

VOL. I.
DECEMBER

NO. 1.
1934

Wireless

AND TELEVISION REVIEW

PRICE

6^p



DR. J.H.T. ROBERTS
D.Sc., F.Inst.P.

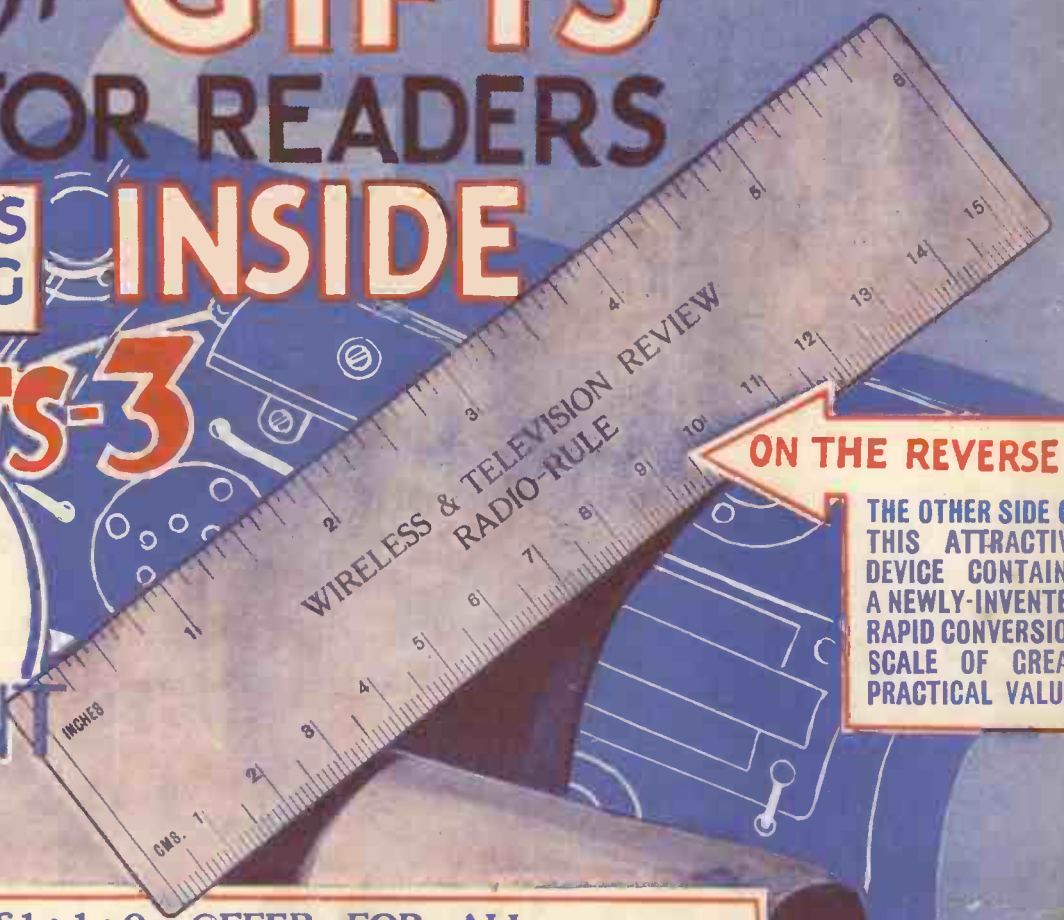
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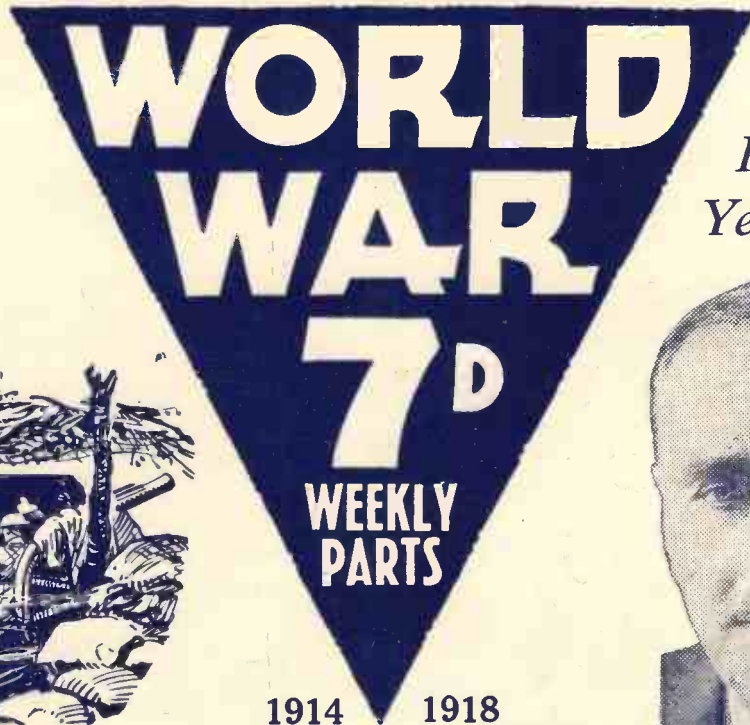
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CONTENTS

	Page		Page
The Editor's Chat	3	The Power They Use	27
The Roberts Three	4	Round the Dials	28
Building the Roberts Three . . .	8	Non-Stop Music for Six Weeks !	30
Point to Point Wiring	12	Questions I Am Asked	31
Wireless In the Great War . . .	13	Short Wave Notes	32
From My Armchair	15	Improving Your Set	34
Practical Hints For All	18	Teaching Flying by Radio . . .	35
The "Wireless" Listeners' Circle	19	"On the Other Side"	38
What the Meters Show	20	Wireless in Austria	39
B.B.C. News	21	In Lighter Vein	42
The Radio Link	22	Our Great Presentation Book . .	45
Entertainment or Education ? . .	23	Using the "Radic-Rue"	47
Our Scientific Adviser	24	About My Book of Practical Radio	50
The New Season's Sets	25	Sending Films by Radio	51
How to Build a Remote Control	26		

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



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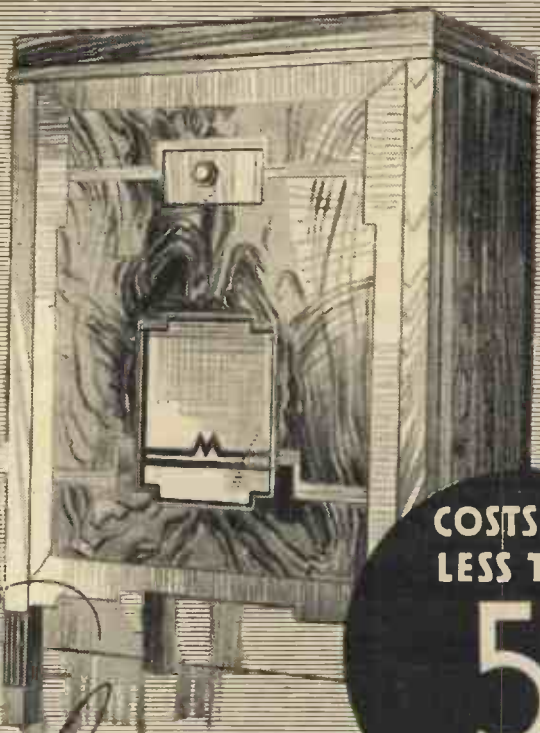
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0-6 volts
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0-120 volts

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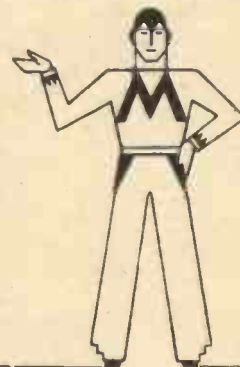


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The
Editor's
Chat

Wireless

& TELEVISION REVIEW

Our "Radio-Rule" Gift — A Prize For Ideas — Dr. Roberts' Great Set — "The Book of Practical Radio."

UNDER a new and more comprehensive title we make our bow this month with one or two surprises for you which, we confidently believe, you will find not only interesting, but — which is far more important — of practical value.

First—accept with our editorial compliments, the "Radio-Rule." It's a useful gadget, isn't it? Apart from using it to draw straight lines and make measurements it has another more definitely radio value. You will find it a handy rule—one you can easily slip into your pocket book and carry about with you without any inconvenience.

Practical Limitations

A word about these radio gifts; and also a request for your co-operation. From time to time, when we decide it is time to make a presentation to our readers, we find ourselves up against a real difficulty—the practical problem of evolving some useful tool or gadget which can be inserted into the pages of this magazine and thus reach you in the normal way when you purchase your copy.

Quite apart from all questions of the cost of making and inserting gifts in a magazine, we have to remember that the gift must be as flat as possible; that it must conform to a reasonable size; that it must not weigh too much; and that it must be the sort of gift which will not easily slip out of the magazine.

Now, with the above limitations you can see that our inventive field for gifts is pretty well restricted. Booklets are easy, so are blue prints,

cardboard charts, and so on, but when it comes to a gift in the tool category, the scope is very small. We should like to make gifts of all sorts of varied and useful kinds to our readers, but practical printing and distribution problems make our desire very difficult to put into practice.

Send Suggestions

Now and then we get "brain-waves" The "Radio-Rule," for example, was a practical proposition. The gift is flat, does not bulk too large, nor weigh too much, and yet has a real utility

For the winning idea for a gift for readers we will pay a fee of £5, and if two or more readers happen to hit on the same winning idea we can only offer this solution to the old difficulty—that the fee will be paid to the writer of the first letter we open containing the details of the winning idea. Fair enough? And the Editor's decision will be—as usual—final.

So when you get your idea, write a letter and describe it, concisely and clearly—and post it to the Editor, Tallis House, Tallis Street, London, E.C.4.

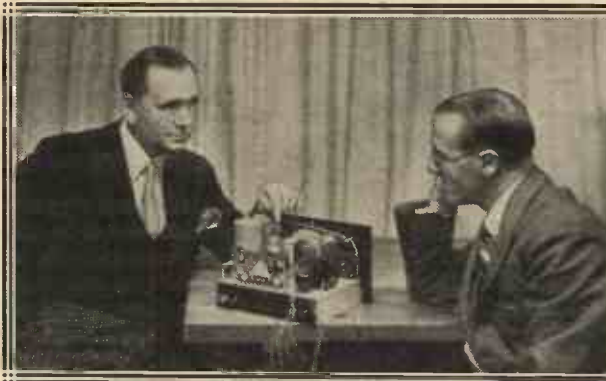
A second gift in this issue is the blue print of The Roberts Three. A word about this set, and about its noted designer.

Specially Designed

It has been specially designed for this first issue of WIRELESS by a man whose name is familiar to you all. Dr. J. H. T. Roberts is undoubtedly one of the four or five leading radio engineers in the country, and on another page you will find a brief resumé of his distinguished career.

The Roberts Three is a set which should make an appeal to thousands of our readers. To begin with, it is a battery set—simple in design and easy and inexpensive to construct. Its economy of running is one of its star features. Reproduction is surprisingly good: and you will note the wavelength calibration of the tuning scale. A mains unit or batteries may be used for H.T. supply. Altogether a set we are definitely proud to bring to your notice.

(Please turn to page 49.)



Dr. Roberts, the designer of The Roberts Three, discussing the salient features of the set with Mr. G. V. Dowding, the Technical Editor of "Wireless."

value. Our Mr. Smith worked out the idea for this gift, and we think you will agree he not only had a "brain-wave," but a practical one, too.

Now, what about readers of WIRELESS putting on their thinking caps and sending in suggestions for future gifts? Only bear in mind the limitations we have previously mentioned. Two heads are proverbially better than one, so, ergo, a hundred thousand heads ought to be much better than two. Send in your ideas.



SPECIALLY DESIGNED
FOR "WIRELESS" BY
Dr. JOSEPH ROBERTS,
F.Inst.P.

In the first place, the set was to be *inexpensive*. This was a paramount consideration, and quite rightly so. The set was to be one that anyone could afford to make for himself. Cost, therefore, was a primary point.

At the same time the set was to be a real stunner—something really good "in its own right," as it were, quite apart from any question of cost.

This led us to the view that three valves was the *minimum* that could be used. I think you will agree with this decision. After all, we couldn't very well do without some H.F. amplification if we were to get bags of stations, and we couldn't dispense with L.F. amplification if we were to get real loud-speaker volume. Well, then, that meant three valves as a minimum.

WITH this issue "The Wireless Constructor," under its new name of WIRELESS AND TELEVISION REVIEW, starts on a new career, broadening its policy according to the broadening interests of radio. WIRELESS will cater for the interests of all radio enthusiasts, listeners and constructors alike; it will keep you *au fait* with the interesting personalities of broadcasting and, not least, will provide the latest information from month to month as to developments in the new science of television.

Important Steps

The Editor, as you will see, has taken many steps to mark this occasion and to make this journal more than ever interesting and useful to his readers. Perhaps the least important of these—he has asked me to act as its Scientific Adviser, to conduct a special television section each month, and to design a special constructional set. I am encouraged in this new task by all the very kind letters I have had from readers of "Popular Wireless" during several years past. If my efforts on behalf of readers of WIRELESS meet with the same appreciation I shall feel more than compensated.

Let me tell you first, about the new set—The Roberts Three, as it has been called—and how it came about.

The Editor wrote to me one day and said (in effect): "You are in a position to take a broad view of radio and the needs of the radio public; we have had all kinds of sets—big sets, little sets, middling sets. Up to the present you have left the designing of sets to others, although I have often asked you to let us have a design of your own. There must be an enormous number of people who would like to make up a simple, inexpensive set, say

A TALK WITH THE DESIGNER

In this fascinating article Dr. J. H. Roberts takes you into his confidence and in an intimate conversational style tells you how he designed The Roberts Three, the new wonder three-valve receiver. The article gives you a peep into the designer's problems, and you will see all the various points which have to be borne in mind when starting out to design a set for popular use. Dr. Roberts, who will act as Scientific Adviser to "Wireless," will also keep you up to date with television developments from month to month.

three valves, easy to make and operate and 'get' everything under the sun. With the immense improvements in valves nowadays this ought to be possible. Why don't you sit down to design us such a set? We would call it The Roberts Three and bring it out with the first issue of WIRELESS."

This idea intrigued me, so I set to work. There were, as you see, certain well-defined conditions which I had to keep in view.

The Limit

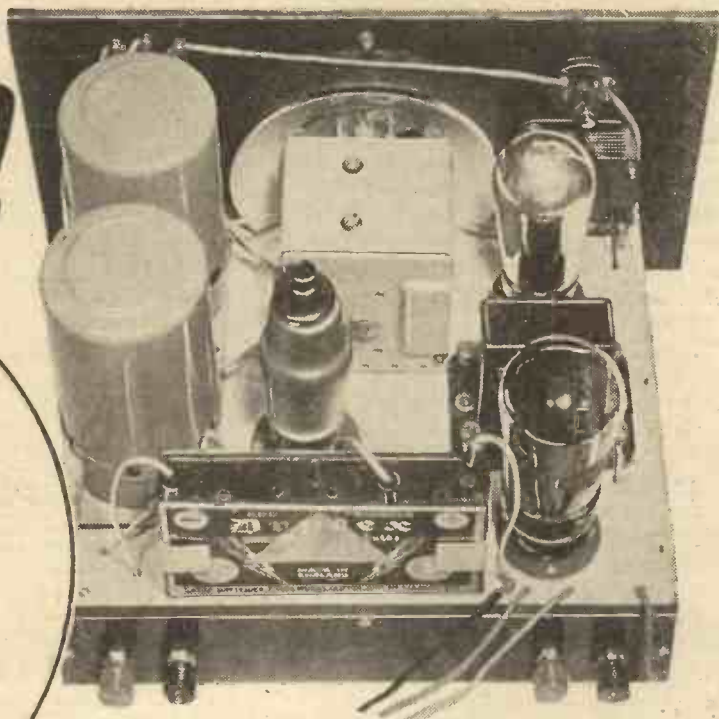
The immediate temptation, of course, was to allow myself an extra H.F. stage, for I thought "What could I not do with *two* H.F. stages?" Also, I should have felt greatly relieved if I had been allowed another L.F. stage. But the Editor was adamant. "No," he said; "three valves must be the limit. Can't you work some miracles with *that*?"

Well, here at any rate, was the problem more defined. "Three valves and the uttermost that can be got out of them."

Now, a few years ago I should have felt pretty sick at being asked to do much with three valves. But now my thoughts ran "multi-mu pentode H.F. for the first valve; plenty of amplification; mustn't forget stability; tuning, say two-gang condenser and two-coil unit; tuned-grid coupling;

Three

Everyman's
Radio for
1935



selectivity, say H.F. output and detector-grid tapped to coil, with loose aerial coupling. good volume control; screening; pentode output for economy and efficiency, with transformer coupling for quality; compactness (good *small* loudspeaker to go in cabinet); battery operation, with alternative of mains unit."

You will see the lines my thoughts were taking. "We have to-day tremendously improved valves, coils, screening, couplings, loudspeakers. How can I cram into a three-

valve receiver every refinement and advantage made possible by these modern improvements?" That was the problem as I finally faced it, and you will see from what follows how I set to work to solve it.

Complete Stability

In the first place, a multi-mu pentode seemed the obvious thing. With only one H.F. amplifier I wanted the utmost I could get and, what was equally important, complete stability. On the other hand, I had to bear in mind the possibility of *overloading* the detector or output stages.

There was, therefore, many advantages in using a multi-mu H.F. pentode for the first stage, and, after careful consideration of the above and many other points, which I haven't the space to deal with here, my choice was confirmed.

"... It will give you an enormous number of foreign stations, one at almost every degree of the dial, amazing selectivity, ample volume on all stations, (enormous volume on some), perfect quality, easy control, economical working, and will cost you very little to construct. . . ."

Now, if a good lot of stations were to be received, it was obvious that the *selectivity* must be above reproach.

The first point in this direction was to make the coupling between the aerial and the first coil very loose, so that the aerial would have very little affect on the selectivity and the ganging.

For the detector I had no hesitation in deciding upon the leaky-grid arrangement; indeed, in the circumstances, I had very little choice, and this was one of the easiest parts of the problem of the design.

As the set was to have a very high

H.F. amplification, the question of *screening* would obviously be very important if stability was to be maintained, which was, of course, essential. I have always maintained that, as cleanliness is next to godliness, stability is next to sensitivity; if, indeed, it is not even more important. An unstable set is an abomination, anyway.

Many Refinements

Well, so much for the H.F. and detector stages. Now we come to the L.F. stage and the coupling. For a large output wattage with a relatively small grid input, a pentode was indicated. This would give me a high degree of efficiency in the last stage and greatly enhance the performance of the set on distant stations,

where the signal input would be very small. I may repeat, in passing that not the least of the objects I had in mind was to get a large bag of stations.

Now you have the rough outline of the set, so far as the choice of valves and couplings is concerned, and it remains to tell you of the refinements of the set which—curiously enough—make *all* the difference. Every motor-car comprises an engine and chassis, but it's mainly the refinements that distinguish one from another.

Sensitivity is no good without *selectivity*, and neither is any good without *quality*. I have, therefore,

given special attention to the question of quality, and when you read my constructional article, following this, and study the circuit diagram, you will see that *quality* has been borne in mind all along the line.

There is, for instance, the impedance-equalising device across the output of the set. By this arrangement, the tone can be adjusted by the user to suit his own requirements. It is well known that listeners differ greatly in the kind of tone they like, and, in my opinion, the only proper solution is to let them adapt the tone to suit their taste and fancy.

The loudspeaker I have chosen is not only extraordinarily good in efficiency and tone, but it is very small and compact (and, incidentally, very cheap). It gives a most remarkable reproduction, equal to an energised unit. You will like it, and will thank me for recommending it!

Simple Wiring

I have given special attention to the question of wiring-up the set, so as to make it simple and convenient and, at the same time, to ensure the effi-

ciency of the completed assembly. The "Metaplex" baseboard you will find a great assistance; it is very convenient for the wiring, aids the screening and simplifies earth connections.

Wavelength Calibration

The question as to whether tuning scales should be marked in wavelengths or degrees has never been settled—probably never will be. So, without entering the controversy, I give you your choice. With my new set you can have it either way.

A momentous decision which has to be taken pretty early on by the set designer is whether the set is to be battery or mains driven. In spite of the great spread of electricity, there is

still a very large percentage of the population of this country without the electric light. Their only means of radio enjoyment is the battery-driven set. On the other hand, the man with the electric supply scorns the battery set. Very well, then, my set is designed for battery operation; but you can, if you wish, substitute a mains unit and work it from the electric light.

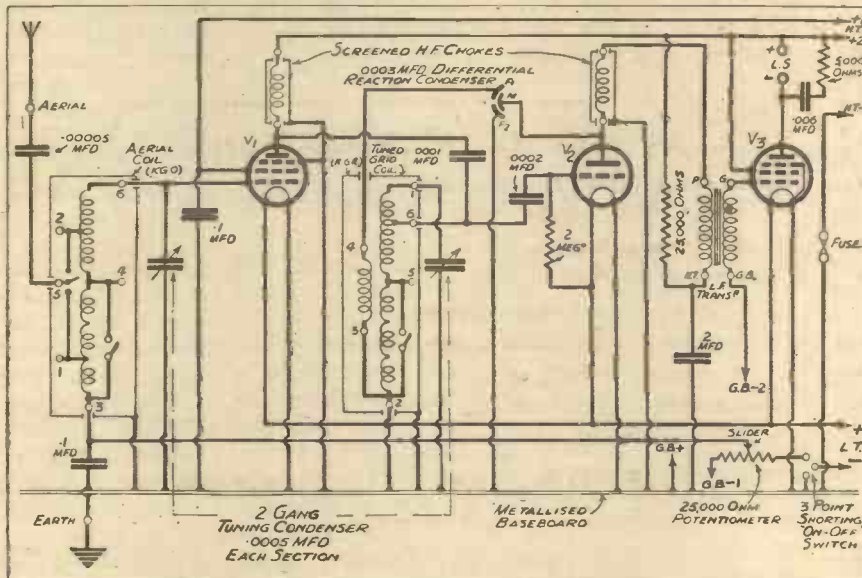
As regards the valves, I give you a choice of these, because I know from experience that many people get a fancy for a particular make of valve and imagine that it works better than any other. All the first-class valves to-day are perfectly reliable, but if you prefer one to another, there is no reason why you should not indulge

your preference. But don't, please, go and use "any old valve" that is no good at all with my new set. Stick to one or other of the types specified, if you want to get the results of which the set is capable.

Detailed Description

In another article I describe the actual construction of the set in detail, and you will readily appreciate the

HOW THE THREE VALVES ARE ARRANGED



THE COMPONENTS REQUIRED FOR BUILDING THE ROBERTS THREE

- 1 Polar "Midget" 2-gang tuning condenser, each section .0005-mfd.
- 1 Polar semi-circular drive for above.
- 1 Colvern 2-gang coil unit (types K.G.O. and K.G.R.).
- 1 T.C.C. 2-mfd. fixed condenser, type 50.
- 1 T.M.C.-Hydra 1-mfd. tubular fixed condenser, type T.24.
- 1 Dubilier 1-mfd. tubular fixed condenser, type 4403.
- 1 Dubilier .006-mfd. fixed condenser, type 670.
- 1 Dubilier .0002-mfd. fixed condenser, type 620.
- 1 Dubilier .0001-mfd. fixed condenser, type 620.
- 1 Dubilier .00005-mfd. fixed condenser, type 665.
- 1 J.B. .0003-mfd. differential reaction condenser, solid dielectric type.
- 1 Graham Farish 2-meg. Ohmite grid leak.
- 1 Graham Farish 25,000-ohm Ohmite resistance in horizontal holder.
- 1 Dubilier 5,000-ohm 1-watt type resistance.
- 1 Erie 25,000-ohm potentiometer.
- 1 Bulgin 3-pt. shorting on/off switch, type S.36.
- 2 Graham Farish screened H.F. chokes, type H.M.S.
- 1 Ferranti L.F. transformer, type A.F.8.
- 1 Clix 7-pin chassis-mounting valve holder.
- 1 Clix 5-pin chassis-mounting valve holder.
- 1 Clix 4-pin chassis-mounting valve holder.
- 1 pair Bulgin G.B. battery clips, type No. 1.
- 1 Peto-Scott ebonite panel, 12" x 7".
- 1 Peto-Scott ebonite terminal strip, 10" x 2 1/2".
- 1 Peto-Scott "Metaplex" (both sides) chassis, 10 x 8", with 1 1/2" runners.

- 4 Clix indicating terminals.
- 5 Clix wander-plugs.
- 2 Clix accumulator spades.
- 1 Belling & Lee wander fuse.
- 2 coils B.R.G. "Quikon" connecting wire.
- Screws, flex, etc.

ACCESSORIES

- 1 Peto-Scott special cabinet.
- 1 W.B. Stentorian Baby loudspeaker.

BATTERIES

- 1 2-volt block accumulator, type B/45.
- 1 120-volt Full-o'-Power standard H.T. battery.
- 1 9-volt Drydex G.B. battery.

VALVES

	*S.G. Pentode	Det.	Output
Cossor	210 V.P.T.	210 H.F.	220 H.P.T.
Dario	T.B. 282	T.C. 432
Hivac	V.P. 215	H. 210	Y. 220
Mazda	V.T. 215	H.L. 2	Pen. 220
Marconi	V.P. 21	H.L. 3	P.T. 2
Mullard	V.P. 2	P.M. 1 H.L.	P.M. 22A.
Osram	V.P. 21	H.L. 2	P.T. 2
Tungsram	H.R. 210	—

* Standard 7 pin type.

various features which have contributed to make the set what it is.

As to the performance of the set, I hope you will tell me, when you have made it up, whether you think I have succeeded in doing anything out of the ordinary with just three valves. I don't want any screaming from the house-tops about it; that has been done so much and so often about other sets that you probably wouldn't take much notice, anyway. No: I want you to make it up and try it for yourself.

Wonderful Results

Properly operated, it will give you an enormous number of foreign stations, one at almost every degree of the dial, amazing selectivity, ample volume on all stations (enormous volume on some), perfect quality, easy control, economical working, and will cost you very little to construct. I have put a great deal of thought and patience into its design, and I believe that it does just about as much with three valves as is humanly possible in the present state of the radio art.

Some of the descriptions of the set by those who have tried it include such expressions as "amazing selectivity," "marvellous range," "incredible performance" and so on.

Well, I leave you to judge. One thing: if you build this set, you won't be disappointed.

An Important Point

This brings me to a point which I ought to emphasise, and that is the importance of following out the designer's instructions and recommendations when building a set. This applies not only to the layout of the components and to the wiring up, but also to the choice of the components. Some of you may think I am exaggerating, or labouring this point unduly, but you would be surprised the number of people who make up a set from published specifications, get unsatisfactory results, and then admit that they have departed—often quite materially—from the designer's instructions. Remember that a set isn't designed in five minutes—not if it's any good. The designer has sometimes to spend weeks in laying it out, trying first this arrangement, then that, varying this component or that coupling and so on, before he begins to approach the results he is aiming at. In the process of all this

he chooses particular components for special reasons. In general he tries to choose inexpensive components, but if he is wise he does not allow himself to fall into the mistake of sacrificing efficiency to cheapness. With some components, of which chokes, transformers and coils are examples (but not by any means the only ones) it is impossible to go below a certain limit in price if you are to get any sort of performance and reliability out of them.

After the question of cost comes the consideration of the suitability of the components for their particular purposes. The ratio of a transformer or the inductance of a choke, for instance, are most important.

The coils also are an exceedingly important ingredient in the make-up of a set and if you depart from those specified, you may very easily upset the whole apple-cart.

NINE FEATURES OF THE ROBERTS THREE

1. Enormous sensitivity and range.
2. Knife-edge selectivity.
3. Perfect tonal balance.
4. Complete stability.
5. Distortion free volume control.
6. Simplicity of construction and operation.
7. Inexpensive to build and run.
8. Handsome, up-to-date appearance.
9. Battery or mains unit operation.

THE FINEST THREE-VALVER YET DESIGNED

Many constructors again are under the impression that, so long as they keep to specified components, they can lay them out in any way that suits their own fancy. Often it happens, for example, that they have in hand a cabinet somewhat different from that shown in the illustration—different in size or shape, I mean, as obviously appearance is of no importance to the working of the set—and it suits their convenience better to arrange things differently. Possibly the "rearrangement" consists in putting the components closer together—and this leads to trouble right away.

Keep to the Design

I think I have said enough to show you that every detail of the design has good reason behind it and the only thing I would ask of you is—stick to the design in every detail.

Before leaving you for this month, I should like to say something about the Television feature which, as I have already mentioned, I have been asked to conduct. You know that a

Government Committee has been for some time past investigating this question of television development, and of the best method of making television into a public service.

Television Evidence

I have given evidence before this Committee on behalf of this journal and "P.W.," and although the findings of the Committee are not yet published, I can tell you that the Committee are definitely seeking to put television on a sound, practical footing. There has been so much silly talk about television—mainly in the newspapers, but also to some extent in the technical press—that the science has been done a great disservice. We are all of us familiar with the prospect of "seeing the Test match in Australia," or some other fine thing that is, at any rate at present, utterly beyond the bounds of

possibility. It is, in my view—and, I think, in the view of all responsible people—ininitely better to confine ourselves to something that may possibly be achieved within a reasonable time.

I think a much saner outlook is coming over the public with regard to television, and such an attitude is much more likely to lead to tangible results. "Promising the moon" is not a bit of good, because you are bound to disappoint and you are

only asking for trouble before you start. Much better promise something that you will be able to deliver.

The Right Lines

A number of leading firms in the radio industry, both in this country and in other parts of the world, are now busying themselves with practical television apparatus, and, as I have already mentioned, the "powers that be" are, for their part, actively looking into the possibilities of a practical television service.

In my television section in WIRELESS each month I hope to keep you up-to-date with the latest television news from all parts of the world, and I hope, as we all do, that before very many months are past we shall see something really moving in the television field—actions, not words.

I may mention that there are some big surprises in store for you in regard to television, with certain of which I am personally concerned. But more of that as we go along.

BUILDING THE ROBERTS THREE

DETAILS FOR THE CONSTRUCTION OF THIS AMAZING THREE-VALVE RECEIVER.

In the previous article I have given you a broad outline of the main features of this new set. The details given in the following article, in conjunction with the blue print of the circuit design, will enable you to build the set without any difficulty.

Tuning is by the simplest and most satisfactory system, a two-gang condenser and two-coil unit, the former calibrated to wavelengths for easy station finding. Tuned grid coupling is used between the H.F. and detector stages, the grid of the detector and the output from the H.F. pentode being tapped down the coil for selectivity.

For the fullest degree of amplification with stability, I have used a multi- μ high-frequency pentode valve in the first stage. With this valve I use a volume control that does away with any possibility of overloading detector or output valve. The result, as I have told you, is distortionless control from a mere whisper right up to the full output of the set.

Loose Aerial Coupling

A very loose coupling is used between the aerial and the first coil, so that the aerial shall have little or no effect on the selectivity or the ganging. At the same time the coupling is sufficient to supply energy enough into the receiver to enable a very long list of stations to be brought in.

In view of the very high amplification of The Roberts Three, screening

is of great importance if stability is to be maintained. This means that the screening of coils, H.F. chokes, the H.F. pentode (metallised by the makers) and the tuning condensers must be carefully attended to.

For the coupling between the detector (leaky grid) and the output pentode, it is difficult to better the L.F. transformer arrangement for economy and general efficiency. For

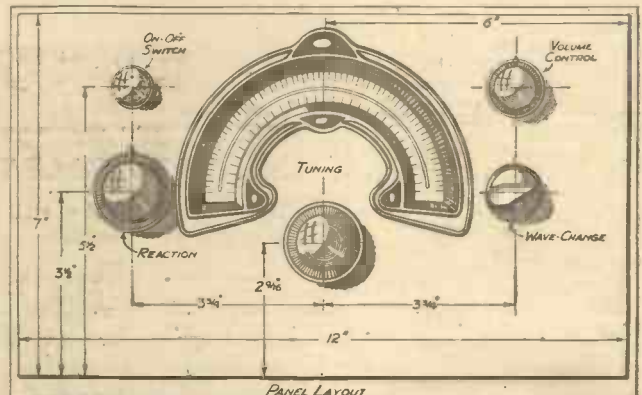
good quality of output, however, it is essential to use a good transformer in this position.

As you know, the third valve is a pentode, which I have chosen in view of the fact that a small grid input voltage will give me a relatively large output wattage. The last stage gives, therefore, a high degree of efficiency. One of the outstanding features of the set is its performance on distant stations, which is largely to the credit of the output stage, this stage requiring but a very small output from the detector to give full loudspeaker strength.

Highest Quality

In order to assist in maintaining the highest quality reproduction, I have included an impedance equalising device across the output of the set, as already mentioned in the preceding article. This consists of a resistance and con-

denser in series with one another, the values being 5,000 ohms and 0.006 mfd. respectively. You will find it best to keep to this value of condenser, but you can vary the value of the resistance to suit your own tastes. If the resistance is increased, the higher notes will be given more prominence, and *vice versa*. You will find it possible to vary it between 2,500 ohms and 10,000 ohms (with the loudspeaker specified).



The panel drilling should be carried out in accordance with the details shown in this diagram.

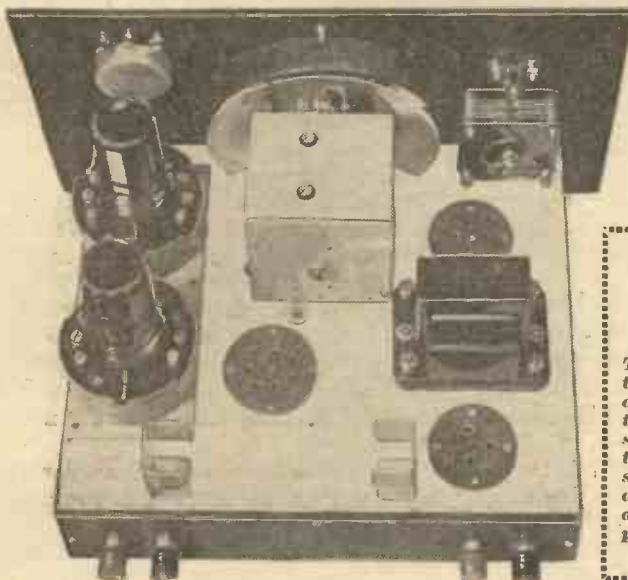
In this receiver I have chosen the popular "Metaplex" plywood baseboard, mounted on runners, so that a certain amount of underneath wiring and layout can be carried out. This ensures short leads and, most important, too, a very valuable degree of screening.

(Incidentally, the use of the metalised baseboard helps very considerably in the wiring, for it means that a large number of connections to earth circuits can be made to the chassis by means of wood screws and washers, the "Metaplex" itself being connected to earth and L.T.)

Accurate Dial Readings

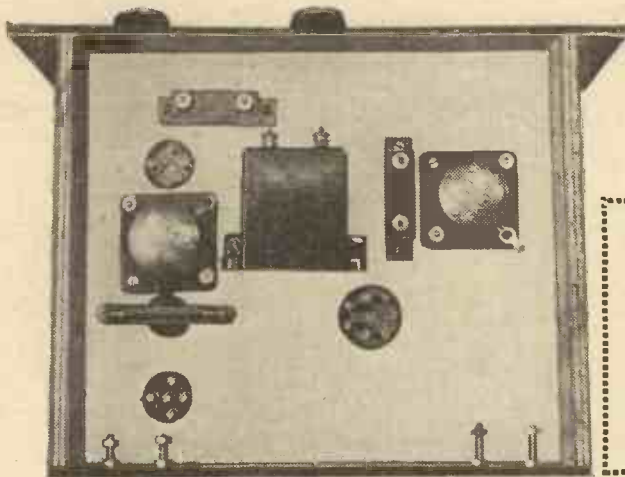
You will notice that the condenser scale of the set is arranged for both wavelength and degree readings, and it will be found to be remarkably accurate on the former if the set is carefully trimmed.

The actual construction of the receiver—that is, screwing the parts on to the chassis and connecting them up—is so easy and straightforward that there is no need for me to go into details. The blue print and the special wiring photographs which I give you here show every lead so



THE BASEBOARD LAYOUT

This photograph and the one on the top left of the next page form the first of four pairs showing constructional stages of the set. Here we see the above baseboard parts and the panel in position and ready for wiring.



be very careful that you do it accurately. Mark out the panel and do the drilling from the front. Otherwise if

escutcheon of the variable condenser can be done with a fret saw, or a key-hole saw, the dimensions being supplied by the makers of the condenser.

Testing the Set

Don't forget to check up the wiring of the set after you have made it. The first test should be carried out with the receiver outside the cabinet. This is necessary so that you shall be able to get at the trimmers on the top of the variable condenser.

The connections of the batteries are clear from the diagrams, whilst the normal arrangement is used for aerial and earth connections.

The loudspeaker should be joined to the two terminals on the set marked L.S. in such a way that the correct

matching for the valve used in the set is obtained. This is achieved by using the terminals on the loudspeaker marked "centre" and No. 4.

Other combinations can be tried if you wish and will be found to alter the tone of the reproduction, but the two mentioned are those that give the correct matching, and are the ones I advise. When the set is undergoing its first test, the speaker should be mounted in position in the cabinet, but should be connected with leads long enough to reach the set at some little distance from the cabinet.

The voltages for the H.T. taps should be H.T. + 1: 75 to 80 volts; H.T. + 2: the full voltage of the

clearly that it is impossible to go wrong.

There is one point I should perhaps emphasise, and that is in regard to the connecting of the various wires that go direct to the "Metaplex" chassis. These connections are made in each case to the metallised surface by means of a length of wire looped at the end and screwed down tightly to the surface of the "Metaplex" by means of a screw and washer. These contacts must be made really well, or you will have trouble.

Excellent Loudspeaker

I must remind you of one thing more. If you want complete success when building my new set, you must keep to the list of parts specified. This applies even down to the loudspeaker, for the speaker I have chosen is the finest small loudspeaker I have yet heard.

Remember that success with a circuit design depends upon what we may call "team work" of all the components and parts of the circuit, and the designer's work will probably be rendered useless unless you stick implicitly to what he advises. So please follow me in this.

Chassis Advantages

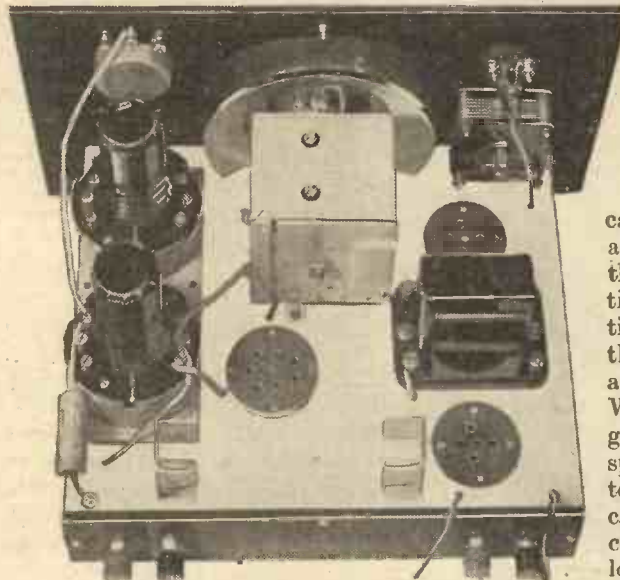
In this connection, you will notice that I have chosen a form of chassis construction for this set. With ordinary baseboard building it is very easy for the constructor to go wrong in the disposition of parts and wiring. With chassis construction, however, the area above the base is very much more restricted, and the danger of too-long leads, or of the components being badly arranged is very much less.

The panel for the set can be obtained ready drilled to accommodate the spindles for the knobs, but should you decide to drill the panel yourself

you force the drill through from the back you will chip the front surface.

THE FIRST STAGE

The first stage in the under baseboard construction is the mounting of the components. Here we see the set ready for the commencement of the wiring.

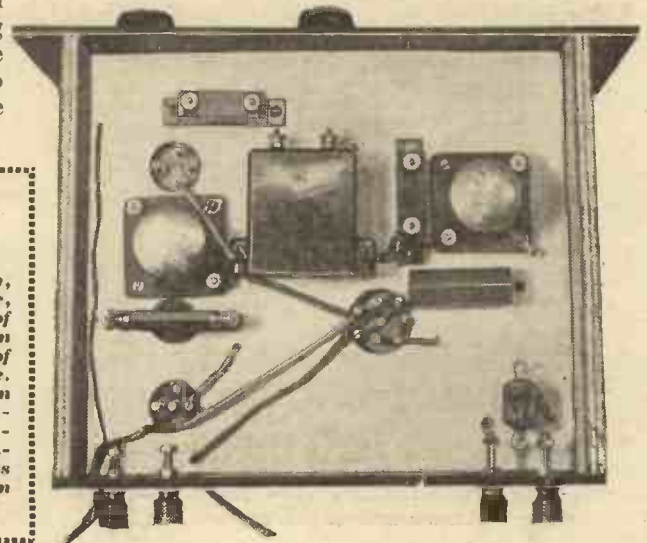


STEP BY STEP CONSTRUCTION IN PHOTOGRAPHS

Another method is to drill from the back until you start to break through the front and then to complete drilling from the front. The large slot that has to be cut to take the

STAGE No. 2

This photograph, with that above, gives a good idea of the second step in the construction of The Roberts Three. The wiring has been commenced, and approximately one-third has been completed. Full details for wiring are given on further pages.



battery—this will be about 120 volts. Grid-bias voltage of 9 volts will be necessary for G.B. — 1, while 3 volts for G.B. — 2 will be needed with a 120-volt H.T. supply. If you use a 150-volts H.T. battery or 150-volt mains unit, then G.B. — 2 should be 4.5 volts.

Use of a Mains Unit

As regards a mains unit, one is quite satisfactory with the set, and should have a variable tap for the screen of the H.F. pentode and a maximum tap for 150 volts; it should be capable of delivering 20 milliamps, to give a safe margin.

“For the fullest degree of amplification with stability, I have used a multi-mu high-frequency pentode valve in the first stage. With this valve I use a volume control that does away with any possibility of overloading detector or output valve. The result is distortionless control, from a mere whisper right up to the full output of the set.”

As to the valves, I am giving you a list of those suitable, and the list is marked so that you know which to place in each valve holder. You can't go wrong, anyway, for the first valve is of the seven-pin variety, whilst the second has four pins and the output five.

And now, with the valves in position and the batteries and rest of the set connected up, let us tune in our first station and be ready to trim the condenser.

The first station will probably be

the local one and, while listening to him, screw up the trimmers fully and then unscrew them two complete turns.

Now, if the local station you are listening to is not near the middle reading of the dial, tune in a station that will give you a reading of about 350 metres. The London Regional is a good one to choose.

Condenser Trimming

The reading may not be accurate according to the published wavelength of the station, but we can put that right when we trim. The art is to trim so that the readings of the stations in the centre of the dial come right with the published wavelengths, then the rest of the stations will not be very far out.

To trim in this way we may have to set the trimmers to positions that are not normally used, that is, they may not be set to the usual minimum positions to give accurate trimming. Instead, they will probably be about half-way “in.” But that is quite all right. The result will be the same, and we obtain the amount of dial reading correction we require.

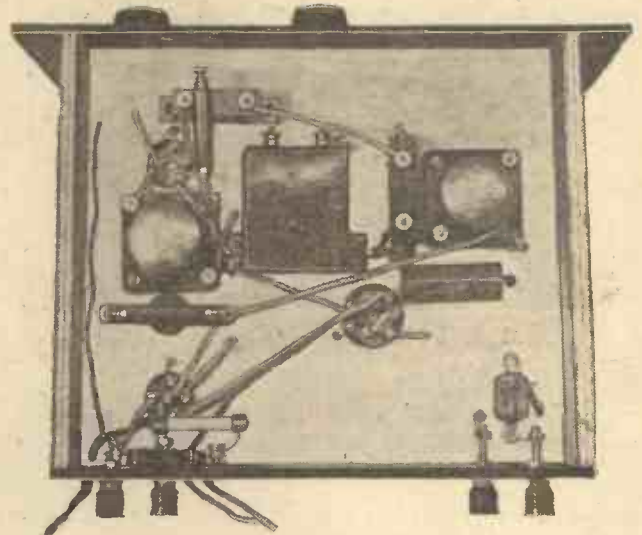
So trim roughly on the local station or a fairly strong station in the middle of the dial. Then search for a station that is close to this powerful station (still near the middle of the dial), and trim again. Concentrate on the trimmer of the detector stage, that is, the one nearer the front of the set, and use a little reaction to sharpen things up a bit.

Final Setting

Get this trimmer right for the station at the reading on the dial at which it ought to be heard.

Then try the other trimmer and bring it into line with the first. Remember to keep the volume of the station down to reasonable limits while trimming, by turns of the volume control.

After the set has been trimmed you



THE THIRD STAGE—

—in construction is depicted in this photograph and the one below. Above is the appearance of the under-baseboard wiring—about two-thirds completed.

can unhook it and re-assemble in the cabinet, putting the batteries on the top shelf with the speaker. Finally, connect up and fit the back of the cabinet in position, when the set is ready for ordinary use.

I say “ordinary,” but the results you get from this receiver will be far

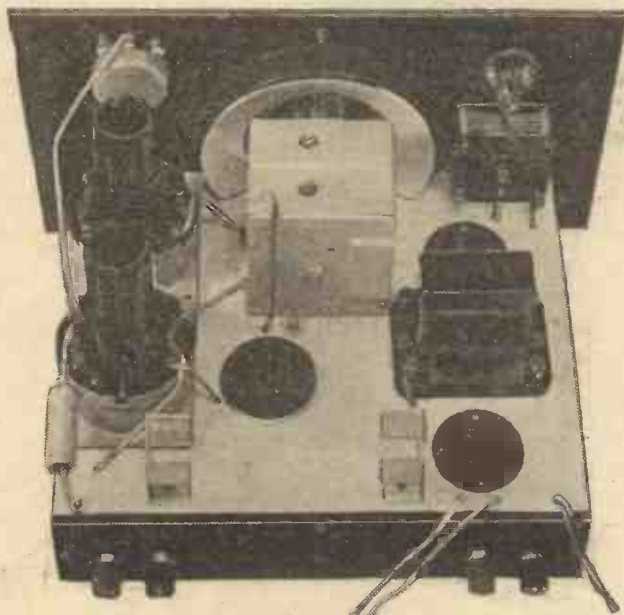
“One of the outstanding features of the set is its performance on distant stations, which is largely to the credit of the output stage, this stage requiring but a very small output from the detector to give full loudspeaker strength.”

from ordinary. You will be amazed at the number of stations that you will be able to receive and, with judicious use of reaction and the volume control, you will get first-class selectivity.

Surprising Power

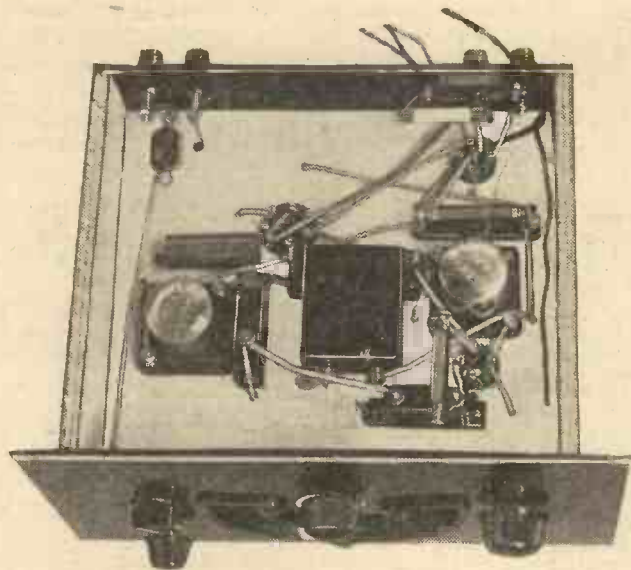
The output power, too, will be all that you will require, for the pentode valve will look after that for you, and will provide a surprising amount of power even on distant stations.

I venture to think that my new set is the ideal one for present-day listening conditions. As to its power, quality, selectivity, range, tone, simplicity, appearance and cost—these have been referred to already. Only one real criticism has been received up-to-date, and that was: “It gets too many stations!”



VERY LITTLE WIRING—

—is carried above the baseboard, and this “Stage 3” photograph shows nearly all of it in place.



THE FINISHED SET

All the wires are now on, and the receiver is ready for test.

I find I have some space left so I am going to go back to the vexed question of alternative components. No, I am not going to condone the frequent practice of providing the constructor of a set with a list of author's selections and also a lengthy catalogue of "suitable alternatives."

Such a step may assist the actual building of the receiver in question—it may even help the constructor in many cases to get good results at less cost than if he used the author's components, and if it stopped there I should not be against the alternative system.

True Alternatives

The trouble is that so many constructor's look upon the list as the thin edge of the wedge, they argue that if there are four or five alternatives to "A" and three to "B," they can surely find another in each case and use substitutes for A and B that they have on hand, or else those that they can purchase more cheaply.

"Remember that success with a circuit design depends upon what we may call 'team work' of all the components and parts of the circuit, and the designer's work will probably be rendered useless unless you stick implicitly to what he advises."

I do not mind anybody using a true alternative to any of the components in my list, but I do object to those so-called alternatives that are in reality inferior substitutes.

The danger points in components are coils, valves, transformers, and H.F. chokes. These parts are not

easily substituted accurately by other components. If you use other makes of coils than those specified you are risking loss of efficiency, for naturally the set designer has chosen the best coils for his purpose.

Important Components

If you employ different types of coils then you are certain to be upset in your hopes of obtaining the proper results from the set. So I cannot countenance the alteration in any

circumstance, of the coils in my set.

The transformer could be substituted provided that the new make had the same ratio, and the same primary inductance and suitable current carrying capacity.

The valve alternatives I have given. And in this regard I do not want anyone to say, "Oh, well, if all those valves are suitable they cannot be particularly critical, and I can just as well use 'Thermionics' throughout."

Such an outlook is fatal to success. There is a small selection of valves, which I have mentioned, and which can be more or less shuffled about into various teams, but though there may be others suitable, I do not know them. So don't stray outside the boundary of safety I have set by those valves.

The H.F. Chokes

I do not consider the H.F. chokes in this particular set all that critical that they cannot be substituted—but here again I do not want any of the "thin edge of the wedge" business. Any substitution of chokes must be by reliable makers with good inductance figures and low distributed capacity. And they must be screened.

So far I have not said anything about a most important component—the variable condenser. This is by no means irreplaceable, but if any other make or type of two-gang unit is used it must be made by a firm that really knows how to make variable condensers, and it should have conveniently placed trimmers.

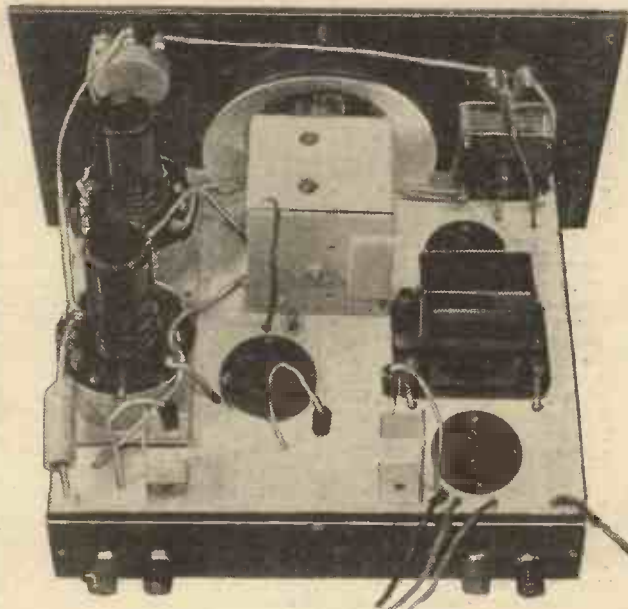
But remember that unless it is calibrated for use with coils of standard inductance the wavelength calibration will be miles out.

"I venture to think that my new set is the ideal one for present-day listening conditions. As to its power, quality, selectivity, range, tone, simplicity, appearance and cost—these have been referred to already. Only one real criticism has been received up to date, and that was 'It gets too many stations!'"

The rest of the components are not so vital provided they are up to specification as regards values, and, of course, they must be of reliable manufacture. How often I have to say that! And yet how frequently will constructors be "penny wise, pound foolish," when it comes to the purchase of radio components.

Use Good Makes

Condensers and resistances are not merely condensers and resistances—they must act up to certain high standards. So in choosing those for your Roberts Three, if you are not going to follow my list absolutely—as I hope you will—please make sure you are getting good makes.



NEAT AND BUSINESSLIKE

A clean "deck" in The Roberts Three is maintained even when all the wires are in place.

POINT TO POINT WIRING

Follow these details closely in conjunction with the blue print when building The Roberts Three.

STAGE 1.

1. The first thing to do in the construction of The Roberts Three is to drill the panel in accordance with the panel diagram and fit the components to it.
2. Next construct the chassis if you have not bought it ready-made. Drill the holes in it necessary for the valve holders, and bond the two surfaces of the "Metaplex" with a bolt run through the baseboard.
3. Place the blue print on the baseboard, the top half of the print going on the upper surface of the board. Mark the positions of the components. Remove print, and mount the components.
4. Do the same to the underside of the baseboard and mount the necessary components there. Such parts as are held in position by wires only cannot be mounted now—they will be placed in position as the wiring is carried out.
5. See that all valve-holder legs are clear of the metallising.
6. Fix panel in position.
7. Drill and fix terminal strip in position with the terminals fitted, as shown in the blue print. (This stage is shown in the first pair of photographs on pages 8 and 9.)

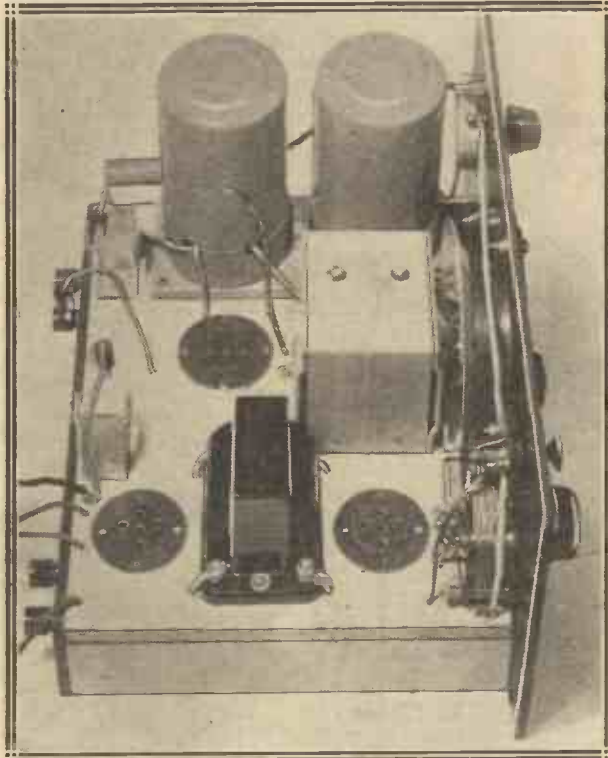
STAGE 2.

8. Connect wire from centre terminal of potentiometer round coil nearer panel to terminal 3 on other coil.
9. Connect to this same coil terminal one wire-end fixed to .1-mfd. tubular condenser, and anchor other wire of this condenser to "Metaplex" near rear of base-board.
10. Connect rear terminal of gang condenser through slot in coil base to terminal 6 on rear coil.
11. Connect terminal 5 on rear coil through slot in base, and take wire round back of coil through hole "E" to one end of the tag type .00005-mfd. condenser. This wire has to be soldered.
12. Solder short piece of wire to other end of this condenser, and connect to aerial terminal.
13. Connect wire to terminal 6 on rear coil, passing out through slot in coil base and through hole "G" to terminal 2 on V_1 valve holder.
14. Connect a piece of screened wire to rear terminal of .0001-mfd. condenser under base-board, take the wire through hole "R" and leave a length for connection to top terminal on valve in V_1 later on. Connect screening of this wire by means of short length of wire to the baseboard underneath the right-hand foot of the 2-mfd. condenser, under the baseboard. (See blue print which clearly shows this.)
15. Connect bottom terminal of on/off switch by means of flexible insulated wire, passing through hole "D" along underside of baseboard and up through hole "P" to a battery spade tag. This is for L.T. —.
16. Connect now another length of flexible insulated wire to rear filament terminal of V_1 (see blue print) and pass wire through hole "P" twisting it round the L.T. — wire, and ending with a spade terminal. This is for L.T. positive. These two wires should be about 18 in. long after passing through hole "P".
17. Join a wire between the filament terminal of V_1 , just mentioned and terminal 5 on V_1 .

Thence take a wire round the back of the 2-mfd. condenser, across the screened H.F. choke to the rear filament terminal of V_1 .

18. Connect terminal 7 on V_1 by means of a long flex lead, passing through hole "N" to a wander plug marked H.T. + 1.
19. Connect to terminal 7 on V_1 one end of .1-mfd. tubular condenser, anchoring the other lead on this condenser to the base-board. All such anchorings should be carried out by making a loop in the wire and fixing it down with a screw and washer, making sure that good connection with the metallised surface is obtained.
20. Connect the earth terminal to the metallising.
21. Take a wire from the "G" terminal on the L.F. transformer to the "G" terminal on V_2 , passing through hole "L." This wire should run underneath the base-

THE FINISHED RECEIVER



COMPACT EFFICIENCY. The Roberts Three ready for its first tests. The tag trimmers in the gang-condenser show up clearly on the top of the component.

- board just above the surface, but should not lie against it.
22. Connect terminals 1, 3, and 4 of V_1 together and connect the latter one to baseboard.
23. Connect left-hand terminal of right-hand H.F. choke to the back (nearer terminal strip) terminal of the .0001-mfd. condenser.
24. Connect right-hand terminal of 2-mfd. condenser to metallising. (All these wires can be seen in the second two photographs showing the construction of the set on page 9.)

STAGE 3.

25. The third stage of wiring is shown in the third pair of photographs, and consists of the following wires. The terminal 6 on the front section (nearer the panel) of

the coil unit follows round the coil inside the base lip and comes out at the slot between terminals 4 and 5. It passes through hole "B" to the remaining terminal on the .0001-mfd. condenser under the baseboard.

26. Connect this terminal to the nearer terminal of the .0002-mfd. condenser under the baseboard.
27. Connect the remaining terminal of this condenser to the "G" terminal of V_2 , taking another lead to one end of an Ohmite resistance (2-megohms).
28. Connect the other end of this resistance to the filament terminal on V_2 nearer the H.F. choke.
29. Connect remaining filament terminal of V_2 to baseboard.
30. Connect remaining filament terminal of V_2 to baseboard.
31. Connect anode terminal of V_2 to L.S. — terminal.
32. Connect L.S. — terminal to one end of .006-mfd. condenser.
33. Connect other end of this condenser to the wire from one end of the 5,000 ohms Dubilier resistance.
34. Take other end of 5,000 ohms resistance to the L.S. positive terminal, and connect this latter to the centre terminal (S.G.) of V_3 .

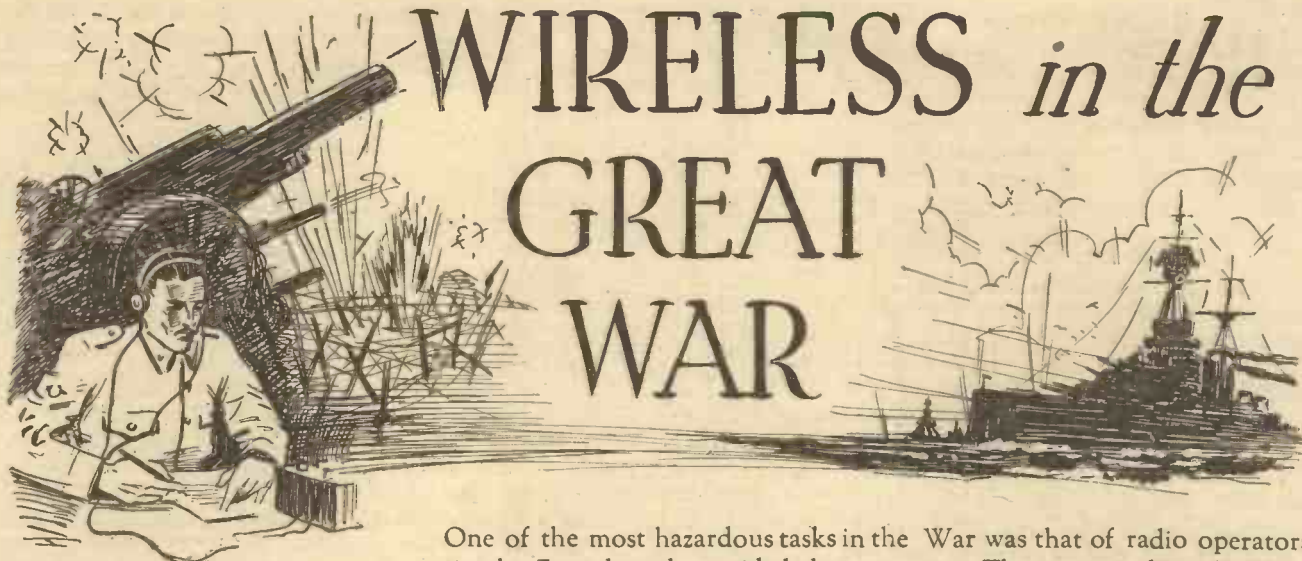
35. A wire is now taken from the L.S. positive terminal under the .006-mfd. condenser through a hole "O" to an H.T. plug marked H.T. + 2. This wire has to be of the flexible variety.

36. Connect S.G. (centre) terminal of V_3 to the end of the 25,000 ohms resistance in holder nearer the valve holder V_1 .
37. Also connect this end of the 25,000 ohms resistance to the right-hand terminal of the screened H.F. choke on the right of the set (see blue print). This wire curves round close to the main body of the choke.
38. Connect rear terminal (nearer terminal strip) of other (left-hand) H.F. choke to the P terminal of the L.F. transformer, the wire passing through hole "J" by the side of the 2-mfd. condenser.
39. Remaining terminal of this H.F. choke is now connected to the anode terminal of V_3 , and a lead is taken from that terminal through a hole "C" to the moving vanes of the differential reaction condenser situated below the on/off switch.
40. Connect right-hand H.F. choke screen terminal to the baseboard by means of a wire passed under the choke.
41. Do the same for the other H.F. choke, the wire being passed under the choke base and the latter screwed down tight. (This brings us to the last of the wires shown in the third pair of photographs, on page 10.)

STAGE 4.

42. Connect terminal 4 of front coil unit to F_1 vanes of differential reaction condenser, the wire passes along the baseboard behind the gang condenser and under the spindle.
43. Connect right-hand terminal of volume control to left-hand terminal of on/off switch. The wire passes above the gang condenser scale.
44. Connect wire from the terminal 2 of coil nearer the panel to "Metaplex." Connect terminal 2 on same coil to terminal 3.
45. Connect the left-hand terminal of the volume control by a flex lead through hole "A" along underside of baseboard and up through hole "F" to a G.B. — 1 plug.

(Please turn to page 48.)



One of the most hazardous tasks in the War was that of radio operators in the Zeppelins that raided this country. The part wireless played in attack and defence is portrayed in this vivid pen picture.

By "Radiat"

NIGHT, dark, starlit, moonless; ideal air raid conditions. London is in darkness, thick blinds cover all windows, no street lamps are visible. Every anti-aircraft battery is manned in readiness, searchlights are primed, guns are ready, for the British wireless stations have reported Zeppelins crossing the North Sea bound for England.

Presently the faint roar of the Zeppelin engines is heard, and London awakens to the approaching horror. Sirens scream, searchlight rays pierce the darkness and guns thunder their deadly welcome to the foe. A faint whining sound rapidly growing louder—a shattering explosion—the wail of the wounded and dying; the tragedy has begun.

How Radio Helped

That we knew of the air raids beforehand and were able to make all defensive preparations possible for dealing with them was due entirely to the good work of the English wireless direction-finding stations on the East Coast. Immediately Zeppelin wireless was heard, our stations would take cross bearings on their signals. Thus the course of the Zeppelin could be followed as it approached the English shores, and in this way ample warning of the enemies approach was conveyed to headquarters in London.

The Zeppelin wireless was of the Telefunken type, universally employed by the Central Powers, but owing to the very light type of apparatus used, the Zeppelin had a distinctive note and this, combined with her call sign, soon enabled the British operators to distinguish the airship wireless from that of German ships. Every effort was made by the Germans to disguise the distinctive call sign of the Zeppelins,

but experience soon enabled the English stations to pick them out.

English stations, on picking up any Zeppelin messages and bearings would phone details through to the Intelligence Department at the Admiralty in



Bringing an anti-aircraft gun into action during the war. These guns were mounted on lorry chassis and were rushed to strategic points at a moment's notice.

London, where it would be examined thoroughly and possibly decoded. The message would usually prove to be a request by the Zeppelin for her bearing from one of the German Direction-Finding stations at Tondern, List, Nordholz, or Bruges, in Belgium. There would also be many requests for weather reports and instruction as to route.

Listening in to the wireless on an air

raid night in England was quite an eerie experience. In the first place, from far away across the North Sea would come the thin piping note of a German Zeppelin. A sudden silence would follow reminiscent of the silence which followed the SOS. from a stricken ship in peace time, the feeling of everyone listening, straining their ears to catch more, the ether would become "electric," for if it was a "Zepp." then more homes would be wrecked that night in England, children killed or wounded, women tortured; it was a war quite different from the war of the battlefield.

Tense Moments

At the direction-finding stations the operators would sit tensely waiting to catch the merest whisper from the Zeppelin so that they could take a bearing on the vessel. The Zeppelin operators made every effort to rap out their messages with the utmost speed in order to make it as difficult as possible for the English operators to pick up the signals and take a bearing.

During their period of action when the bombs were being dropped, the wireless aerial of the airship would be wound in to avoid fouling the descending bombs, and the wireless would be quiet. After the action, however, the ether would resemble the tower of babel, more especially if a number of Zeppelins were taking part in the raid.

In the action all direction and position would be lost, the Zeppelins having moved about from place to place blindly in attempts to avoid searchlights and anti-aircraft guns.

When all the bombs had been dropped, therefore, it was the desire of every "Zepp." commander to find out his position and this could only be done by wireless. Every attempt would be made to preserve order, but usually a panic would ensue, and it would be every Zeppelin for herself.

London Landmarks

In the first few raids over London it was comparatively easy for the airship navigators to pick out the various London landmarks, the Thames was an unfailing guide, St. Paul's stood out clearly, so did the great glass roof of the Crystal Palace gleaming in the starlight.

But London soon awakened to the danger of its illuminations, lights were dimmed, glass was painted, and the Zeppelins had greater difficulty in ascertaining their position, their only hope now was the bearing by wireless.

Storms and fog would also throw the airship out of her course, and clouds, although useful to hide in, were a curse when it came to navigation.

Navigation Errors

Indeed, the most extraordinary errors could be made in navigation, and frequently a ship might be over Spain when the Commander thought himself over England, until shown the error of his way by a wireless bearing.

A Zeppelin on a raiding trip to England would seldom be in the air for less than twenty hours, and all this period, apart from the time of action or during a thunderstorm, the wireless operator would be on duty. If the Zeppelin was flying high in the rarefied atmosphere, half of the twenty hours might be spent by the operator with an oxygen tube in his mouth, which, however essential, was decidedly unpleasant.

The aerial on a Zeppelin, or any aircraft of those days in fact, was unwound from a large reel, similar to a fishing reel, and the wire trailed for some hundred of feet below the belly of the craft. In a thunderstorm such an aerial would collect a heavy charge of electricity from the atmosphere, even although it might not be struck by lightning. This charge would cause sparking in the hull of the ship, which might ignite the ultra inflammable hydrogen gas in the balloons.

Enormous Difficulties

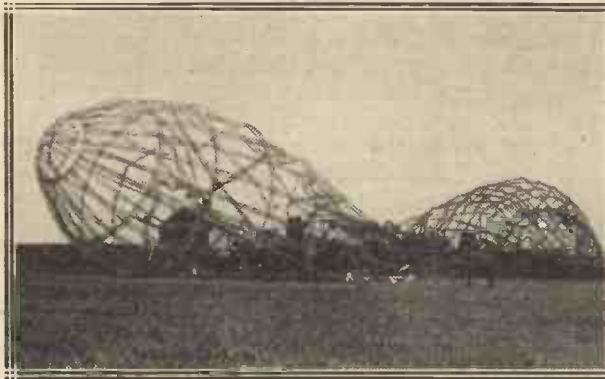
Every move of the operator in the ship would be followed by the operator on the ground, and every effort made

THE END OF THE ZEPPELIN

to prevent his establishing communication with Germany. The difficulties of the Zeppelin operator were enormous (perhaps I shall be forgiven if these are stressed, for it will be appreciated that wireless has no frontiers, that wireless is not a destructive weapon, and that its main purpose is to preserve life and property whether it be hostile or friendly).

With shells exploding all around, through the roar of the airship's engines, with death at his elbow, the Zeppelin operator must needs keep his head, and get his vital messages through, and even under ideal and peaceful conditions airship wireless was difficult, valves were almost un-

DOWN IN FLAMES!



Zeppelin LZ 133, which was brought down in flames near London. Little was left but two mountains of aluminium girders and the engines. All the crew were killed.

known and the crystal was still the detector in the wireless receiver.

Just as a vital message was being received or transmitted he would be interrupted by the door of his tiny cabin being opened, and someone making an inquiry for bearings, the snag was that when the door opened the light in his cabin automatically went out, and the thread of the message would be lost.

Few Returned Unscathed

Crippled Zeppelins were attractive prey, and as time went on very few airships returned from a raid over London totally unscathed. Even if they managed to survive the anti-aircraft shells and incendiary bullets or bombs of the buzzing aeroplanes, something was sure to go wrong with the ship herself.

It is necessary to fly in an airship to realise fully how fragile such crafts are. Balloonets which contain the vital gas will, under the best conditions, spring a leak due to friction

between the fabric and some nearby metal girder. Gas will escape, and loss of gas means loss of height, when height alone will save the vessel from destruction.

Engines will fail due to a thousand and one reasons; freeze up, for instance due to extreme cold at great altitude, or to any of the usual idiosyncrasies in which internal combustion engines delight to indulge at critical moments.

Following Them Home

From the Zeppelins' wireless, English stations could follow the vessels all the way home, that is, of course, if they managed to get so far. Over land the guns from our anti-aircraft batteries shelled them continuously, over the sea warships followed them up whenever possible.

By the middle of 1917 it became obvious to the German Air Command that Zeppelin raids were not worth the tremendous cost and loss involved. Fewer and fewer ships returned and already nearly a dozen vessels had been brought down in flames.

Fire in the Air

No terror could equal that of fire in the air.

The door of the tiny wireless cabin opens, "Ship on fire," shouts a voice above the roar. "Tell Nordholz. Do what you can for yourself. Good-bye, good luck."

As the door slams to the operator catches sight of the fierce blue glow of the fire, and hears the fizzling sound of burning fabric.

The sky seems alight from one horizon to the other, untold quantities of hydrogen gas are aflame. The ship has lost her "lift" and is driving downwards at terrific speed, the draught fanning the flames to greater fierceness. Girders bend and crash, petrol tanks explode. The fur coats of many of the crew are already ablaze, some jump screaming into the void, flaming human torches. Others await the end more calmly, death most terrible awaits them either way, it is the fortune of war.

NEXT MONTH

More about

THE ROBERTS THREE

and a long illustrated section dealing with

1935 COMMERCIAL SETS

IN "WIRELESS"



From My Armchair

by
S.T.

What has happened to Carlos? Remember him and his "Inkstrain"? Our popular contributor who, at the time of writing these notes, was touring the country with his now famous S.T.600 receiver, has been showered with questions by sympathetic readers who are anxious to hear more of the "histles and parkles" of our amusing Portuguese friend. Read S.T.'s stirring appeal to him, among a variety of subjects discussed this month.

I AM supposed to be in my armchair, but I laugh in a bitter sez-you fashion merely to think of an armchair.

In half an hour I am scheduled to meet a pack of keen radio wolves waiting to tear me to pieces in Newcastle. I have just come in from Edinburgh where canny Scots were even keener to "hear first."

The results have been amazingly good—and it takes a frightful lot to amaze me. Scotland will certainly back the Six hundred to the limit if their comments are anything to go by. And I have a whole wad of appreciative letters.

Here's one from Glasgow—from F. Carmichael, of 199, Glamis Road., Glasgow. He says: "The volume, selectivity and tone were more than even an S.T. enthusiast could expect or wish for. Those S.T.400 owners who think they have the 'goods' will have a shock when they hear Big Brother 600."

The Irresistible "600"

Well, that's true enough. The 400 will go on—I'm not pretending it won't—but its had two good years, and the S.T.600 is streets ahead as regards selectivity and about 20 sights better on sensitivity. I don't care how small an aerial you have, whether you live in a tent or next door to a gasholder, the 600 will bring them romping in.

Naturally I am the last person to decry my S.T.400, which will continue to give good service for a good while yet. But once you have seen the 600—even seeing it will tempt you at once to make it, but just why I cannot disclose at the moment—and once you have heard it you will be unable to resist it.

As far as I am concerned the S.T.600 very definitely puts the 400 in the shade—a pleasant shade, but still the shade. Many of those to whom I have demonstrated the S.T. 600 already possess the 400 but, to a man, they have expressed the intention of building the latest arrival.

It doesn't pay me to lead you astray in this matter. I told you long ago I should not advise you S.T.400 users to

strongly advised S.T.300 to convert to S.T.500.

Well, this is evidence that I don't just want you to build every new set I produce. And when I suggest that you will be delighted if you convert the S.T. 400 to the S.T.600 I appreciate the responsibility I undertake.

Much More Sensitive

But even if you do not do so immediately, I want your goodwill for this new set. Plenty of your friends will be seeking your advice, and I should like to feel that you were wholeheartedly recommending the S.T.600 even if you do not propose building it yourself for the moment.

You have all taken my word for things in the past—no one would ever build a set unless they could trust the designer—so take it now: The S.T.600 is many more times sensitive, easier to work, and far more selective than even the 400. The improvement is not just noticeable but startling. Technical readers will realise immediately they see the circuit that a big improvement must be there.

My only regret is that more of the 400 cannot be used in the set. There is a fair amount of new components which is unavoidably necessary to get new effects, but I have a reputation, I think, for saving the constructor money, and there is not an extra penny you will spend which will not bring you pounds worth of new radio pleasure.

What's Happened to Carlos?

Wherever I go, old Carlos is mentioned. His troubles bring sympathetic and kindly laughter to many who would gladly help him. His keen business sense (remember the ink-strain?—and the whole kit he wanted for a small unconcerned sam—or for

" . . . The results have been amazingly good—and it takes a frightful lot to amaze me . . . " Thus says S.T. of his masterpiece—the "600"—an opinion that has been confirmed a thousandfold by those readers in all parts of the country who have been privileged to hear it. When he commenced writing these notes, our distinguished contributor, in the middle of his tour, had just arrived at Newcastle (see picture below). Since then, the full details of this wonder set have been revealed in the October 27th issue of our companion paper, "Popular Wireless."



build a set that was only *rather* better than the 400.

Please remember also that I told you all that the S.T.500 of last year was rather less sensitive than the S.T.400 but capable of a bigger output volume. I discouraged S.T.400 people from building the 500, although I

nothing, was it?) makes the Scots' mouths water.

Since Carlos sold his S.T.400 for a large sum to the small corpulente peasantry to keep the birds off his fields—since histles and barkles, splitters and crockles, are anathema to our feathered friends, we have heard little of him.

And what of Chan—the Chinese doctor? He has never written, not even to prove his existence, which is doubted by Mr. Gandi of Bombay who, you remember, got my goat, by saying that Mr. Chan was just a dream.

Now, Carlos, old boy, do your stuff. The great mutton-faced British public is not as sick and tired of you as you think. What have you done with all that money you got from the farmer? Spent it, I daresay, on buying a dried sardine factory to annoy other listeners with electrones hopping from the dynamo brushes and bursting into their speakers.

Effect of Carbohydrates!

Mr. Carmichael (*see above*) says: "Even Carlos will go nuts over this set (the S.T. 600)." He also adds, by the way:

"Also tell those photographers of WIRELESS that they don't photograph you at all like yourself. You are much more genial (and stouter) than they make you appear."

EVERY DISTRICT IS VISITED

I didn't know my layout was to be composed to blue print, but I pass on the information. If Mr. Carmichael had eaten all the starch and carbohydrates generally that have gone down my throat on this tour, he'd look stouter than his photographs. The geniality, of course, is forced.

I resume my pen at the Midland Hotel, Manchester. Actually I am in bed—about the only place where I can get time to write. My sleep suffers, but I am getting use to that.

Why These Tours?

Yesterday, some good woman said to me. "Is it very dignified for anyone of your standing to go round the country demonstrating a set?" My retort was rather smug and priggish, but pretty close to the truth. I said: "Unless I placed my work before my dignity, I should not have any standing."

Certainly it would save me a lot of trouble to stay in London. But conditions are different in different parts of the country, and I think the trouble I take is much appreciated by constructors. I am not a "London designer."

People in Scotland hail me as a

countryman. Lancashire knows I was born there. London knows me as a naturalised Londoner. The West Country has had me as a landowner in a small way.

In all areas my sets are built, and it seems natural for me to be amongst the people there. I am not treated as a strange visitor from the Metropolis.

Two nights ago I was in Leeds, before that, Newcastle. I saw nothing of the famous televisionaries of Newcastle. Do they no longer wrangle heatedly about the fifth diamond-shaped "square" on the linoleum of the studio at Portland Place?

It is very unfair of the Editor pressing me for armchair notes this month. He says he must have "some," otherwise readers will think I have deserted the paper in its new form. Don't worry. Readers will have to go on reading this "column" for many a month unless they, themselves, want it stopped.

End of An Old-Timer

I see "Poldhu" is for sale. Can any pre-war amateur read the news without a tear falling from his rheumy eyes? The very first evening—11.30 p.m., wasn't it?—that I ever received anything on anything, I "got" Poldhu's high-pitched sizzly signals, sending messages and news to liners on the high seas. What a thrill!

THE RADIO OF JAPAN



A relay of the religious service from the Zoji Buddhist Temple at Shiba, Tokyo, is a regular feature of the radio programmes. Note the microphone by the young priest in the centre.



Here is Ketsho Imai, Japan's greatest blind performer of the "Koto"—an instrument of 13 strings—broadcasting from station JOAK, Tokyo. He is taking part in a trio recital, the other two artists broadcasting their parts simultaneously in two other Japanese cities.



In Japan they have professional storytellers. Here is one reciting a ghost story before a hushed audience. The microphone by which the story is being carried to listeners may be seen in front.

"East is East and West is West" . . . but Japan does not lag very far behind in broadcasting affairs. These unique pictures, which are exclusive to "Wireless," provide an excellent insight into the use that is made of radio in the picturesque "Land of the Chrysanthemum."

I used to practice Morse with a post-office telegraphist until Poldhu became too easy. My "home work" used to suffer those days. I suppose it does nowadays with the wireless schoolboys.

Poldhu, by the way, is a very beautiful spot. Around 1926 I toured Cornwall and Devon to find the loveliest spot on the coast. It happened to be Poldhu. The weather was glorious—sunshine every day, and the gulls wheeling over the foam-covered rocks was a sight I could not resist. Then and there I bought four or five acres on the coast, where the view over Mullion Island was superb. My next-door neighbours were Marconi's Wireless Telegraph Co., Ltd.

But my house was never built. The next time I went it rained and rained for two solid, squelchy weeks. I hung on to the land for years. The scenery suffered through the building of houses along the cliffs. In the end I sold it.

Perhaps I may buy some of that Marconi land. The lure of Cornwall to me is irresistible. In the depths of my heart the rocks, the gulls, the salt south-western winds mean rest and peace. You get no rocks, no gulls, no salt winds in the Midland Hotel, Manchester.

Do you know what makes my back rise most after a tiring tour like this? Well, it's the man who is going to write: 'I know you demonstrated the S.T.600 at Little Pigniff-in-the-hollow. That was very clever of you. You didn't dare come to Great Pigniff, where conditions are quite different.'

I always feel like writing back: "Who else designing wireless sets has ever been within a hundred miles of either Pigniff-in-the-hollow or Great Pigniff?"

Sunshine in Manchester!

I've been demonstrating the S.T.600 in places which are h— (which is not short for heaven) compared to Great Pigniff, but this mutton-faced reader will go through life—like the whole population of Papplewich—smelling a rat.

Am I losing my temper? Well, blame the dream I had last night. My bed skidded across the road continuously as I drove it from one end of Britain to the other. (It has rained every day of my tour until I came to Manchester, where glorious sunshine has poured into Deansgate).

I have followed hundreds of miles of tram lines. I have gone "straight on" for leagues. I know every public-house from the Angel to the Cock o' the North. It's the only way, to find people's addresses I mean.

Those Route Directions

Two years ago I found that you had only to find out the nearest pub. to a reader's home, and you could find Minster Street or Winton Terrace in a flash. Everyone—at least, everyone standing at the side of a road—knew where the Cold Beef and Prunes was.



There are few listeners who do not enjoy the broadcasts of Jack Jackson and Reggy Cochrane. Here they are seen before the recording microphone in one of the H.M.V. studios discussing their arrangement of "Kiss Me Dear"—a popular number from the new Cochran revue "Streamline."

THE "QUEEN MARY" LAUNCHING

As proof of the confidence which is placed in the reliability of Exide batteries, it is of interest to record that the release mechanism at the recent launching of the "Queen Mary" was operated by a battery of this make.

I had hoped that the period of national chastening would have aroused a new spirituality in the nation, but I found this time, as last, that St. Barnabas came as a poor second in the landmark races, with the Bull and Cockfinch a winner by a throat. I suppose it's the drought.

I intend—for the benefit of other tourists—to prepare a dictionary of common words and phrases. It will go something like this:

Straight on. Yorkshire term for: go half a mile, turn up the lane to the left, then down the brew to the right; when you get to the cross-roads turn sharp left. This term is also used in Scotland and Lincoln.

You can't go wrong. Lancashire for: You will probably take the wrong fork three miles on. You will then turn left instead of right at the traffic lights and follow the tram-lines to Middleton where on asking a policeman where you are, he will mention a place ten miles from where you thought you were.

Never mind. Birmingham tomorrow. Good heavens, I forgot. That means more pork pies. In case of eventualities, the last person to see me was the hall-porter of the Midland Hotel.

J. S.-T.

This interesting fact was mentioned by Mr. D. P. Dunne, the Managing-Director of Exide Batteries, when he took the chair recently at the annual Exide Motor Show Luncheon, which was held at the Clarendon Restaurant, Hammersmith.

The launching of the world's largest liner was the climax to years of elaborate preparation, and that the battery chosen for the occasion should have been of Exide make is indeed a tribute to their extreme reliability.

The Wireless Listeners' Circle



Isn't it funny how, if you attempt to stop a person in the street, they frown upon you with suspicion, expecting any moment that you will produce from inside your coat a card of buttons or a tray of matches? I somehow scented that that might be my lot when I set out to "collect" the first

my best to make them feel thoroughly at home preparatory to the actual test. It occurred to me that the average Englishman can be horribly stiff and reserved when in strange surroundings, and our (forgive me, Listeners' Circle Number One)—shall we say—his best behaviour?

WHAT IS THE "WIRELESS" LISTENERS' CIRCLE?

What is the WIRELESS Listeners' Circle? In describing it simply as an innovation designed to assist the potential purchasers of commercial receivers the scheme is hardly revealed in its true colours, for there is something very much more behind the feature than just a straightforward review such as may be found in almost any paper. What is it then, that distinguishes it from all the rest; what is there about it that makes it pre-eminently the feature to refer to when in doubt about the set to buy? Just that it is contributed not solely by the people who, in their own sphere, design sets, but—and much more to the point—by the listeners who actually use them! If you were buying a car, for instance, would you be content simply to learn of its mechanical merits from the knowledgeable salesman in the showroom, or would you feel much more happy about it if, in addition to knowing the performance details, you knew also that Mr. Jones down the road, with no more experience of motoring than yourself, had been able to get wonderful results from the very car in which you were interested? In the series commencing with this first issue of WIRELESS we are going to give you valuable guidance—technical guidance—on modern commercial receivers. But we are not going to ask you to accept our word alone for fear that you may have reason to doubt whether your own operating ability is sufficiently advanced to enable you to emulate our results. In addition we are going to solicit the opinions of chance-chosen critics; ordinary men-in-the-street; listeners who, perhaps like yourself, have little or no knowledge of the technicalities of wireless and who, until the moment when they are suddenly invited to attend a WIRELESS Listeners' Circle, may never have seen the set upon which they are asked to express an opinion. Their views, whether adverse or eulogistic, will be faithfully recorded, and when published together with our own comprehensive technical report will represent an authoritative guide on which, for obvious reasons, you can place the utmost reliability. Follow the WIRELESS Listeners' Circle, and you will not go very far wrong!

WIRELESS Listeners' Circle, and in consequence I purposely donned a clean collar and brushed my hair with intent to allay suspicion. Even so, it was fortunate that I was able to produce a card to establish my bonâ fides, for otherwise number one of our great new series might never have seen the light of day—at least, not without interminable explanations! However, having overcome the "stage fright" associated with the "first night," and having, moreover, secured promises from certain as then "unknowns" to call at an address at 9 p.m. precisely that same evening, I was able to return home in a much happier frame of mind, and was, in fact, quite excited about the prospects of the evening.

Must confess I had doubts; wondered whether they would come after all, but I had not long to wait. At 9 p.m. sure enough there was a ring at the door, and I had hardly shown the first arrivals in when the second gentleman arrived.

I showed them the set—the new Marconiphone Model "Q286"—and did



Mr. and Mrs. F. Taylor, of Addiscombe, and Mr. L. J. Mileham, of London—who constituted the first "Wireless" Listeners' Circle—are here seen conducting their tests of the Marconiphone model "Q286."

But by the greatest of good fortune I could not have selected a more critical and enthusiastic trio had I probed the whole of London! The way in which they fell to the task of reviewing that set—or perhaps I should say radiogram—from the listener's angle was gratifying in the extreme, and I soon realised that WIRELESS readers would be able to rely with confidence upon the opinions of these chance-chosen critics.

Mr. and Mrs. Frank Taylor, of Rose Cottage, Cheyne Walk, Addiscombe, were keen listeners, and had, in fact, owned a radiogram—curiously enough a Marconiphone radiogram—for some time, although neither of them were acquainted with the technicalities of radio. Mr. L. J. Mileham, of Capel House, New Broad Street, London, E.C.2., on the other hand, did not actually own a set, but was of a musical turn of mind, and therefore of great value in his capacity of critic.

As a matter of fact, he told me afterwards that his best friend was in

the wireless business, and that as a result he was frequently able to hear all the latest sets, which set me thinking that if he was eulogistic in his summing-up of the "Q286" it would be praise indeed.

Well, it didn't require any urging on my part to start them off on the task which was before them, and with the purposes of the various controls all clearly marked on the actual knobs, I had nothing to do but sit back and listen, and occasionally to venture a question.

Mrs. Taylor who, up to this moment had been studying the appearance of the "Q286" with typical feminine thoroughness, was the first to set the ball rolling.

"You know," she said, turning to her husband, "I think there is something very dignified about the appearance of this new Marconiphone—er—what do you call it? Radiogram? It appeals to me tremendously: in fact, I think I like it even better than our present one, and I have always thought that was the best I've seen."

"I'm inclined to agree with you," observed Mr. Taylor. "There is certainly something very stately about it. What do you think, Mr. Mileham?"

"Exceptionally Pleasing"

"Well, I'm not showering any compliments—at least, not yet," laughingly observed our musical friend. "But I must confess that the design and general finish are exceptionally pleasing and much more in keeping with a tasteful furnishing scheme than the majority of present-day sets."

"Yes, that's rather how it strikes me," concluded Mr. Taylor, as he lifted up the cabinet lid. "Now, then, who's going to be operator-in-chief?"

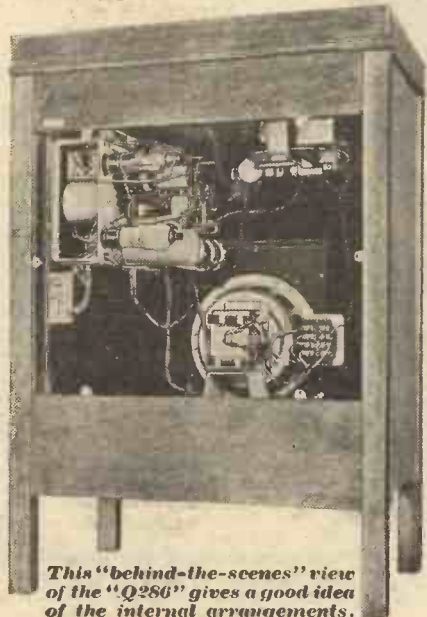
From the looks of keen anticipation on the faces of my guests I found the greatest difficulty in nominating an "operator-in-chief," and so I discreetly suggested that we had better adopt the law of "ladies first."

"No, Frank, you do it first," pleaded Mrs. Taylor, obviously feeling, as no doubt any other lady would have done, a trifle embarrassed at the prospects of having to be first at the controls.

Without further ado, Mr. Taylor took up the reins, and in less time than it takes to say Jack Robinson the room was flooded with music, and we were all listening to a most excellent pianoforte rendering.

"Isn't that Chopin's Étude in B Flat Major?" I observed.

"G Flat Major," corrected our musical friend. "I know it well, although, as a matter of fact, it is not one of my favourite Chopin compositions. But I say," continued Mr. Mileham, "isn't that piano reproduction remarkably good?"



This "behind-the-scenes" view of the "Q286" gives a good idea of the internal arrangements.

"I was just going to say the same thing," chimed in Mr. Taylor. "One would never credit that it was coming by radio. I think it is grand."

We listened to another Chopin piece, the Prelude in B Minor, as I subsequently learned, and then began a tour to determine the capabilities of the set on distant stations.

We spent five minutes at Budapest, down through Athlone, Vienna, and Brussels to Prague. All of them were there exactly in the named positions on the dial and all at excellent speaker strength, practically free from background hiss. On to Stockholm for a few minutes, two minutes here, three minutes there, Rome, Hamburg, Brno, all the well-known continental programme-providers and dozens of less well-known ones as well.

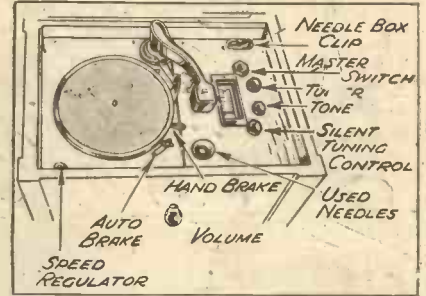
The Whole of Europe

In little less than half an hour—twenty-eight minutes, to be precise, for I actually timed it—we had scoured the continent from the Baltic to the Levant, from Ireland to the eastern fringes of Europe. What a pot-pourri of contrasting entertainment! I thought a lot, but purposely refrained from saying anything until I had observed the reactions of my guests—your representatives!

It was not until the tour of the medium band was completed that the silence of my guests was broken.

"Phew, can you beat that," ejaculated Mr. Mileham, passing his cigarettes across to his

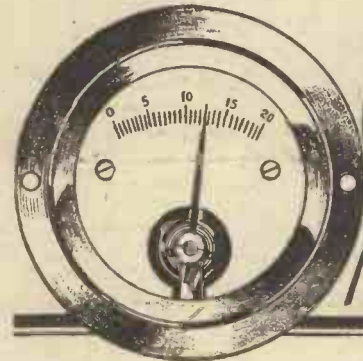
co-critics. "I've heard a few sets recently, but I think this one just about takes the biscuit." "You're right," broke out Mr. Taylor enthusiastically. "Surely nobody could want anything better than this. Why, we must



The simple controls are all clearly indicated in this artist's impression of the "Q286" motorboard.

have heard everything in Europe that's worth hearing during the last hour. And have you noticed how wonderfully constant they all are? I was always under the impression that the disappearing trouble was a phenomenon that could not be overcome, but I can't say that I have noticed any tendency with this set."

(Please turn to page 46.)



What the Meters Show

Here are the observations of our technical staff following their laboratory tests of the Marconiphone model "Q286" radiogramophone.

WHAT is there about the superhet that is employed in the Marconiphone model "Q286" that is different from any other modern five-valve superhet? Mainly the fact that it is Marconiphone.

A famous name always carries with it traditions that have to be upheld, no matter in what sphere the firm's activities may be directed. Thus, although Marconiphone may fall in with present-day requirements by producing a radiogramophone at a—shall we say for want of a better word?—reachable price, and although basically at any rate the circuit may be similar to that of any other modern super employing five valves, you can rest assured that somewhere in the design there is a subtle difference which makes all the difference between mediocrity and perfection.

Extensive Research

It's just the little touches here and the little refinements there that do the trick—not just haphazard shots in the dark to pander to the present public

demand for novelty—but all of them the results of extensive research and all of them combining to achieve Marconiphone distinctiveness.

There are a number of present day commercial sets which claim distinctiveness on the score of what are, when you come to get down to them, nothing more or less than "window dressing" ideas with little practical utility, but don't be beguiled into buying a set on the score of novelty alone. It doesn't do!

The Test Results

The acid test every time is results, and that is primarily the reason for this technical epilogue to the WIRELESS Listeners' Circle.

We shall probably have nothing at all to say about either appearance or novelty appeal, for those are subjects which can be dealt with more convincingly by our chance-chosen critics in the foregoing text matter. We shall endeavour to confine ourselves to the all-important question of results.

Without further ado then, let us plunge

(Please turn to page 46.)



B.B.C. NEWS

*The New Midland Regional—Promenade Concerts—“ Growing Wings ”
—The B.B.C. Charter—Improved News Bulletins
By Our Special Correspondent*

R. A. Rendall, head of the Adult Education Department, is shortly to leave London to replace Mr. Sutthery at Cardiff.

Clark was able to get an excellent account of its performance from what he heard in Russia during one of his recent visits.

Sir Henry Wood and the B.B.C.

The usual “ post Prom. ” negotiations have begun between Sir Henry Wood and the B.B.C. I gather that this year the atmosphere is a good deal more pleasant than on previous similar occasions. One reason, no doubt, is that the B.B.C. did make a special effort in connection with Sir Henry Wood’s fortieth season just completed.

Any way, the negotiations have gone far enough to make it possible for me to announce that there is no question of Sir Henry’s early retirement. His health is better than it has been for years and has stood the strain of the recent season admirably. So we can look forward with confidence to a forty-first season next summer. Also, Sir Henry will be given his usual share of B.B.C. Symphony’s during the

Christmas Day Programmes

Although the B.B.C. maintains its usual secrecy about the Christmas Day programmes, I know as a fact that plans are maturing for another world-wide Empire Broadcast on the afternoon of Christmas Day. There will be an exchange of greetings throughout the British Commonwealth of Nations. Although the Royal assent has not been definitely given, I prophesy with confidence that the voice of His Majesty the King will once again thrill the world.

The Future of the B.B.C.

The Government will announce before Christmas its intentions about

THE new Midland Transmitter will be ready early in 1935. It was decided not to transfer the Regional gear from Daventry to Droitwich, but rather to provide completely new apparatus for the Midland Regional installation at Droitwich. I understand that this will be ready before the end of February. When the Midland Regional Transmitter goes on the air from Droitwich with its brand new apparatus, it will not require as high a wavelength as it has enjoyed at Daventry. This will provide an opportunity for a reshuffle of wavelengths in the B.B.C. service.

This has no international significance and will not upset the allocation under the Lucerne Plan. It will mean, however, a better signal in those areas which are not now as well favoured as they should be in view of their population. The B.B.C. has promised to give fair notice of the introduction of the changes.

Another “ General Post ”

The practice of switching round officials between London and the Regional centres continues and is likely to be extended. It began with the creation of the post of Programme Director as part of the establishment of a Regional Headquarters. Thus Mr. T. M. Sutthery went from London to be Programme Director of the West Regional, and Mr. Harding to the corresponding post for the North Region in Manchester.

Now Mr. Sutthery is transferred to Belfast, and is accompanied by Mr. Lance Sieveking, who will be Drama Director for Northern Ireland. Mr.

.....
On Thursday, November 29th the wedding ceremony of Prince George and Princess Marina will be broadcast to the world. This is the first Royal wedding ever to be broadcast and Mr. Howard Marshall, whom you see here, will act as commentator.
.....

winter, and may take some of the Christmas “ Proms. ”

More “ Growing Wings ” Talks

Mr. Filson Young plans to resume his series of talks on flying early in the new year. His first series gave an account of the early stages of his flying instruction. The next series will deal with the completion of training and solo work.

The Serge Jaroff Kossack Choir

This world famous combination is visiting England in March, and will be broadcast by the B.B.C. Mr. Edward



the transition when the B.B.C. Charter expires in 1936. It is believed that the Post Office and the B.B.C. are working for another Departmental Committee like that set up by Mr. Baldwin in 1925 and presided over by Lord Crawford. But broadcasting has become a vastly

B.B.C. NEWS

—continued

more important business in the years since 1925.

There is a strong and growing feeling in Parliament that the right procedure is not a Departmental Committee, but a Joint Select Committee of both Houses of Parliament. Certainly this is what will be done if attention is paid to the wishes of the average M.P. As to what will emerge from the proceedings of this Committee, Departmental or Parliamentary, it is premature to speak. Those in a position to know are in no doubt that the principle of public service broadcasting on monopolistic lines will be extended.

There will be changes in the financial arrangements with the Treasury and the Post Office, partly to make available additional funds and partly to remove the necessity for the continued intrusion of the B.B.C. into the publishing field.

London Headquarters for Dominion Broadcasters?

Mr. MacFarlane, a member of the governing body of the New Zealand Broadcasting Corporation, has just returned home after an extended visit in England. During his stay here Mr. MacFarlane began to explore the possibility and desirability of setting up in London a sort of joint bureau to represent the interests of the broadcasting authorities of Canada, Australia, New Zealand, South Africa, India, and any of the Crown Colonies that would care to come in.

Some progress was made with the plan, and I believe that correspondence is now passing between the New Zealand broadcasters and the other broadcasters concerned. Such a Bureau would act as a Clearing House for the Exchange of Programmes as between Europe and the countries overseas. It would also be a permanent point of contact with the B.B.C.

Women Announcers Again?

Mr. Roger Eckersley is not easily deflected from an objective on which he has set his heart. This business of women announcers is near and dear to his heart. The failure of the experiment of last year has not diminished his enthusiasm. The result is that candidates for women announcers are being unobtrusively sought and given unofficial tests. I would not be surprised to see at least two appointed in London during the Spring.

Experiments in News

The B.B.C. News Bulletin is again in the melting pot. With a comparatively small staff, these bulletins have gradually assumed a certain form conspicuous for its compactness. Now, however, the B.B.C. is determined to add vitality and human interest, and to this end the staff has been trebled and numerous experiments are to be tried during the next twelve months.

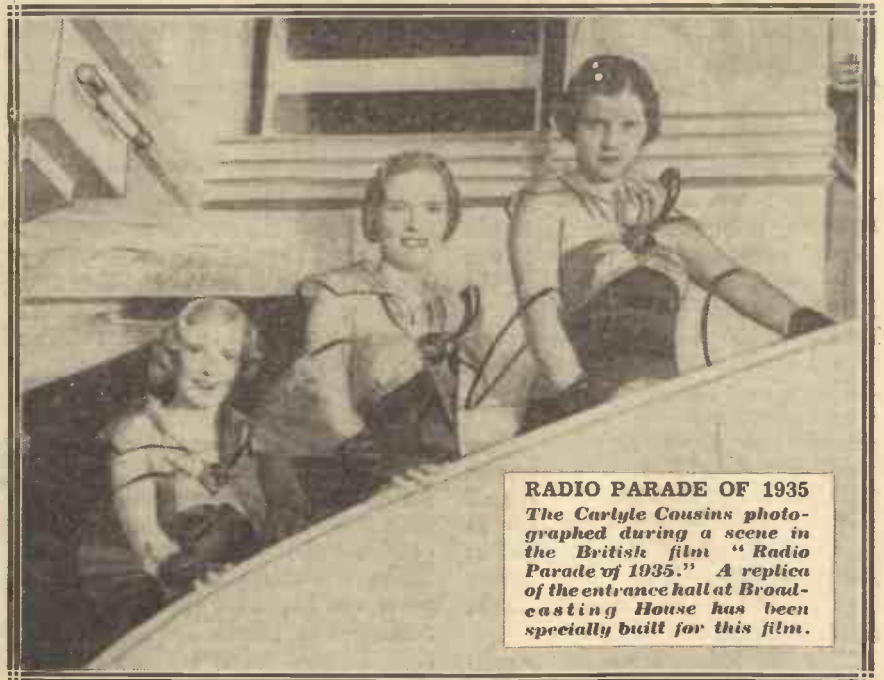
The first experiment, now in progress, is the insertion into the bulletins of short topical talks providing commentaries on or explanations of items of news. There are signs that this is

not altogether successful and that most listeners prefer to have all the news together and any embellishments afterwards. Fortunately the situation is still fluid and will remain so for at least a year.

The Royal Wedding

The wedding service of His Royal Highness the Duke of Kent and Princess Marina at Westminster Abbey on November 29th, will be broadcast in its entirety.

The service and the commentaries will be broadcast from all B.B.C. transmitters including the Empire station at Daventry.



RADIO PARADE OF 1935
The Cartlyle Cousins photographed during a scene in the British film "Radio Parade of 1935." A replica of the entrance hall at Broadcasting House has been specially built for this film.

THE new Orient liner Orion will be launched at Barrow-in-Furness on December 7, and it is hoped that the ceremony will be broadcast in home and Empire programmes. The launching of the vessel will be performed by His Royal Highness the Duke of Gloucester, who will be attending a concert given by the Returned Soldiers and Sailors' Imperial League at Brisbane, Australia, on that day. The concert will be interrupted by the Duke to press a button which will provide a radio impulse sufficient to set the Orion in motion down the slipway. As she moves off, a "tripper" will be actuated automatically which will break a bottle of Empire wine against her bows.

Details of the Programme

The speech by the Duke given from Brisbane, and the remainder of the launching ceremony, will be heard by the crowds at Barrow and, it is hoped, by other listeners both in this country and throughout the Empire. Commander Sir Charles Craven, managing director of the works and shipyards of Vickers-Armstrongs, is to call for three cheers, and the Rt. Hon. S. M. Bruce, C.H., M.C., High Commissioner for Australia,

THE RADIO LINK

How the Duke of Gloucester will launch the new Orient liner from Brisbane.

will subsequently announce from the launching platform that "All is well," and will broadcast loyal greetings to the Duke of Gloucester. A running commentary on the whole proceedings will probably be given by Commander D. A. Stride, recently retired from the Royal Navy, who is also a Freeman of the Honourable Company of Master Mariners.

For the Australian Service

The construction of the Orion in the shipyards of Vickers-Armstrongs is giving employment to thousands of people and has given a fresh impetus to the shipbuilding industry in the north-west. She will voyage between this country and Australia.

Orion has a displacement of 24,000 tons, with a length of 664 feet and a beam of eighty-two feet. Her hull will be white and she will have one yellow funnel and a single mast. Two twin-screw turbines giving a horse-power of 27,000 are to be installed. Elaborate arrangements to render the vessel fireproof throughout have been made for the safety of the 1,100 passengers she will carry. As might be expected she will be equipped with the very latest wireless apparatus including the most advanced direction-finding gear.

It would seem that the B.B.C. policy of relaying such features as Promenade Concerts from Queen's Hall during every single evening of the season does not meet with universal approval.

No one will deny that the Proms. are popular with a certain section of the community. Critics of music maintain publicly that the discrimination shown by Prom. audiences is pitiful, that they will rapturously applaud the most uninspired works, that they are, in brief, "a lot of hooligans." But so long as they enjoy themselves what does it matter what the critics think?

What does matter is that the B.B.C., seeing that some two thousand people in London go nightly to the Promenade Concerts, has assumed that millions of listeners all over the country must be equally enthusiastic. What justification can be found for this rash assumption I cannot think. Nevertheless, the reasons appear to be strong enough to justify one Prom. a night through the whole season, and a very large number of these on the National wavelength.

No Figures

There are, I am afraid, no figures available to show how many people attend the variety and music hall performances of this country every night. There are no figures as to the number of nightly theatre goers. I cannot attempt to estimate the number of people who attend lectures up and down the towns and villages of Great Britain every evening. But I warrant that I can make out as good a case for a nightly variety programme, a nightly radio play and a nightly lecture as is made for the Proms. And yet when any logically minded person ventures to point out to the B.B.C. that perhaps this music business is being overdone, he is met with a disdainful look which suggests that if he is not sufficiently intellectual to appreciate a weekly dose of six Proms. then he ought never to be a listener at all.

Is It Overdone?

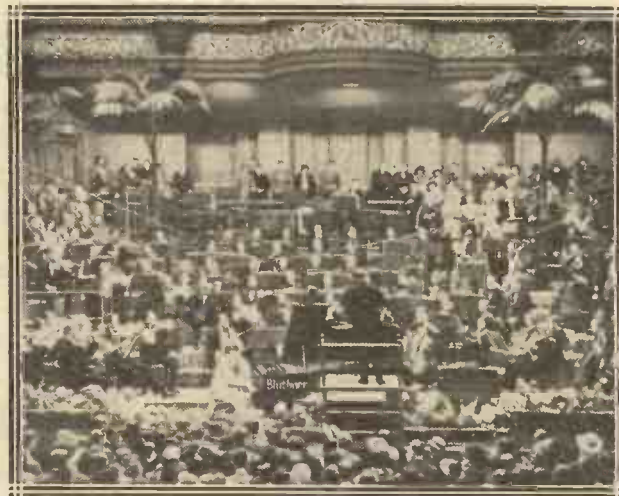
All the same, I will venture to suggest that what is known, for want of a better description, as "good music" is being overdone. I have just picked up at random a copy of the "Radio Times." I see that on Sunday there is a concert of serious music by Scan-

?

ENTERTAINMENT or EDUCATION

A Prom. a Night! And many of them on the National Wavelength! What justification has the B.B.C. for giving so much "Good Music"?

Asks our
Special Correspondent



Sir Henry Wood conducting one of the recent Promenade Concerts at the Queen's Hall, London.

dinavian composers lasting one hour. On Monday, Borodin, Bach and "Ancient Dances and Airs for the Lute" are included in a seventy-minute programme. Tuesday provides an hour and a quarter of music by the London Symphony Orchestra. On Wednesday we have an hour of Oratorio. Thursday brings forth a two-hour Symphony Concert, with an hour and a quarter of similar music on Friday.

On Saturday, for fifty-five minutes, Section C of the B.B.C. Orchestra is again in the field. Over eight and a half hours of "good music" in one week—and this the week following the Prom. season, when listeners might well be excused for wanting a little change. (I have chosen all these

concerts from the National or London Regional programme, and no account has been taken of such things as song recitals, foundations of music, selections of old English keyboard music, and what not.)

But over the same period I can find only four hours devoted to Variety—and even these include forty-five minutes in an afternoon programme, and an hour of "Songs from the Films," which does not strictly come under the heading Variety at all!

For some extraordinary reason, however, it is thought that listeners must have liberal doses of serious music whether they want them or not.

It may be that the B.B.C. is anxious to do a good turn to British music by showing foreigners how much we appreciate Symphony concerts. It may be that the B.B.C. Orchestra has to be employed in some way in order to earn its keep. Whatever the reason may be there can be no doubt that the amount of programme time devoted to Symphony concerts, recitals of little-known, untuneful music, oratorios and organ music is out of all proportion to their entertainment value.

Sets Silent

No one, least of all myself, begrudges the music lover his full quota of serious music. But we do object to being offered overdoes of such music because it is supposed to be good for us, to educate us. We don't want to be educated when we pay to be entertained.

"Why on earth must you grumble? You need not listen to all this music if you don't want to." That is what I and those who agree with me are told over and over again. To which we make reply: "We don't listen. But as often as not this means that we have to keep our sets silent. For there is no alternative."

I was talking recently to a well-known B.B.C. producer. His name doesn't matter, but every listener has heard and enjoyed his programmes at one time or another. I asked him why he had to reject so much really good material for his variety and dramatic programmes.

Quite frankly he told me that at every conference of programme officials
(Please turn to page 49)

OUR SCIENTIFIC ADVISER

*An Appointment of Interest to all
Readers of WIRELESS*

WE are pleased to announce that Dr. Joseph Harrison Roberts the well-known scientist and radio engineer, will act as Scientific Adviser and Television Expert to WIRELESS AND TELEVISION REVIEW.

Dr. Roberts is much too well known in the radio industry to need any introduction to our readers, most of whom are already familiar with his articles. He has had a distinguished career all along the line—but cannot be induced to talk about it. At nineteen he was a Bachelor of Science, and at twenty took a 1st Class Honours Master of Science Degree in Mathematics and Experimental Physics, receiving, in addition all the Scholarships and Prizes that were going and a Fellowship of his University.

At Cambridge

At Cambridge he held the 1851 Exhibitioner, the Wollaston Scholarship of the Cavendish Laboratory, and a special scholarship of his College, all three at the same time—an unprecedented achievement. He collaborated in Cambridge with Sir J. J. Thomson at the famous Cavendish Laboratory, and during the war, as a Naval Officer, he worked with Sir Ernest (now Lord) Rutherford and was later appointed Senior Experimental Officer of Submarine Sound Section under the Admiralty. He has published a large amount of important research work, and was created a Doctor of Science in 1920.

Radio and Film Interests

He is a Fellow of the Institute of Physics and has acted for several

important Companies in a technical and executive capacity. He has also given expert evidence in a number of High Court cases and excels as an expert witness, largely owing to his quiet and convincing

manner and the extreme reliability of his testimony.

His greatest interest in life, however, is in applying science to industry and he is "the man behind the scenes" in a number of successful enterprises in radio and in other directions. He has conducted many negotiations on behalf of radio interests and recently gave important evidence before the Government Television Committee.

Readers of WIRELESS will have the benefit of his unrivalled ability and his great experience on all matters connected with radio and television.

✱
A Recent
Portrait of
Dr.
**JOSEPH
HARRISON
ROBERTS**



THE NEW SEASON'S SETS

—ON—

HIRE PURCHASE

WHAT THEY COST PER WEEK



6s. 3d. per week

The TELSEN MODEL "3435/MV"

This attractive-looking six-valve all-electric table model superhet of Telsen's incorporates their famous "Pointograph" dial on which are actually marked the names of 100 stations. With its preliminary stage of H.F., it is one of the most sensitive of all popularly-priced mains supers, and yet it is extremely simple to operate. It is capable of providing an undistorted output of 3½ watts.

Cash Price and Hire Purchase Terms: 14 guineas, or 25s. deposit and 12 monthly payments of 25s.



6s. 5d. per week

The FERRANTI "ARCADIA"

One of the most popular of all sets in the famous Ferranti range, the "Arcadia" is renowned for its excellent quality of reproduction. It is a five-valve A.C. mains superhet with all the latest refinements, and it incorporates the well-known Ferranti "All-in" dial. The three-tone cabinet of quilted maple, figured walnut and Macassar ebony, with recessed panelling, is a superb piece of work.

Cash Price and Hire Purchase Terms: 15 guineas, or 35s. deposit and 12 monthly payments of 25s. 8d.

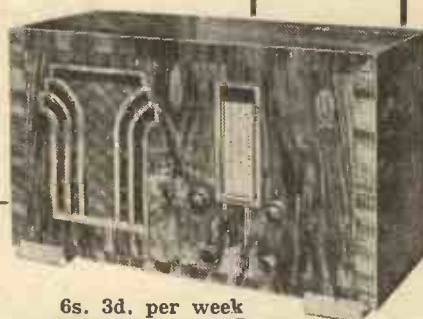


6s. 3d. per week

The CLARKE'S ATLAS "7-5-8"

A distinctive touch is given to the external appearance of the Atlas "7-5-8" A.C. mains receiver by the judicious introduction of chromium-plated fittings, which, against the polished walnut of the cabinet, look very smart indeed. The actual set is a five-valve (including rectifier) superhet of advanced design incorporating the exclusive Atlas feature of "Spectrum Tuning."

Cash Price and Hire Purchase Terms: 14 guineas, or 32s. 6d. deposit and 12 monthly payments of 25s.

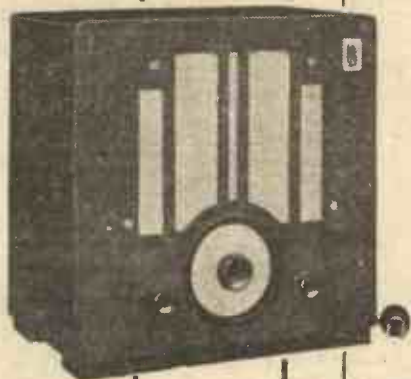


6s. 3d. per week

The G.E.C. "SUPERHET A.V.C.5."

The figured walnut front of this handsome G.E.C. receiver makes it eminently suitable for walnut furnishing schemes, although the unobtrusiveness of the design renders it an asset in any room. It is a five-valve superhet with A.V.C. for operation on A.C. mains, and used under average conditions it is capable of providing extraordinarily good results.

Cash Price and Hire Purchase Terms: 14 guineas, or 25s. deposit and 12 monthly payments of 25s.



4s. 6d. per week

The K.B. MODEL "381" (left)

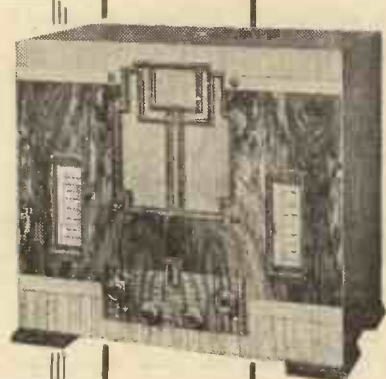
This new K.B. set, which is both attractive in appearance and outstanding in performance, is one of the cheapest of all superhets for universal mains operation. Cash Price and Hire Purchase Terms: 10 guineas, or first payment of 28s. (including 3s. insurance) and 12 monthly payments of 18s.

5s. 8d. per week. (approx)

The MARCONIPHONE MODEL "296" (right)

The Marconiphone model "296," which is a five-valve A.C. mains super with "Vision Tuning," A.V.C., and all the latest refinements, is remarkable value for money.

Cash Price and Hire Purchase Terms: 13½ guineas, or 30s. deposit and 12 monthly payments of 22s. 9d.



How To Build A REMOTE CONTROL

THE following is a description of the remote control I evolved a short time ago. With this control it is possible to switch on and off a set with one or more on-off switches, to select one, two, or even more different stations, and to control volume. All this is done with only two extension wires, or one wire and an earth.

An ingenious device which enables the set to be operated from a distance merely by pressing a button.

By DUDLEY NEWTON

A VERY SIMPLE ARRANGEMENT

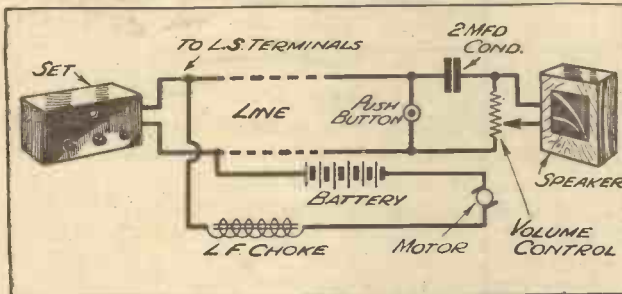


Fig. 1. The full circuit of the control described on this page.

Two wires are run from the set to the distant loudspeaker in the usual way. At the remote loudspeaker and in series with it is a large condenser; 2-mfd. is a suitable value. In addition, a small push button is connected directly across the line.

If a volume control is desired, the

choke and a suitable battery of storage cells is connected across the line.

Fig. 1 is a diagram of the complete circuit. The condenser is necessary to prevent current from the storage cells passing through the loudspeaker continually, while the choke is required to prevent the motor and battery from bypassing the L.F. currents.

It is, of course, taken for granted that a filter output is incorporated in the set. Such a filter is absolutely necessary, otherwise the H.T. current will have to traverse the whole line before reaching the anode of the last valve.

The relay necessary for the operation of the set makes use of the electric motor, which operates a certain number of contacts by means of cams. The electric motor should be suitably geared down. I used a Meccano motor which lends itself readily to this.

THE THREE CONTACTS

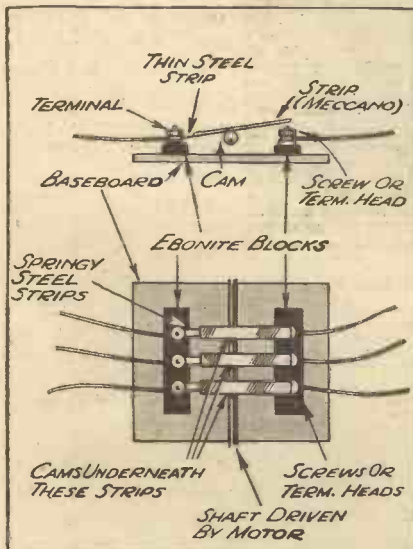


Fig. 2. The relay system as arranged for three contacts. More can be added if desired.

diagram in Fig. 1 shows the necessary connections. At the set end, an electric motor, in series with an L.F.

It is only necessary to connect contact No. 3 in series with this extra condenser, which will be in circuit when the strip is resting on the contact, and out of circuit when the strip is lifted off by the cam. If the condenser has been correctly set, then the higher and lower wavelength stations will be received.

If the set has two on-off switches, as in the case of a battery set which

THE CORK CAMS

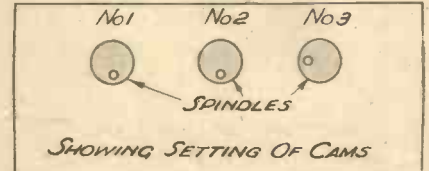


Fig. 3. The three cork cams are set as shown above.

derives its H.T. from the mains, then two of the cams should be adjusted so that their appropriate strips work in step. (See Fig. 4.) The third cam should be set so that during the "on" position of the set the strip is resting on the contact for only half the time.

An Important Point

It is essential that all contacts should be good. Mercury contacts, however, are not advocated. Insulation, too, must be of the highest order, especially where mains are concerned.

To operate the set from the distant point it is only necessary to depress the push-button for a few seconds at a time until the required station is received. Further depressing will switch the set off. Volume can be altered by rotating the knob of the volume control.

WITH MAINS H.T.

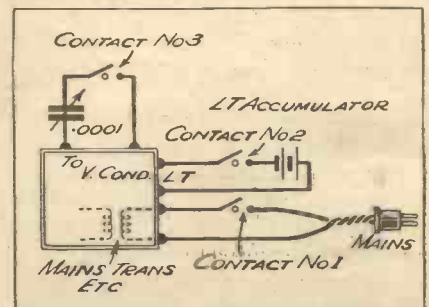


Fig. 4. How the contacts are arranged when the receiver has mains H.T.

If desired more condensers and contacts can be arranged, in order to select more stations. In this case, the cams should be of larger size, and the motor geared down further, otherwise the required station might be easily "overshot."

The POWER They Use

BY VICTOR KING

POWER is a fascinating thing, fascinating in both its extremes of greatness and smallness. How many "baby" car engines would be needed to develop the power of the "Queen Mary"? What is the "horse power" of a gnat in comparison with its weight?

I don't know much about aviation, but I remember that some years ago an ideal designers of aero engines were working towards was to create an engine which would produce one horse power for every pound of weight.

Interesting Radio Aspects

Whether or not this has yet been done I do not know, but there are some equally interesting aspects of power to be encountered in radio, and about that subject I have, as government officials say, some information!

For instance, I have it on the authority of the B.B.C. that the power house at the new Droitwich transmitter can develop three thousand horse power.

On the route between the power house and the aerial a considerable amount of power falls by the way-side. Every time a resistance has to be traversed power is used up. Still, even although the power house doesn't have to go all out and there are outgoings of energy here and there, Droitwich can push out into the ether a very respectable one hundred and fifty kilowatts.

The kilowatt is of course the unit of electrical power and very roughly corresponds with one and a quarter horse-power of mechanical power.

But how much of that one hundred and fifty kilowatts, which is about equal to the power used by a small aeroplane, is the individual listener likely to collect on his aerial?

Quite Easily Measured

Yes, it can be measured quite easily. All you have to do is to use a couple of quite ordinary measuring instruments. I calculated the power absorbed from

Do you know how much power your aerial picks up from Droitwich? Or the amount you obtain from your loudspeaker? . . . You'll probably get quite a big surprise from this article.



the Droitwich transmission by my aerial and I make it approximately one fifty thousandth part of a watt.

Which means that of the total power radiated by Droitwich, assuming it operated at its rated maximum, my share is a beggarly one seven-thousand-five hundred-millionth part. Which isn't a lot to get for ten shillings a year!

Magnifying the Input

But what about my own wireless receiving equipment? The output of this is six watts. Its input, from Droitwich, is as I have said, a fifty-

times. This is a rather crude way of putting it, but that is in effect what happened.

But this magnification has not been obtained free gratis and for nothing. Plenty of power has been expended by the set in the course of building up that six watts output.

Sixty Watts Needed!

Take the last valve alone, that valve in which and by which that six watts are finally accumulated. It has an anode voltage of four hundred and the anode current is just over sixty milliamperes. Here then is an expenditure of twenty-four watts.

There is the heater power to add to that. This is a matter of eight watts. So a total of thirty-two watts is spent by the valve. Seventeen watts go west in the other valves in the set, therefore we have a grand total of about sixty watts all used up to turn a fifty thousandth of a watt of aerial power into about a tenth of a watt of air vibration power.

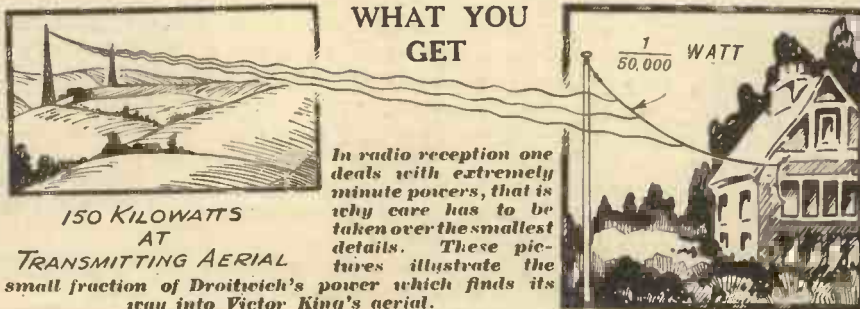
Now the point to observe, my practically minded friends, is that this consumption of power is quite unavoidable. One of these days we may be able to buy valves which will amplify without

consuming power. I doubt it. In any case I have often wondered whether it is worth while striving to such an end.

Is the "Cold Valve" Worth While?

You have probably guessed that I am referring to the search for the "cold valve." This is a kind of philosopher's stone of radio. The search had real point in the early days of radio.

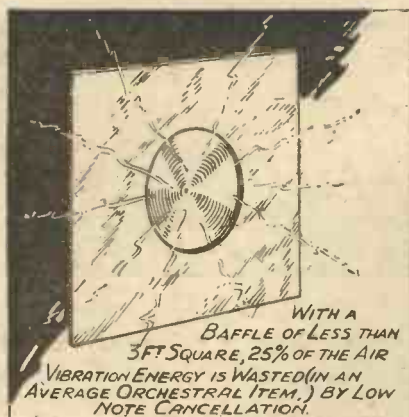
Then the majority of wireless sets used batteries and the valves of the time were such current eaters that the days of the listener were very frequently punctuated by visits to the



thousandth of a watt. The loudspeaker has six watts handed to it and so there has apparently been a three hundred thousand magnification.

Yet there is a snag. My loudspeaker gets six watts handed to it but the magnification has well and truly finished because at this point, the last link in the chain as it were, we slip right back. The loudspeaker, though quite efficient (save the word!) is able only to transform about two per cent. of that power into air vibrations.

Now we have seen that the radio outfit magnified the received power to the tune of three hundred thousand



In order to obtain the full low-note response it is necessary to use a large baffle.

accumulator charging station and the shops where H.T. batteries were sold (at extortionate prices).

But what is the total power consumed by the average modern mains set? Supposing it is as much as sixty watts. Well, that is no more power than is eaten by one ordinary electric light bulb. And if the current is taken from the power mains the cost is less than that of lighting current.

A Farthing an Hour!

It might amount to as much as one farthing an hour! Who wants to devote a lifetime in search of a valve which will save three farthings a day during only those days when the radio set is used quite a lot?

It is true that power consumption still is of vital consideration where battery sets are obligatory, even though modern battery sets are relatively economical. L.T. charges do not amount to much, but the H.T., even when current saving stunts such as Q.P.P. and metal rectifier economisers are employed, is still a disagreeable item on the year's budget.

Power mains for all would, however, seem to be the more sensible ideal for which to strive.

As a matter of fact I am straying rather from the subject I had in mind. This is rather the waste of power than the incidental use of it in the various receiving processes.

Loudspeaker Baffles

One of the most serious aspects of power wastage which occurs to my mind, and one which seems to have had all too little attention devoted to it is the waste of power by a loudspeaker. I don't mean by its inherent inefficiency as a converter of electrical energy into air vibrations, but by the inefficient use of the principle.

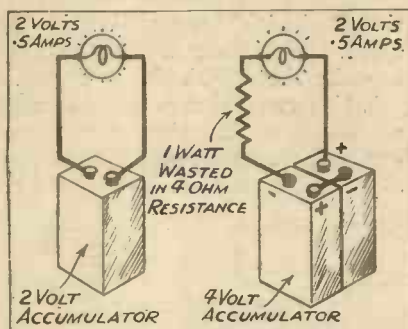
Many a fine set has its fine output wasted in the desert air of the im-

mediate vicinity of the loudspeaker's diaphragm.

The waste occurs in the loss of bass because of the absence of good baffling. Baffling seems to have gone out of fashion. I wonder why? We used to make such a lot of it at one time. I still do. You simply cannot get low notes away from a small cabinet. Even a large cabinet needs special design if you are to get anything much below one hundred and twenty cycles.

You know what happens, I suppose? The high notes tend to come straight off the diaphragm like a beam of light, but the low notes spread out sideways and round towards the back of the speaker. That is, unless you use a baffle to stop them.

WASTED POWER



Both these schemes will give the same light, but the right-hand one will use up twice the power of the other.

If they are allowed to get round they meet their counterparts coming from the back of the speaker and there is a cancellation. Yes, there are strong arguments in favour of having loudspeakers built into walls of houses!

A baffle of under three foot square is not adequate. I use one of six foot square. It nearly fills the side of a room. It doesn't look too good, but it does deliver the goods.

Output and Local Listening

Here's another example of power wastage. A listener builds or buys an outfit capable of delivering a three, four or more watts output in which there are umpteen valves or perhaps, a compact team of expensive treble-duty valves and he uses that outfit for nothing but a quiet spot of music or well-turned-down play-stuff and speech on the two local programmes.

He'd get all he wanted with a simple pair of valves costing only a fraction to buy and a fraction to run. It's like buying a full-sized steam roller to roll the garden path!

Mind you, I'm always in favour of wide margins. There are two very wrong ideas about radio sets. One is

that if a set is rated with an output of, say, three watts, that is the output you are bound to have.

The other is that the rated output of a set is reached all the time it is working.

No WIRELESS reader will, I hope, contribute to the first error, but the second one can be forgiven even to those who ought to know quite a bit about radio.

Avoiding Overloading

I like a set which is capable of delivering three or four watts to be working at a level where the peaks are well below the maximum. And that doesn't allow a loudness of very considerable dimensions. Call it a "moderate room strength," if you like.

For "loud room strength" I want six or seven watts, then I know that there is plenty of margin for the development of good bass without overloading. Actually, I don't run my sets at "loud room strength," and I don't suppose all but a very few others do, and I imagine that most of those few are people with little sets trying to make big noises!

ROUND THE DIALS

A review of the present reception conditions on the broadcast wavebands.

IF we exclude Droitwich, the most-talked-of station during the past few weeks has been Radio Normandie. At this time last year he was one of Britain's favourite foreigners; but now many listeners complain that he has disappeared altogether, or the programme is not strong enough to be enjoyed.

This is not the fault of the set, or anything remediable, but is due to the fact that the limit of power at Fécamp is now 10 kws.

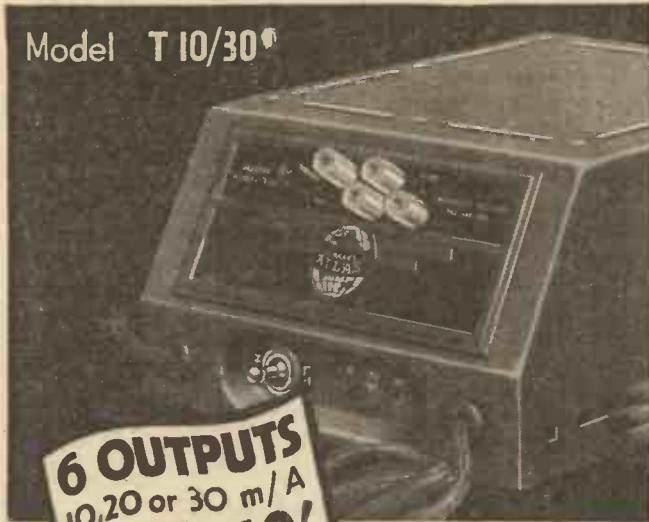
At the lower end of the medium-wave dial there is really very little to be hoped for in the way of long-distance reception, Radio Normandie, Trieste and Frankfurt being the only stations below the West and London Nationals with any pretensions to other than low power. But from 261.1 metres right up to the top of the medium waves there is a high-powered station at every few degrees on the dial.

An interesting newcomer to tune for is Madona No. 2, the Latvian station now using 50 kws. on 271.7 metres.

(Please turn to page 48)

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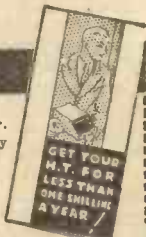
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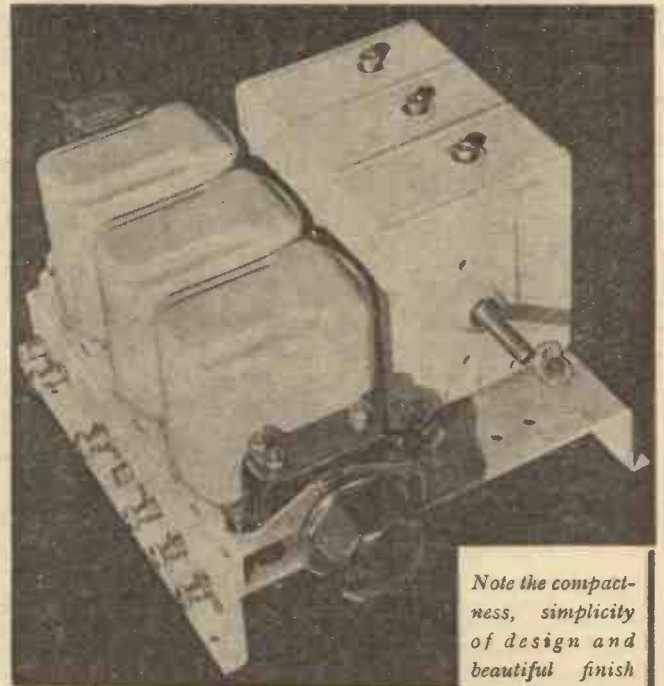
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A Vast Selection

At a moment's notice practically any selection of music can be chosen and played from this magnificent library, while should it be desired to broadcast the voice of Caruso, of Melba, of Stanley Holloway or the Western Brothers, the library holds it there in safe keeping.

But the great array of black discs in their card envelopes is not the only wonder that is contained within the libraries of the B.B.C. In another series of rooms there are vast collections of orchestral music, thirteen thousand items or so, of dance music, piano and violin items, organ pieces, some eight or nine thousand songs, and nearing a hundred thousand vocal scores! The twelve years of life of the B.B.C. have not been wasted by the librarians who from a tiny collection of more or less odd items piled in a corner have built up a vast and priceless storehouse of reference.

Eight Thousand Plays!

There is a third library; smaller but none the less important. It contains something like eight thousand plays collected during the last eight years from those considered suitable for broadcasting. They have not all been "on the air," however, and are being kept ready for inclusion in any desired programme.

This huge assembly of plays is not by any means comparable with the number of plays that are submitted,

for every week a hundred or so are rejected and returned to disappointed would-be playwrights.

But don't let that fact discourage you if you feel that you know what is wanted in the way of radio play material. The B.B.C. is always ready to consider plays submitted, and you might be one of the fortunate authors to have their work accepted. But don't make your play too long, and keep the number of characters down, at the same time arranging as far as possible such variety in the characterisation that the different voices are readily distinguishable over the air.

By the way, when submitting a play for broadcasting do not accompany it with a whole list of author's directions. And specially avoid the not unknown peremptory request that it should be performed *the same evening!*

RADIO ON THE ROAD

GRADUALLY car radio is growing in popularity, though the growth has not been so rapid as was expected by many. From a rather small, insignificant start at last year's motor show radio has pushed itself to the fore to the extent that over thirty vehicles at the show exhibited radio fitted as either standard or an extra.

The Philco company have forged ahead, and twenty-three stands at Olympia showed Philco car radio sets in situ. Among the cars fitting these sets are Austin, Standard, Singer, Vauxhall, Humber, and Hillman.

An Output of Five Watts

One model Philco gives an output of 5 watts via a Class B stage, and is designed for limousine work where a separate speaker is required, or for passenger coaches. This set is a seven-valver using multi-purpose valves, and it costs 24 guineas.

The Ekco Co. have also entered the motor market very seriously, and at the recent show two Rolls-Royces, a Humber Snipe, and a Vauxhall were shown fitted with the



Filing a new arrival among the accepted plays in the B.B.C. library.

4-watt receiver that is produced by this well-known firm.

Of course, caravans and boats showed radio fittings, but car radio has not caught on so generally as it should. Perhaps the slow growth is an advantage, for it will certainly mean that by the time it becomes a standard fitting or standard extra on practically all cars the technical snags will all have been erased—as they have in the cases that are so far on the market. It does not look, however, as if more than four or five manufacturers are going to interest themselves in the problem of providing music for those on the road.

A Pleasant Companion

There is bound to be a fairly wide difference of opinion among motorists until car radio has fully proved its worth. In most cases, of course, it is not the necessity which home radio is considered by millions to-day, but it is a very pleasant companion; and, though I do not care for it to be "on" while driving, it is certainly a boon at picnics and other times where a little diversion is required.

Car radio is not difficult to fit, though in most cases it is a job for the qualified engineer, and not one that can successfully be accomplished at home.

Easy to Install

Should it be desired to be fitted at home, then one of the easiest to install is the Lissen—a six-valve Class B receiver that fits completely under the floorboards if desired being contained in a metal weatherproof box.

The control is carried out by Bowden cable from a small fitting on the steering column, while the loudspeaker can be situated in any convenient part of the vehicle. A popular place is under the fascia board.

There are two models of Lissen car radio available, at 16 and 20 guineas, for battery or generator power supply. It is certainly a set that any motorist who is considering car radio should investigate. K.D.R.

Questions I am Asked

Q. 111. My H.T. battery runs down apparently, even when the set is switched off? How is this? I have made certain that the filaments are switched off by disconnecting the accumulator.

A. A likely cause of trouble is a leaky decoupling condenser. These sometimes are sold leaky (may their manufacturer's soul have no peace). Several in parallel can produce quite a considerable steady drain on an H.T. battery. Taking out all the positive H.T. plugs is, of course, the safest way of switching off a set, in addition to disconnecting the L.T.

Q. 112: How can I bring the S.T.400 up-to-date? It has given very good results, but I find Droitwich is a definite trouble these days. Would a wave-trap help?

A. I think your best move is to build the S.T.600, which now replaces the S.T.400. It is described in "Popular Wireless," dated Oct. 27th, and is my autumn "Star" set.

The ordinary wave-trap has dropped out of use because it was inefficient and badly designed, and was used with the wrong type of circuit. It affected tuning and was itself affected. Moreover, it was invariably used in circuits possessing poor selectivity in themselves and, of course, it does nothing to improve such selectivity.

The S.T.400 circuit is unsuitable for use, in any case, in connection with a wave-trap. At any rate, that is my experience. All wave-traps hitherto used spread their effect on to adjacent stations which are consequently weakened or wiped out.

Q. 113. I can receive the local station without an aerial. Is this unusual or to be regarded as a sign of efficiency?

A. It shows the set is sensitive but a far more important question is: "What other stations can you get?" The mere reception of the local may even be a criticism of the set since direct pick-up may be a cause of interference. For example, an unscreened coil in the anode circuit of an H.F. valve may pick up the "local" direct and thus the "local" evades the sifting process.



The questions dealt with on this page are a selection from those raised by readers, and are chosen because of their general interest. The answers are written in the easy-to-follow manner for which our popular contributor is world renowned.

The S.T.600—my new set—will easily pick up 30 stations at full loud-speaker volume, and still retain its selectivity. The signals are actually picked up by wire (65), a wire inside the set, going to the aerial terminal. So enormous is the sensitivity of the S.T.600 that this tiny aerial will receive scores of foreign stations from Fécamp at the bottom of the medium waves to Huizen at the top of the long waves.

Q. 114. I find when tuning to some stations that they appear twice on the dial. My set is a two-gang three-valve job. How can I stop the effect?

A. The effect may be due to overloading a leaky grid detector valve. Such a detector becomes less sensitive when the H.F. applied to it exceeds a certain amount. This means that a strong signal will produce a weaker sound than a signal which is not so strong. When tuning-in to a strong local station, the H.F. input to the detector rises to a maximum and then falls off. When the set is correctly tuned, the actual sounds heard from the loudspeaker are weaker than the

sounds to each side of the H.F. maximum point. The result is a "double-hump" signal.

To get a single "hump," or maximum tuning point, the H.F. input to the detector must be reduced, e.g. by increasing the negative bias on a variable-mu H.F. amplifier valve.

The double-hump, or two tuning points is also experienced sometimes when the two circuits are not properly ganged. As one circuit comes into tune with the desired station, the signal is heard, and then as the gang condenser knob is turned the other circuit tunes in to the desired station which is thus heard at another point on the dial.

The remedy, of course, in this case, is to gang the circuits properly.

Q. 115. How can I tell when overloading occurs on the last valve?

A. If you cannot hear the distortion due to feeding too much L.F. to the grid of the last valve, connect a milliammeter in the anode circuit. Theoretically (unless Class B, Q.P.P., etc., is used), the anode current should remain steady. In practice you will get slight kicks of the milliammeter on strong signals. The overloading may cause the grid to become momentarily positive during positive half-cycles of the input L.F. currents. To test for this, a microammeter (reading up to, say, 100 microamperes) may be included in the grid circuit of the last valve. No current will pass through the microammeter unless the L.F. input is excessive. Having controlled this, you can check up on the anode circuit milliammeter to see if there is any distortion due to curvature of (or over-running) the anode current curve.

Q. 116. Is S.T.600 your autumn set or have you anything for "Wireless" readers? Why have you changed over papers? And why was there no Armchair last month?

A.—The S.T.600 is my autumn set and will be the only set in its class for two years at least. All S.T.400 owners are strongly recommended to build it; many readers letters corroborate its greater performance. No "Armchair" because was never in it. Hope readers will build my sets wherever published.



SHORT WAVE NOTES

Below our contributor shows how easy it is to lose efficiency on the short waves by not using the most effective layout. Layout is very often the secret of success, and frequently accounts for the marked difference in the results given by two receivers each employing the same basic circuit.

THE first thing to remember regarding short waves is that short-wave work does not imply the complete scrapping of all existing apparatus and ideas, but is simply a logical development of ordinary radio technique.

Before I start going into the matter of circuits, there is one big difference between medium waves and short waves that must be emphasised. In these days, on the average medium-wave broadcasting station, a stage of screened-grid H.F. before the detector will usually give a far greater gain than a stage of L.F. after it.

On short waves this is not the case. For one thing, it is a matter of extreme difficulty to get a really high degree

By W. L. S.

channels, whereas on short waves that trouble will very seldom appear.

Thus, in this talk on short-wave circuits, I am going to leave H.F. amplifiers entirely alone and confine myself to detector circuits and their layout. The three diagrams illustrating this article tell their own story.

Fig. 1 shows the theoretical circuit that we have chosen for our detector. Fig. 2 shows it laid out in baseboard fashion in a way that almost certainly will give extremely poor results.

Where the Faults Lie

Fig. 3 shows an altered layout that should give excellent results. What I want to do is to enlarge upon the difference between Figs. 2 and 3 and explain why Fig. 2 is a nasty business.

Mind you, our imaginary constructor who put the Fig. 2 layout together might have made many more mistakes. He wasn't a complete ignoramus—for instance, he has the moving plates of each condenser earthed.

The most glaring fault is the tremendous length of wire from the grid condenser to the grid coil—a fatal error. Also, the lead from the fixed plates of the tuning condenser should go straight to the terminal on the grid

coil, instead of which he had taken it round to the grid condenser and left it to join the other wire.

But now try to trace the wire from the moving plates of the condenser to the "earthed" side of the grid coil. Along to the reaction condenser moving plates, then to the L.T. switch, through that, all round the baseboard to the L.T. — terminal, along to the earth terminal and then to the coil.

That one length of wire probably has as much inductance as the entire coil that he plugs in when he vainly hopes to receive something on 20 metres!

Long Reaction Lead

Then consider the wire from the reaction coil. It has got to be fairly long, admittedly, to reach the reaction condenser, but he has placed his H.F. choke so that the lead from the reaction condenser to that component—a "live" lead—is very long.

The bit on the other side (between the H.F. choke and the 'phone ter-

A POOR LAYOUT

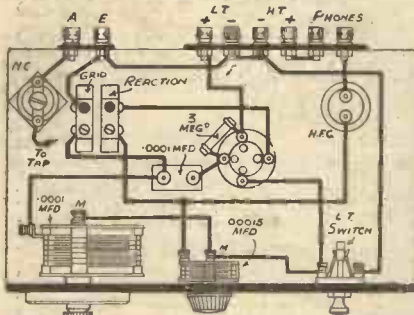


Fig. 2. One bad fault in this practical layout of the Fig. 1 circuit is the long lead from the .0001-mfd. tuning condenser to the grid coil holder. Also note the round-about way of joining the moving vanes of the condensers to earth.

of magnification from an H.F. stage below 30 metres; for another, we are not contending with really weak signals, but rather with signals that are nearly swamped in the general mush-level.

The H.F. Stage

H.F. can be made to do quite a lot in experienced hands, but the chief reason for its employment—to wit, selectivity—is, as yet, practically absent. One can obtain a much higher degree of selectivity (comparatively speaking) from a plain detector on short waves than one can on the medium broadcast band.

What I am getting at is this—that on the medium waves a detector only will be unsatisfactory on many stations because of interference from adjacent

THE BASIC CIRCUIT

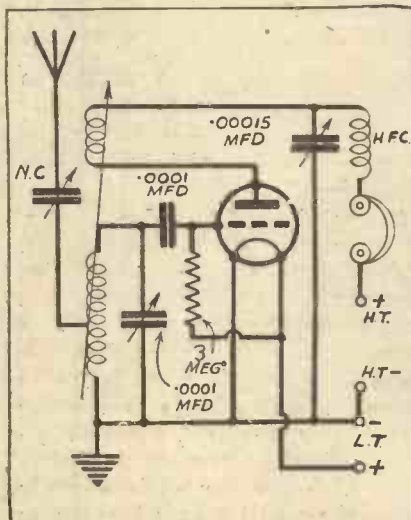


Fig. 1. The circuit of an efficient short-wave single-valver.

THE CORRECT METHOD

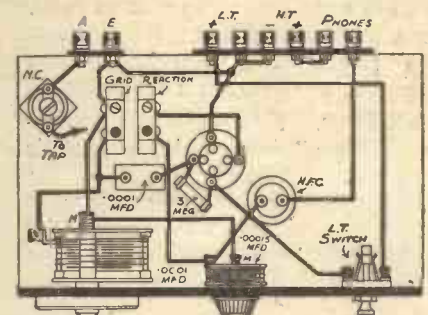


Fig. 3. In this case the vital leads are kept as short as possible, giving an infinitely better layout than that in Fig. 2.

minals) doesn't matter nearly so much. That is—or should be—"dead."

I haven't been exaggerating the sort of things I have found in short-wave sets, either. I regret to make the statement, but Fig. 2 does represent the kind of layout that one meets all too frequently.

A Better System

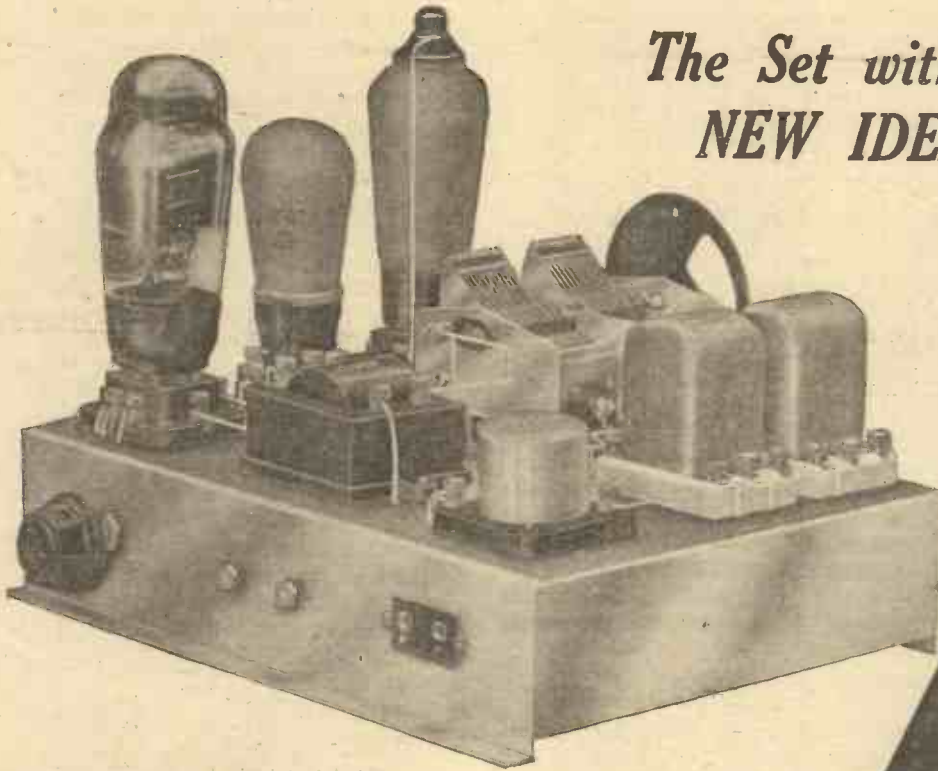
So far this has all been destructive criticism. Now turn to Fig. 3 and see how to get over some of the troubles. This doesn't represent an ideal layout by any means, but it is the sort of thing that anyone could arrange quite easily, and is, of course, vastly better than that of Fig. 2.

The coil holders and valve holder have been moved nearer together, so that the long grid and plate leads are avoided. Both sides of the grid coil are taken by direct and fairly

(Please turn to page 49)

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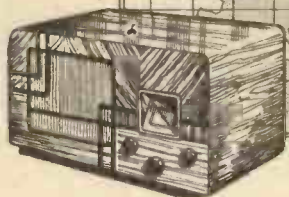
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"RAIDER"

IMPROVING YOUR SET



Some useful advice for obtaining first-class quality from your receiver.

By **FREDERICK LEWIS.**

THERE IS SO MUCH in a radio receiver that can be "wrong," not completely out of order, perhaps, but just "wrong" enough to spoil the results, that in attempting to give you some quality hints this month I hardly know where to begin.

Perhaps it is best to commence at the end where the quality, or lack of it, is heard. That is, at the loudspeaker.

The Loudspeaker

What can be wrong here? Well, first of all the design of the speaker. Your choice is naturally governed by price to a large extent, but let me give you two hints in choosing a speaker. One is to use a mains driven model if you can—the transients are usually better, and the second is to choose your speaker after you have built

job to hear as many different sets and speakers as I can during the course of the year and I have long given up any idea of imagining that I have heard finality in speaker design. The loudspeaker I prefer best to-day may be superseded—perhaps by a model from the same stable—next year.

Look what W.B. have done with their permanent-magnet speakers. They set out to beat their last year's "Microlode" and the "Stentorian" is the result. Then Benjamin, with the new "Double Six" have improved on their already very good "Magna" models—a fine effort. If these speakers are beaten next year, it will be an amazing effort, but it is not impossible, though if no further progress is made by these two firms, for example, I do not think they need worry.

Modern Types are Best

But I divert. What I intended to infer was that you should up and hear the latest speakers on your set. You may do better than you are now.

Then, with your speaker chosen, make sure that it is properly matched to the receiver. This is not difficult with modern methods of multi-ratio transformers on the speakers, but set owners sometimes slip up.

Avoid overloading the set. If you place a milliammeter in the H.T. circuit of the last valve and the needle kicks up or down you are overloading. If it is a violent kicking, then the bias wants attention, though this fact does not absolve you from the overloading stigma. Here's the bias rule as shown by the milliammeter. Needle kicks up—bias down (valve needs less bias volts.) Needle down—bias up (increase the bias).

Nowadays there is no excuse for not knowing the bias and H.T. voltages and also the anode currents of the valves. Meters are so cheap—look at the "Pifco" ranges—that every set constructor should have one. The possession of meters is an invaluable aid to quality.

But what is the use of seeing that the speaker is good and the valves do not overload if the design of the set is such that the full range of frequencies which the speaker can handle are not fed to it. Modern speakers can carry a big input power and they will reproduce a pretty full musical scale in many instances.

So, make sure that your set is good enough for your speaker. Whatever the speaker the set should err on the side of too much, rather than too little "goodness."

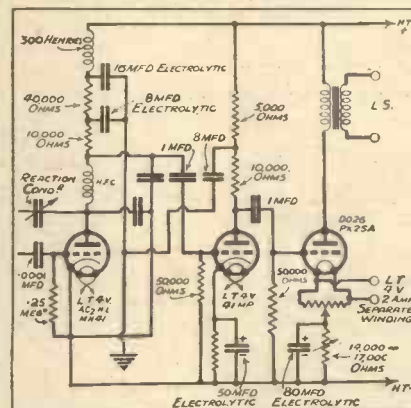
It is the L.F. side, of course, that counts most here, though the H.F. section must not be too "peaky" if high notes are not to be lost. A good band-pass single-valve H.F. stage followed by a good detector (power grid if possible) and a couple of resistance-coupled L.F. stages, is a good combination. With power grid, by the way, it is best to use a separate reaction valve if you want reaction.

The All-Mains Set

Naturally, the mains user has most chance of getting best quality, owing to the fact that he can use a good margin of power to avoid overloading troubles, but resistance-coupled, or shunt-fed transformer-coupled stages in battery sets can be used with effect, though naturally the output power is not very great when compared with what is possible in a mains circuit, such as that shown (L.F. side only) in the diagram.

This circuit, fed from a 400-volt supply, with full-wave rectification, is

FOR QUALITY RESULTS

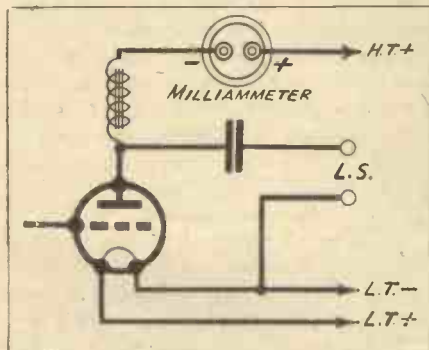


A suggested L.F. side for a high-quality mains-driven receiver. Note that R.C. coupling is used throughout.

capable of giving about 7 watts when fully loaded, and will give very fine amplification right down to 32 cycles. Note the detector de-coupling, which it is really required if complete stability is desired.

It is a circuit that I can thoroughly recommend.

WATCH THE METER



Showing the correct position for a milliammeter in the output-valve circuit to indicate distortion due to overloading.

your set and to hear it on the set before purchasing.

But because a bad speaker can spoil your reproduction don't make the mistake of blaming the speaker if quality is bad without making sure the set is O.K. Always try your speaker on a neighbour's set or at the dealers if there is any doubt.

And also, because you have had a good speaker for two years don't imagine you cannot now get one that will be even better. It is part of my

Teaching Flying by Radio



SCIENCE LENDS
A HELPING HAND
TO THOSE
LEARNING THE
ART OF SOARING

THAT wireless plays an important part in aviation is common knowledge; in fact, every airliner carries transmitting and receiving apparatus enabling it at any moment to communicate with the ground.

Particular importance, however, attaches to radio-telephony in the realm of soaring flight, where it constitutes an invaluable means of teaching the art.

He who wishes to learn ordinary flight does not require any such devices. Comfortably seated in a double-seater, with his instructor and a set of dual controls, he practises all the necessary manoeuvres. In fact, not until after quite a number of hours of such dual instruction will he be given leave to start on his first unaided flight.

Learning to Soar

Matters are altogether different in the case of soaring flight, where the beginner is called upon to show far more initiative, and after some preliminary instruction on the ground he sets off unaccompanied by an instructor for his first jumps and flights. The training is, as a matter of fact, so careful and cautious that personal injury is a rare exception, but breakage of material during the first soaring lessons is fairly frequent.

In order to remedy this state of affairs, the Telefunken people have provided special wireless transmitters and receivers for the teaching of soaring flight. By means of these the instructor is able instantly to draw the attention of his pupil soaring in the air, to errors and to

mistakes likely to prove dangerous. The soaring novice can in a similar manner be given many useful hints as to the wind and weather, thus greatly increasing his safety.

A Compact Set

The instructor uses a miniature transmitter communicating speech to a particularly light receiver fitted into the 'plane. It is a short-wave set which, in spite of its four valves, only weighs 6½ lb., and which, thanks to its special design, is safe against shocks and jars.

The airman uses for listening either a flying helmet and headphones or—particularly during his early tuition—a loudspeaker fitted into the 'plane, which, owing to the noiselessness of the flight, is perfectly understandable. The rudder cable of the airplane is used as an aerial, unless a wire about 6 metres long, stretched out below the wing or along the airplane body, is preferred.

This new training method has been tested out at gliding schools with the result that the danger of breakage has been considerably reduced, and the time of apprenticeship shortened. In many cases, pupils were helped out of difficult situations by timely wireless directions.

However, the use of wireless apparatus in connection with soaring flights is by no means confined to the training of novices. Inasmuch as motorless 'planes generally cruise over a limited area, airmen in such cases are deprived of the variety, which in the case of power flight keeps their attention continually awake.

Recently Tested in Germany

Wireless apparatus, however, should afford a welcome change of amusing airmen by musical and other broadcasting. Moreover, any hints as to changes of weather, local peculiarities in the configuration of the ground and other sources of danger, will prove useful to the experienced soarer, as well as to the novice.

Special wireless transmitters and receivers were tested at the recent motorless Flight Contest on the Wasserkuppe mountain (Roehn), when new possibilities for wireless in this branch of aviation were found.

Generally speaking, there was a marked improvement in all aspects of the meeting, wireless apparatus being used both in signalling to the airmen and in communicating from the 'planes with those controlling the contest.

On several summits surrounding the Wasserkuppe mountain there were transmitters for signalling to headquarters the accurate times

"HE'S COMING DOWN TO LAND"



An observation post at a motorless flying meeting in Germany. Note the cycle-type generator.

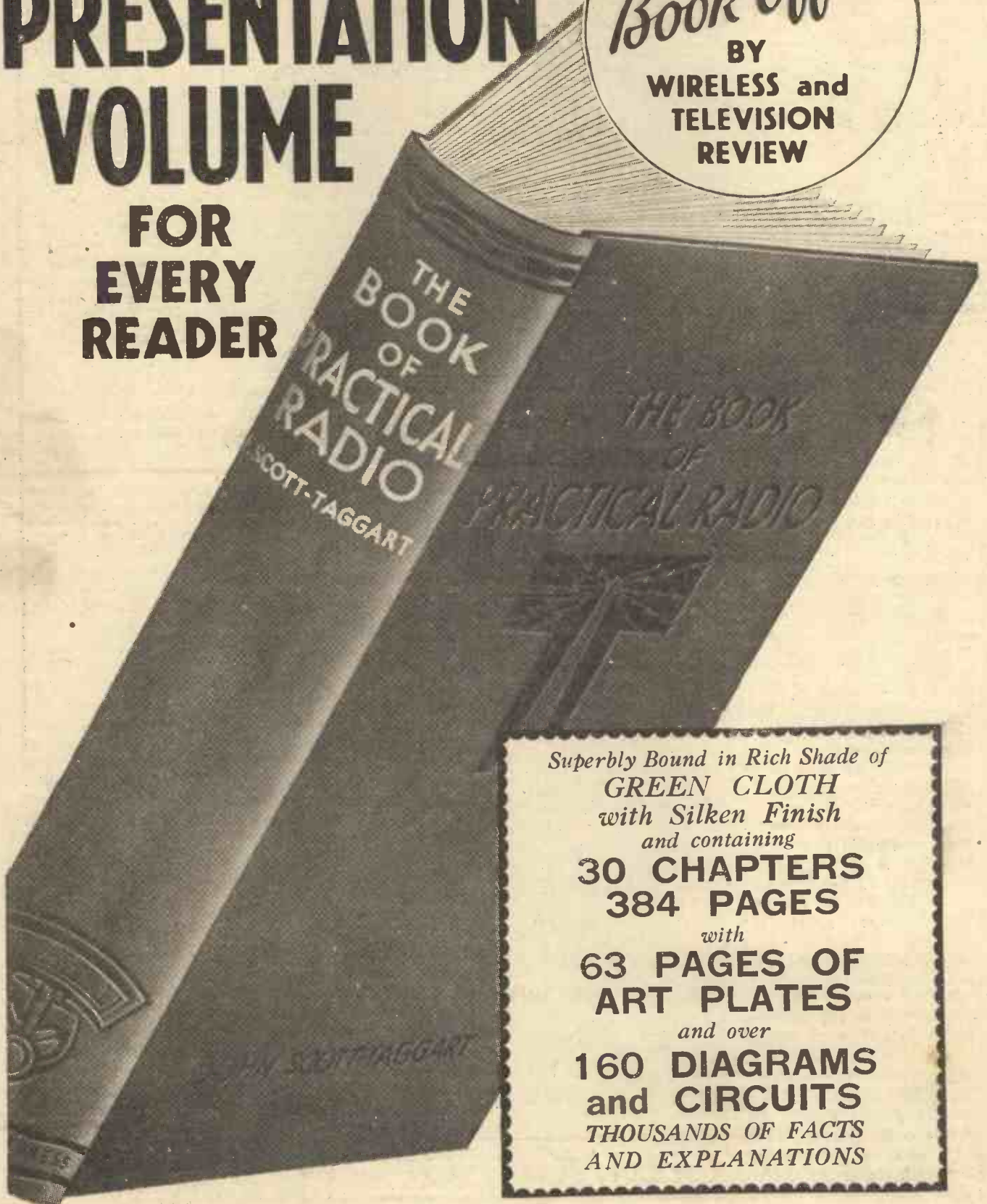
(Please turn to page 52)

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A RADIO CHANCE OF A LIFETIME

"ON THE OTHER SIDE"

Behind-the-microphone sketches of some of our well-known recording personalities.

EACH month I am going to give you some glimpses of the human side of the gramophone world. Details of new records are interesting, but news of the makers of these records, the unseen artists that entertain you, is far more fascinating, and it greatly aids one's appreciation of any gramophone item if something is known of its recorder.

So under different titles I hope to give on this page not only news about the latest gramophone records, but short pen pictures of recording stars and others who have recently come to the microphone.

Bing Crosby has long been a great favourite on record and film in this country; in America they get him on radio as well, and even now he is busily engaged with **Connie Boswell**—of the famous **Boswell Sisters**—in broadcasting in Hollywood.

Bing must be one of the highest paid male artists in the world, but in spite of his huge broadcast fees, his record royalties and his film contracts, Crosby is still an ordinary man. He has not been spoiled by the adulation that has been his, and his chief concern after "office hours" is to be left alone with his family. Though he has great wealth, he lives his life as an ordinary business man, without ostentation, no night life as might have been expected, just a wife and three children—and home.

Connie Boswell, whom we have already mentioned above, has also recently been doing quite a lot of recording (for Brunswick, like Bing) by herself, apart from the popular trio combination we know so well.

A Tireless Worker

Connie is a hard, tireless worker, sadly handicapped physically. She is crippled and has to be carried or wheeled in a chair. But, in spite of this, and thanks to her intensive musical training, she is able to

"arrange" practically all her accompaniments, and spends hours in perfecting her phrasing and moulding the scheme of her songs.

The subject of the photograph this month is another very popular recording artist and radio broadcaster—**Harry Roy**, whose climb to the top of the dance-band ladder has been sure, and whose arrival in stardom well deserved.

A Popular Broadcaster

Always enthusiastic, Harry Roy has invariably put all his energies into anything he may have decided to try. Here is a brief synopsis of his life.

On leaving school he threw up a

"JUST A SHORT NOTE . . ."



Harry Roy, the famous leader of the band now playing at the May Fair Hotel, has received a letter from a lady "fan." Each of the two pages measures thirty inches by twenty-two inches!

chance of working with his father (box making) and set out to find a job. Tried several and then joined his father's business, after all, war then intervened.

In 1919 his brother formed a dance band and gave Harry a clarinet to play with. This set on fire an unquenchable ambition to go in for dance music—it was the real birth of the famous Harry we know to-day.

He alternated between dance bands and his father's factory several times and eventually got going in a nightclub with a band. Four years later he appeared at the Café de Paris, and after that date he has never faltered in his steady climb. Now, of course, he is at the May Fair Hotel, whence his "Bugle

Call Rag" signature tune is so eagerly tuned for by thousands of radio fans.

And here are a few brief details of a star moving in a somewhat different firmament, though her rise to fame has been no less remarkable. Her name is **Miliza Korjus**, a 22-year-old German soprano who has suddenly illuminated the H.M.V. sky.

Miliza has recorded two very trying (technically, not actually) pieces, and yet she has never had a singing lesson in her life! Her sole acquaintance with music and the technique of singing has been gained from playing gramophone records of celebrated sopranos.

From an early age she has tried to imitate such stars as Galli Curci, Tetrizzini and Frieda Hempel, and in Germany they are already saying that she is the rightful successor for the mantles of those famous stars.

Of those who have recorded that ridiculous "hit," "Miss Otis Regrets"—the "sad" story of a young girl who had more than her fair share of adventure—is **Anona Winn**. She is to be heard on Regal Zonophone, and she has certainly done it very well.

But then, look at her versatility—she is a first-class mimic, a good soprano, a lyric writer, actress, dancer; she is a "high-kicker" and tap dancer, scenario writer, and horse-woman. She is an Australian and spends as much time as she can at Angmering, where she recuperates from her many strenuous tasks.

Incidentally, she manages to run a household as well, for **Anona Winn** is married, and she is an enthusiastic gardener, too! She certainly packs her life full!

K. D. R.

HAVE YOU HEARD THESE?

A Few Recent Records for Your Entertainment

DANCE NUMBERS

Where the Blue of the Night. Bing Crosby's signature tune re-recorded. (Bing at his best—if you like crooners. (Brunswick O1849.)

Say It. Connie Boswell. One of her best. (Brunswick O1865.)

With My Eyes Wide Open I'm Dreaming. Greta Keller, the Viennese microphone star, whose intimate style of singing is perfectly conveyed by this disc. (Decca F5203.)

Love in Bloom. Guy Lombardo and his band. One of the best recordings of this most haunting number. The band is as neat as ever. (Brunswick O1871.)

Ache in My Heart. Henry Hall and the B.B.C. Dance Orchestra. You've heard this played on the radio? Well, here it is in permanent form, just as good. (Col. CB784.) This has also been well recorded (H.M.V. B6521.) by Jack Jackson and his orchestra. Hear them both.

Isle of Capri. Ray Noble's Orchestra, excellently played. (H.M.V. B6519.) If you want a vocal solo of this haunting tune try Al Bowly's Decca recording. (F5188.)

(Please turn to page 52)

Wireless in Austria

AUSTRIA is a capital without a country. Three-quarters of her population live in Vienna, the luxury centre of the old Austrian Empire. And the heart of that magnificent city is the broadcasting station. For, whoever controls the radio has absolute power in a land depending upon the air for news of life and death.

When I was in Vienna a few weeks ago, tourists were pouring through the town as usual. The cafés and restaurants were crowded, the shops filled with expensive trifles in enamel, leather and carved metals. But every street leading to the broadcasting station, which had recently been occupied by Nazi rebels, was barricaded. Behind the steel mesh stood sentinels with fixed bayonets. Enormous notices: "Back! Or you will be shot!" provided a contrast to the peaceful appearance of college youths with cameras.

The First Point of Attack

When Social Democrats (comparable to our Socialist party) or Nazis (the National Socialists, so much more revolutionary in Austria than in Germany that they are apt to be considered as "reds") attempt to turn out the present Conservative Government, which represents only 20 to 30 per cent of the people, their first point of attack is what is generally known as "radio house."

Once in command of the transmitting station, the rebels can announce that a successful revolution has been effected and so encourage lukewarm supporters all through the country to come in on the winning side. It is a curious comment on modern conditions that the objective of every insurrection against unconstitutional government should be, not the Parliament or the Barracks, not the offices of Ministers or municipal authorities, but the gaunt building which habitually echoes to the sound of folk songs, or light opera.

*A vivid account
of present-day
conditions*

By
*Rosita
Forbes*

As soon as one leaves Vienna, one realises the reason for the countryside's dependence on air news. In Styria and Carinthia, centres of the National Socialist movement, youth has been swept off the village streets and out of the fields and woods, into concentration camps and prisons.

The newspapers are dumb. They are strictly censored and they arrive very late in the villages where house-to-house searches result in the arrest of anyone who possesses a photograph of Hitler, or a magazine containing a pro-Nazi article. Consequently, parents whose sympathies may be with the Government, but whose sons are behind the bars, with all the other young men who hope that a change of

national policy will bring them work, wages, and food, are obliged to listen hour after hour, until the air tells them whether their boys are alive or dead.

It was at Loeben that I first realised the peculiar attitude of the countryside. While filling up with petrol, an old man in charge of the pumps informed us that over a hundred youths had been arrested in the immediate neighbourhood.

"What's happened to them?" I asked.

"We heard on the wireless that two were condemned to death an hour ago in Vienna."

Subsequently, it seemed to me that every man and woman was waiting for the news that might come suddenly—without warning—on the air.

Awaiting the Announcement

We dined in the back parlour of a small restaurant. The walls were panelled and hung with heads of stags and boar. It was rather dark and the waiter, who was scarcely out of his teens, crept about, white-faced and sullen. Some officers could be seen eating quickly in the main room. All day the wireless had been turned on. The lilt of old-fashioned waltzes filled the air. Whenever the music changed, whenever there was a pause, the room grew tense. Even the stuffed heads of beasts appeared to stiffen into an attitude of expectation.

Suddenly, while the waiter bent over us with a plate of cream cakes, the music broke off in the middle of a bar. There was an incalculable period of silence while everybody held his breath. Into the stillness of the room came a voice, abrupt, clear and impersonal. It announced the sentences of a military court. Some were condemned to life imprisonment and others to execution. The waiter dropped his plate. Cream oozed out of the cakes. They lay pink and white on the floor. In the next room, more brightly lighted, the



THE GAY CITY. Vienna, the luxury centre of the old Austrian Empire, is noted among other things for its world-famous Opera House, which you see here.

officers leaned together, talking rapidly.

With a crash, like splintered metal, music burst out of the loudspeaker. The air was filled with song. One could no longer hear one's own thoughts, no longer visualise the young men, foolish in their courage, pale in spite of their determination to appear unmoved, marching across a hostile court-room to pay the tribute of a handshake to equally youthful comrades faced with the gallows.

The Radio Always On

The same sort of thing was happening all over Austria. No doubt talks on such diverse subjects as agriculture, literature, and housekeeping form part of the wireless programme but, to me, the Austrian air will always be connected with light music, interrupted by the sentences of courts martial.

It happened that I was staying in a country-house in the Tyrol, while the festival was in full swing at Salzburg. From that charming and hospitable villa, freshly white-washed, with gay green shutters and window-boxes full of flowers, I carried away an impression of perpetual music. The radio was always on, but it seemed

clash between Heimwehr and Nazis a few miles down the road, when a motor-bus was stopped by tree-trunks piled across the road, and five of its passengers slaughtered before the rest fought free of the ambush.

I remember, in the middle of all the music, an old man, thin and crumpled, who used to stand in front of the radio cabinet, with his hands behind his back and his head bent forward in the attitude of a bird of prey. He never moved. He just listened. And, at last, it came! The song of gaily-dressed peasants dancing for the benefit of tourists travestied in Tyrolean hats and embroidered jackets, drinking coffee on a terrace above the river at Salzburg, ended in a screech. There was a spluttering of atmospherics, and then the impersonal voice erasing names from the roll of the living.

A Divided Country

A stain of red dyed the old man's cheeks. His hands gripped and clenched as he heard the vengeance he'd dreamed of translated into cold fact. But it wasn't enough! Three men were to die. How could three unknown men make up to him for the loss of an only son? He would have

has no chance of gaining legally by a free election—now the broadcasting station in Vienna takes the place of the keep of a mediæval castle. An aerial is the flagstaff of a beleaguered Government. And the first insurgent to win access to the closely guarded microphone, hauls down the standard of the Vaterlandische Front!*

* The Fatherland Front, an anti-Nazi organisation consisting of Government supporters.

THE WORLD WAR

A Splendid New Weekly Publication

TWENTY years ago the world was swept into the greatest and most catastrophic of all wars. THE WORLD WAR is the title of a new weekly part publication which comes now to make plain to the readers of to-day the events that led up to that war, to describe the main events of the war in every sphere, on land, at sea and in the air, to picture scenes and events of interest in every place in which war was waged, to tell for those who fought, for those who waited at home and to generations then unborn, the whole story of the gigantic conflict that plunged the world into chaos.

Of Interest to All

THE WORLD WAR is a book that will form a vivid and long-enduring record of those tense, dramatic years from 1914 to 1918, when the destinies of nations and the fate of civilization were in the melting pot. As a record of events alone, it should be read by every man and woman in whose life the war will always be the one never-to-be-forgotten experience. There is not a single one of us on whom the events of the war years has not had some influence.

Only 7d. per week, this splendid book is beautifully printed and illustrated on a scale hitherto believed impossible in a publication sold at such a modest price. The war archives of the nations have been searched for illustrations, and many of the photographs appearing in this work have never been seen in print before.

A Striking Article

Mr. H. G. Wells contributes to Part 1, now on sale, a remarkable article on "The War Twenty Years After," in which the great author reviews his impressions of two famous articles he wrote on the outbreak of war in 1914 and his reactions to the possibilities of war in the future.

A TYPICAL SCENE IN VIENNA



POLITICS AGAIN! Continued interruptions in the musical programmes are made to broadcast political news and government propaganda. Here is an open air political meeting in progress—with the inevitable microphone.

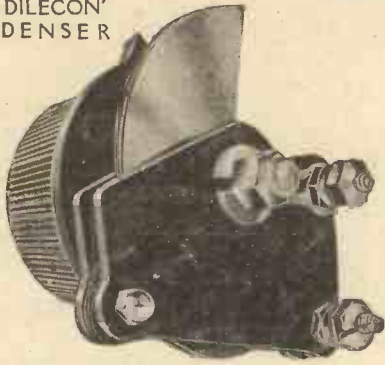
to me that even those who listened most eagerly to Mozart and Strauss, strained their ears beyond the Spielhaus at Salzburg.

Already the rumour of a royal engagement was in the air. But a youthful relative of the house, himself engaged, had just been killed in a

liked to have gone on listening—all night—to an unending death-roll!

So, in hope or fear, Austria waited for news. And now with revolt of one kind or another imminent, since the country is divided in a line between the forties and the twenties, and youth is determined to win by force what it

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"COME in, my dear fellow, come in," called the Professor genially to Tootle. "You're just in time to hear something of the wonderful new set that my friend Wayfarer and I have evolved for the benefit of readers of WIRELESS. If I may say so without undue immodesty,

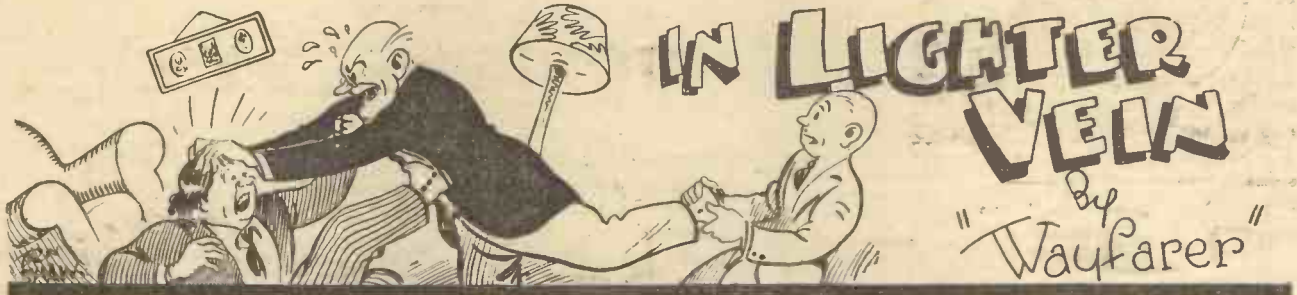
his clutching hands from the mazes of Tootle's back hair.

"There, there," I said, holding them firmly at arm's length. "Let dogs delight to bark and bite and all that sort of thing. I'm sure Tootle had no intention of being insulting. Had you, Tootle?"

sitting up and beginning to take notice.

"Look here," I said, "if you don't recover at once what you'll get is water and lots of it."

Shuddering slightly, Professor Goop and Tootle struggled to their feet and sank into armchairs.



it is quite the finest thing ever turned out by a radio set designer. Presently I'll show you our advance model so that you can judge for yourself."

"Steel chassis, I presume?" queried Tootle.

An Argument Ensues

The Professor bent down and removed one of his elastic-sided boots. Then, rising to his full height, he glared at Tootle, a monument of offended dignity.

"Wayfarer and I," he hissed, "may occasionally have borrowed here a valve, there a transformer; in moments of absent-mindedness we may have slipped accumulators or loudspeakers into our hare pockets. In the sacred name of Science we may now and then have relieved others of apparatus that they were not fit to own. But to the man who dares to use the word steal in my presence I have but one thing to say, and that is—TAKE THAT!"

The boot hurtled through the air, catching Tootle fairly on the ear, and the next moment the argument was well under way.

Things Calm Down

I left them to it for a little while, but when a bookcase had crashed on to a rack of valves and a large armchair had been pushed through the window, it occurred to me that matters had gone far enough. I therefore removed the Professor's bootless foot from between Tootle's jaws and disentangled

"Of course I hadn't," said Tootle. "I wouldn't offend the Professor for worlds, but when the doddering old goat has such a guilty conscience that he flinches when one talks of a perfectly ordinary metal, all I can say is that he jolly well deserves all that's coming to him."

"You lop-eared, cross-eyed son of a warthog," bellowed the Professor, struggling to get at him again.

"Come, come," I said, as I banged

AMAZING NEW GOOP-WAYFARER SET

One Knob Tuning All Batteries Eliminated. Illuminated Dial. Running Costs Negligible. Can Receive Every Station in Europe.

their heads together. "Kiss and be friends."

I laid them side by side upon the hearthrug to recover consciousness, and whilst they were doing so I collected no less than 14s. 9½d. that had fallen from their pockets during the struggle. Only the other day some johnny pointed out in a topical talk that it's the neutrals who always really win wars.

For some time they lay motionless, then "Brandy" moaned the Professor in a weak voice.

"Double!" gasped Tootle.

"Re-double!" cried the Professor,

They were rather sorry sights since each of them had a perfect peach of a black eye. Always equal to any emergency, I dashed off to the larder in search of the correct first-aid. No steak was to be found, but I discovered a large hunk of bacon from which I cut two generous slabs.

Mrs. Goop Objects

I couldn't come across any bandages, but foraging round I hit upon what I took to be an old overall of Mrs. Goop's. It was a silky kind of affair, all covered with flowers and things, and it was so difficult to tear into strips that I had used up most of it before I got two decent bandages.

Returning to the den, I bound the bacon over the warriors' black eyes and then suggested that we should adjourn to the Wireless Club, there to divulge particulars of the great set to the members who were sure to be assembled at that time.

We were debating whether we should walk down or borrow Miss Worples' car when the door was burst open by Mrs. Goop, purple in the face and holding in her hands a mass of rags and tatters.

We Go to the Club

"Who," she bellowed, "has been tearing up my new evening dress?"

The french window was open: I slid through it.

"Meet you at the Wireless Club," I smiled as I left.





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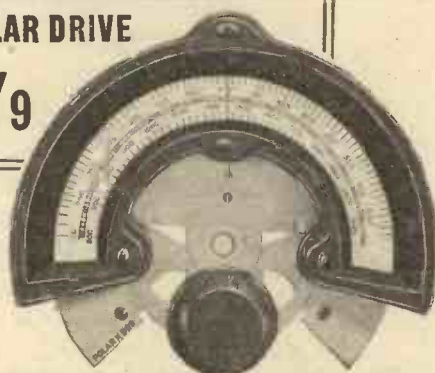
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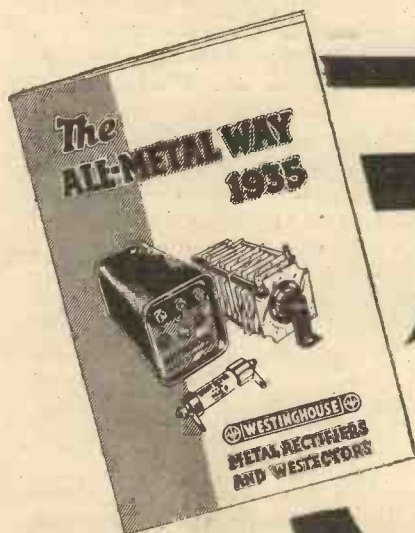
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47/6
(7 in. Cone).

It must have been nearly an hour later when the Professor and Tootle turned up. Professor Goop, who seemed to have suffered from what our American cousins term a bust on the snout, was leading Tootle, both of whose eyes were now completely closed up.

"Have you been at it again?" I inquired, more in sorrow than in anger.

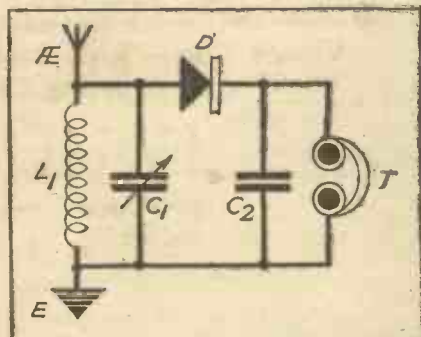
"No," groaned Tootle, "we haven't been fighting; we've been fought. Give Mrs. Goop a rolling pin and she would knock out Carnera. But look here, young Wayfarer, when I can see again—"

The System Praised

"Tush, tush," I said. "Let bygones be have-beens. Here's the club waiting to hear about our wonder set. I can see that the Professor is in no fit state to do the talking so I'll do it instead."

I will not set down in full those words of mine which left the Mudbury Wallow Wireless Club gasping with amazement. Instead, I will give you just a précis, digest, or synopsis of the particulars of that astounding apparatus, the Goop-Wayfarer No. 4004, about which the whole world of wireless folk will soon be talking.

SINGLE-KNOB TUNING



"Since there is but a single tuning condenser a vast amount of time is saved in the process of ganging up or trimming."

Before we come to the particulars let me quote one or two testimonials from Eminent Men to whom the set has been submitted for test.

Professor Pippleton, discoverer of the famous layer, telegraphs: "A bit on the heavy side, but makes a fine door stop."

Captain East, Chief Engineer of the B.B.C. morses: "This set will make history in Great Britain. Happy is the country that has no history."

Mr. O. Boy of Chicago cables: "All my life I have suffered from protruding ears with a tendency to flap. Thanks to the gentle pressure of the Goop-Wayfarer 4004's telephones both protrusion and flapping have now ceased."



Mr. R. A. Blotson-Watt of the National Physical Laboratories sends a postcard: "You have solved the problem of eliminating watts."

From these expressions of appreciation you will see at once that we have produced something quite out of the ordinary. We have indeed, and then some.

Let me call your attention to the special illuminated dial pictured in the accompanying illustration. Neither batteries nor switches are required and the illumination is such that an entirely new light is thrown upon fine tuning problems.

Constructional Details

The set is actuated by a single knob which we have placed in the middle of the panel, though those with new-arty tastes may put it in one corner or even round the corner if they like.

No batteries of any description are used and since there is but a single tuning condenser a vast amount of time is saved in the process of ganging up or trimming.

The coil is easily made at home by winding umpteen turns of Number something or other D.C.C. wire round a piece of curtain rod, cardboard tubing or what not. The latter, by which of course I mean the former,

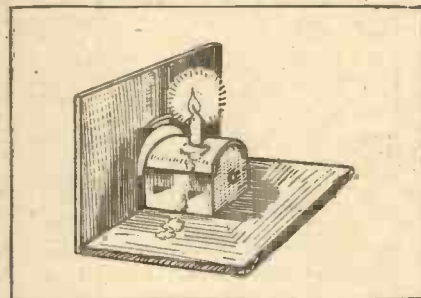
should have a diameter of some 2½ inches and the wire should be of any gauge between No. 16 and No. 30.

The latter, by which I mean not the former but the latter, should be wound upon the former, by which of course I mean the former, evenly and tightly. The last, by which of course I mean the last, should apply to the wire and not to the winder.

It is possible with this remarkable set to receive every station in Europe, provided that one is near enough to it, by which I mean of course to the station and not to Europe.

Special tests made in Vienna showed that magnificent reception from the Vienna station was obtained and

SPECIAL DIAL LIGHT



"Neither batteries nor switches are required and the illumination is such that an entirely new light is thrown upon fine tuning problems."

similar trials have proved equally effective in Paris, Berlin, Stockholm, Rome, Nastikoff, Yupopoff and Wigan.

The circuit of this remarkable set appears upon this page.

(Another powerful article next month: "Should the Short Waves Be Lengthened?" By Professor Goop.)

WITH the giant building of Broadcasting House now some

two years old, and with such adjustments as the Queen's Hall, St. George's Hall, No. 10 at Westminster Bridge, and the odd houses in Portland Place, the B.B.C. tentacles have stretched out still further for fresh space.

For Orchestral Broadcasts

They have landed on a derelict skating rink in Delaware Road, Maida Vale, wherein they have erected a vast studio for really big orchestral broadcasts. Yes, they have retained the old walls and erected their studio inside with separate walls. This gives perfect sound proofing, and still the hall is 110 feet long and 72 feet wide.

STILL EXPANDING

Details of the new B.B.C. Studio at Maida Vale.

As a matter of fact, further space is available in the outside shell for

three or four more studios of more ordinary dimensions, as well as a dozen recording rooms that have been built.

All the performances in Delaware Road will be amplified on the spot and sent to Broadcasting House ready for transmission. The studio is intended as a successor to the famous No. 10, but it will be interesting to see if No. 10 is really released—at present Henry Hall is using it.

At Delaware Road there is so much space for further expansion that at first sight it would appear that the B.B.C. has reached its goal.

But somehow I shouldn't be surprised if the tentacles move on again ere long.

D.R.

**OUR GREAT
PRESENTATION BOOK**

EVER seen an expert service man trace a fault in a radio set?

How much he learns from the crackles or other sounds that come from the loudspeaker; how quickly he isolates the fault to one particular stage; and having found the trouble, how quickly he puts it right!

You may look on amazed, but he wears a look which might say: "It's just an everyday job to me." You may wonder what the magical secrets are, but he knows they don't exist—that it's just a simple matter of knowledge.

And you yourself—anyone—can obtain all the knowledge of the expert service man, and much more besides from *The Book of Practical Radio* which has been specially written for you by Mr. John Scott-Taggart.

But rectifying faults is only one aspect of this amazingly comprehensive work dealing with the practical side of radio. The proper operation of sets of all kinds and the use of all types of controls is another.

Makes all the Difference

It is surprising the difference which a thorough understanding and proper handling of the adjustments of a set can make to the results obtained from it. The man who knows "why" and "how" is at a colossal advantage in getting the best from a receiver.

All the "whys" and "hows" of set operation are explained in this entirely new work by Mr. Scott-Taggart. And, as you know, when Mr. Scott-Taggart explains anything you are told all about it that matters; and in a way which leaves no doubt or confusion in your mind.

The wealth of detail in his descriptions of what might on the surface appear minor operations is an outstanding feature of the book. At the same time the most complicated adjustments take on a clarity and straightforwardness unbelievable before reading about them in *The Book of Practical Radio*.

Never once throughout its intensely practical pages are you asked to take anything for granted. The reason is given for everything, and in a way that the most non-technical can follow with ease.

The book is so obviously written by one who has first-hand experience of every item dealt with, that it is like receiving personal tuition from the great designer himself.

ANOTHER NOTABLE



**TECHNICIAN
SOLELY
SPECIFIES A
STENTORIAN**

WHY?

In appearance the W.B. Stentorian is almost conventional; but make no mistake—this new instrument, incorporating three distinct revolutionary improvements on previous practice, brings an illusion of reality which is amazing.

Even if your present speaker cost double the price of a STENTORIAN, ask your dealer to demonstrate this remarkable new instrument. You will be astounded at the improvement.

- **Unique new magnetic material (Prov. Pat.)** gives nearly double strength and sensitivity at similar cost.
- **New Whiteley speech coil** brings amazingly crisp attack and better bass response.
- **Improved "Microlode" feature** provides really accurate matching to the individual set.



Stentorian Senior (PMS1) - - 42/-
100 per cent. dust protection. Oversize cone.
Stentorian Standard (PMS2) - - 32/6
Stentorian Baby (PMS6) - - 22/6



Write for the new W.B. Stentorian leaflet.

Model PMS1

STENTORIAN

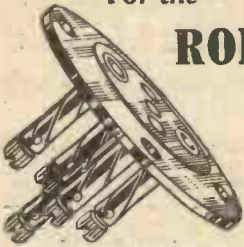
PERMANENT MAGNET MOVING-COIL SPEAKERS.

Whiteley Electrical Radio Co., Ltd. (Dept. C), Radio Works, Mansfield, Notts.

Sole Agents in Scotland: Radiovision, Ltd., 233 St. Vincent Street, Glasgow, C.2.
Sole Agents in I.F.S.: Kelly & Shiel, Ltd., 47 Fleet Street, Dublin.

For the

ROBERTS-3



The designer specifies ALL these **CLIX** components

CHASSIS MOUNTING VALVE-HOLDERS

One 4-pin. 8d.; One 5-pin. 9d.
Standard type One 7-pin. Floating type 1/-



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Engraved. A.E. Two LS— One LS+.
Type A. 2½d. each
Type B 4d each

SPADE TERMINALS

Small, 1½d. each
Large, 2d. each

WANDER PLUGS

Engraved
HT1. +. HT2. +. GB
—I. GB—2. GB+.
Medium or short shank and insulator. 1½d each

Typ B

There are over 30 Cliz perfect contact components described in Folder "G" free.



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As specified in W.B.C.

65/- Cabinet for 35/-
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THE TECHNOLOGICAL INSTITUTE OF GREAT BRITAIN, 21, Temple Bar House, London, E.C.4. (Founded 1917, 19,000 Successes.)



To Success

THE "WIRELESS" LISTENERS' CIRCLE

—continued from page 20

"That," I explained, "is one of the joys of what is known as automatic volume control, and it happens to be one of the features of this instrument. In all normal circumstances it completely eliminates fading."

"Oh, so that's the reason, is it?" continued Mr. Taylor. "I thought there must be something different about it."

The anxiety of my guests still further to test the "Q286" precluded further conversation, at least, for the time being, and then began a hurried tour of the long-wavers.

With a set so commendably good on medium waves, I felt pretty confident that we were in for something good on long waves. Nor was I disappointed. My guests had soon paraded for my entertainment all the stations that make long-wave reception worth while, and to say that they were now "at home" with the receiver would be to put it mildly.

TECHNICAL SPECIFICATION

GENERAL DESCRIPTION: Five-valve (including rectifier) superhet radiogramophone, for operation on A.C. mains, 200-250 volts, 50-60 cycles.

CIRCUIT ARRANGEMENT: Seven-stage bandpass superhet, consisting of non-radiating heptode frequency changer, variable-mu intermediate frequency amplifier, double-diode-triode (combining the functions of second detection, Q.A.V.C. and first L.F. amplification), and indirectly heated pentode output. Rectifier is of heavy-duty, indirectly-heated type. The maximum undistorted output of the instrument is 2 watts.

CONTROLS: Four in number, consisting of one main tuning (which actuates knife-edge pointer over illuminated wide-vision scale giving station names and wavelengths); volume; tone; and master switch (which also controls waverange). Although not strictly a "control" in the operating sense, there is a supplementary switch on motor-board for controlling the "quiet" effect of the A.V.C.

SPECIAL FEATURES: (1) Provision for varying the "quiet" position of the A.V.C.—i.e., the field strength below which an incoming signal is not reproduced. This control forms useful static suppressor; (2) Excellence of cabinet work; (3) Effectiveness of Q.A.V.C. on distant stations.

MAKERS: The Marconiphone Co., Ltd., Radio House, Tottenham Court Road, London, W.1.

CASH PRICE AND HIRE-PURCHASE TERMS: 22 guineas, or £2 deposit and 24 monthly payments of £1. An alternative H.P. arrangement, consisting of 2 guineas deposit and 12 monthly payments of £1 17s. 8d. is available.

"Well, I think we have heard sufficient of the radio performance of this set to be able to commend it," said Mr. Taylor. "What do you think, Mr. Mileham?"

"I heartily agree. I think it is an instrument that is likely to satisfy even the most fastidious listener, and I am full of praise."

Time was now getting on, and my guests, with obvious regret, indicated that they would have to be going.

So while they were enjoying a much deserved cup of tea, I crossed over to the instrument and put on a record. It was the H.M.V. version of the tone poem "Finlandia," played by the Philadelphia Symphony Orchestra.

My guests were obviously impressed. They said so in no uncertain words, and even temporarily abandoned the tea proposition in order to determine the degrees of control of both the volume and tone adjustments.

Finally they had to go. But their one topic of conversation as they took their leave was certainly nothing to do with my refreshments—it was simply the eventualities of the evening with the "Q286." I shouldn't be surprised if they are still talking about it. G.K.T.

WHAT THE METERS SHOW

—continued from page 20

straight into the question of our tests with the Marconiphone model "Q286." It is appropriate to preface our observations by a few remarks on the actual circuit, for the very obvious reason that one must have some basis on which to assess results. One cannot marvel at a new motor-car that will do 70 miles an hour unless one is told also something about the horse-power of the engine.

The "Q286" is known as a five-valver, although as far as the actual receiving valves are concerned that is hardly correct, for one of the five is a rectifier. However, that is a matter of opinion. The actual receiving chain consists of a heptode frequency changer (combined oscillator and first detector); intermediate-frequency amplifier; second detector, amplifier and Q.A.V.C. control valve; and output pentode.

A Clever Scheme

There are many actual circuit refinements which combine to place this instrument on such a high level, but perhaps the most interesting is the scheme which has been evolved by the Marconiphone engineers to overcome the disadvantage, common to most ordinary A.V.C. ideas, of maximum sensitivity (with consequent maximum response to mush and static) between stations.

They have overcome the difficulty by the clever application of biasing effects. When the receiver is quiet, i.e. when no station is being received, the I.F. amplifying valve is supplied with slight positive bias causing grid current to flow, and thereby damping the associated circuit. At the same time, the diode valve has a paralysing negative bias on it and the heptode frequency-changer a high negative bias.

When, however, a steady carrier reaches the diode and the amplified A.V.C. system, a negative bias is applied to the I.F. valve, thus neutralising the existing positive bias, the high negative bias on the frequency-changer is reduced and the paralysing negative bias on the diode is removed, thus ensuring a rapid return to normal sensitivity.

The scheme is most effective in practice, and certainly does all that is claimed for it. It constitutes a striking exemplification of Marconiphone distinctiveness.

What Our Tests Revealed

Turning now to the question of our tests, it would be no idle statement to claim for this particular instrument the maximum sensitivity possible for the valve combination employed. With the aid of our modulated oscillator we were able to make actual measurements of the overall gain, and without reeling off a list of what, perhaps, might be meaningless figures, it will be sufficient, we feel, to generalise by saying that this set is not within our normal tolerance figures for the type of set, it is actually just slightly above them!

That, of course, represents an extraordinarily good performance, and is the exception rather than the rule. More than that we feel that it is unnecessary to say.

On the selectivity side the set is up to the standard that one normally expects for a modern superhet. In other words, it is adequate for all normal requirements and permits of the interference-free reception of many more stations than are actually marked by name on the dial, and those number well over forty.

Quality of reproduction, too, is very well balanced, and with the aid of the tone control incorporated can be adjusted to suit almost any and every individual taste.

It will be obvious from our foregoing observations that we rate this set among the most outstanding popularly-priced radiograms available. There are few to equal it, and certainly none to surpass it at or anywhere near the price of 22 guineas.

USING THE "RADIO-RULE"
A Few Remarks about this month's Free Gift.

WITH the aid of this intensely practical gift, the conversion of kilocycles to metres or vice versa, is reduced to the amazingly simple task of merely finding the number and reading the answer direct. There are not two scales, one for frequency and one for wavelength, to confuse you; and except for 550 each number only appears once.

For instance, no matter whether you wish to convert 300 metres to kilocycles, or 300 kilocycles to metres, you simply find 300 on the "Radio-Rule" and read off the answer, namely 1,000. The same applies to all other numbers given, and intermediate frequencies or wavelengths are ascertained just as easily.

An Ingenious Design

To cover the wide range of 125 metres to 2,400 metres and 125-2,400 kilocycles would normally require a scale twice as long, or the use of two scales the size of the one on the rule. The compactness is entirely due to the ingenious design which also provides the simplicity of conversion just described.

But kilocycle and metre conversions is only one of the many uses of this metal "Radio-Rule." The very fact that it is metal makes it ideal for marking out ebonite or wood with a metal scriber. (The edge of a wooden rule tends to become damaged when used in conjunction with a sharp instrument.)

Due to the fineness of the marking of inches and centimetres on the rule, and the clarity (which is greater than that of the average engineer's steel rule), the most accurate of measurements may be made.

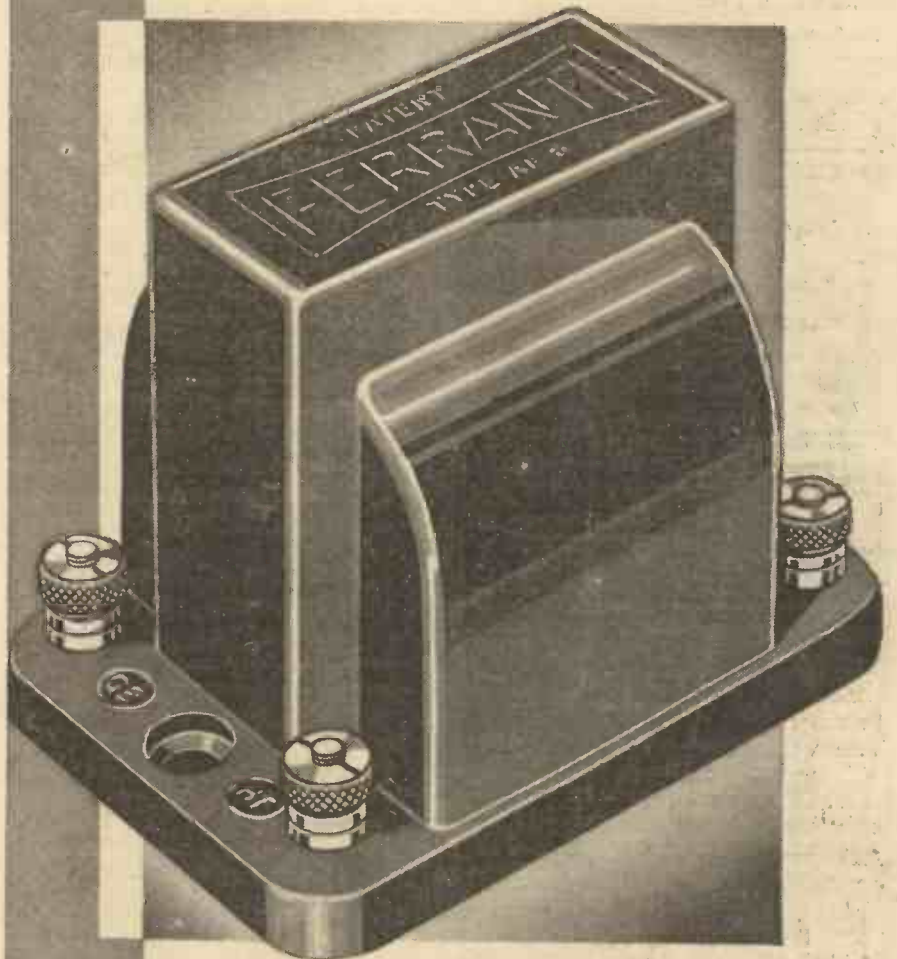
Practical in Every Way

With the aid of a set square, or other right-angle, such as the corner of a piece of note-paper, inches can be quickly converted to centimetres and centimetres to inches. Just set one edge of the right-angle parallel to the edge of the rule, and the other level with the known value (whether in centimetres or inches) and read off the desired length on the scale at the other edge of the "Radio-Rule."

Finally, the handy size of the instrument deserves mention, and the rounded corners make it ideal for carrying in the pocket. And that is the best place for it, because it will then always be handy for the many occasions on which it is bound to prove invaluable.

ONLY ELEVEN AND SIX-

and a FERRANTI at that!



This AF8 Transformer has no superior in its price class.

It employs the FERRANTI patent air-spaced sectionalised windings, which are known the world over. It is not only capable of providing fine reproduction but will keep on doing it indefinitely. Robust construction being a well-known feature of all Ferranti Transformers.

Primary Inductance 48/20 henrys. 0.5 milliampere. Ratio 1/3.5. Price

11'6



**FERRANTI LTD, HOLLINWOOD, LANCS.
 LONDON: BUSH HOUSE, ALDWYCH, W.C.2.**

ROUND THE DIALS

(Continued from page 28.)

His dial-reading is between those of Naples and Madrid Union Radio.

If you prefer to use the B.B.C. stations as markers, Madona will be found half-way between the Scottish National and the London-West National wavelengths.

The best foreign-station results on medium waves are now to be found at the top of the dial. Budapest, Bero-munster and Athlone are respectively on the adjacent wavelengths of 549.5,

539.6 and 531 metres, and just below are Stuttgart (522.6 m.), and Vienna (506.8 m.).

They are all high-powered stations. And a little beneath them Florence (492.6 m.) and Brussels No. 1 (483.9 m.) are proving that medium power of 20 kws. or less is quite capable of providing excellent reception in Britain.

Those listeners who have been neglecting foreign reception during the brighter months will be amazed at the strength of the Germans, now that their Regional improvements are materialising. Hamburg, Berlin, Munich and Stuttgart are all using

100 kws. (double the power of our own Regionals), whilst Leipzig is employing 120 kws.

In addition, "anti-fading" aerials are being used at some of these stations, and although this was not intended to aid long-distance reception it seems to do so, judging from the reliability factor now achieved.

On long waves Droitwich is easily the dominating programme. The Moscow stations have been doing well, especially Moscow No. 1 on 1,724 metres, just above Radio Paris. This is a 500-kw. transmitter, in a class by itself since its nearest rivals—Luxembourg and Droitwich—use only 150 kws.

Luxembourg, incidentally, does not seem to have quite the punch which might have been expected now that we have settled down to "winter" conditions.

Probably the most outstanding point of all to the searcher for foreign stations is the remarkable improvement as compared with this time last year in the absence of heterodynes, etc., due to the Lucerne Plan. This is especially true of the medium waves, where conditions are almost ideal.

Station after station can be found, clear of its neighbours; and on sets with automatic volume control it is almost uncanny to find how every degree or so on the dial provides a worth-while programme from abroad.

With such unusually good separation Europe alone will give us unlimited alternatives. But additionally there is transatlantic reception, already quite easy after midnight.



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



A whole night's job becomes but a few minutes' work with the Pifco ROTAMETER.

The new De-Luxe moving-coil model is amazingly accurate—it has a resistance of 200,000 ohms. The voltage scale registers up to 400 volts. In fact the ROTAMETER is a complete testing set in one handy-sized bakelite case.

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



29/6

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9 SEPARATE METERS IN ONE

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| <p>ROTAMETER</p> <ol style="list-style-type: none"> 1.—0.8 volts. For low-tension voltage test. 2.—0.30 volts. For grid-bias voltage test. 3.—0.250 volts. For high-tension voltage test. 4.—BATTERY TEST. 5.—0.20 m.a. For individual valve test. 6.—0.100 m.a. { For testing current taken by total valves in set. 7.—0.250 m.a. { 8.—FILAMENT AND RESISTANCE TEST (4,000 ohms). For D.C. and rectified A.C. 9.—Plug-in test for valves. | <p>ROTAMETER-DE-LUXE.</p> <ol style="list-style-type: none"> 1.—0.5 volts. 2.—0.20 volts. 3.—0.100 volts. 4.—0.400 volts. 5.—0.10 milliamperes. 6.—0.50 milliamperes. 7.—0.250 milliamperes. 8.—Resist./valve test. 9.—Plug-in test for valves. |
|--|---|

POINT TO POINT WIRING

—continued from page 12

46. The terminal 1 on the front section (nearer the panel) of the coil unit is joined to the front terminal on the two-gang condenser, the wire following round the coil inside the base lip and coming out at the slot between terminals 4 and 5.
47. Connect right-hand terminal of on/off switch to metallising.
48. Connect F₁ vanes of differential condenser to the baseboard, holding the wire down with the same screw as that for above.
49. A flex lead is now taken from a wander-fuse to a point on the baseboard near V₁ (see blue print). And to the same point is taken a flex lead from a G.B. positive plug.
50. Connect terminal G.B. of transformer by a flex lead through hole "M" and along underside of baseboard through hole "H" to a wander-plug for G.B. - 2.
51. Connect terminal H.T. of transformer through hole "K" to the remaining terminal on the 25,000 ohms resistance, and then bring a wire back through hole "K" from the unoccupied terminal of the 2-mfd. condenser. This wire is passed under the 2-meg. grid leak and round by the H.F. choke. It terminates at terminal H.T. on the transformer.

This completes the wiring of the set, and with the various external connections (speaker, aerial and earth, etc.) made it is ready for use.

PIFCO ROTAMETERS

PIFCO ON THE SPOT WILL TRACE YOUR TROUBLES LIKE A SHOT

ENTERTAINMENT OR EDUCATION?

—continued from page 23.

which he attends he is told, by inference if not directly, that the amount of light material broadcast must not be increased, and that any addition to programme time must be given over to music, preferably to the kind of music which I must again call "good."

* * *

I once attended a luncheon at which Sir John Reith was the guest of honour. At the conclusion of the speeches Sir John very courageously offered to answer any questions which might be put to him. He was asked why, with fourteen B.B.C. stations at his command, it was not possible for every listener to have the kind of programme he enjoyed at least for one hour during the evening programmes.

For a moment Sir John did not answer. The question was repeated from another part of the table. "Wait a moment," said Sir John. "I'm just trying to think why?" Everybody laughed, and the matter was dropped. But there was something in the idea.

* * *

No one will envy the B.B.C. programme builders their task. The criticism is not against the quality of the programmes which are provided. It is directed against those whose sense of proportion allows them to provide eight hours of serious music to four of variety, when there is not one shred of evidence to show that listeners demand this proportion.

Entertainment not Education should be the object of the programme builders—and all things in moderation!

SHORT-WAVE NOTES

—continued from page 32.

short wires to the tuning condenser that is across it.

The H.F. choke is near the front of the baseboard, almost against the reaction condenser, and the long lead from the "dead" side of it up to the 'phone terminal doesn't matter too hoots. It's almost part of the 'phone cords!

So as not to complicate matters, I haven't shown a metal baseboard, but that, of course, clears things up still further and reduces the wiring more than ever. Imagine that the baseboard of Fig. 3 is covered on the underside with copper foil, directly connected to the earth terminal, and that every lead that is destined to connect with

L.T. — and earth is simply taken to a bolt at the nearest place and thus connected through to the foil.

That will do away with well over a foot of wire, and will eliminate the following leads—from earth terminal to L.T. — terminal; from rear terminal of grid coil to moving plates of tuning condenser; from moving plates of tuning condenser to reaction condenser. The other leads—from L.T. — to filament terminal of valve holder, and from earth to grid coil—are best left as they are, for they are pretty short already.

A Large Amount Saved

You can imagine that amount of wiring that is saved in a large set by using a metallised or "Metaplex" baseboard.

Now you are probably asking in what way the results given by the two layouts would differ.

Well, first of all, you would probably have had great difficulty in making the Fig. 2 layout work below 30 or 25 metres. Probably it would refuse to oscillate at some point between those two wavelengths, owing to the long earth return and grid wiring.

Secondly, when it was oscillating, it would probably give such severe hand-capacity effects that it would be a matter of great difficulty to tune in anything but the strongest signal.

The Danger of Crackles

Thirdly, the effect of taking a part of the H.F. wiring through the L.T. switch would probably cause elusive crackly noises that would be difficult to locate and cure.

All these troubles should be absent with the Fig. 3 layout. Next month I will deal with some more advanced receiver circuits, still from the laying-out and constructional point of view.

THE EDITOR'S CHAT

—continued from page 3.

Finally, we want to ask you to make a careful note of the terms on which we are able to offer you Mr. John Scott-Taggart's latest and best book on radio. The rules for obtaining "The Book of Practical Radio" are simple. You will find them set out on another page; and the cash outlay is, you will agree, trivial, when you compare the charge we make with the value of the book.

A guinea volume by John Scott-Taggart at a cost of a few dozen pence is a bargain not to be sneezed at. So collect your tokens and, in due course, your copy of "The Book of Practical Radio."

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PILOT AUTHOR KITS

ROBERTS 3

KIT "A" CASH OR £4:15:0 C.O.D.

Complete Kit of First Specified parts, including Peto-Scott Ready-Drilled Ebonite Panel and Terminal Strip, and Peto-Scott Metaplex Chassis, less Valves, Cabinet and Speaker. Cash or C.O.D. Carriage Paid, £4/15/0.

Yours for **7/6** and 11 monthly payments of 9/-

KIT-BITS You pay the Postman. We pay Post charges on all orders over 10/-. Great Britain only.

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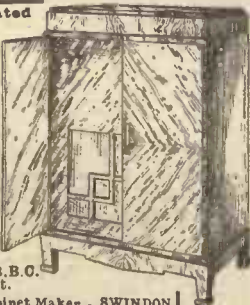
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by John Scott-Taggart, F.Inst.P., A.M.I.E.E.

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My interest in "The Book of Practical Radio" lies in two directions. The first is that it is essentially a *personal* book—one that I and no one else could write in that particular way. Whether it is a good book or a bad book—and I think it is a good book—it is really an account of my own experience. It is an account of how I would operate a receiver, how I would identify foreign stations, how I would put a faulty set right.

Experience That Counts

In this respect a practical book is far different from one which deals with theory. Half a dozen good authors could tell you how a valve acts as a detector, but when it comes to the practical side the author as an individual adviser becomes ten times as important. And if he is a respected author his books have ten times the circulation. No one else could write those books or even imitate them.

The *Book of Practical Radio* is ten times more my book than *The Manual of Modern Radio*, my last work. The *Manual* was

Practical Radio. You will obtain experience by proxy and you will have me guiding you to the best of my ability whether it is in installing, operating, or servicing a receiver.

For Better Results

In five minutes you can read of methods which it has taken me five years to evolve. In a week—if you can remember it all—you will gain twenty-two years of experience.

There is absolutely no one who will not benefit from such a volume. If you get good results, I am convinced you will get better. If results are disappointing, somewhere in this book will be found the advice that will bring you delight.

I have always secretly longed to write such a book, but somehow I have always put off revealing such hard-won experience. Well, here it is at last.

The publishers have produced a volume magnificently printed and beautifully bound. It is a big book—nearly 400 large pages simply packed to overflowing with information and advice. The chapter headings—which you should read—give only a hint of the wide scope of the book.

I am amazed that for 2s. 10d. and only one

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10. Operating superheterodyne receivers.
11. Secrets of successful trimming.
12. How to identify foreign stations.
13. Installing a wireless receiver.
14. Aerial and earth faults.
15. How to test your components.
16. Reaction faults remedied.
17. How to cure distortion and improve tone.
18. Noises and how to cure them.
19. Hum: its causes and cure.
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obtained by 50,000 readers but it dealt with theoretical matters whereas the new book is based on twenty-two years of working with brain and hands with wireless receivers.

Also I have had many brains and hands working under my supervision and instruction. Many of these now occupy highly important positions in the world of radio.

Over and above all this, I have as an editor and designer been in the closest touch with a vast body of amateurs. I know how to help them; I know where to warn them, and I know where they fail.

Invaluable Information

Never before have I written a book of such concentrated practical advice. It is a very rare thing for a professional engineer to reveal all those details of practical experience which he tends to keep jealously to himself. Once he reveals everything, he raises thousands to his own level and in a couple of pages he may disclose invaluable information which he has taken years of arduous work to acquire.

Having taken the plunge in this book, I have myself placed before every reader a vast amount of practical information which he could not possibly acquire except by following laboriously the footprints I have left behind over these twenty-two years.

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How a film of the winning airmen in the England to Australia race was transmitted by radio from Melbourne to this country.

STARTING on the 20th of October, Messrs. C. W. A. Scott and Campbell Black flew from England to Melbourne in 71 hours. Shortly after their arrival, a film showing them exactly as they arrived in the control tower of the aerodrome at Melbourne was transmitted to England. It covered the distance in less time than they took to reach Australia—65 hours in all.

At first sight of these figures one might imagine that there was nothing particularly marvellous about the achievement, particularly when one learnt that the cost of sending the film from Australia to England did not fall far short of the cost of despatching Messrs. Scott and Campbell Black to Australia.

An Historic Event

It was, however, an historic event, and time alone will enable us to judge its true importance. The ideal at which we are aiming, naturally, is that of long-distance television, which will enable such a scene to be portrayed

THE APPARATUS USED



An engineer at Electra House, London, dealing with a picture actually being transmitted through the ether.

instantaneously at any distance in this small world of ours.

This remarkable milestone in radio (and film) history necessitated the transmission of 160 complete pictures over some 10,000 miles.

Each Sent Separately

This film was enlarged so that each picture was of the standard size used for the transmission by radio of important news photographs. Each of the 160 pictures was transmitted separately from the short-wave station at Melbourne to the beam station at Somerton, in Somerset.

At this end, each of the photographs was, of course, received separately. After the 65 hours the Gaumont-British Picture Corporation had in their possession the 160 "stills" which, placed in their proper sequence, would represent a moving picture of roughly seven seconds' duration.

When one looks at an ordinary "still" from a moving picture and notes the wealth of detail, some idea of the enormous complexity of the problem of sending not one but 160 such pictures through the ether may be gained.

Add to that the fact that twelve years ago it was not possible to communicate with Australia by radio, and ten years ago it was only done for the first time on the newly-discovered short waves, and you will be getting things in their true perspective.

The film was shown in 100 cinemas on the Friday night (Oct. 26th), together with another film showing how the whole thing had been carried out. Together, they make one wonder whether the day can be very far distant when the transmission across the world of such pictures will be accomplished by television.



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W. 22

TEACHING FLYING BY RADIO

(Continued from page 35.)

and places of landing as well as any accidents and any breakage of machines. Two of these worked on a wave intermediary between 60 and 100 metres and were fed by batteries.

Another transmitter, of 20 watts and a range of about 40 kilometres, used the same wave range and derived its current from a pedal-operated 60-watt generator. This served as the same time to transmit to aviator from the starting place any directions and commands, as well as weather bulletins and other information.

The central receiving station on the Wasseruppe mountain was kept posted by the same means as to the progress of the contest. In fact, the latter owed much of its success to this harmonic co-operation between aviation and wireless telephony.

A. GRADENWITZ.

HAVE YOU HEARD THESE?

(Continued from page 38.)

LIGHT ORCHESTRAL

All the Latest. Debroy Somers Band. A pot-pourri of recent hits. (Col. DB1431.)

The Merry Middles. Orchestra Raymonde with Xylophone Solo. On the other side is a new Ketybel composition. (Col. DB1432.)

Streamline. New May Fair Orchestra playing a pot-pourri from the famous Cochran show now running. (H.M.V. C2691.)

Yes, Madam. Same orchestra playing another selection. Very good, too. (H.M.V. C2692.)

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HUMOROUS

Her Head Tucked Underneath Her Arm. Stanley Holloway records a recent broadcast monologue. Quite unlike his usual "Sam" series, but very funny. (Col. DX603.)

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Anchored. Columbia Players. With orchestra and effects. A descriptive ballad built

around the well-known song "Anchored." There is a very fine recording of a storm. (Col. DX601.)

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Una voce poea (a Barber of Seville). Miliza Korjus. (H.M.V. C2688.) The 22-year-old German soprano who recently walked into the H.M.V. studio in Berlin, completely unknown, and made a remarkable recording of Strauss' "Voices of Spring." The C2688 is her second H.M.V. record.

So We'll Go No More A-roving. Richard Crooks. The famous American tenor adds yet another gem to his already large collection of H.M.V. recordings. (DA1386.)

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NEXT MONTH'S "WIRELESS"

The January Number of "WIRELESS" will contain a wide variety of highly interesting and authoritative articles dealing with every phase of radio.

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WE have just received for review a copy of the "Wireless World" Diary for 1935, and without a doubt this new edition eclipses all previous efforts.

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ant valve on the market. At the price of only 1s. 6d., this useful diary is a sound investment for all who are interested in broadcasting.

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INDEX TO ADVERTISERS

	PAGE
Amalgamated Press Boys' Annuals Cover iii	
Amplion (1932), Ltd.	43
Automatic Coil Winder Co., Ltd.	1
British Institute of Engineering Technology	52
Clarke, H. & Co. (M/r), Ltd.	29
Cole, E. K., Ltd.	Cover iv
Colvern, Ltd.	29
Dubilier Condenser Co. (1925), Ltd.	41

	PAGE
Ferranti, Ltd.	47
Gilbert, J. C. (Cabinets)	50
Graham Farish, Ltd.	33
Jackson Bros. (London), Ltd.	41
Lectro Linx, Ltd.	46
Marconiphone Co., Ltd.	2
Peto-Scott Co., Ltd.	49
Pickett Bros. (Cabinets)	46
Pifco, Ltd.	48
Radio Resistor Co., Ltd.	50

	PAGE
Southern Supply Co., Ltd.	50
Swift Service & Supply Co.	50
Technical and Commercial Radio College	51
Technological Institute of Great Britain	46
"Tonic" Chargers	50
Westinghouse Brake & Saxby Signal Co., Ltd.	43
Whiteley Electrical Radio Co., Ltd.	45
Wingrove & Rogers, Ltd.	43
World War	Cover ii

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