more than halved the trouble, but did not remove it completely.

"So I tried lowering the H.T. applied to the detector. No effect. Then I tried altering the capacity of the condenser shunted between plate and filament, and noticed distinct advantage after experimenting with different values. There still remains, however, a distinct plop when getting to (and from) the not-oscillating stage to oscillation; and after going to so much trouble about it I feel I would like to get that smooth increase without a trace of 'plop' which some people seem to get.

"What else can I try?"

There are many "possibles" that we might suggest, including such rather obvious ones as correct value of reaction coil and condenser. A below-the-average power supply, also, is a possible cause, so anything in the way of extra decoupling and by-passing that can be effected is worth trying.

We presume you have suspected the H.F. choke (or chokes), since a faulty choke is often responsible for the appearance of ploppiness. But have you an H.F. stage? And if so, have you considered that any tendency to instability there may affect detector reaction efficiency?

The H.F. layout, screening and, in fact, the general condition of the H.F. stage may be responsible for the remaining trouble.

TROUBLE WITH VOLUME CONTROL.

"UNLUCKY" (Thirsk, Yorks).—"The volume control seems determined to best me. It was never very good, so I thought I would look up Mr. Scott-Taggart's book on the subject, and that seemed to show that all I need was a *graduated* volume control.

"I fixed this, and the result is that I am going to sign this letter with the nom de plume 'Unlucky,' for now, when I adjust the V.C., all the action takes place at one end of the movement.

"It is the same resistance value as before, so why has it decided to act only at the one end? I think it is nothing wrong with the volume control itself, because it is very smooth to work and seems in perfect condition."

Probably all that is wrong is that you have got it connected in circuit the wrong way round.

Try reversing the leads to the end terminals; that should do the trick.

TAKING OFF THE AERIAL TO REDUCE STRENGTH.

W. N. (Purley, Surrey).—"My new set is a five-valve-and-rectifier all-electric superhet, and the strength, using a roof aerial, is simply tremendous.

"By accident I discovered that the best way to tone Regional and National to quiet conversational strength is to take the aerial plug out altogether, leaving just the short earth lead and the flex to mains socket. Am I doing any damage like this?"

No. If the set gets the locals sufficiently well without an aerial you can safely leave it off altogether for "local" listening.

FOR TESTING NOISY SWITCHES.

G. E. G. (Southend-on-Sea).—"It was in 'P.W.' not long ago that I read that noisy switches were one of the biggest nuisances in wireless sets. I think everybody will agree. But how many people can *test* a switch?

"So far as I can remember, it has never appeared in the descriptions of simple tests which can be made by the average handyman,

(*Continued on next page.*)

RADIOTORIAL QUESTIONS & ANSWERS

(Continued from previous page.)

though details have been given of much more complicated components than switches under test—condensers, valves, etc.

"But surely somebody must be using a more or less simple *switch* tester? What about getting him to pass his circuit on to others who find continuous trouble with switches?"

There is no particular secret about switch testing, and the required apparatus is not complicated. Probably the reason the description does not appear so frequently as others is that switch faults are so noisy that the set itself acts as a testing instrument and responds violently to anything but a good switch, thus leaving no doubt where the fault lies.

If, however, you want to compare switches, try the following: Across two "switch-testing" terminals connect an ammeter; then join one of the testing terminals to an accumulator, its other side to a variable resistance and the other side of the variable resistance to the remaining test terminal. The switch under test must be joined to the test terminals by good stout leads, and, of course, connections must be very firm.

The variable resistance should be adjusted to give a full-scale reading on the ammeter, and when this is obtained the switch may be operated and the effect observed.

An imperfect switch will cause the needle to waggle uncertainly, but a good one will virtually short the ammeter when "on," causing the needle to drop cleanly almost to the zero mark.

THE USE OF A "BLEEDER" RESISTANCE.

T. F. (Huddersfield).—"The circuit I have been using came originally from the pages of the radio supplement of a Canadian newspaper.

It was put up more as an experiment than anything, but as it proved very good in use it has become a permanent fixture.

"On the diagram there is a resistance dotted in across the grid bias. It is marked 'Bleeder resistance—Optional,' so I left it out on the strength of the second term, not understanding the first. It is switched on all the time the set is working.

"Not having seen anything of the kind before, I wonder what it is for, and whether it would make any difference to the working of the set?

"I worked out from the resistance value and the voltage across it that there would be only a very small current through it all the time the set is working, and it is switched off with the L.T. But I cannot see what good a resistance there can possibly do, as the only effect would seem to be to run down the G.B. battery slowly."

You hit the nail on the head with that last remark, for the sole purpose of the "bleeder" resistance is to discharge the grid-bias battery very slowly. It seems a queer thing to arrange for, but the explanation is quite simple.

The object is to keep the grid-bias battery continuously in the same condition as the H.T. battery, so that they shall always need replacement at the same time. You probably know that the G.B. battery normally supplies no current to the set; the "bleeder" gives it a little work to do, and keeps its voltage drop about level with that of the H.T. battery.

With some classes of valve it is important to keep G.B. closely in step with H.T., and this is done automatically when a "bleeder" resistance of suitable value is connected across the G.B. battery.

ABSORPTION WAVEMETER FOR SHORT WAVES.

P. W. P. (Crowhurst).—"With the object of identifying as many short-wave stations as possible I wish to make a wavemeter, using a set of bare-wire plug-in coils.

"I believe that the only components required for such an instrument are the coils and variable condenser for tuning. But if there are any other points you could give me bearing on the successful use of an absorption wavemeter I should like to know of them, as I have not seen one used yet.

"Also, would a milliammeter, reading the anode current of the short-wave set, be an advantage? I could by-pass this with a big condenser to keep reaction smooth, and I thought that perhaps the drop in anode current when the station was tuned in would be more exact than relying on the ear for the tuning point."

The following observations will help you to get satisfactory results:

In making the instrument you merely connect the tuning condenser across the coil holder. But the few connections necessary should be made with scrupulous care, soldering being desirable, and the coils themselves must always be stored away and handled carefully, since any careless handling may bend them and alter their electrical characteristics, thus altering the readings obtained with them.

The tuning condenser must be of really sound construction and of first-class quality.

The provision of a milliammeter in the set's anode lead is definitely a good move, and should assist close calibration very considerably.

In use, place the wavemeter near the set's earth lead or aerial, make the set gently oscillate and then tune the wavemeter slowly. At one dial reading it will cause the milliammeter needle to flick and a click in the 'phones. This is the in-tune position, and in this way any known station's wavelength can be transferred to the wavemeter, until you have enough readings to draw your tuning curves.

(Continued on next page.)

RADIOTORIAL QUESTIONS & ANSWERS

(Continued from previous page.)

WIPED OUT BY INTERFERENCE.

P.L. (Stockport).—"It begins with a sort of low growl, and then gets up suddenly to fearful strength, and the programme is wiped right out.

"It cannot be the set, because on one occasion I was standing beside it when the growl began, and I switched off at once, but I heard the roar coming from a neighbour's loudspeaker until he, too, switched off.

"What can we do?"

Strident interference of that kind cannot be cut out by palliatives, and the only real cure is to get it stopped at the source. Get a form from the post office, and fill in the details (of time, type of interference, etc.) which will help the authorities to track the offending apparatus.

By comparing notes with neighbours, or enquiry at a dealer's in the vicinity, you may find one of the excellent anti-interference devices now on the market will provide some relief from the nuisance; but the only real cure in such a bad case is to tackle the trouble at the source, through the P.O. engineering department which is responsible.

A USEFUL SWITCH

MULTI-CONTACT switches are becoming more and more valuable in modern radio outfits. What with the necessity of circuit changes for adapting the apparatus to medium and long waves, switching over to short waves and changing over to the pick-up, the multi-contact switch is indeed vitally essential.

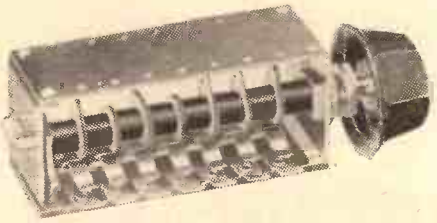
And soon there will be the television "side" with its own switch demands. Fortunately, there are good switches available.

Messrs. Burne-Jones & Co., Ltd., of 296, Borough High Street, London, S.E.1, have just produced a new type which knows no limitations in its adaptability.

It is obtainable with 5, 6, 7, 8 or 9 pairs of contacts at 4s., 4s. 3d., 4s. 9d., 5s. and 5s. 6d. respectively. But two-, three- or five-position switching is available with any of these at the same price. Also special types, either single or double sided, up to 38 pairs of contacts, can be supplied to customers' requirements.

And a Q.M.B. (quick make and break) switch can be incorporated at an extra price of 1s. 6d. each.

AVAILABLE IN MANY TYPES



One of the multi-contact switches made by Messrs. Burne-Jones & Co., Ltd. A quick make and break switch can be incorporated if desired.

The action of the switch is plainly to be seen in the accompanying photo. The knob rotates a substantial spindle on which are fixed a number of cams. There is one cam for each pair of contacts. As the spindle turns, so do the cams open or close the contacts in accordance with their positions.

The contacts are of nickel silver, for the switch is a low-priced version of the Burne-Jones' gold-silver contact type.

It is a well-designed and nicely made component, and should give trouble-free service. Experimenters should remember it when they are faced with switching problems.

B.B.C. TELEVISION TRANSMISSIONS

(Continued from page 804.)

The septet includes Edgar Wheatley, of the Birmingham City Orchestra, John Harrison, who is also a composer, Herbert Lumby (viola), Leslie Sutton ('cello), Reg Whitaker (bass and bassoon), a member of a Birmingham theatre orchestra, and Fred Nott, saxophonist, who also plays the clarinet and fiddle and sings. The tenor singer is Harry Hartland, who, like most of the other members of the septet, is a former student of the Birmingham Midland Institute.

The Mike at Stamford.

Famous events in the history of Stamford, which in the Middle Ages was one of the most important towns in the Midlands, will be recalled in the next of the "Microphone at Large" broadcasts arranged for Monday, February 25th.

At one time Stamford was a centre of the wool trade, and had no fewer than 19 churches. To-day it has five, and in one of them an annual sermon is preached by a Fellow of St. John's College in accordance with the will of the great Lord Burleigh.

Dr. Malcolm Sargent and the late Lord Northcliffe were pupils at Stamford Grammar School—one of the oldest in the country—and there are other distinguished persons whose names are associated with the town.

Stamford's situation on the Great North Road is, of course, well known, and though to-day it is a stopping place for long-distance motor coaches, it was equally, if not more, prominent to travellers by the old stage coaches.

Both the old and the new forms of travel will be represented in the programme on February 25th, the central "outside" broadcast point chosen for these "scenes" being "The George," the first of the old coaching inns as one enters the town from the south.

O. H. M.

ALL ABOUT THE NEW TELEVISION

(Continued from page 808.)

signals. Such a system has been devised by the Baird Company.

Contrary to general opinion, the design of an ultra-short-wave receiver, having the necessary sensitivity and giving the wide frequency response required, is not a tremendously difficult matter. A super-heterodyne is used in conjunction with a special type of aerial, and it was interesting to note that although a Baird demonstration was given in Victoria Street (abounding in heavy traffic!) there was no noticeable interference.

The cathode-ray system of scanning is used in conjunction with a special large tube giving a black-and-white image. A smaller tube giving a "sepia-and-cream" picture is also available, and the illumination is ample for a darkened room. The larger tube, however, gives a perfectly clear picture when the ordinary room lighting is switched on.

We hope to publish full technical details of suitable receivers at an early date.

"RECORD" RADIO VALVES

Some details of new ranges of inexpensive valves recently placed on the British market.

A NEW range of battery and mains valves at extremely low prices has arrived on the market under the name of "Record" Radio Valves, and readers of POPULAR WIRELESS will naturally be interested in the results of tests we have carried out on samples of these valves.

At our request a number of battery and one or two A.C. valves were submitted to our laboratory for tests, and we can say at the outset of this short account that if all the "Record" valves behave like those we have handled users of them will be well satisfied at the value for their money.

Output Types.

In general the valves follow well-known characteristics as regards output wattage and slope, the largest battery output valve being the P.T.2, a pentode with a slope of 1·5 m.a./v. and an output of 420 milliwatts. In the A.C. mains class the A.C./P.T. heads the list with 2,500 milliwatts.

The L.2, a small power battery amplifier, is the only valve "duplicated" in the range, and it rather clashes with another type as regards its purpose. The D.L.2 would be the better valve to use in most cases as a first L.F. amplifier, unless a resistance-coupled, or a shunt-fed transformer, stage with fairly large input-carrying capacity was required.

The D.L.2 takes only 2 milliamps anode current and has a mutual conductance of 1·3, with an impedance of 11,000 ohms, while the L.2 takes 5 milliamps and with an impedance of 10,000 ohms has a slope of 1.1 m.a./v.

An Excellent Detector.

The H.2, described for some reason or other as a high-frequency amplifier, makes an excellent detector, and has an impedance of 23,000 ohms or thereabouts, with an amplification factor of round about 30. It is also a good R.C. first L.F. valve for amplifier units where the valve takes its grid input from a pick-up. It is not, of course, a high-frequency valve as we now know these, S.G.'s and screen pentodes having taken the place of the triode H.F. types.

For H.F. work we would recommend the S.2, a screened-grid valve of useful characteristics. Its A.C. counterpart is the A.C./S., while in the multi-mu class there are the V.S.2 and the A.C./V.S., two excellent valves for H.F. work.

Value for Money.

Throughout our tests we found that the "Record" valves came very near their published characteristics, and, as we have remarked, they seem excellent value for money.

With the arrival of battery and mains types of screen pentodes the "Record" ranges will provide practically everything that the average set constructor will require in the way of valves.

FOR THE ADVANCED CONSTRUCTOR

Superhet enthusiasts and those who work from the mains will be particularly interested in the components described below.

A FINE MAINS TRANSFORMER.

TURNING from the seriously heavy task of designing battleships and eighteen-inch guns, you will find that a naval engineer cannot conceive of a hat-rack being any good unless it is built of six-inch matured oak reinforced by steel supports.

On the other hand someone going straight at the task with no preconceived ideas of mechanics is likely to use such flimsy materials and poor design that the whole thing collapses when there is rain and the hats are thereby made a bit heavier.

There must, you probably say to yourself, be a happy mean. In principle there perhaps might be, but in practice, so far as mains radio apparatus is concerned, we do not think there is or ought to be.

Now, Messrs. Ferranti, Ltd., of Hollinwood, Lancs., are constructors of some of the biggest transformers in the world—transformers which have to handle great slices of the electricity used in the Grid Scheme, for instance. There are possibly whole villages or small towns all over the country which derive all their electrical power via Ferranti transformers.

The difference between one of these huge pieces of apparatus and the transformer used in a mains radio set is, in physical dimensions and power limits, as much a difference as that which exists between a real motor-car and a sixpenny toy one.

But the minds and hands which build those big Ferranti transformers are reflected in the small ones. And radio is the better for it because there is still too much unreliable mains gear on the market.

Complete safety and reliability in mains radio can only be attained when the components are designed and made by those who approach the problems with "high-voltage, heavy-current" minds. The result is rather heavy stuff, but that is what you must have. Compactness and lightness should, in fact, make you suspicious. But substantial construction need not mean clumsiness or undue size.

Messrs. Ferranti themselves say of their S.V.18a mains transformer that the design "is liberal," and that is their interpretation of the need to build mains gear for radio sets with relatively as much care as is bestowed upon anything employed in direct connection with power supplies. Not only in order to make it safe and reliable, but so that it shall be efficient.

HEAVY CONSTRUCTION

★

As the component shown here illustrates, there is nothing flimsy or unsubstantial in the construction or design of Ferranti mains transformers.

★

Good Voltage Regulation.

This S.V.18a Ferranti transformer, for example, has a quite extraordinarily good voltage regulation, and the voltage variation between full-load and no-load conditions is less than four per cent. This most desirable quality could not have been obtained in a light construction using thin wire.

So far as its insulation is concerned, it will stand up to 2,000 volts, not as a flash test, but in continued application. And it is claimed it will not break down even if double its full rated mains voltage is applied to it, although, of course, that is something that is never likely to occur in practice.

The S.V.18a is for use with a full-wave rectifier and has the following outputs: 280–0–280 volts 120 milliamps, 4 volts 2½ amps. centre-tapped winding for rectifier filaments; 4 volts 4 amps. centre-tapped winding for indirectly-heated valves; two 4-volt 2-amp. windings, centre-tapped, for filaments of separately biased output valves.

It is a grand transformer, and one which particularly builders of the larger types of mains outfits can use with the assurance that it will stand up to its job safely under all normal, and even some quite abnormal conditions, although that last part of the remark must not be construed as a suggestion!

AN INTERESTING SUPERHET DEVICE.

A VERY interesting component for short-wave superhet circuits has been developed by Messrs. A. F. Bulgin, of Abbey Road, Barking, Essex. It is a compact single-winding coil having an inductance of 2,200 microhenries, so that, in conjunction with a preset type of condenser having a maximum capacity of ·0005 mfds., it can be tuned to an intermediate frequency for short-wave superhet adaptors.

TUNED EFFICIENCY

★

This H.F. choke is particularly suitable for superhet work, as it is a simple matter to tune it to the intermediate frequency in use.

★

Apart from its special uses, this coil should find a ready market among experimenting constructors. It will be listed as the S.W.50, and is to sell at about half-a-crown. At the time of writing the price has not been definitely fixed.

It is a well-made coil of straightforward multi-layer design, as can be seen in the accompanying photograph. Its special purpose is to provide I.F. tuning to the anode circuit of the super-valve, which may be either operating on the autodyne principle or of the heptode variety.

If you examine the theoretical circuit of practically any short-wave adaptor of the superheterodyne type you will see that the signal energy, after being reproduced at the lower frequency, is led from the adaptor to the first valve of the existing set by means of a choke-capacity coupling. The H.F. choke is in the anode circuit of the adaptor valve.

This choke is replaced by the Bulgin coil, which is tuned to the I.F. frequency by the preset condenser that has to be used with it. Thus you have a tuned anode coupling instead of choke-capacity coupling, although it must be mentioned that the tuning does not have to be altered with every different station received. It is set at the I.F. frequency, and can then be left at that adjustment without the necessity for further reference.

It would be strange if a change from an aperiodic coupling to a tuned coupling did not effect an improvement in results, and our tests showed that there certainly was a marked improvement.

It was even more noticeable when the adaptor fed into a receiver having an aperiodic aerial circuit.

An attractive feature of the scheme is that it does not cost much more than the normal method.

THE B.B.C.'S WAVE-LENGTH CLEAN-UP

(*Continued from page* 799.)

site has not yet been chosen, but it will be somewhere about 15 miles inland from Newcastle, as far as I can make out.

In a similar way Belfast gains a higher wavelength, taking West Regional's 307·1 metres. This means an immediate gain in service area, as well as preparation for the 50-kilowatt North Ireland Regional replacing Belfast as soon as the transmitter now being erected at Lisburn is ready.

West Regional takes over Scottish Regional's wavelength of 373·1 metres, another clear gain in service area. Scottish Regional, to complete the clean-up, annexes the old Midland Regional's wavelength of 391·1 metres. This is a much more equitable line-up, for no one can deny that Scottish Regional, with its difficult country to cover, has a harder job than Midland Regional.

On balance, then, the clean-up promises better reception of B.B.C. programmes to a very large proportion of listeners. That a few isolated areas will lose by the changes is inevitable. But, as an engineer rightly said, if the B.B.C. once lost sight of its slogan of the greatest good for the greatest number it would be for ever in trouble.

MAINS GRID BIAS

And Other Jottings of Interest to All Set Users.

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

MOST mains units nowadays are provided with terminals for supplying grid-bias voltage, but there are some units in use — dating back, perhaps, two or three years ago—that are not so equipped. It is, however, a fairly simple matter to get your grid bias from the unit by a few adjustments.

One method is to connect a variable resistance between the negative H.T. terminal of the unit and the corresponding terminal of the set. The previous H.T. negative terminal will now give you the negative-bias voltage. A fairly large capacity condenser, say 1 or 2 mfds., should, however, be connected across the terminals of the resistance in order to by-pass alternating voltages. The variable resistance may conveniently have a maximum value of 5,000 ohms, and by adjusting this it is possible to obtain grid-bias voltages from zero up to about 30 volts.

Subtracted from H.T. Voltage.

You will see that by the above arrangement the grid-bias voltage is subtracted from the H.T. voltage, and so, when you vary the G.B., you produce variations, in the opposite sense, in the H.T. voltage.

This difficulty should not be serious, but you can overcome it by utilising the voltage drop across the choke for the purpose of providing the G.B. voltage. In order to vary the voltage a high-resistance potentiometer may be connected across the ends of the choke, say 50,000 ohms; the G.B. voltage is tapped off from the slider of this potentiometer. A point to notice here, by the way, is that the smoothing choke must be in the negative supply lead.

Decoupling.

It will serve its purpose (as a smoothing device) just as well in the one lead as in the other, so if it is in the positive lead you will have to transfer it to the negative lead if you want to make use of it for getting G.B. as explained above.

A final point which I may mention is this: You may find it necessary to introduce some form of decoupling with the arrangement mentioned above. If this proves to be the case, put in a decoupling resistance, say 100,000 ohms, in series with the lead from the slider of the potentiometer or the slider of the variable resistance, whichever method you use.

Use a Heavy-Duty Battery.

Many listeners write to me complaining that though H.T. batteries are cheap they do not last long enough. Usually the trouble is the fault of the users and not the batteries—they are employing H.T. units that are too small in capacity for the jobs on hand.

It is much more economical to use double- or treble-capacity batteries, because, although the initial cost is not all that much greater, the battery can stand the racket so much better and its internal resistance rises much more slowly.

At any rate, if you care to make careful tests over a period of many months or a year you will be able to satisfy yourself that the heavy-duty battery is a much more economical proposition. If you are not anxious to make a careful test over such a long period you can take my word for it that very accurate tests have been made by the manufacturers, and there is no doubt about the facts as stated.

Gramophone Notes.

A reader writes to ask me the difference, as far as the operation is concerned, between synchronous and induction types of gramophone motors.

Briefly, the difference is as follows:

The synchronous type of motor works like a synchronous electric clock, "in step" with the A.C. mains, and so it runs at one fixed speed. This speed is designed to be the correct speed for playing the records, so you will not need to be troubling about any speed regulator, and there is no possibility of the speed being wrong.

This alone is a great advantage of the synchronous type. It has, however, the disadvantage that (in most cases, at any rate) it is not self-starting, and therefore the turntable has to be given a send-off by hand to start it up before setting the needle in the track. But this is a minor point and you soon get quite used to it.

The Induction Type.

The induction motor, on the other hand, is self-starting, but does not run at a fixed speed. You have, therefore, to regulate the speed for yourself by means of a speed regulator, exactly as with an ordinary spring motor, and make sure that it is correct.

Personally, I think it is a good thing to have the speed fixed for you (as with a synchronous motor), because undoubtedly a great many people seem to have a passion for running their records far too fast.

Getting More Power.

It is a very usual and no doubt a very natural desire to want to get more power out of the set. How this is to be done without radical changes in the construction of the set is, however, often a mystery. As a matter of fact, you can often get a good deal more power by comparatively simple means.

Often nothing more is needed than an increase in the anode voltage on the output stage. This, of course, means a greater drain on the H.T. battery, but in ordinary conditions you must expect that if you want added power. Extra grid bias will be needed also to regulate the anode current and to keep the valve on the correct part of its operating curve.

Saving the Battery.

If you care to go to the length of converting to the quiescent push-pull or Class B systems, you will find that the above-mentioned objections are not nearly so

(*Continued on next page.*)

MAINS GRID BIAS

(Continued from previous page.)

serious. You can use quite large anode voltages without unduly increasing the battery load.

Assuming you have greatly increased the power-handling capacity of the output stage, however, it is obviously necessary to supply it with the power it is designed to handle, otherwise it isn't doing its job.

This generally means increasing the output from the detector, and in order to avoid overloading you may find it necessary to increase the voltage applied to the detector also. For the Q.P.P. arrangement you can, of course, use pentodes or triodes.

"Flabby" Tone.

If the tone of a loudspeaker has become a bit "flabby," owing to the cone diaphragm having got slack or cockled, it is commonly recommended to dope it with cellulose or shellac varnish for the purpose of tightening it up. This may be all right in a good many cases, but the fact that it can sometimes go wrong is shown by the experience of a friend of mine recently.

He had a speaker of very good make, with a rather large cone, and the latter had become loose and buckled. Notwithstanding this, the speaker was, for some reason, still giving quite a good tone. Thinking, however, to improve it, he doped it well over with cellulose varnish. Judge of his surprise when he found, a day or two afterwards, that it would hardly work at all.

Trouble with a Diaphragm.

I was asked to examine the speaker, and I came to the conclusion that the doping had been so drastic that the diaphragm had shrunk or cockled, or whatever you like—at any rate, it was jamming the moving coil hard against the magnets (it was an M.C. speaker, I forgot to mention).

It was in such a hopeless state that, after more than an hour's work trying to make head or tail of it, we decided that the only thing to do was to scrap the diaphragm and fit a new one.

This only goes to show that varnishing a diaphragm, like many another good dodge, can be overdone. If the diaphragm is badly out of shape you should take it out and reshape it before attempting to varnish it. And also the varnishing, even of a good diaphragm, should be done in stages, a thin coat at a time. As a matter of fact, I suspect that part of the trouble in the above case was that the varnish had been lumped on in one great thick coat instead of in two or three thin coats. Remember this, because you can easily spoil a perfectly good diaphragm this way, and this is a thing you don't generally see mentioned.

The Straight-line Principle.

There is a lot of talk about the needle of a pick-up being held so that it progresses across the record in a straight line, the so-called "straight-line principle." I think, however, that the importance of this is often exaggerated.

It is true that when the record is first made the recording needle *does* move across in this way, and therefore the ideal condition would be to have the reproducing needle move in the same way. But with a well-designed tone arm or pick-up arm the error is really very small, and I do not think it has the terrible results, either in its effect on the reproduction or upon the record, that is often made out. I have tried true straight-line reproducers and compared them with the best types of rotary-arm pick-ups, and I challenge anybody to tell the difference.

Of course, there *are* sound boxes and pick-ups that are so incorrectly mounted that they present themselves to the record at a totally wrong angle, and in these bad cases there can be little doubt that both record and reproduction suffer pretty badly. But I am sure that in these days manufacturers are so alive to these points that such cases are the exception rather than the rule.

High Definition Television.

People are asking now whether it will be possible to transmit actual scenes when high-definition television is established, or whether it will be necessary to rely upon televising films. As you will have noted from Mr. Thomas' article even if the transmissions were confined to films, it would still be possible to transmit *nearly* instantaneous television, because of the arrangements whereby the film can be exposed, developed, fixed and passed through the transmitter all in 30 seconds. So by this system you are only half-a-minute behind the times. But, however small the lag may be, it is obviously not *true* instantaneous television.

It is difficult to say whether early transmissions will be confined to films or not. Personally, I think they will. Anyhow, it doesn't matter to the "looker" for the moment.

Ultra-Short-Wave Receivers.

Another important point is the question of the wavelength used for the transmission of the television signals. As you know, it is proposed to use ultra-short waves, and in his article on the Baird system Mr. Thomas again discusses this matter of wavelength choice. The radio receiver for this low wavelength is not such a tricky matter as it at first appears; but, as has been pointed out by others, what is going to happen about picking up all sorts of interference at this wavelength? What about sparking-plugs of motor-cars, and all the various kinds of what the Americans call "man-made static" that cause us enough bother at present on the medium waves? It seems to me we are going to have a nice day receiving these ultra-short waves free from interference. So far as the receiver goes, I have just been testing a receiver capable of receiving down to 5 metres and working perfectly, so it is by no means impossible although, I must admit, it wants a good deal of thought and skill to make such a set.

Manufacturer's Licence.

On the amplifying side there should be no great difficulty and, so far as the 180-line definition goes, this can be raised to a higher definition without very much trouble.

No doubt various radio manufacturing firms will get busy with television receivers, and it is important to note that "responsible manufacturers" will be able to solve all patent difficulties by the simple process of taking a licence from the "big two" and paying the prescribed royalty.

(Continued on next page.)

MAINS GRID BIAS

(*Continued from previous page.*)

I expect we shall see a number of television receivers on view at Olympia this year, which should give an immense impetus to the radio trade. A great question is that of price. Fifty to eighty pounds is rather a lot, but it will undoubtedly come down very soon when manufacturers start in earnest. After all, a decent wireless set used to cost the same a few years ago; compare this with the prices of really first-class popular receivers to-day.

Cathode-Tube Reception.

By the way, before leaving this subject, I must mention the question of mechanical and electrical picture reception. At the House of Commons, the other day, I asked the P.M.G. whether it would be necessary for television receivers to be on the cathode-ray principle. His reply was that it would not be *necessary*, but very *desirable*. Now, personally, I think you will find that cathode-ray reception will completely displace any other kind. When you have seen reception on the very latest type of cathode-ray tubes, as I have, with high-brilliancy screen, you realise what immense improvements have been made in this method of reception and what great advantages it offers. A fine cathode-ray tube of the very latest type can now be had for about £8 retail.

THE MARCONIPHONE JUBILEE MODEL "287" RADIOGRAM

(*Continued from page* 803.)

choosing quite automatically; in fact, almost uncannily. As the tuning knob is turned you hear a station at full volume, then a band of absolute silence, then another station at full volume, then another band of silence, and so on. And the great joy of the scheme is that you *can* hear the whole lot if you want to merely by the movement of a switch.

Without a doubt this is one of the most praiseworthy developments of modern receiver technique. It's rather like a car with automatic gear-change; you don't have to worry about "sorting them out."

The fundamental circuit of this "radio-robot" is a seven-stage, five-valve band-pass superhet with a non-radiating heptode frequency changer. In other words, you can use it to your heart's content without fear of invoking the wrath of your neighbours.

Arrangement of the Controls.

The controls, which are four in number, are, with the exception of the volume control, conveniently mounted on the motor-board, and they consist of one for tuning, one for tone and a master switch. The "robot-selection" adjustment, which is not, strictly speaking, a control, is located at the back of the instrument, and the switch for putting it in or out of circuit is on the motor-board.

Incidentally, the volume control is effective on both radio and gramophone and we commend the idea of putting it on the front of the instrument because it obviates opening the lid every time it is desired to make an adjustment to the output level.

Despite the very high degree of sensitivity of the instrument, the selectivity—due, no doubt, to the band-passing and to the well-designed I.F. chain—is exceptionally good.

Quality of reproduction, too, challenges comparison with the highest modern standards, and the provision of a tone-compensated volume control ensures correct tonal balance at all volumes, thus eliminating the "thinness" of tone which sometimes makes itself apparent at low-volume levels.

The gramophone arrangements comprise a heavy-duty electric motor with automatic and hand brakes and a Marconiphone type 19 pick-up. For the reproduction of records the instrument must surely be one of the finest at present available. We subjected it to a very thorough test with constant-frequency records, and we were most surprised at the evenness of response throughout the range of frequencies employed for broadcasting and for gramophone recording.

"It is Sensationally Real"

That is a far more significant test than just listening to programmes, although from the moment you first hear the "287" you cannot fail to be impressed with its remarkable reproductive qualities. It is *sensationally* real!

To sum up, if this set is an example of what can be done by way of celebrating an historic occasion, perhaps it is a pity that we do not have a few more of them! It is one of the finest, if not *the* finest, radiograms that we have yet tested.

"P.W.'s" PIONEER TELEVISION RESEARCH

We greatly regret that the above article, by G. V. Dowding, Associate I.E.E., announced for this week, has been unavoidably held out. We hope, however, to publish this article in our next issue.

(*Continued on next page.*)

MISCELLANEOUS ADVERTISEMENTS

(Continued from previous page.)

Pearl & Pearl continued from foot of previous page.

CROMWELL Cabinets (for set and speaker combined). Horizontal type, 23 in. wide, 8 in. deep, 11½ in. high. Polished walnut veneer, additional baffle behind speaker grille. Just secured on terms which enable us to offer them at the astonishingly low price of only 4/11 each.

NOTE.—All Cabinets supplied for Cash with order only and sent carriage forward.

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