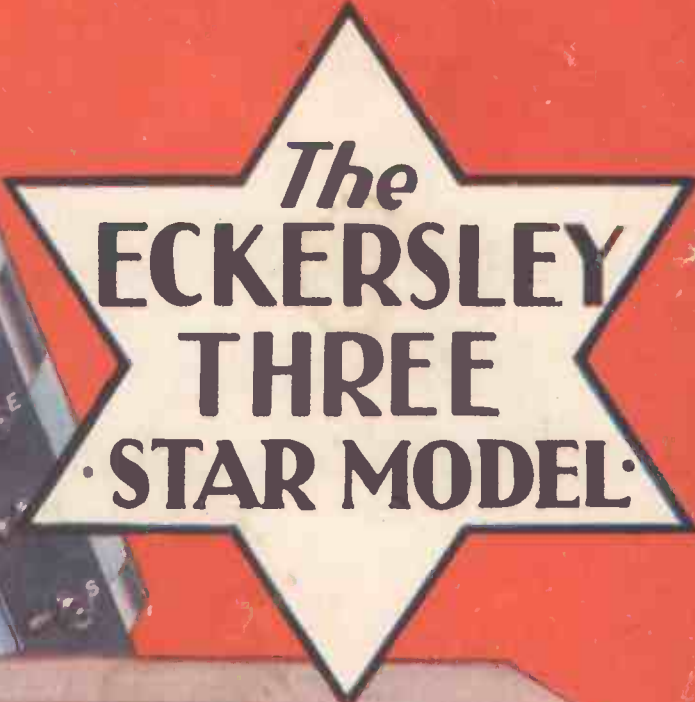
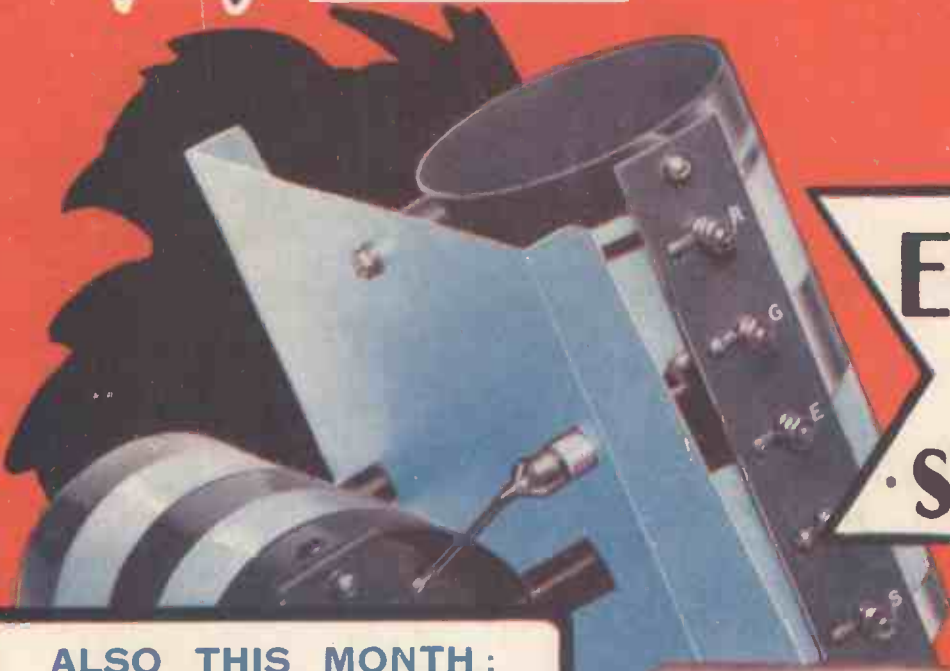


ANOTHER ECKERSLEY SET FOR CONSTRUCTORS

MODERN 1/- WIRELESS

VOL. XVII. N° 61

JANUARY 1932



The
**ECKERSLEY
THREE
STAR MODEL**



ALSO THIS MONTH:

THE "UNI-COIL" THREE
(MODELS C and D)

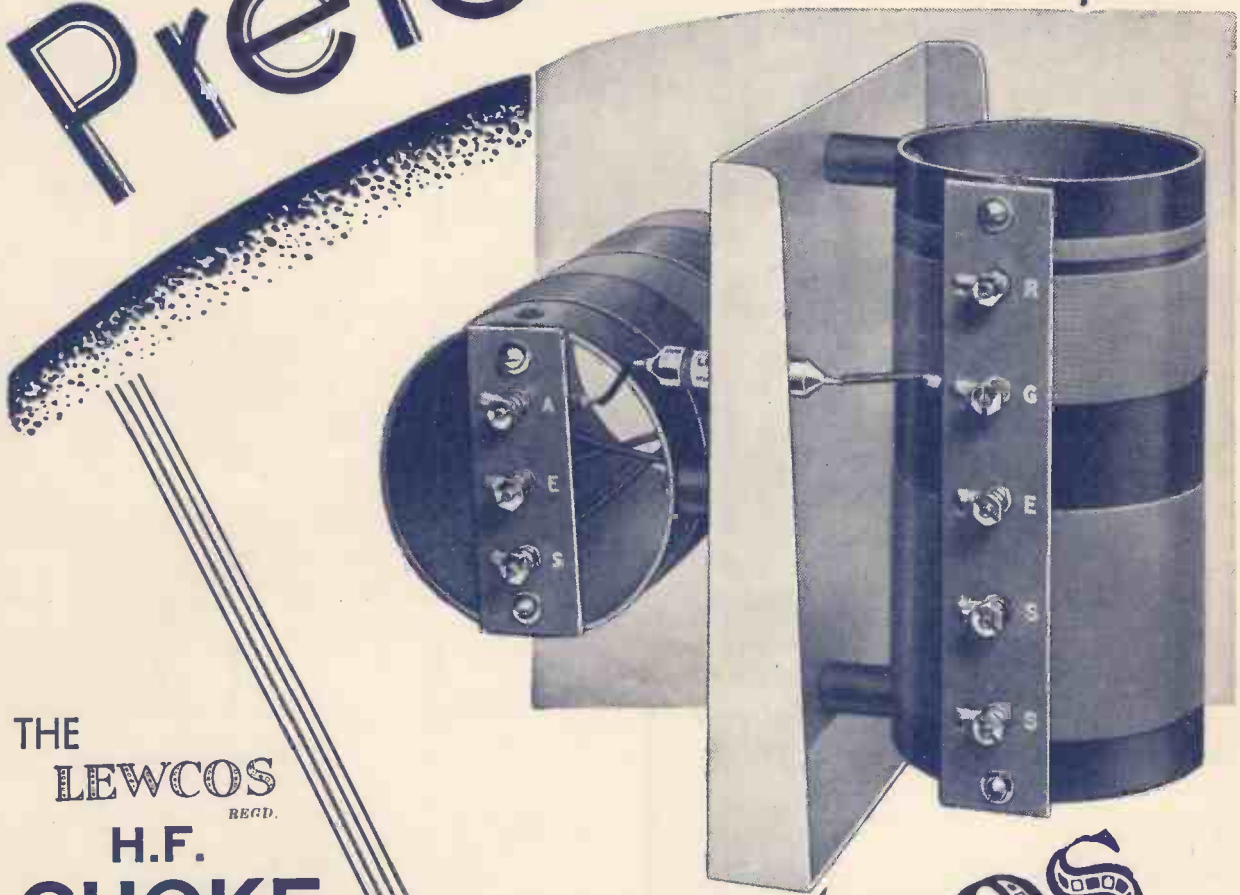
"THE W.L.S. 1932
SHORT-WAVER"

AND AN ENLARGED
WORLD'S PROGRAMMES
SECTION

Full of readable information regard-
ing those foreign stations and how
to bring them in on your set

EDITOR-IN-CHIEF CAPT. P. P. ECKERSLEY M.I.E.E.

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

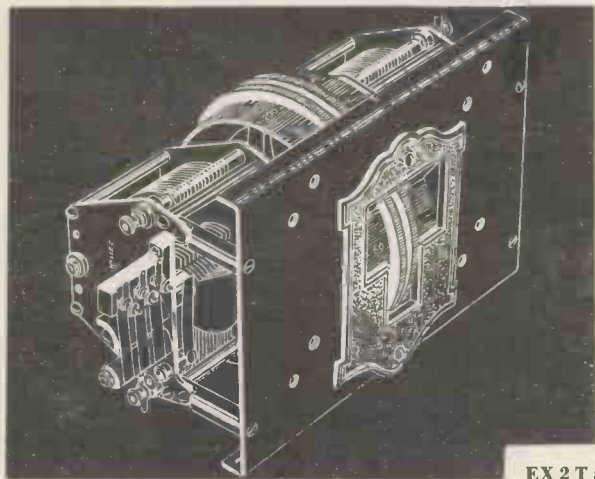
Edited by NORMAN EDWARDS.

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Scientific Adviser: J. H. T. ROBERTS, D.Sc., F.Inst.P.

CAPT. ECKERSLEY SPECIFIES CYLDON FOR HIS "STAR THREE"



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CYLDON EXTENSER CONDENSER, TYPE EX 2 T 5 as specified for the "Eckersley Star Three" includes double thumb drive, Bakelite escutcheon, chassis steel drilling template, fixing screws and instructions.

39/6

Send for new CYLDON Catalogue showing full range of Standard and Extenser Condensers. Wherever an Extenser is used, there's a CYLDON Model that fits the Set.

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FIVE YEARS GUARANTEE

Is your
Wireless
spoiled by
**Station
Overlap***



★ Selectivity is
to-day's great
Radio problem

CRISP, clear-cut programmes—free from irritating background noises and overlapping transmissions from other stations—are what everyone wants to-day. But you can't expect your Set to be selective if its Screened Grid Valve (or Valves) is inefficient. The Screened Grid Valve has a very great influence upon selectivity.

Due to its design and unique Mica Bridge Construction the Cossor Screened Grid Valve is exceptionally efficient. Its record low grid-anode capacity (of the order of .001 micro-microfarads) is not approached by any other valve. Its high stage gain enables it to give a big all-round improvement to any Screened Grid Receiver. Every Cossor S.G. Valve is available with a metallised glass bulb which improves selectivity still further at no extra cost.

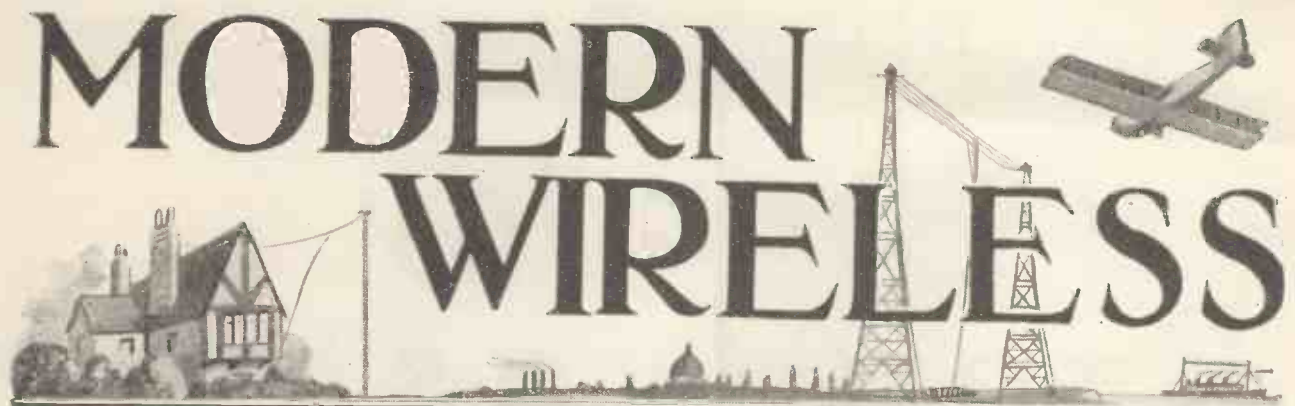


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VALVES

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THE VALVES WITH THE MICA BRIDGE CONSTRUCTION

MODERN WIRELESS



Vol. XVII. No. 61.

BRITAIN'S LEADING RADIO MAGAZINE

JANUARY, 1932

A few words concerning Capt. Eckersley's Second Set for Constructors and other matters of vital interest to "M.W." Readers.

THE wave-length situation being what it is, it is not surprising that Captain Eckersley's new coil has created widespread interest. As most of our readers know, the recent wave-length discussions in Rome came to nothing.

The Germans still maintain that a separation of 9 kilocycles between broadcasting stations is quite enough. In a recent visit to Germany we were confirmed in the opinion that German listeners will put up with far more inferior quality than the average English listener, and consequently the Germans fail to see the B.B.C.'s point of view.

The B.B.C. holds the opinion that station wave-length separation should be on a basis of at least 11 to 12 kilocycles, and it is true that this is the minimum frequency band for the B.B.C. if the present quality of British broadcasts is to be maintained.

Designed by Captain Eckersley

Now, Captain Eckersley's coil is undoubtedly a most useful thing of its kind for the present-day wave-length situation. Most of our readers are now fully *au fait* with the principle of the coil, and they had an opportunity in last month's MODERN WIRELESS of building Captain Eckersley's first specially designed set for amateurs including this coil.

In this issue of MODERN WIRELESS we present another version of the "Eckersley" Three. Captain Eckersley has called this the "Eckersley Star" Three receiver, and again this set has been specially designed and described by him.

It is, in fact, the second version of his first receiver. This is a rather more elaborate set than the first version. It includes his new tuner and also a dual Extenser, and we think readers will agree that no two components could be better united, for the Extenser eliminates two wave-change switches and greatly simplifies the wiring and construction of the set.

We feel confident the "Eckersley Star" Three receiver will appeal to you as a truly magnificent set. It is by no means as expensive as one might think from a description of its virtues, and as for construction, that is perfectly straightforward.

We should be very grateful if readers would communicate with us as soon as possible when they have built either the first or second version of the "Eckersley" Three, and give us details of their experiences—especially their experiences in connection with the operation and general behaviour of the "Eckersley" coil.

"Do Constructors Score?"

AN important article which we would particularly ask our readers to note very carefully is: "Do Constructors Score?" In this article an important executant of one of our leading manufacturers very emphatically claims that constructors must inevitably lag behind manufacturers.

Our contributor advances a strong case in an endeavour to prove this, but our Technical Editor meets him point by point, and a very powerful and readable article results.

We should very much like to have our readers' views on this interesting discussion, and letters on this topic should be addressed to: The Editor, MODERN WIRELESS, Tallis House, Tallis Street, London, E.C.4, and should be marked in the left-hand corner of the envelope—"Constructors."

Those Licence Figures!

WIRELESS licences continue to increase, and the other day the Postmaster-General, Sir Kingsley Wood, informed Mr. G. Macdonald in the House of Commons that the number of wireless licences in force on October 31st was about 4,101,000. That is: England, 3,682,000; Wales, 140,000; Scotland, 244,000; and Northern Ireland, 35,000. At the beginning of 1931 there were 3,411,910 licences issued.

When will saturation point be reached? That is a question which has exercised the minds of statisticians ever since broadcasting began. Certainly there are no signs to-day of a limit being reached.

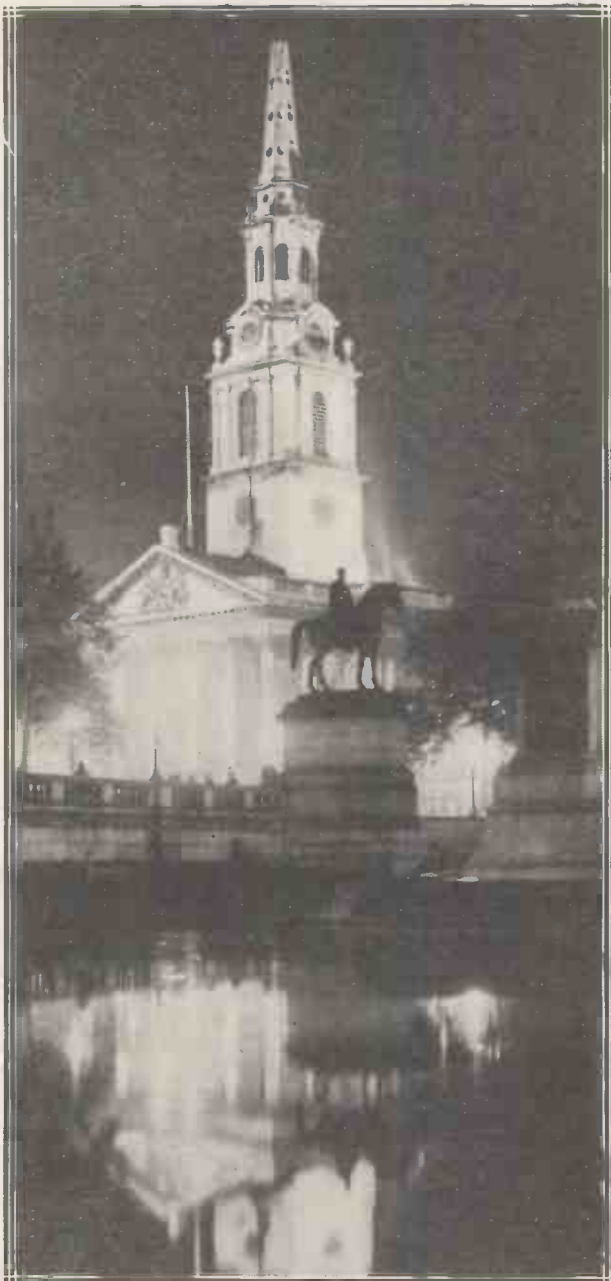
Listeners, however, will definitely be entitled to air their grumbles if the B.B.C. programmes in any way show a falling off in the New Year.

With the increase in revenue there is no excuse for the economy axe to fall too heavily at Savoy Hill.



CAPT. P. P. ECKERSLEY, M.I.E.E.,

ON—Sunday Broadcasting



The church of St. Martin's-in-the-Fields is well known to all listeners. The sound of its bells and the sermons delivered from its pulpit have been heard all over the world. This photograph was taken during the flood-lighting period.

I HAVE received, apart from the "interference post-cards," hundreds of letters which have thanked me for my articles and have expressed the writers' enthusiastic agreement with the tenor of my views. I am naturally gratified.

I am now going to risk a considerable measure of disapprobation from many of my readers. I enter this discussion with unaccustomed humility. I know no one will feel really against me if I can explain my feelings accurately. I only fear that in treading on such dangerous ground I shall inadvertently slip from the path I see too dimly.

"Treading on Thin Ice!"

The path I have chosen leads me to a discussion of the B.B.C.'s religious policy.

The B.B.C.'s religious policy is a policy of denial; it is both ungenerous and fearful.

For what are the facts? On a Sunday evening from about 5.30 to 8 o'clock most British stations are silent. No one is permitted to listen to any form of broadcasting whatsoever.

On—mark it well—Sunday winter evenings, as dusk falls, there is no radio entertainment for the mass of the people whatsoever. One sees four million homes with the family together (probably the only time in the week they are together) denied the right to listen to anything, unless their set is expensive enough to enable them to pick up foreign stations (probably playing Jazz!)

I do insist people are *denied* a simple pleasure because the B.B.C. believes that it is for "the people's" good.

On Sunday mornings there is nothing. Invalids and older people may not listen. It has been decreed—they may not listen. On Sunday afternoons after 3 o'clock there is nothing but weightiest music, and no talks except those dealing with religious subjects. And on Sunday evenings nothing after 10.30 save the epilogue. This is a policy of denial.

Religious Programmes Only

But many say that they feel that this is right, it is in fact religion, that it is fitting, that this is a day of rest, of quiet, of contemplation. Logically, then, and assuming this to be so, surely there should be complete quiet.

Let us suppose that the real intention behind the policy is that all broadcasting on Sunday is religious broadcasting and that a military band is not too secular in these days of greater tolerance.

I say to the fair-minded, I say to those whom I respect and would not wish to hurt, is it fair to the listening community that because you *believe* the B.B.C.'s Sunday

Our Radio Consultant-in-Chief has some very definite views regarding this subject, and whether or not you agree with him we feel sure you will enjoy reading this provocative contribution from his inimitable pen.

policy to be right, it is necessarily right? You wouldn't be so unfair and so without tolerance as to say that people must be *forced* to agree with what you *think* is right. You would agree, I am sure, that no one is sinful who believes that to listen to good music, to hear talks concerning the deeper significances of life on a Sunday, is a legitimate occupation.

Persuasion—Not Force

All I am suggesting is that we should be allowed to listen freely on the day when we have most leisure to do so. You are sorry, no doubt, that an ever-increasing percentage of the population never goes inside a church, but do you stop to ask yourself why? And would your answer be that you would, whatever their answer, *compel* them to do what does not seem to them—decent moral folk leading kindly sorts of lives—necessary to them. Surely you would not *force* people to go to church just because *your* life is enriched by church-going? You would try and persuade them? Yes, but not *force* them.

Those who are sincere, decent people, and yet who find that the religious broadcasts do not mean to them what doubtless they mean to others, are denied all opportunity of listening to what, to them, is comforting and inspiring.

Here we have the technical means to give everyone a choice of programme, and yet, while religious broadcasts go on, no one is allowed an alternative.

Their Only Day of Leisure

By all means let the religious have their religion, but why not be generous enough to give facility to the others?

If you say "this comes on other days of the week," remember Sunday is a day of rest, and surely rest could



Dick Sheppard, the famous "Padre," who has broadcast many stirring sermons. In this article Captain Eckersley suggests that the B.B.C. should persuade him to give regular talks.

The Wireless Military Band Broadcasting from No. 10 Studio



Nearly all the present big studio broadcasts come from No. 10 Studio, and as its acoustical characteristics are particularly suited to massed music, it is here that the Wireless Military Band generally performs.

Is the B.B.C.'s Programme Policy Out of Date?



be well accompanied by listening? Sunday is the best day for wireless, and there is less wireless that day than any other.

Come, we deserve something better and finer than this!

Firstly, I would propose a Sunday which was different from the other days of the week. As a first principle you would want to give the very best items of the week from 4.30 p.m. onwards, because more people are likely to listen at this time (particularly in the winter) than any other.

The full B.B.C. orchestra, if it never played at any other time, should play then. During relays from churches—which, of course, would continue—I would suggest addresses given by leaders of thought, of whatever shade or degree of opinion. Americans, Europeans, and Orientals could well deal with the problems of the world as *they* see them.

The Views of Great Men

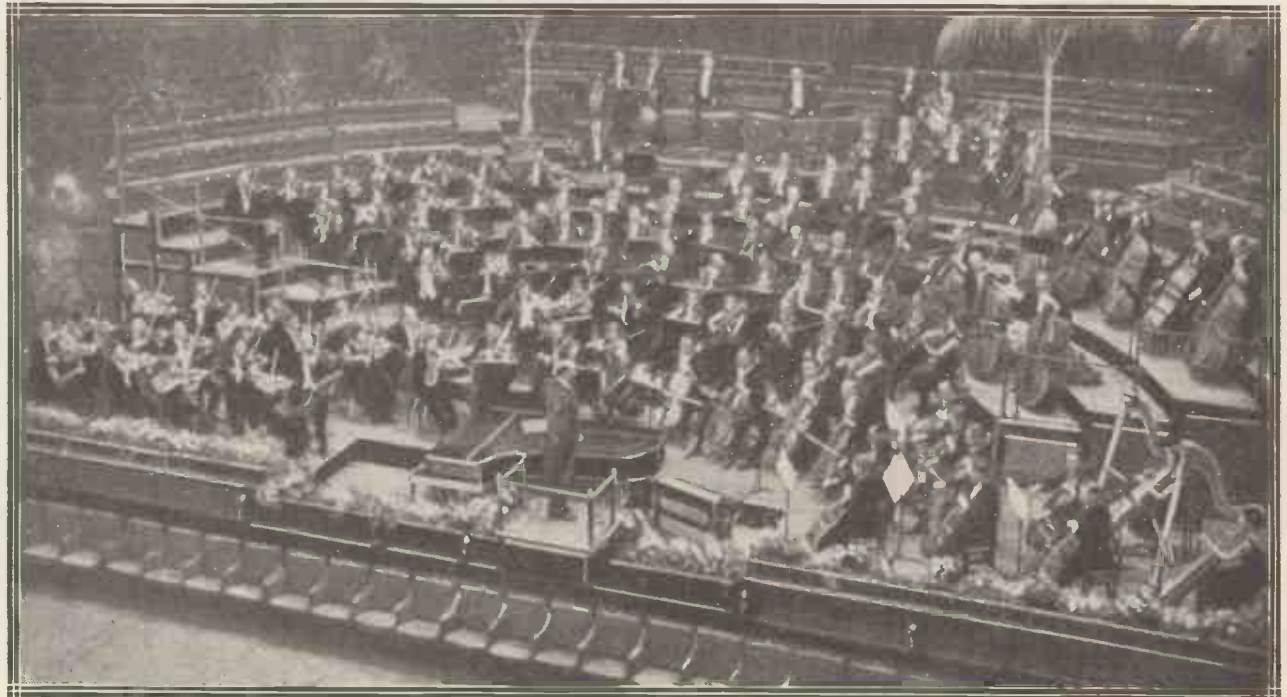
Men of learning, but with the true sympathy and simplicity that comes with real knowledge, might give us ideas of how they view their moral problems, how *they* decide between right and wrong. There would be an opportunity to give us pictures of the lives of great men of the past.

All this may seem as dreadfully serious and dull as many feel Sunday broadcasts are to-day, but, properly presented, done with a spirit of gaiety and helpfulness, I guarantee it could do a great deal towards helping people to understand their inner lives.

If it is sincerely felt that the B.B.C. has a mission to help people to believe and to lead more moral lives, nothing could, I think, achieve that end more quickly than generosity of policy in regard to religion as such and,

(Continued on page 97.)

A Masterly Band of Musicians



The Queen's Hall has accommodated many famous musicians in its time, and here you see the Wireless Symphony Orchestra giving one of their popular broadcasts from this colossal amphitheatre.

DO CONSTRUCTORS SCORE ?



The Publicity Representative of one of the largest radio manufacturers most emphatically says "No," but G. V. Dowding, Associate I.E.E., takes up the cudgels for the constructor, and makes some extremely telling points. The Publicity Representative, Mr. "X," writes first.

A VERY interesting article which appeared in the November issue of MODERN WIRELESS, under the title of "Where Constructors Score," seemed at first sight to call for a reply in which might be shown that there is another side to this case.

But on reading the article again very carefully one is left with the conclusion that even on the author's own showing there is only one specific point where the advantage lies with the home constructor.

The remainder of the article provides quite an interesting picture of many aspects of the activities of a set manufacturer, even though perhaps in one or two instances the difficulties of manufacturers have been sketched with undue (albeit humorous) emphasis!

Nevertheless, one feels that there is some necessity to reveal the other side of the picture, because obviously if all the advantages lay with the constructor, the unfortunate manufacturer of radio sets would be having a very thin time.

Relative Efficiency

The fact that, on the contrary, the makers of the best radio-gramophones and receivers—those at any rate which enjoy a good name and the confidence of the public—are working day and night to meet the unprecedented demand from the radio-buying public for their products, shows not only that the manufacturer has very many advantages, but also that the public are quick to realise the advantages to them of buying a commercially manufactured set.

It is well known that the present-day radio instrument is vastly more efficient than those of earlier years; in fact, to make a broad generalisation, it is not far short of the truth to say that an up-to-date 3-valve set is better from all points of view than a 4-valve set of last year, or a 5-valve set of the year before.

A Research Point

This tremendous advance is due almost entirely to one factor—that of research. Careful, painstaking, co-ordinated and continuous research has produced the highly efficient radio of to-day, and is even at this moment engaged on producing the still more efficient radio of next year.

Research calls for the finest brains, highly specialised training and long

experience, backed up by the most complete and up-to-date equipment available. All these things, obviously, cost money, and they can only be enjoyed, equally obviously, by the biggest and strongest firms in the industry.

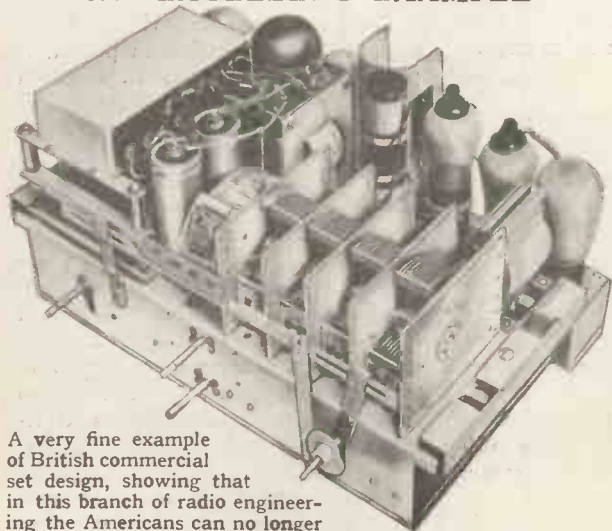
After research comes design, and here again the dice are heavily loaded in favour of the manufacturer. His designers are men of the same mental calibre, technical skill and experience as his research engineers, and they are faced with quite a different problem from that which confronts the designer of a set which is to be published in one or other of the radio journals catering for the home constructor. The latter has certain very obvious limitations which must necessarily cramp his style.

He must bear in mind, for example, that his design will be built by many people who have but the merest elementary knowledge of radio, and probably only a slight degree of manual skill.

Experience

This is not to decry either the technical knowledge and experience of the constructor-designer or the high standard of workmanship which is undoubtedly possessed by

AN EXCELLENT EXAMPLE



A very fine example of British commercial set design, showing that in this branch of radio engineering the Americans can no longer claim to be superior. (Marconiphone.)

many enthusiastic constructors, but even if the constructor-designer knew that all his readers were well endowed with both technical knowledge and manual skill he must still face the limitation that very, very few of them possess a testing equipment of even average accuracy and comprehensiveness. He must therefore make his designs more or less foolproof, so that they can be, so to speak, taken on trust.

The commercial designer, on the other hand, knows no such limitations. His first concern is to produce a set in which every part will yield its highest efficiency. In doing this he has the overwhelming advantage of being able to design every component to suit its particular job and to match it perfectly with every other part of the set.

"Nothing Haphazard"

The basis of good design is knowledge—knowledge not only of scientific theories and principles, but knowledge based on accurate quantitative measurement of every step in the evolution of a radio instrument. So that instead of having to make a choice of existing components, designed more or less arbitrarily to work as efficiently as can be expected under average conditions, the commercial designer takes the maximum theoretical efficiency as his standard, and designs every part of his instrument to that, checking his work at each stage with accurate measurement. There is nothing haphazard about an instrument designed in this way.

Then another advantage which lies with the commercial designer is that his designs will be built up by skilled workpeople, whose activities again will be checked at every stage in manufacture by elaborate testing equipment, to ensure that every production instrument reaches the same high standard as that originally achieved by the designer in his experimental models.

Actual Production

So much for what may be described as the preliminary stages of manufacture. When we turn to the actual production we find that during the last few years the advantages of the commercial manufacturer over the home constructor have been rapidly increasing.

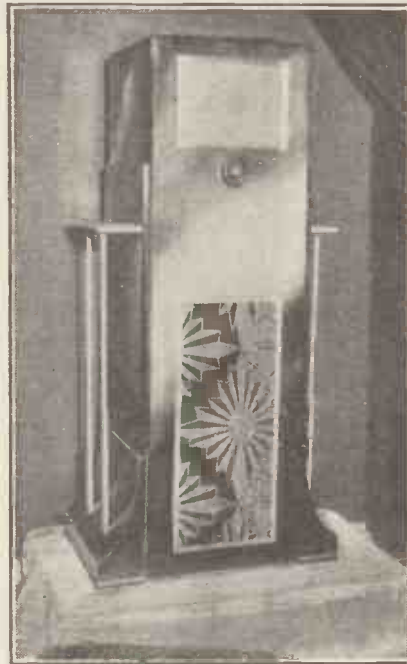
At one time even a commercial set was not vastly different fundamentally from a home-constructed set, the method of procedure in both cases being, broadly, to fix certain components on a baseboard according to the particular circuit arrangement

connect them all up, and house the assembly in a cabinet.

Modern technique, however, calls for totally different methods, and if the inside of the first-class commercial radio instrument be examined it will be found that the whole of the chassis consists of metal pressings and stampings, and mouldings of bakelite or other similar insulating material.

The advantages from the point of view of design are obvious; the adequate screening necessitated by present-day high-efficiency circuits and the widespread adoption of mains drive are admirably met by this all-metal construction.

A VERY FINE CASE . . . !



An American combined radio and television set. But we have no information as to the "service" possibilities of its very neat television screen.

The metal chassis, which in the best instances is cadmium plated, is practically everlasting. In addition to being immensely stronger and more robust, it cannot rust or deteriorate in any way. Again, by making the chassis itself serve for the necessary screening, a tremendous reduction in space is achieved.

The advantages in production are no less noteworthy. Metal stampings and pressings can be easily and cheaply turned out in quantities by up-to-date repetition machinery, and turned out not only rapidly, but so accurately that assembly is enormously facilitated.

And here we come to the point on which this article may well be brought to a conclusion. It is intentionally

left to the last, because it is the logical outcome of the facts already discussed. It is, moreover, the point which probably carries most weight with the public: the price of commercially manufactured radio instruments.

The Final Point

The author of the original article has been at some pains to show that a manufacturer on a big scale is involved in a heavy expenditure before he is in a position to produce even one instrument. But, as he has also shown, spending money in this way enables him to save money on his products, and the more he makes the more money he saves, and thus the cheaper becomes the finished instrument. Since the initial outlay for efficient quantity production is necessarily large, it follows that only the biggest firms can afford to adopt these methods.

Summing it all up, the facts all go to show that the big manufacturer enjoys advantages which are inevitably beyond the reach of the home constructor, and that by highly specialised research, design and production methods such a manufacturer can give the public a radio instrument which is better built, more efficient in performance, and offered at a price which is comparable with, if not actually lower than, even the best the home-constructor can produce.

THE CASE FOR
 THE CONSTRUCTOR
 Advanced by
 G. V. DOWDING, Associate I.E.E.
 (Technical Editor.)

MR. X, as I will call the writer of the preceding article, is connected with a concern which produces most excellent sets. Indeed, it is my opinion that these productions represent the peak of achievement in the British radio industry.

A "Fishy" Claim

In these circumstances, Mr. X can be forgiven for his enthusiastic dogmatism, and I am almost sorry it is so mighty easy to show how very weak is the case he has made out. He is delivered into my hands at every turn by his very own words!

First of all, he says that because manufacturers are "working day and night" to meet an "unprecedented demand . . . the public are quick

"Oh, for a Steady Trade Like Tobacco!"

to realise the advantages of buying a commercially-made set."

That is completely fallacious reasoning. It is as bad as a small but busy fishmonger saying: "As I have been excessively busy to-day, it is obvious the public has now given up buying cake and vegetables and is showing a general preference for fish."

The same kind of mistake is frequently made, especially by those who are intensely preoccupied by an intensive specialised activity, and it is a very human and forgivable mistake.

Next Season's Sets

Mr. X's facts could quite as well be interpreted as suggesting either that his section of the radio industry is not large enough to cope with what is, after all, a comparatively small demand, or that it is not sufficiently elastic comfortably to handle a seasonal demand.

Of course, it is the latter which is the actual state of affairs.

It is usual for a manufacturer to start preparing his "new season" sets in April or May. From then until the Radio Exhibition, in September, he proceeds to build up a stock the while his current models decline in sales until they reach what is almost a vanishing point.

At the time of the Radio Exhibition orders pour in, and soon his stock is exhausted and the same old word goes forth: "Record sales"; "five weeks behind"; "feverish activity in an attempt to fulfil orders," etc., etc., etc., etc., etc.

It might be argued that he should have accumulated a sufficiently large stock to meet all demands on the spot, and have a large enough factory to produce ample replenishments. A very sound argument—but there are big snags!

Storage Snags

Even if that manufacturer could be sure that there would be a demand for so-and-so many sets—and he cannot be, for various excellent reasons—he would have to provide for an uneconomic degree of warehousing and capital locking-up, for the retailers will not stock his "new season's" goods until the "new season" commences; nor could they be expected to, for such early deliveries would seriously jeopardise the already diminishing sale of current models.

Radio receivers being substantial articles to make, even when modern

mass-production methods are employed, no firm, however wealthy, can command workshops big enough to keep pace with the sudden rushes of orders peculiar to the radio trade.

And so you have this anomalous condition—factories which work with greatly reduced staffs during the summer are totally unable to supply the demands made upon them during at least the earlier months of the "season."

And I am not drawing upon my imagination for this picture, for I have seen them! There are very few of the larger radio factories in this country which I have not visited; during the past few months I have inspected radio factories in Manchester, Birmingham, Coventry, London, and many other places.

Last June I happened to be gazing round one of the "shops" in a large factory in the North of England, and as my eyes roved along the hundreds of yards of empty benches the works manager apologetically pointed out that "in the season" there would be insufficient accommodation for his needs!

In December the managing director of another company accompanied his announcement of "exceptional business—cannot keep pace—advertising for more 'hands'" with groans and lamentations. I asked him why he wasn't intensely happy at having such big business. He described "this set business" as "most worrying."

"Oh, for a steady trade like tobacco!" he grumbled, and added that the only bright spot was that he had started in on the "component business"!

Figures Talk!

The point to note here is that fluctuations in the "constructor" trade are much less mercurial, and the curve of demand a more easily flowing one. It is true there are peaks, but these are approached and left in less difficult gradients.

At this juncture I can hear Mr. X murmuring: "And it's smaller business." But is it?

His firm may be able to manufacture three hundred receivers per day when working "full steam ahead." I say *may* advisedly, for that is a quite respectable figure. But I know

IN THE "M.W." RESEARCH DEPT.



Capt. P. P. Eckersley and G. V. Dowding examining an experimental model of a new set design for home constructors in the "M.W." Research Department.

"It is Here That Constructors Score Even More Heavily"

a component-making firm which during August was turning out one thousand per day of a certain component of vital interest to home constructors. And yet this firm was able to increase its production to nearly four thousand per day in December without in any way interfering with the manufacture of the many other lines for which it is well known.

Pooled Resources

Right in the very middle of the last season another company, although prosperously engaged in other directions, suddenly decided to manufacture the "M.W." dual-range coil. Within three months it had to face demands for no less than 60,000 of those units, and it did so without at any time being more than a few days behind with its deliveries.

There were some eight or nine other firms making this same "M.W." dual-range unit, and I know that at least one other almost equalled the above output! Now the "M.W." dual-range coil figured in a limited number of home-constructor set designs, so we have here a definite proof that the "public was quick to realise the advantages of"—home-constructor sets!

But, as I have shown, colossal demands for components for assembling into "constructor" sets do not have a paralysing effect on the trade, for it is possible to retain much greater elasticity in the production of component parts, and there is a large and powerful group of companies all bringing their resources to bear on meeting a common demand.

The designer of a home-constructor set chooses his components so that this shall be the case, and that no hitch in the works of one particular firm shall temporarily cut off supplies.

Some Searching Questions

I can safely include an "M.W." P.V. coil in one of my own efforts with the assurance that whatever the demand for that particular item there will be some fifteen factories, dotted all over the country (and one or two of these factories have railway sidings of their own), which are prepared to increase their productions at a moment's notice.

But now let me ask an important question. "M.W." and its associated journals describe some 120 designs per year. We have definite figures to show that one of the most popular

"P.W." sets was made by at least 150,000 people (a kit supplier advertised the fact that he sold 55,000 kits of parts of this particular design). The major portion of this business occupied a span of two months.

Has any set manufacturer in this country sold 150,000 of just one of his models in the space of two months?

I'll ask another. Has any set manufacturer sold 150,000 of one unchanged set design in any length of time? And here's another—has any set manufacturer sold more than a quarter of the above number of sets, even including all his models, in a mere matter of two months?

Mr. X's next point is concerned with the brains behind manufactured and home-constructor designs respectively, and this item is very easily dealt with. I have only to point out that the home constructor is served, and well served, by such men as Captain P. P. Eckersley, John Scott-Taggart, Dr. J. H. T. Roberts, and

THE TRIUMPHANT "TITAN"



The "Titan" sets achieved an enormous popularity mainly because they were among the very first to use S.G. valves. Going back still farther it will be remembered that neutralising made its first appearance in home-constructor receiver designs.

K. D. Rogers, who are backed up by staffs of trained technicians, many of whom have been actively and constantly engaged in radio research since varying years before broadcasting began. And in addition to our own research we have the great advantage that we are able to make full and immediate use of the published material emanating from laboratories all over the world, for we are unhampered by those restrictions imposed upon individual manufacturers of sets.

Then Mr. X goes on to claim that the manufacturer can make the best set because he constructs all its component parts himself and does not assemble a medley of items bearing different brands. That would be sound argument if any one manufac-

turer were able to make every component part better than his rivals.

There is as yet no firm able to claim so much. It is here, indeed, that the constructor scores even more heavily. It must not be thought that the designer of a home-constructor design does not choose the parts he recommends for his sets with discrimination.

Those "Matched" Components

On the contrary, he surveys the whole industry in broad perspective, and selects his components accordingly. He asks himself who are the best makers of this component, who of that, etc., and frames his choice accordingly.

And he has working in his interest certain firms who highly specialise in various kinds of components, and whose productions reap the full benefit of such specialisation.

Again, there are firms which list wide ranges of radio products, but excel in particular ones. The home-constructor designer knows that and takes advantage of the fact.

But what of this "necessity for matching components" in a particular receiver if the highest efficiency is to be obtained? Can Mr. X tell me why the grid leak produced by the "A.B.Z. Co." won't "match" a grid condenser made by the "Z.B.A. Co.," if their respective values are correct?

"Matching" certainly is essential, but it is the matching of characteristics and not makes of components that is necessary.

Lowering Efficiency

Then Mr. X says that the commercial designer takes the maximum theoretical efficiency as his standard and designs every part of his instrument to that.

This is not so. The commercial set designer has been forced by circumstances to give his tacit approval to inefficient methods of design. If the British radio industry follows the same trail as the Americans have done, and it is showing signs of so doing, it will eventually be producing sets of abnormally low efficiency.

Mind you, I have nothing to say against this as a commercial practice—were I a commercial set designer I fancy I would favour the system in moderation as making for easier production. The idea is, of course, to reduce the stage gain and add extra

(Continued on page 94.)

RECORD RESULTS ON *The* ECKERSLEY THREE



ANY programme at any time" is a slogan that can justly be applied to the "Eckersley" Three. Not only is it capable of pulling in broadcasts from a surprising number of stations, but it is also eminently suitable as a gramophone amplifier. This is due in no small measure to the special filter used on the radio side to cut out sideband interference, and acting where the gramophone is concerned as a very useful scratch filter and "peak leveller."

Proportional Representation

This latter phrase perhaps needs a little explanation, but although it is not a recognised technicality, it expresses what is meant very well.

Too many pick-ups—even "quite good" ones—are prone to get over-"enthusiastic" when they are dealing with frequencies above, say, 2,000 cycles,

RECOMMENDED PICK-UPS

H.M.V. Model 11 or 15, Marconiphone, B.T.-H. (Minor and Senior), Claude Lyons "Audak," Blue Spot, Celestion W.5, Graham Farish, Varley.

and the result is we too often get over-emphasis of high notes and their harmonics.

If, then, the pick-up (or the record, or both) be lacking in low notes the result is indescribably "thin" and shrill. The ideal record reproduction at the present state of the science of recording is not perfect realism, but proper balance.

Though it is a fault not to be able

Here are some further useful practical details regarding the outstanding three-valver designed by Capt. P. P. Eckersley and described last month.

to record and reproduce 30-cycle notes, and notes above 7,000, in their proper proportion (if at all!), it is better that some of the top and the bottom of the musical scale be cut off rather than that one should come out in all its fullness and the other be totally lacking.

The recording will snip off the very low notes for us; we must see to it

that we do not over-emphasise the top notes by means of a resonant and "peaky" pick-up.

The first result in attempting balanced record reproduction is usually a fairly decent overall reproduction of the main fundamental notes and their first harmonics—a scale of from about 100 to 3,000 or 4,000 cycles. Above this any reproduction would begin to make the result unbalanced, especially if the pick-up was inclined to peak on the high notes, unless it also "went down" well below 100 and had a rising characteristic at that end of the scale.

The Question of Balance

Few pick-ups do this, however, in sufficient measure to enable good balance to be obtained without some sort of tone corrector. And the type

PUTTING ON A PROGRAMME



This photograph shows the "Eckersley" Three being used with the H.M.V. Playing Desk No. 116 and the L.S.7 moving-coil speaker.

A Very Fascinating Set to Operate

most generally needed is that incorporated in the "Eckersley" Three.

The use of a pick-up with the "Eckersley" Three, therefore, merely consists of plugging in the two ends of the pick-up leads by means of the plug into the jack on the terminal strip, and just carrying on as usual, no tuning having to be done, but just volume controlling on the set as if a radio programme were in progress.

Avoiding Overloading

And here a word or two about what volume controlling is necessary. The control on the set is placed in the grid circuit of the second valve, and for many pick-ups such a control is quite adequate.

With a sensitive instrument, however, it may be found that on loud passages the first valve is overloaded, in which case no reduction of volume by the panel control will remove the distortion caused. The remedy is to use a control external to the receiver, across the pick-up.

This can then be used in two ways. If you wish to control the volume from the gramophone turntable, set the panel volume control at maximum and operate the one at the pick-up end.

On the other hand, if you want to control from the panel, take the loudest record you can find, put it on, and turn the panel control to maxi-

mum value. Then adjust the pick-up control so that the first valve just does not overload.

You can then leave that control "set," and operate only on the panel, secure in the knowledge that overloading of the first valve is not likely to occur, and that you have, therefore, perfect volume control on the second valve.

So much, then, for the "Eckersley" Three on pick-up, except to remark in answer to certain readers' queries that G.B.-1 (for pick-up) goes into the -1.5 socket of the bias battery.

THE LATEST RECORDS

For the benefit of "M.W." radio-gram enthusiasts all the latest records are tested to discover which are most suitable for electrical reproduction. You will find the result of these tests detailed in the article

"Recent Record Releases"

which appears on another page in this number.

We must say a few words about the set's operation on radio. These need be only few, because fairly detailed hints on tuning are given elsewhere in this number in the description of the "Eckersley Star" Three.

It should be borne in mind, however, that the right-hand condenser is the more critical control, and that unless

this is dead in tune distant stations cannot be received. The left-hand tuning control is much less critical, and it is possible to have several degrees latitude before a moderately powerful distant programme is lost.

The carriers of such stations as Rome, Radio-Paris, Langenberg, and other "big noises" of the ether, can be picked up on the second dial only; as a rule, the setting of the first dial being almost unimportant.

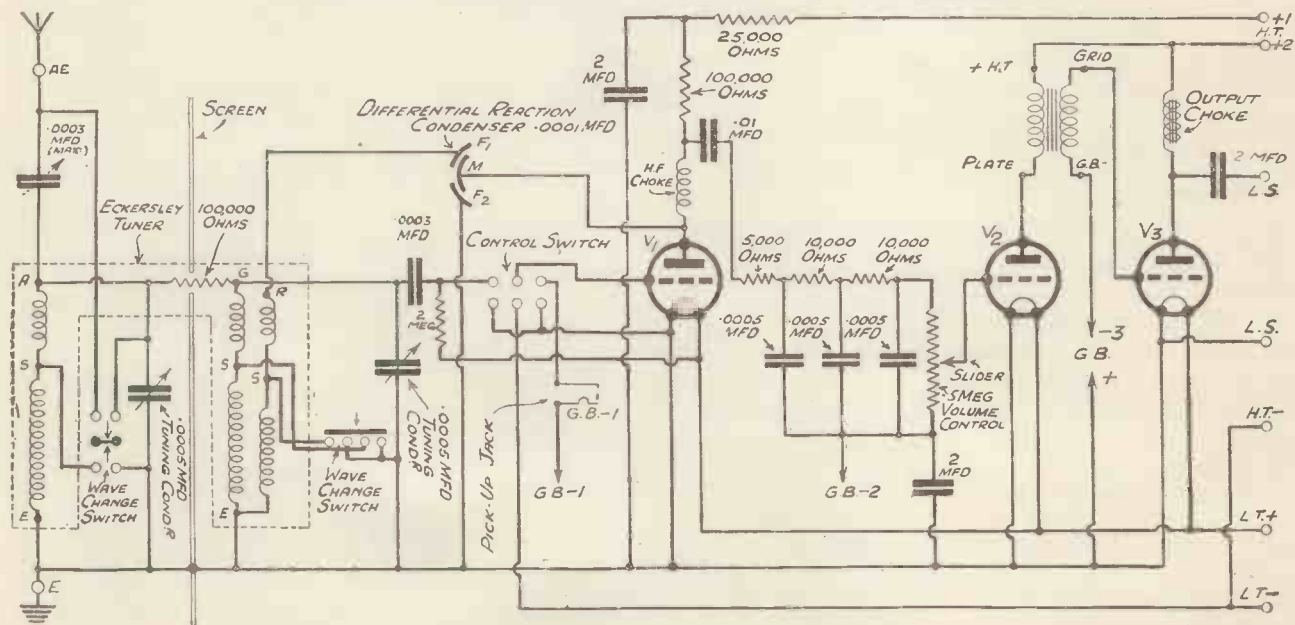
As a matter of fact, it is rather fascinating to tune in a carrier and then, leaving the second dial set, bring up the first till maximum strength is obtained. Then resolve the carrier on the second dial and there is your station.

Handling the Controls

This should not be done too often, however, especially in local broadcast hours, as it is liable to cause a certain amount of neighbouring interference; but it does teach one a great deal in a few minutes about the handling of the "Eckersley" Three.

In fact, after a few trials of this order you will be able to find and tune in foreign programmes without recourse to such crude methods, and having learnt how to handle the set you will be able to carry on with due regard to Capt. Eckersley's oft-repeated request regarding oscillation—"Please don't do it!"

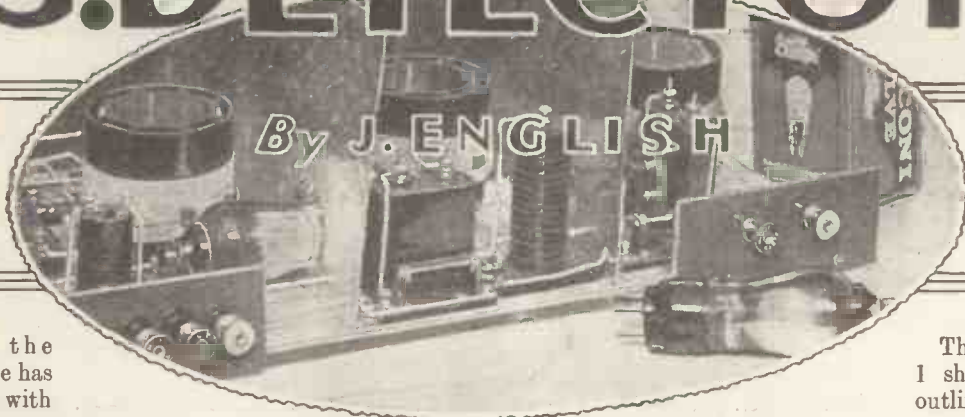
"The Finest Three-Valver of the Year"



The theoretical circuit of the "Eckersley" Three showing how the pick-up is inserted.

W 445

S.G. DETECTORS



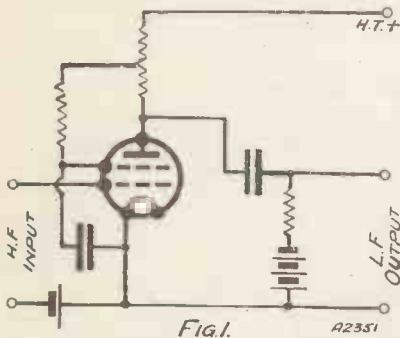
ALTHOUGH the S.G. valve has now been with us for some years, we do not seem to have troubled to use it for anything but H.F. amplification. The general belief still appears to be that, having been developed solely for H.F. stages, the S.G. valve is of little use elsewhere.

Actually this is far from the case. As a detector the S.G. gives high mag. with an excellent rectification characteristic.

Sensitive and Powerful

Some tests I have been making recently show that the S.G. valve can be a more powerful and sensitive detector than the usual triode. Such

RESISTANCE COUPLED



The high internal resistance of an S.G. valve necessitates the use of a very large impedance in the anode circuit. It is for this reason that resistance coupling is employed.

excellent results have been obtained that you will no doubt be interested in details of the circuits used and the method of operation.

Owing to the peculiar characteristics of the S.G. valve you cannot substitute it for the detector of any receiver and expect better results straight away; special but quite simple detector circuits are necessary to make the most of its capabilities.

The writer has recently been carrying out some very fascinating experiments with the screened-grid valve as an anode-bend detector. Read what he has to say about the results obtained and the novel circuit arrangements he has devised.

Normal detector stages are usually followed by a transformer, but the very large A.C. resistance of the S.G. valve rules out everything but a resistance-capacity coupling, which alone fulfils its special requirements for high amplification without distortion. To get a true idea of how the S.G. detector operates under these conditions we need to consider the valve first as an R.C.-coupled amplifier.

The latest types of screened-grid valve have a remarkably good figure of mutual conductance with a very high order of internal screening. Consequently it is not difficult to get enormous amplification without the snags normally associated with R.C.-coupled triodes.

Little Grid Damping

For example, the damping reflected into the grid tuning circuit via the triode detector's anode-grid capacity is considerable. In the case of the S.G. detector, however, this capacity is so much reduced that tuning is sharp and selective without recourse to reaction.

In addition, the S.G. detector requires a smaller H.F. input for an even greater L.F. output, while the quality of reproduction, as far as I was able to judge, is distinctly superior to that obtainable from the average detector stage.

The circuit of Fig. 1 shows the main outlines of the detector scheme finally

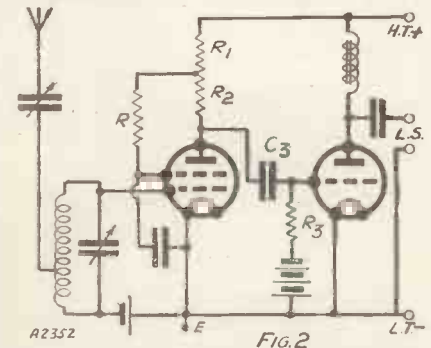
approved. Without reaction and just a small indoor aerial surprisingly good results were obtained, the output of the S.G. detector-amplifier overloading the following super-power output valve. The latter normally handles the output of a transformer-coupled detector preceded by an S.G. H.F. stage.

An outstanding feature of this two-valver's performance was the excellence of reproduction, both bass and treble being properly balanced. Full high-note response gave the desired effect of brilliance to musical items, while the reproduction of transients was very pleasing. Normally a receiver with iron-cored couplings between detector and L.F. stages tends to mishandle transients, but here there is a particularly good "attack."

Anode-Bend Detection

The full circuit of the two-stage receiver finally arrived at is shown in Fig. 2. Anode-bend detection was adopted as it proved definitely more satisfactory than the grid-current method. Observe that the screen current is fed through a high resistance

HIGHLY EFFICIENT



The two-valve circuit shown above proved very efficient indeed, and the author says the results exceeded all his expectations

A Novel Detector Scheme for an Experimental Set

connected to the centre-tap of the anode resistance, actually two resistors in series.

A very essential requirement of the resistance-coupled S.G., whether detector or amplifier, is that the screen potential must be less than the effective anode voltage. If the screen volts are too high or too low you get considerable distortion and loss of volume.

Screening-Grid Volts

The maintenance of the correct operating voltages with some circuits is difficult, plugging in a different S.G. valve upsetting the proper relation between screen and anode volts. With the scheme of Fig. 1, however, such difficulties are overcome, due to

In another test layout, inferior volume and quality was found to be due to unsatisfactory insulation of the coupling condenser. This emphasises the necessity of choosing a component of very high insulation resistance. I myself use nothing but mica dielectric condensers for this position.

This article would be incomplete without details of operation, which I will now give you in brief. The values of components used in the Fig. 2 scheme, with such S.G. types as the Cossor S.G.220, Mazda 215 S.G., are as follow: C_3 , .05 to .1 mfd.; R_1 and R_2 , 150,000 to 200,000 ohms each; R , 2 to 3 megohms. The grid resistance R_3 should not exceed 1 megohm, otherwise the input

consequently of volume. In addition, the variable resistance can be connected direct to H.T.+ if required, so that a single anode resistor can be used.

Although such very small currents flow through screen and anode resistors (the total current is only some .25 to .3 m.a. for 150 volts applied H.T.), we are dealing with voltage amplification, and the valve currents are consequently quite out of proportion to those obtaining when a transformer-coupled detector is used.

Voltage Variations

In fact, it is easy enough to put a grid swing of 25 volts on to the grid of the output valve with an insignificant H.F. input, without boosting the detector by reaction.

Turning now to mains operation, it is here that the full possibilities of the S.G. detector-amplifier are capable of realisation. With more H.T. available you can get even greater amplification from the detector stage and, at the same time, afford to run a full-size super-power output valve. No alterations are necessary in the arrangement of the detector circuit, while A.C. valves can be used with advantage.

I myself have for some time been running a local-station "two" of the Fig. 3 type from a mains unit with really satisfactory results. The receiver is compact and trouble-free, while the excellence of volume and quality are out of all proportion to the relatively small cost and trouble of construction.

Another interesting feature of mains operation with a battery type S.G. detector is the freedom from mains hum. In this respect it is far less susceptible than the normal detector.

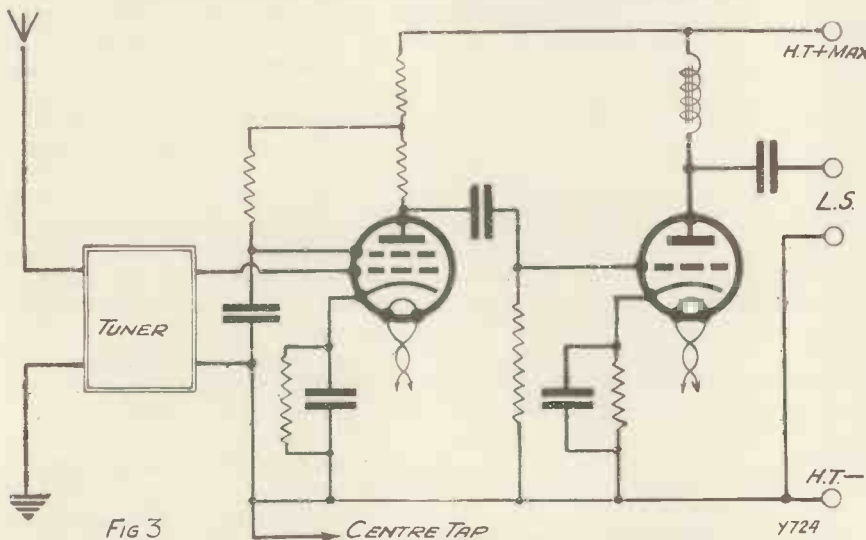
A further interesting development of the detector circuit is the provision of reaction by adding a normal reaction circuit of coil and condenser in series across S.G. anode and L.T. negative.

Use of Reaction

The reaction condenser needs to be smaller than .0001 mfd. max. to give proper control. You cannot, however, make the detector oscillate, as the S.G. chokes up before you get to this stage.

In spite of this, a moderate degree of reaction adds enormously to the range of the receiver.

DESIGNED FOR ALL-MAINS WORKING



In this circuit mains valves have been used, and the values of the various resistances will depend to a large extent on the valves' characteristics.

the special arrangement of resistances.

Another vital connection is the large fixed condenser shunting the screening grid to "earth." At least 1 mfd. is wanted here, 2 mfd. is better, connected directly across the terminals of the valve holder.

This completes the internal valve screening, the effectiveness of which partly decides the degree of amplification.

An Important By-Pass

I remember when testing one of the several experimental layouts of this circuit experiencing an alarming drop in volume with insidious distortion. This was traced to a broken connection between this shunt condenser and L.T. negative.

capacity of the power valve in shunt may occasion some high-note loss. Less than 1 megohm, of course, means reduced power output.

For a terminal H.T. voltage of 150 or more a negative bias of 3 volts is required for the detector, although some S.G.'s may take a little more. Apply all the H.T. you have available, but even if this is only 120 volts (about the minimum) you can still get exceptionally good results.

I find it very convenient to use a resistance variable from 0 to 5 megohms for R , a low-capacity pattern preferably, not of the compression type.

Such components are not expensive nowadays. With this variable you have control of screen volts and

Trouble Tracking

On this page the Chief of the "M.W." Query Dept. discusses, month by month, some of those common difficulties and troubles which can be so perplexing. This month he deals with selectivity problems.



WHAT a lot of listeners there are who still use antiquated methods of tuning. I receive dozens of letters every day which read something like this: "I have a three-valve set which I built three years ago from a MODERN WIRELESS design. It has always given splendid results, and, in fact, still continues to give wonderful volume and clarity. But there is a snag, and that is I cannot separate stations as I would like, with the result that I frequently hear two or three transmissions at the same time. Is there anything I can do to improve matters?"

A Long Time

Three years old! I can well imagine that my correspondents do have considerable difficulty in separating the various stations.

Three years doesn't seem very long, but in the science of radio it is an enormous span. Conditions have changed vastly—existing stations have doubled and even quadrupled their power—there are more of them—many more. The spacing between these powerful transmitters is a mere nine kilocycles. Why, these older sets cannot possibly cope with modern conditions without modification, because they were not intended to separate giant stations such as exist these days.

The "Eckersley" Tuner

And what is the remedy? It is this. Scrap your present tuning arrangements and try an "Eckersley" Tuner or a good band-pass coil unit.

I know that much can be achieved in the matter of selectivity by inserting small condensers in series with the aerial, but these produce a drop in volume. If the decrease is acceptable, by all means connect a .0005-mfd. Brookmans type condenser in the aerial lead.

The condenser I have in mind is the

small solid-dielectric variety which in appearance resembles a reaction condenser (not the differential type), and is preferably one having a "shorting" pin so that when the knob is rotated so as to engage fully with the moving vanes the condenser is cut out of circuit.

Full Volume

This enables one to retain full volume on the long waves.

But if you have a receiver with a simple single tuned circuit (a plug-in

accentuate the effect by applying more reaction.

That is why I suggest the "Eckersley" Tuner or a good band-pass unit. These give you all the possible top without an undesirable drop in volume.

This question of tuning reminds me that in some of these less recent sets the S.G. valves are not biased.

Now it isn't difficult to connect a 1.5-volt cell in most of these circuits, and to arrange it so that it applies a negative potential to the grid of the valve.

Simple Scheme

It is true that there are instances where the inclusion of a cell necessitates an alteration in the wiring to avoid "shorting" the battery.

In these cases the voltage can be applied to the grid via a 1-megohm leak. The idea is similar to the grid leak detector.

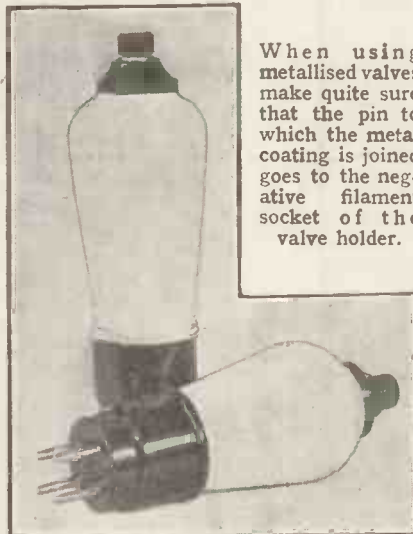
A small fixed condenser is joined between the grid end of the tuner and the grid of the S.G. valve. One end of the grid leak is also connected to the grid of the valve and the other end of the leak is taken to the negative terminal (zinc casing) of the 1.5-volt cell. Positive on the cell goes to L.T. negative.

Prevents Rectification

This negative biasing of the grid tends to prevent rectification on strong signals. If rectification takes place the selectivity of the circuit is liable to be upset.

Incidentally, you want to be careful in connecting up the filament of the new metallised battery S.G. valves, when they are arranged to pass through and touch a vertical screen on the baseboard. The idea is excellent, provided you note which filament terminal is joined to the metal coating. The coating should, of course, go to L.T. negative.

YOUR WIRING CORRECT?



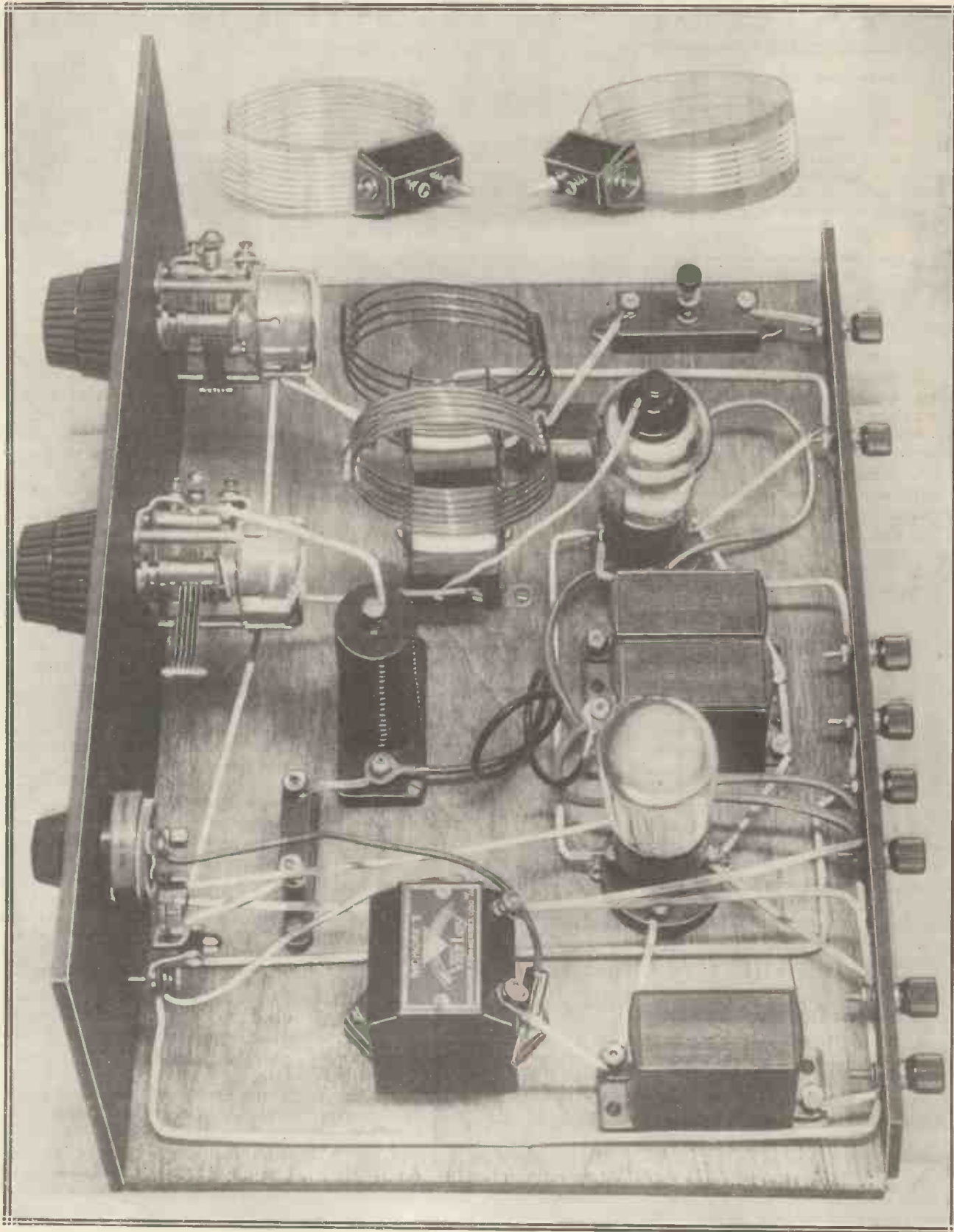
When using metallised valves make quite sure that the pin to which the metal coating is joined goes to the negative filament socket of the valve holder.

coil for example), and you start cutting down the aerial coupling to give you the desired measure of selectivity, you lose volume.

Then if you apply more reaction than previously in order to bring back some of this volume you get "woofy" reproduction.

Unfortunately you must cut off some of the high notes if you are to obtain sufficient selectivity to separate two stations like the London Regional and Mühlacker after dark, but you will

A First-Class Set for World-Wide Reception



"The W.L.S. 1932 Short-Waver"

Designed and Described by "M.W.'s" Short-Wave Expert

No attempt has been made to render this instrument suitable for ordinary broadcast wave-lengths. It has been planned to give the greatest possible efficiency on those distance-smashing high frequencies.



IN one of the many letters that the Editor has recently forwarded to me I was greatly amused by a description of myself. So far as I can remember the wording ran: "W.L.S., that fellow that writes oceans of stuff about his short-wave receivers, but never tells you how to make one."

A Snag-Free Design

I would not go as far as to say that this set is described as a direct con-

tradiction to that statement; I have been intending for some time to make a receiver that is rather more suitable for publication than my usual experimental gear.

It must be realised that the apparatus used by the experimenter or the "junk" used by the "dabbler" may both be capable of producing excellent results, but will not in any way be suitable for description in a radio magazine, since the chances are that when the various circuits are

duplicated they will not work! Thus when I intend to make a short-wave set for description in "M.W." I make it with that object definitely in view, so that there is more than a chance that every copy of it that is made will work just as well as did the original article.

Built for "Broadcasting"

The "1932 Short-Waver" is a case in point. To be frank, it is not the kind of set I should use for my

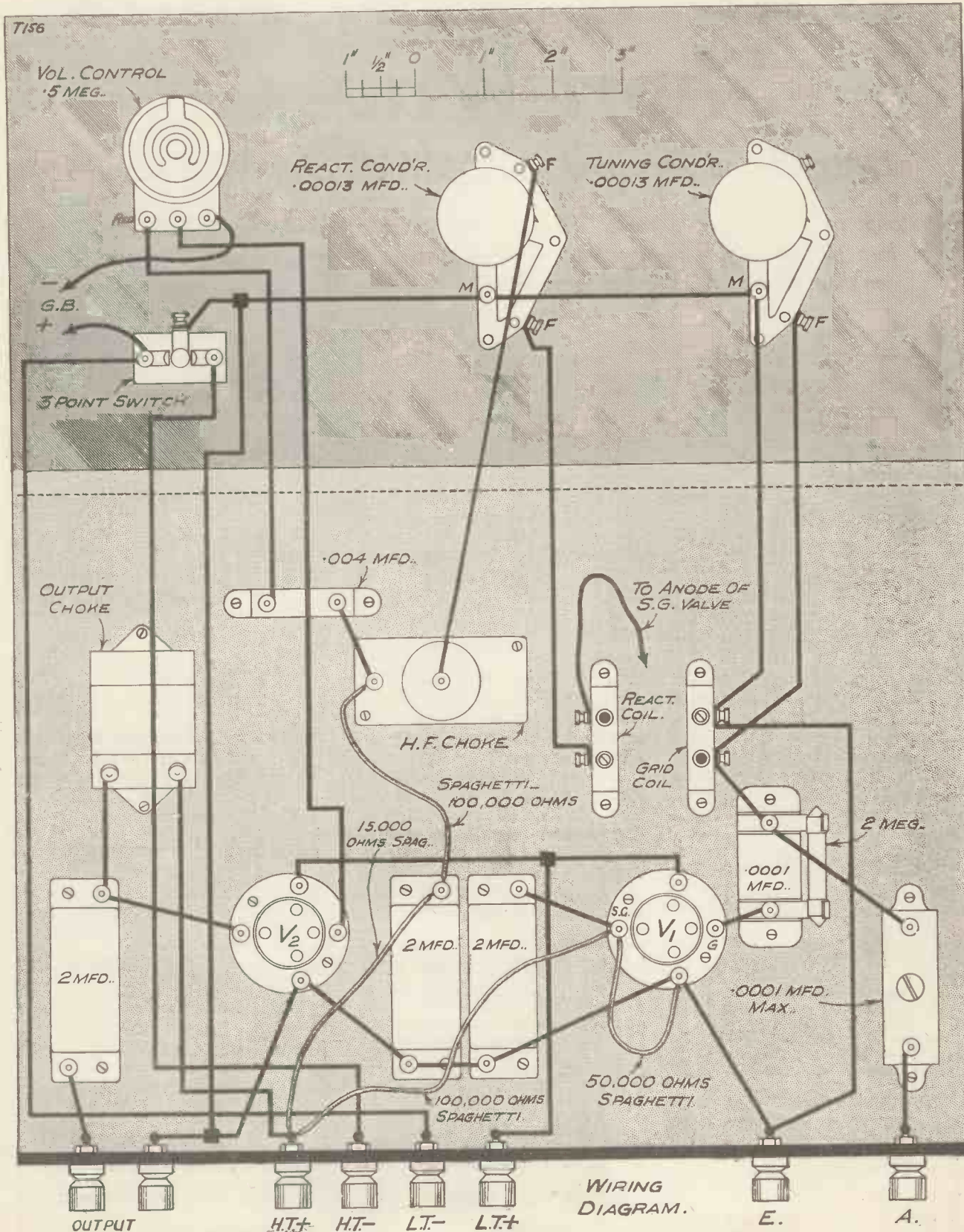
HERE ARE THE COMPONENTS YOU WILL NEED

- 1 Ebonite panel, 14 in. × 7 in. (Permol, Becol, Wearite, Ready Radio, Goltone, Peto-Scott).
- 1 Cabinet to take above, with baseboard 10 in. deep (Camco, Pickett, Osborn, Gilbert, Peto-Scott, Ready Radio).
- 2 .0001-.00015-mfd. slow-motion variable condensers (Ormond, Utility, Polar, J.B.).
- 1 5-megohm volume control (Igranic, Ready Radio, Wearite, A.E.D., Varley, Magnum, R.I., Clarostat, Sovereign).
- 1 3-point L.T. switch (Ready Radio, Telsen, Bulgin, Lissen, Peto-Scott, Wearite, Sovereign).
- 2 Valve holders (Lotus, Graham

- Farish, Telsen, Wearite, Formo, W.B., Clix, Igranic, Lissen).
- 2 Single-coil holders (Lotus, Wearite, Peto-Scott, Ready Radio, Igranic).
- 1 H.F. choke (Lewcos Universal, Telsen, Tunewell, Ready Radio, Varley, Wearite, R.I., Sovereign).
- 1 Output choke (Varley Nichoke II, Wearite, R.I., Telsen, Peto-Scott, Ready Radio, Lotus, Tunewell).
- 3 2-mfd. condensers (Telsen, Dubilier, T.C.C., Ferranti, Formo, Igranic, Helsby).
- 1 Compression condenser, .0001-.000005 (Formodensur Type F, Graham Farish).
- 1 .0001 fixed condenser (Dubilier, Mullard, Ediswan, Telsen, T.C.C., Lissen, Ferranti, Graham Farish,

- Igranic, Watmel, Goltone, Ready Radio, Formo).
- 1 .004 fixed condenser (T.C.C., etc.).
- 1 2-megohm leak and holder (Lissen, Telsen, Ediswan, Mullard, Dubilier, Ready Radio, Varley, Ferranti, Graham Farish).
- Spaghetti resistances: 2 of 100,000 ohms, 1 of 50,000 ohms, 1 of 15,000 ohms (Varley, Bulgin, Lewcos, Graham Farish, Telsen, Sovereign, Igranic).
- 8 Terminals (Belling & Lee Type R, Igranic, Eelex, Goltone, Clix).
- 1 Terminal strip, 14 in. × 2 in.
- Glazite, Jifflinx, Lacoline, Quickwire, screws, flex, etc.

Simplicity is a Vital Quality



The extraordinary simplicity of assembly was achieved by aiming at the highest possible efficiency; for, you see, the fewer and shorter the leads—the better the results!

W. L. S. is an Accepted Authority on Short Waves

own requirements. It is, however, far *more* suitable for the reception of short-wave broadcast than my own receiver. The latter, I should explain, has to be used for all manner of special tests on the amateur wave-bands, and the reception of broadcast is a secondary consideration.

The "1932" set may be described as the short-wave counterpart of the ordinary efficient broadcast receiver.

With this amount of introduction to clear the air I will proceed with the description of the set itself.

Highly Efficient

The original aim in view when I undertook to make the receiver was to give the maximum amount of signal-strength with the minimum number of valves. This did not need much deep thought; it simply necessitated the use of an extra-sensitive detector, together with an extra-efficient L.F. amplifier. What more natural than to decide on a screened-grid detector followed by a pentode?

After various trial runs this combination was finally standardised, although one modification has been introduced since then. As the set stands, the use of a pentode is optional. It should make an extremely good headphone receiver if a normal power valve is used in the output stage; at the same time it will operate a speaker on the better of the stations that are received.

On the other hand, if a pentode is used it may be looked upon as essentially a loud-speaker outfit, since headphones cannot be employed except with considerable use of the volume control.

Perfectly Straightforward

The total number of components used is very small indeed, but a reasonably large panel and baseboard have been used in order to give that "spacious effect" so desirable in a short-wave receiver.

And now for yet another confession. Out of sheer "cussedness," or whatever you prefer to call it, I vowed that I would make the set perfectly tame and stable without adding any complications. I refused to use a metal panel, or even a metal baseboard. No screening is used at all; and there is not a soldered connection in the whole set. In short, it is made in such a way that it is no more trouble to construct than the very simplest

of broadcast receivers. And, I am glad to say, the idea worked perfectly. By careful choice of layout and planning of wiring there is a complete absence of hand-capacity trouble, threshold howl, and all the kindred nuisances generally associated with short-wave receivers. It handles like a broadcast set, and tuning-in Schenectady on 32 metres is just

W. L. S. veils the identity of one of the best-known short-wave experimenters. He is an official of various important international bodies and his transmitting station has a world-wide reputation.

about as difficult as tuning-in Rome on 441 metres!

Referring to the back-of-panel diagram, you will notice that the layout is a little unusual, in that the valves are placed well towards the back of the baseboard. In fact, the coils are actually between the detector valve holder and the tuning condensers. This, it will be seen at a glance, gives very short wiring indeed for the tuned circuits and the grid and plate leads.

Since a screened-grid detector is used, the plate lead is taken, of course, to the top of the valve; but this layout with a triode would give grid and plate leads not more than about two inches in length.

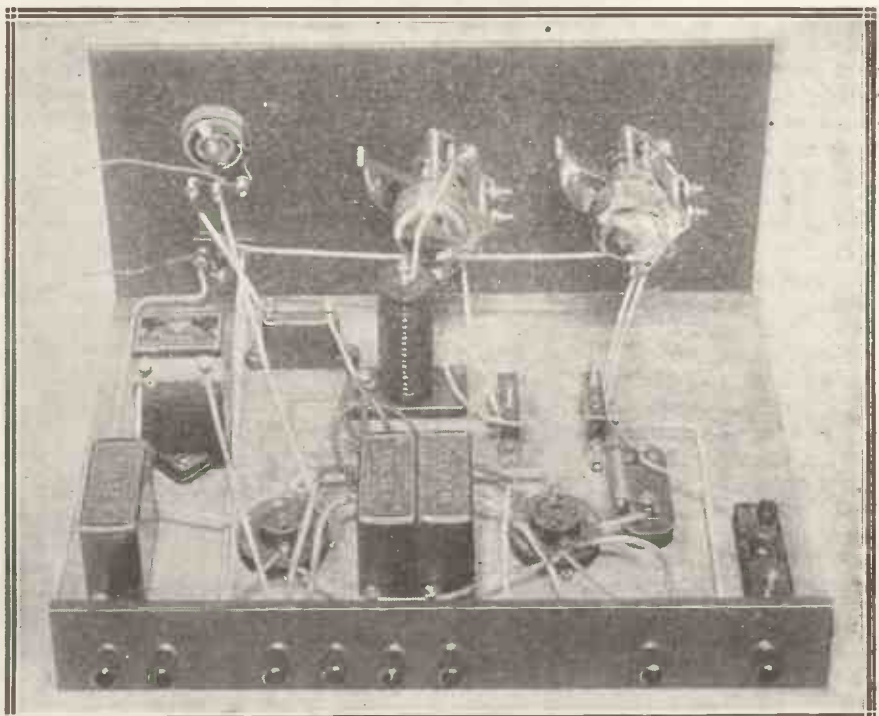
More noticeable from the photographs than from the diagrams is the fact that most of the wire in the set is at the L.F. end. Even then most of it goes merely to the L.T. switch!

An S.G. Detector

The circuit, as is to be expected, is quite conventional. The screened-grid detector uses exactly the same circuit that one would normally employ for a triode detector, except that the screening electrode is interposed, with a fixed voltage on it. Reaction control is by the usual "throttle" method, and the valve is resistance-coupled to the note-magnifier.

Resistance coupling is, of course, desirable with an S.G. valve, on account of the high impedance of the latter. Transformer coupling without a specially designed transformer generally results in a loss of efficiency coupled with a peculiar

THE RESULT OF RESEARCH



W. L. S. did not rely solely upon his vast practical experience and merely design this set on paper for mechanics to assemble. He conducted numerous personal experiments, and even the final model was made by himself. As before mentioned, its simplicity is one of its greatest virtues.

"high-pitched" effect in the output circuit.

The necessary fixed voltage on the screen is provided by a fixed potentiometer consisting of two Spaghetti resistances. One of 50,000 ohms is taken to earth from the screen, and another of 100,000 ohms is taken to the positive H.T. terminal. Simple arithmetic will show you that, whatever the H.T. voltage is, one-third of it will be applied to the screen.

The valve has in its anode circuit a resistance of 100,000 ohms and a de-coupler of .15,000 ohms (which is,

It is coupled to the tuned circuit by an adjustable condenser which, generally speaking, will be set near its minimum value of .000005. This is a perfectly adequate path for the transfer of energy on the very high frequencies we are dealing with. The grid coil and the reaction coil are two plug-in type coils mounted at a distance of about 1½ inches from each other, each near its appropriate variable condenser. Please note that the leads from the grid coil to its tuning condenser run *direct*, and do not include loops going halfway round

of the filament. Better reaction control results from this, with no trace of a drop in sensitivity.

Points to Watch

Following the wiring round from the plate of the detector valve, it will be seen to go to one side of the reaction coil; thence to the reaction condenser and the H.F. choke; from the other side of this to the coupling resistance and to the grid condenser of the L.F. valve; and, lastly, the far side of the 100,000-ohm resistance is taken on to one side of a 2-mfd. de-coupling condenser, whence a 15,000-ohm Spaghetti is taken to positive H.T.

This is mentioned in detail because this particular corner is a little tricky. It is so easy to take either the reaction condenser or the L.F. valve's grid condenser from the wrong side of the H.F. choke.

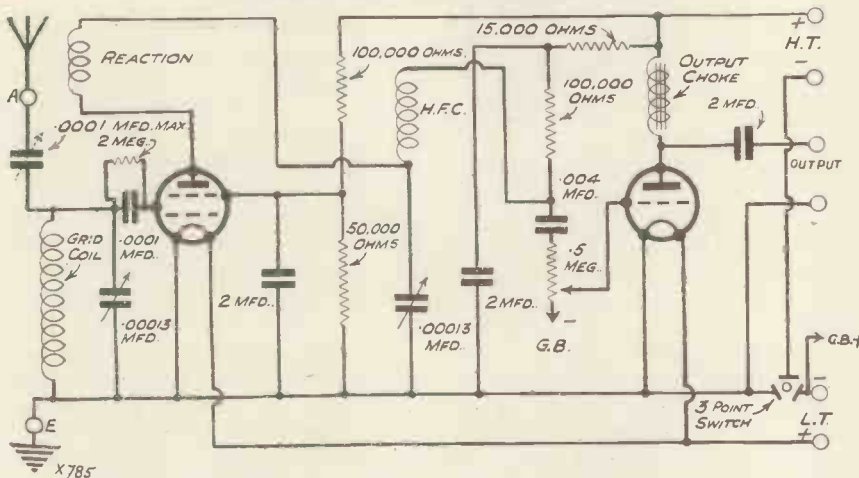
The grid leak on the L.F. stage is arranged as a volume control, with the grid taken to the slider in the conventional manner. Choke filter output is used, the 'phones or speaker being taken from the plate to earth, in series with a 2-mfd. condenser.

The particular output choke used appears to be quite suitable for a pentode. At all events, the substitution of a pentode for a triode in this stage results in a huge increase of "mag." without any loss of quality. The priming-grid terminal is, of course, taken straight to positive H.T.

Direct Wiring

If you examine the actual wiring of the set you will find one complete "loop" in the earth-return wire. The low potential side of the grid coil goes straight to its variable condenser, thence to the reaction condenser, after

IT USES AN S.G. DETECTOR



An S.G. detector and "throttle" reaction are the special features of W. L. S.'s circuit.

by the way, an essential to the good behaviour of the set), and thus the voltage actually on the anode is substantially less than the total H.T. voltage. Using a 120-volt H.T. battery the actual operating voltages in the case of the original set were 40 on the screen and about 88 on the anode.

Three-Point Switch

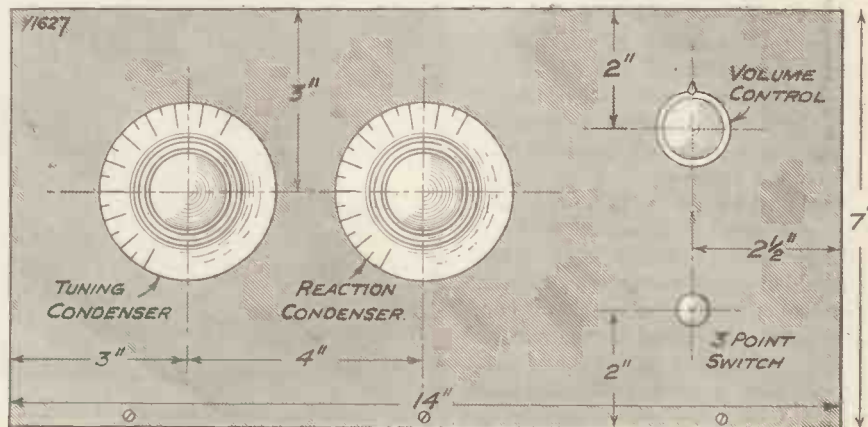
There is no need to be concerned about the constant drain on the H.T. battery through the "fixed potentiometer." The total resistance is 150,000 ohms, so that the total current lost in that way is less than 1 milliamp. It is necessary, however, to use a three-point L.T. switch, so that the H.T. is also disconnected when the set is not actually in use. Even 1 milliamp. will tire a battery when it is flowing continuously for several weeks or months.

Now let us analyse the set from input to output. The aerial needs very little in the way of description. It may be anything from a long outdoor affair to a few feet of wire strung up in the room. Very little difference will be noticed unless you happen to be in an abnormally bad location.

the set. The importance of this simply cannot be over-estimated; it may make all the difference between a set that will not oscillate below 30 metres and one that works successfully right down to 7 metres.

The grid condenser has a value of .0001 and is shunted with a leak of 2 megohms. I find this value most suitable for the S.G. detector, and I also find that it prefers to have its leak taken down to the negative side

NO SCREENING—NO HAND-CAPACITY!



PANEL LAYOUT.

Although no screening of any kind is used, there is a complete absence of hand-capacity and the set is perfectly stable.

As Easy to Handle as a "Broadcast" Set

which it is taken to the L.T. switch, across the set to the L.T. — terminals on both valve holders and the earth terminal. Going back to the starting-point, we find that the low potential side of the grid coil also goes by a *direct* path to the earth terminal. Removal of this wire immediately brings in hand-capacity troubles on the tuning dial, so that it is well worth the length of extra wire used.

Constructional Tips

Do not confuse this sort of thing with a loop of wiring included in one of the tuned circuits, which is absolutely *taboo*.

ACCESSORIES

Valves. 1 S.G. type (Marconi S.22, Cossor, Osram, Mazda, Mullard, Six-Sixty, Tungram, Dario).

1 Small power or pentode (Mazda 220 or Pen.220, Mullard, Osram, Tungram, Marconi, Lissen, Six-Sixty, Dario).

Coils. 1 set short-wave coils (Atlas, Igranie).

Accumulators. 2-volt (Exide, Pertrix, Ediswan, G.E.C., Lissen).

Batteries. H.T., 120-150 volts (Drydex, Pertrix, Ever Ready, Lissen, Ediswan, Magnet, Columbia).
G.B., 9 volts (Pertrix, etc.).

Loud Speaker. (Blue Spot, Celestion, Amplion, W.B., Epoch, H.M.V., Graham Farish, B.T.H., Marconiphone, Undy, R. & A.)

We have covered the theoretical side of the set fairly well. About the actual construction there is very little to be said. Keep as strictly as possible to the layout shown, although if you are sufficiently experienced in short-wave work you will be able to introduce modifications and ideas of your own. *Do not* put in tuning condensers of a larger capacity than those used, as you will not benefit in any way whatever from that. The .00013's, or even .0001's, are quite large enough to join up the ranges of the various standard plug-in coils, and there is no point in making the tuning difficult just to save occasional coil-changing.

Now we come to the most important question of all—that of operation. Although the actual handling of the set is easy enough, the use of a little common-sense is often necessary to obtain even *better* results than are given at the first trial.

The valves used are simply a screened-grid type as detector, and

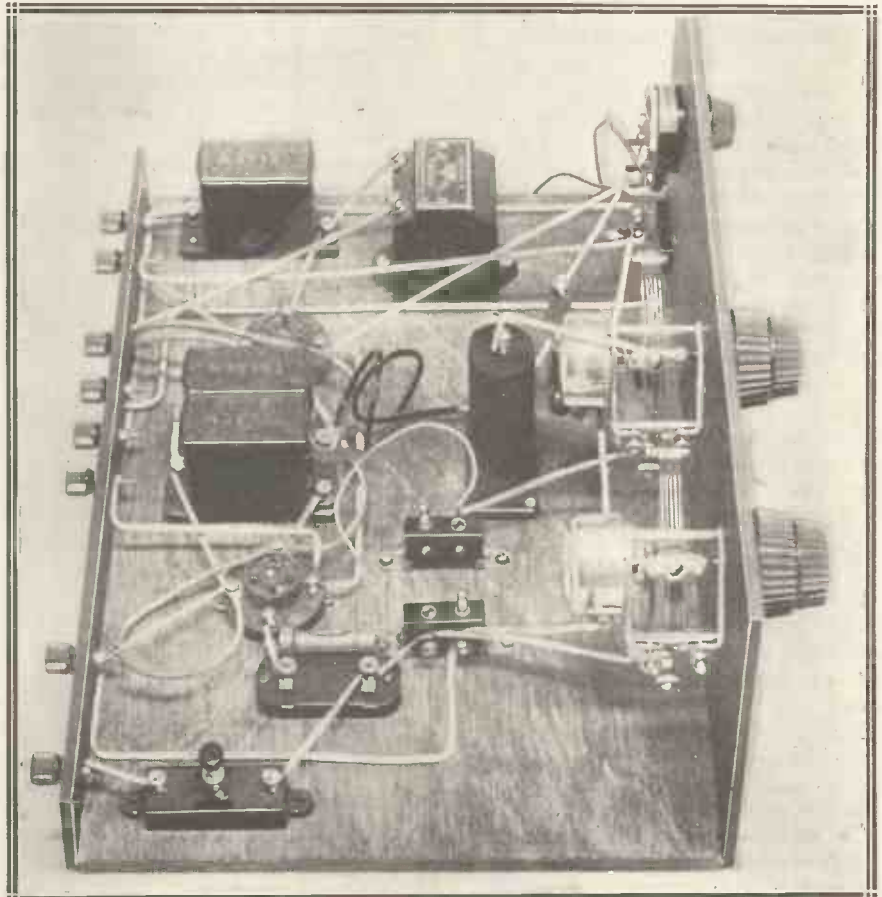
either a pentode or an ordinary power valve for L.F. amplifier. Care must, of course, be taken to comply with the maker's recommendations about grid bias. This should be remembered when changing from pentode to triode, if this is often done.

About the Batteries

Two-, 4- or 6-volt valves seem to show very little difference nowadays,

moment of suspense after you have switched on the set for the first time, you will probably find that it goes smoothly into oscillation when the reaction condenser is about half-way in. This should apply with almost any combination of the usual sets of short-wave coils except the two-turn coil. Using a "9" as grid coil and a "6" as reaction, or a "6" as grid coil and a "4" as reaction, there

THRESHOLD HOWL ENTIRELY ELIMINATED



By carefully choosing the components and arranging their layout, all those usual troubles often met in short-wave sets—such as threshold howl—have been entirely eliminated.

and the best plan is probably to keep to whatever voltage you have standardised upon for previous sets. If this happens to be your first set, the 2-volt valves and accumulator will probably get the vote.

The H.T. Supply

For H.T. a 120- or 100-volt battery is excellent, but nothing much smaller should be used. If you have a mains unit you may be able to put it straight on the set without finding any trouble from mains hum.

Allowing for the usual dreadful

should be no difficulty in making the set oscillate.

If, however, it doesn't, it is just as well to know what to do. First, remove the aerial and see if it does then. If it *does*, your aerial coupling may be too tight. Either screw the coupling condenser farther out or reduce the length of the aerial.

If it is still difficult to produce oscillation without having to work with the reaction condenser "all in," you may try the effect of increasing the H.T. voltage slightly. Incidentally,

(Continued on page 100.)

QUESTIONS ANSWERED



Pentode Tone Control

S. G. (Nottingham).—"I am using a three-valver with a pentode in the last stage. Although I have a centretapped choke output I find that the high notes are a little too prominent with my particular speaker. Can I adjust matters by cutting off some of the higher notes? If so, how do I set about it?"

You can control the high-note response by connecting a .01-mfd. condenser and a 20,000-ohm variable resistance across the two ends of the output choke winding. By adjusting the variable resistance you should have no difficulty in adjusting the upper musical frequencies to suit your requirements.

Output Chokes

L. C. T. (Barnstaple).—"I am purchasing an output choke and would be glad if you will tell me the main points which distinguish a good choke from a bad one."

First and foremost, choose a choke made by one of the well-known makers and there will be no fear of your getting a bad one.

The main factors are D.C. resistance and inductance. It is necessary for the choke winding to possess a low D.C. resistance in order to avoid loss of valuable H.T. volts.

The loss or drop in volts across the winding is equal to the current in milliamps divided by a thousand and multiplied by the resistance of the choke.

So, you see, if you increase the resistance of the winding fewer volts will arrive at the anode of the output valve, and in consequence you will not be getting full value from your H.T. supply.

Then there is the question of inductance. You must choose a choke that will possess a reasonably high inductance (say, 20 henries) at the current taken by your output valve.

The inductance value will decrease as the anode current is increased, so that if your valve requires something like 15 milliamps at 120 volts H.T. you should obtain a choke designed to give a high inductance at this figure.

purposes. There is nothing better than a good buried earth—either an earth tube or copper plate—or alternatively a connection taken to the main waterpipe just before it enters the ground.

Oscillator Units

P. E. (Acton) asks us whether the Wearite and Lewcos oscillator units are interchangeable in the "M.W." "Super-Quad."

Yes, these two units are interchangeable with each other, and in wiring up it is only necessary to adhere to the colour markings on the blue-print. Thus the red lead in one unit is equivalent to the red lead in the other, and so on.

The "Uni-Coil" Three

J. R. (Hayward's Heath).—"I am making up the 'Uni-Coil' Three, Model B, which was described in last month's issue of MODERN WIRELESS, and I am not clear as to the exact wiring of the two Spaghetti resistances through which the H.T. flows to the anode of the detector valve. Will you please make these connections clearer?"

One end of the 25,000-ohm Spaghetti is connected to H.T.+1 and the other end to one terminal of the 2-mfd. condenser.

One end of the 100,000-ohm Spaghetti is also joined to this terminal on the 2-mfd. condenser, as shown in the wiring diagram on page 452.

There is a slight misprint on the back-of-panel diagram, and instead of joining the other end to the 100,000-ohm Spaghetti to the terminal on the .01-mfd. coupling condenser, which goes to the grid of V_2 , connect this end of the Spaghetti to the other terminal on the .01 condenser; that is, the terminal which is joined to one side of the H.F. choke.

TECHNICAL QUERIES DEPARTMENT

Are you in trouble with your set?

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

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

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

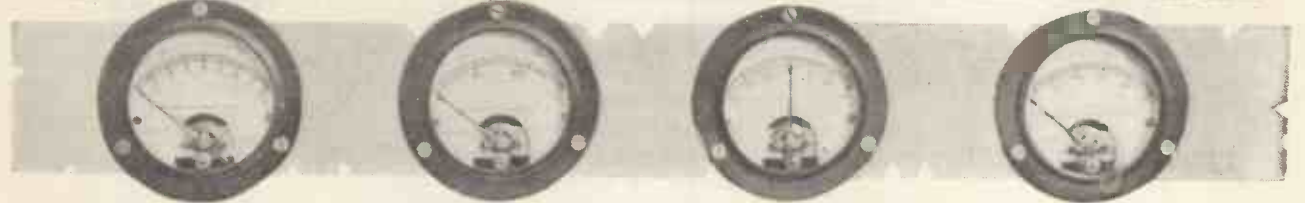
London readers, please note: Inquiries should not be made in person at Fleetway House or Tallis House.

A Poor Earth

S. N. (Wellhall).—"For some time past I have been using a gas-pipe as an earth, and recently a friend advised me to try a buried earth underneath the window of the room in which my set is placed. I joined a length of copper wire to a copper plate buried 2½ ft. in the ground and immediately noticed a marked increase in volume. Does this show that my previous earth was inefficient?"

Yes. Your gas-pipe earth was probably a very bad one. Gas-pipes usually are, because of the number of red-lead joints. These joints form a high-resistance path to the oscillatory currents, and no earth at all is frequently more effective than one of this type. Never use gas-pipes for earthing

NEW LIFE *for* OLD METERS



THERE must be to-day in the hands of wireless enthusiasts many thousands of perfectly good milliammeters which have come to be regarded as useless for most practical purposes.

The reason for this is that they have not a high enough maximum reading to be able to handle the large amounts of high-tension current passed. They were bought in the days when the

By R. W. HALLOWS.

If you have any old milliammeters and you would like to increase their ranges to conform with the healthy appetites of modern receivers, here is an article which will interest you. Even if you don't want to alter any of your meters at the moment, there are some very useful dodges well worth noting.

your set is oscillating; and many other things besides.

What would you like your milliammeter to read up to? Very likely its present maximum is 5 milliamperes, for this type of instrument was the one most commonly sold a few years ago.

You can make it read 0 to 10, in which case you will have to double the readings which it shows. But why not turn it into a 0 to 50-milliamper instrument? In this case you will have no calculations to make.

ALTERNATE PATHS

A2027

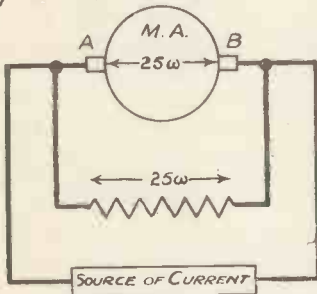


FIG. 2.

In order to double the range of a milliammeter it is necessary to divert exactly half the current flowing in the circuit through a shunt connected across the meter, and having the same resistance as the windings of the instrument.

average consumption per valve throughout the set was not much more than 1 milliamper, and when such a thing as a single valve passing 15, 20, or 40 milliamperes of current was not heard of.

That Maximum Reading

To-day all of us who value quality from our loud speakers use super-power valves in the output holders of our sets, and often two of these valves are used in push-pull.

Again and again I come across those who say: "I realise how useful it is to have a milliammeter semi-permanently wired into the common

negative high-tension lead, and I would do this if only my milliammeter had a high enough maximum."

In this article I want to show what a simple business it is to increase the range of a milliammeter to twice, five times, ten times, or, in fact, any multiple of what it originally was.

How It Helps

In this way old milliammeters with low maximum readings can be made useful once more in the modern set, and can be put into the position suggested as well as being employed for a variety of other purposes.

Put a milliammeter into the common high-tension negative lead as shown in Fig. 1,

and you know (1) just what your total high-tension current drain is; (2) whether you are over-working your high-tension battery or your eliminator; (3) whether the emission of your valves is what it should be; (4) whether you are overloading your low-frequency valves; (5) when

Choosing the Scale

One on the scale stands for 10, 2 for 20, and so on, whilst each single division will represent 1 milliamper. If you like you can make it have a double scale, say, 0 to 50 and 0 to 500. In the case of milliammeters with a low maximum, five or ten times the original is probably the best reading to choose.

If you have a 0 to 25-milliammeter it will probably be convenient to double the scale reading, making it extend from 0 to 50 milliamperes.

CALIBRATING THE INSTRUMENT

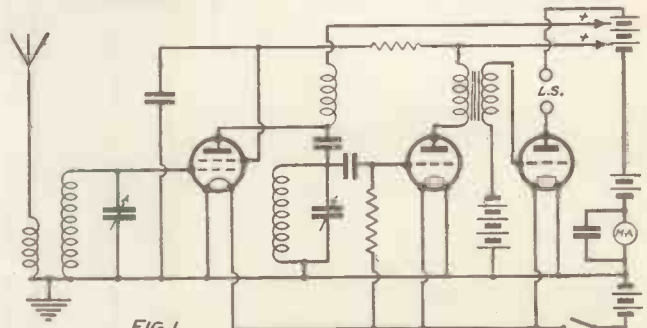


FIG. 1

To find the right amount of wire for the shunt it is a good plan to connect the milliammeter in the negative lead to your H.T. supply, as shown in the above circuit diagram. You can vary the windings until the correct range of readings is obtained.

The process of converting a milliammeter is done by providing it with a shunt, which is simply a length of wire of the correct resistance wired in parallel with the instrument—that is, between its terminals.

Half and Half

Let us take the simplest case—that we wish the new reading of the scale to be exactly double the old. The shunt in this case will have to be made to exactly the same resistance as the windings of the milliammeter. A little consideration of Fig. 2 will show exactly what it does.

TESTING IT OUT

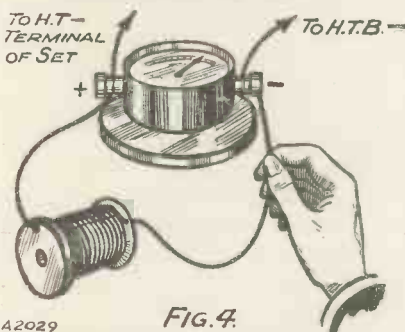


FIG. 4.
A2029
When connecting the trial shunt across the meter make sure that there is good connection, otherwise false readings will result owing to the additional resistance at the point of contact.

In this figure is seen a source of current in series with a milliammeter across whose terminals is placed a shunt whose resistance is equal to that of the windings. Let us suppose that 10 milliamperes of current are flowing in the circuit.

On reaching terminal A of the milliammeter a current finds two paths of equal resistance open to it, the first through the windings of the instrument, the second through the shunt. In such circumstances Ohm's law shows us that current divides equally, one-half taking each path.

Doubling the Range

Five milliamperes, therefore, flow through the windings of the instrument. The milliammeter shunted in this way will therefore record 5 milliamperes when 10 are actually flowing in the circuit, 10 when 20 are flowing, and so on. In other words, its maximum range is now doubled. By varying the resistance of the shunt we can make the instrument read any multiple of its original scale.

Figs. 3 and 4 indicate the way in which a trial shunt is made up and adjusted. Let us suppose once more that we wish to double the range of the milliammeter—that is, to make it

record just half the amount of current that is passing.

We want to make a shunt with a resistance equal to that of the windings, but we don't know what this resistance is. Actually it varies a good deal according to the make. Six of my milliammeters have resistances respectively of 55, 50, 50, 36, 28, and 10 ohms.

Use Eureka

We can take it that the resistance of the milliammeter is not likely to be much more than 60 or less than 10 ohms, for this last figure is exceptionally low. No. 34 Eureka wire has a resistance of a fraction over 10 ohms per yard; the actual figure is 10.13. This is very convenient material for shunts, and I recommend the double-cotton-covered variety.

In the rim at either end of a cotton reel pierce a small hole. Anchor the end of your wire to one of these by taking it twice round and pulling through six inches or so. Measure off, say, six yards, and wind this on to the cotton reel, anchoring the "out" end in the same way.

Connect your milliammeter into the common high-tension negative lead of the set as indicated in Fig. 1, switch on and adjust by varying plate, filament or grid potentials until the needle is pointing exactly to a line about two-thirds round the scale.

Halving the Reading

Now connect one wire from your shunt to the positive terminal. Bare the end of the other wire and touch it against the negative terminal of the instrument. We will suppose

IMPROVED APPEARANCE



Besides making for greater efficiency, a meter always enhances the appearance of a set to no small extent.

that the original reading was 16 milliamperes. If the resistance of the shunt were exactly the same as that of the instrument's windings the reading would come down to precisely 8 when the wire was placed on the negative terminal.

THE TRIAL WINDING

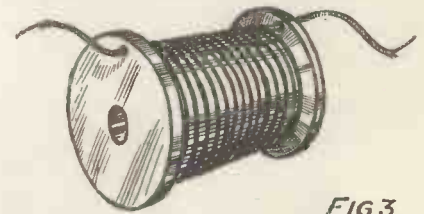


FIG. 3.
A2028
The experimental shunt, which takes the form of a length of wire, can be very conveniently accommodated on an old cotton reel, or wire bobbin.

If it is more than 8, as it most likely will be, then the shunt is not taking enough current—in other words, its resistance is too high and some wire must be stripped off the cotton reel. In the unlikely event of the reading being below 8 you know that you have not sufficient wire in the shunt and you must add some more. The odds are, though, very heavily upon your having too much.

A Final Trim

The reading itself will give you an indication of how much superfluous wire the shunt contains. If connecting the shunt to the negative terminal brings it down to, say, only 13 or 14 milliamperes, then clearly you are dealing with a very low resistance instrument and you can take off quite a number of turns from the reel before you test again. On the other hand, should it be only, say, 9, then you must go carefully.

As the reading when the shunt is connected to the negative terminal of the milliammeter becomes closer and closer to the desired figure, you must snip off less and less of the wire until towards the end you are removing only half an inch or so at a time. Continue until you obtain exactly half the original reading.

For Fives and Tens

If you wish to make a shunt for a five times or a ten times scale reading the procedure is exactly the same. For example, to make a 0 to 10 milliammeter to read from 0 to 50 it would be convenient to make the current 7.5 milliamperes and to adjust the shunt until a reading of exactly 1.5 was obtained.

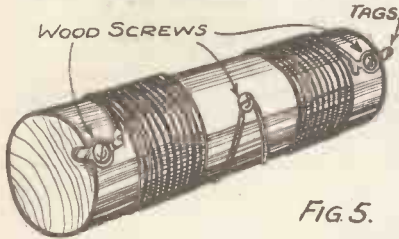
Similarly, when making a 0 to 2 milliammeter read from 0 to 20.

An Easy Method of Making Multi-Range Meters

make the initial current 1.5 milliamperes—only one valve will be required for this—and continue trials with the shunt until you obtain a reading of .15.

If possible after the trials just suggested the instrument with the shunt

THE FINISHED SHUNT



A2030
When the right amount of wire has been arrived at it can be taken off the reel and wound on a circular length of wood in the manner shown above. This ensures an astatic or non-inductive winding.

should be tested against a high-class instrument (probably some friend possesses one) of known accuracy. Any small adjustments needed can then be made.

Making It Astatic

Fig. 5 shows how the finished shunt was made. Obtain a piece of wooden rod of suitable length. Close to either end drive in a wood-screw with two tags under its head. A third screw is driven in at the middle of the rod.

Strip the wire carefully off the cotton reel used for the trial shunt and solder one end to one of the tags. Wind on half the wire in a clockwise direction, then take half a turn round the screw in the middle and put on the remainder of the wire counter-clockwise.

Solder the "out" end to the second tag. If there is any difficulty in making the end of the wire just reach the tag the position of the middle screw can be altered suitably.

A shunt wound in this way is astatic, rather an important point sometimes in sensitive sets using a considerable amount of high-frequency amplification. In any case, unless ample de-coupling circuits are provided in the set the milliammeter with its shunt should have a large fixed condenser in parallel as shown in Fig. 1.

The On-Off Switch

If this is not done it may be found that the windings of the instrument have a wave-length of the same order as that of the station tuned in or one

of its harmonics, in which case queer results may occur.

Once the shunt has been made it is an easy business to make a milliammeter cover either its original range or the greater one provided by the shunt. The only component needed is a simple on-and-off switch, and Fig. 6 shows how the wiring is arranged.

With the switch open as shown in the drawing the shunt is out of action, so that the instrument has its original small range. Close the switch and the shunt comes into operation. The instrument then reads the multiple of its original range for which the shunt was made.

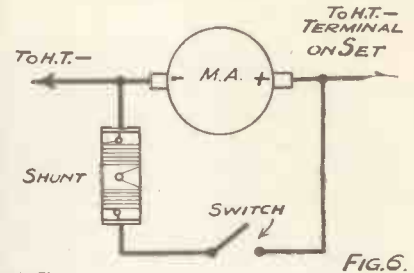
A Quick Change-Over

The switching arrangement is exceedingly handy when an instrument covering originally, say, from 0 to 20 milliamperes is used with a large set. When no great volume is required from the loud speaker a single super-power valve strongly biased will suffice in the last holder.

The total plate current will then be well within 20 milliamperes, and the instrument is best used without the shunt. When greater volume is required, or when the set is being arranged for reception of super-fine quality, a valve of the L.S.6 or P.625A. class, or even two valves in parallel or push-pull, may be employed in the output stage. This means a considerable increase in the

plate current, but when the switch is closed the milliammeter will be able to deal with it.

A TWO-RANGE "JOB"



A2031
By having a switch for connecting or disconnecting the shunt it is a simple matter to change quickly from one "scale" to another.

A SHORT-WAVE REMINDER

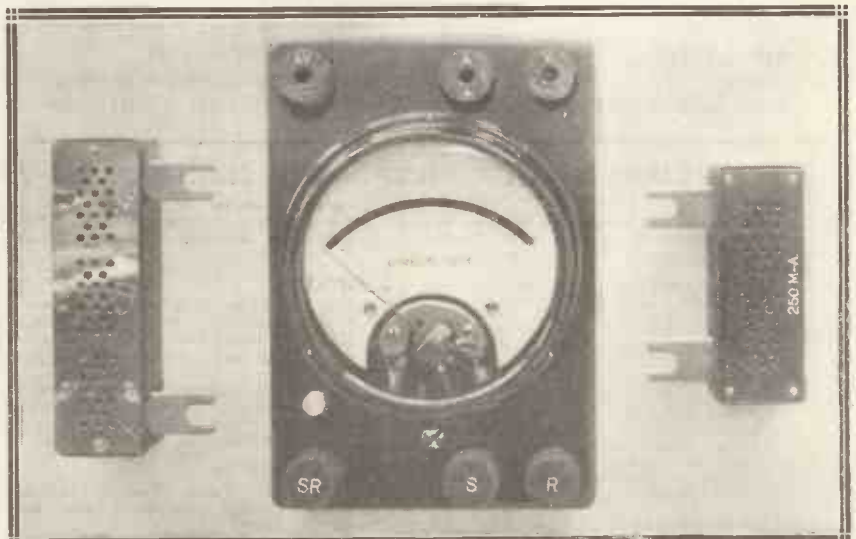
Those Unwanted Noises.

I HAVE often found that a bad aerial connection anywhere in my immediate neighbourhood plays old Harry with my short-wave receiver.

In one case the only cure was the use of a screened-grid stage, which by virtue of acting as an "aerial decoupler" effectively stopped them all. If you do not care to go to this trouble—although I assure you it is well worth while for other reasons—simply loosen your aerial coupling as much as you can, and put up with what noise is left.

W. L. S.

IT READS VOLTS, AMPS. AND MILLIAMPS.

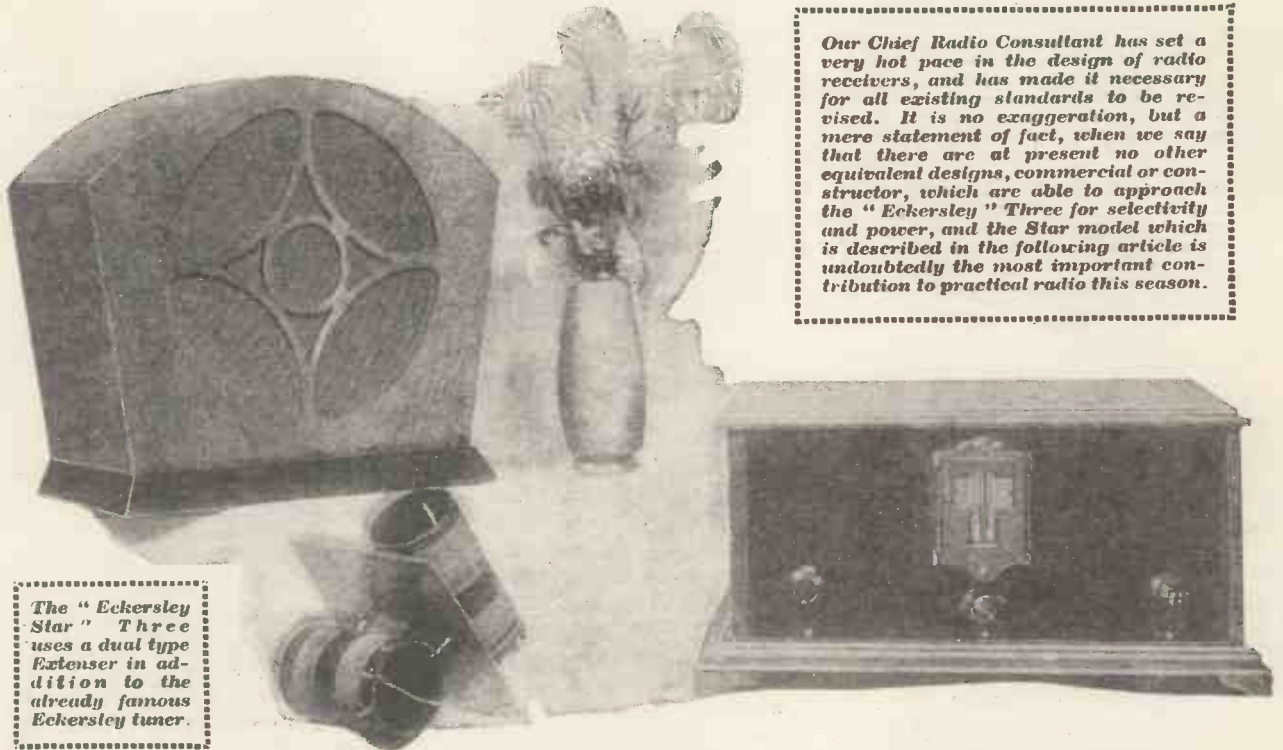


This combined instrument is a commercial model of the type of meter, described in this article. With interchangeable shunts and series resistances it is possible to use it for covering about fifty different ranges.

ANOTHER MAGNIFICENT SET DESIGNED ESPECIALLY FOR HOME-CONSTRUCTORS

By the **ORIGINATOR OF REGIONAL BROADCASTING**

Our Chief Radio Consultant has set a very hot pace in the design of radio receivers, and has made it necessary for all existing standards to be revised. It is no exaggeration, but a mere statement of fact, when we say that there are at present no other equivalent designs, commercial or constructor, which are able to approach the "Eckersley" Three for selectivity and power, and the Star model which is described in the following article is undoubtedly the most important contribution to practical radio this season.



The "Eckersley Star" Three uses a dual type Extenser in addition to the already famous Eckersley tuner.

LAST month I gave details of my first home-constructor receiver—a set that has marvellous powers of cutting out interference, enabling uninterrupted reception to be obtained even when the station is badly heterodyned.

Many readers, however, have asked for an "Eckersley" Three incorporating the famous Extenser, instead of the ordinary tuning condensers and wave-change switching.

I have been trying the tuner in

more and more different ways. I took it to the South Coast. I got Mühlacher free from London. I got London free from Mühlacher. Quality quite good. Oh, yes, it works! It's terribly simple, it's wonderfully selective. I don't mind telling you I'm rather bucked about the whole thing.

"Amazing Simplicity of Operation"

Let it be noted also, in passing, that I've compared certain band-pass cir-

cuits. No, they pass too many bands. A reliable friend told me he'd taken curves of certain band-pass circuits. He found one peak 50 kilocycles away from another! I think the simpler scheme described hereunder may not be perfect, but it's an advance. And we do want advances.

So here it is—a "drum-extensured" model that will really surprise all who build it because of its amazing simplicity of operation and astounding sensitivity.

Incidentally it will render its owner

CHOOSE YOUR COMPONENT MAKES FROM THIS COMPLETE LIST

PANEL

16 in. x 7 in. (Permol, Becol, Wearite, Goltone, Peto-Scott, Ready Radio, Parex).

CABINET

With 12-in. deep baseboard (Pickett, Camco, Peto-Scott, Gilbert, Ready Radio, Osborn).

EXTENSER

1 .0005 double-drum (Cylton, Wavemaster).

VARIABLE CONDENSERS

1 .0003-mfd. solid-dielectric self-shorting type (Ready Radio, Ferranti).

1 .0001-.00015-mfd. differential reaction (Lotus, Telsen, Cylton, Ready Radio, Polar, Dubilier, J.B., Lissen, Parex, Formo, Burton, Wavemaster, Graham Farish, Astra, Igranio).

FIXED CONDENSERS

1 .0003-mfd. (Dubilier, T.C.C., Telsen, Edlswan, Mullard, Lissen, Ferranti, Igranio, Watmel, Formo, Graham Farish, Goltone, Sovereign).

1 .01-mfd. (Dubilier, etc.).

1 2-mfd. (Telsen, Igranio, Dubilier, T.C.C., Ferranti, Sovereign, Hydra, Helsby, Formo).

RESISTANCES

1 2-meg. grid leak (with holder if necessary) (Graham Farish, Igranio, Telsen, Ready Radio, Dubilier, Mullard, Sovereign, Loewe).

1 .5-meg. leak (and holder) (Graham Farish, etc.).

1 100,000-ohm Spaghetti (Varley, Sovereign, Telsen, Lewcos, Igranio, Bulgin, Ready Radio, Peto-Scott, Goltone).

1 25,000-ohm Spaghetti (Goltone, etc.).

COILS AND CHOKES

1 "Eckersley" Tuner (Wearite, Goltone, R.I., Sovereign, Lewcos, Formo, Melbourne, Parex).

1 H.F. choke (Lewcos, Telsen, R.I., Sovereign, Varley, Wearite, Peto-Scott, Ready Radio, Atlas, Climax, Graham Farish, Dubilier, Lotus).

SWITCH

1 on-off snap type (Ready Radio, Bulgin, Colvern, Igranio, B.A.T.).

L.F. TRANSFORMER

1 ordinary ratio (R.I., Hypermu, Lotus, Varley, Climax, Telsen, Graham Farish, Ferranti, Goltone, Formo, Atlas).

VALVE HOLDERS

3 4-pin type (Graham Farish, Lotus, Igranio, Telsen, Formo, Lissen, W.B., Clix, Wearite).

MISCELLANEOUS

2 terminal blocks (Belling & Lee, Sovereign).
4 terminals (Belling & Lee type B, Goltone, Bulgin, Igranio, Eelox, Clix).

1 Extension screen (see text), 6½ in. x 6 in.

1 G.B. battery clip (required if small power valve is used: if larger valve fix G.B. battery on back of cabinet). (Burton, Bulgin.)

Quickwire, Glazite, Lacolinc, Jiffilinx.
Spade terminals, battery plugs screws, flex, etc.

The "Eckersley Star" Three

Designed and Described by CAPT. P. P. ECKERSLEY, M.I.E.E.

the envy of all his radio neighbours—no mean achievement in these days of advanced technique.

To get "down to brass tacks," let us examine the features of the Extenser model of the "Eckersley" Three, and check up the parts required for building it.

A Fine Investment

Here, then, let me say that this set is not unduly expensive, as you will see from the kit advertisements. It

costs a little more than many cheap three-valvers, but it gives very much more in the way of results.

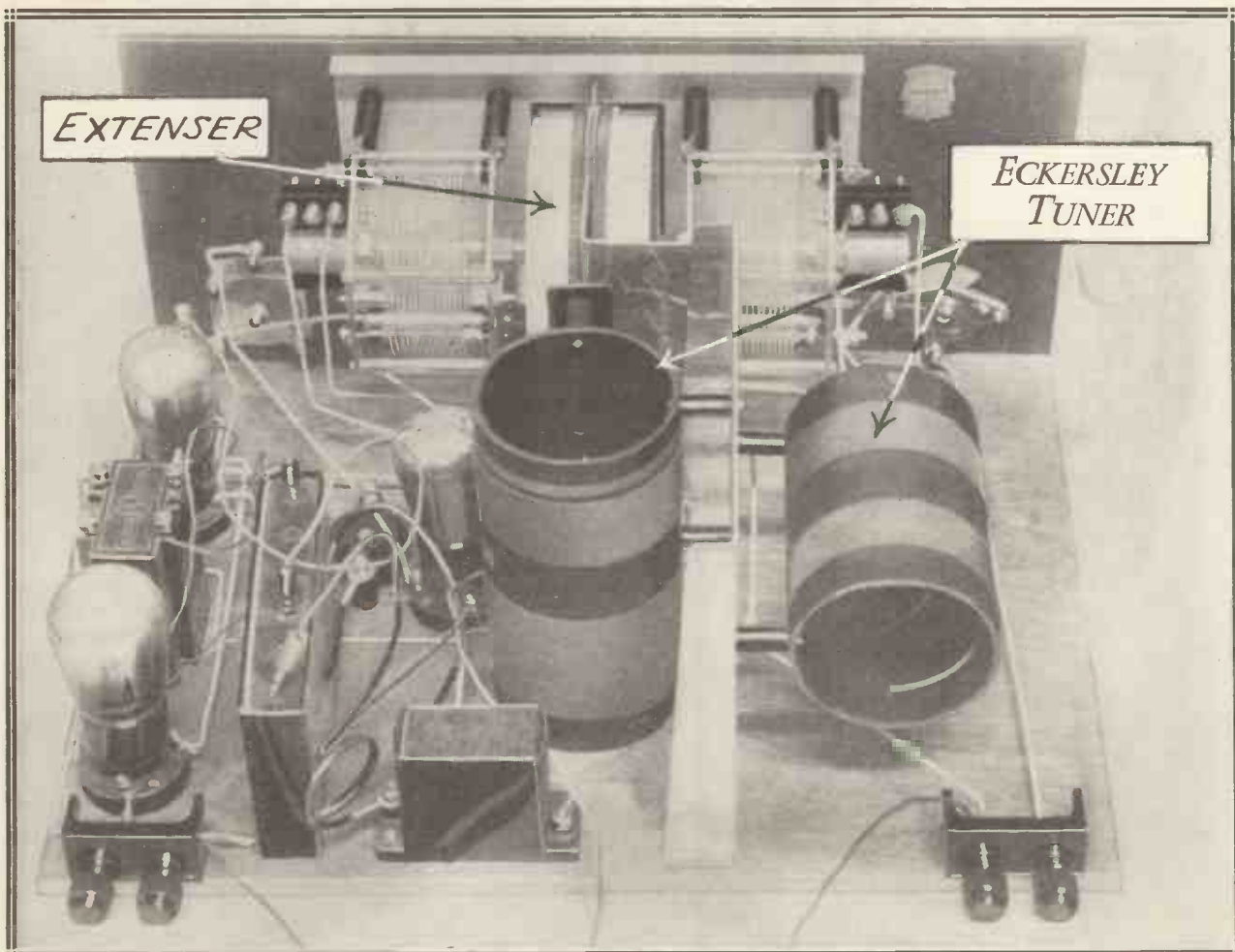
Certain circuit modifications have been made which enable the price to be kept down to a minimum, but of these more later on. The fact remains that for the service given the "Eckersley Star" Three is remarkable value for money.

Don't forget what you are going to get for the few pounds the kit of parts costs. You cannot truly judge the set

by ordinary standards, because if it is appraised by the ordinary coil criterion it leaves it stone cold in selectivity, and if you compare it with the usual band-pass arrangement it "whacks it hollow" on sensitivity. To high selectivity and high sensitivity add the fact that you have no wave-change switches to manipulate—just a tuning drum—and you will begin to realise what a remarkably fine investment the receiver is.

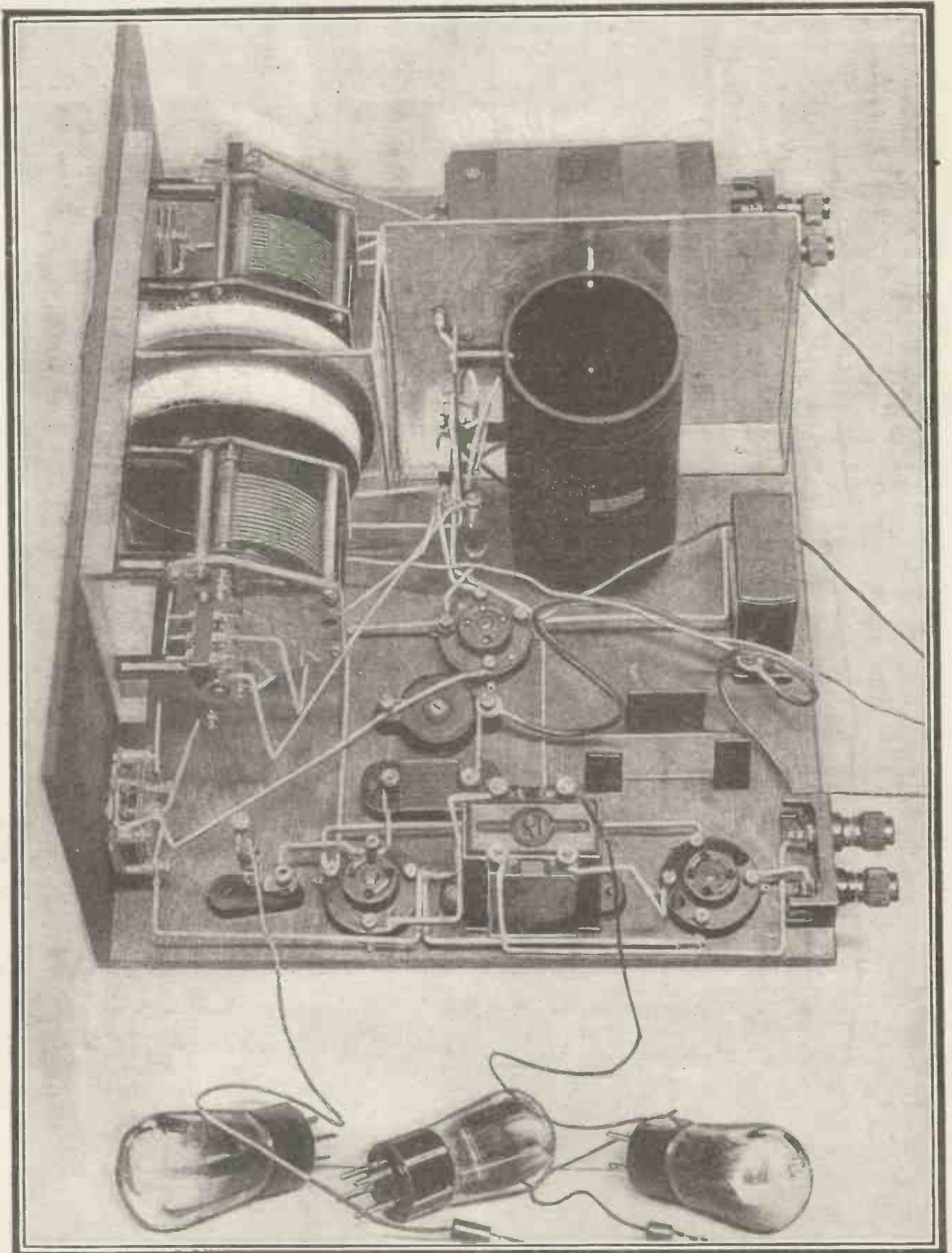
And it is so simple to build, too!

Two Ultra-Modern Components Working Together



The dual-type Extenser not only eliminates two wave-change switches, which otherwise would be essential, but also assists in the efficient operation of the two tuned circuits by shortening and reducing the wiring.

A Fine Receiver For Bringing in Foreign Programmes



It Equals Most Sets Having Complex S.G. Stages

Anyone can do it; even if he has never built a set before he can hardly go wrong, while there are no fiddling adjustments to be made before the set is ready for operation.

The double-drum Extenser doesn't need trimming, for each drum is rotatable separately, and so the inefficiency so often born of badly trimmed receivers cannot possibly be introduced into this set.

Efficiency Ensured

If it is reasonably carefully constructed it cannot help being efficient.

And apart from that given above there is a very good reason why the highest efficiency must be maintained. Every manufacturer of the "Eckersley" Tuner has submitted specimens to me and has had them personally passed after stringent laboratory tests.

So you can rest assured that the two tuned circuits, by virtue of their accurate tuning and the fact that only approved tuners are on the market (see those mentioned in our list of components), must of necessity give the very highest efficiency.

This, coupled with a perfectly straightforward but indisputably sound L.F. end, completes a receiver that is destined to be the finest "three" of the season.

Before going into the actual "screws and wire" part of the construction of the set, let us have a look at the panel layout. There are few things on this piece of 16 in. by 7 in. ebonite. From left to right they are: volume control, tuning control, and reaction, while underneath the second-named is the on-off switch. A clean, business-like-looking panel, is it not?

A Switch Tip

And just as the panel spells ease of control and efficiency, so the inside of the set denotes ease of construction.

A brief glance shows that there is very little "to it," as they say; in fact, apart from the mounting of the "Eckersley" Tuner and its accompanying screen extension, there are remarkably few components to be fixed.

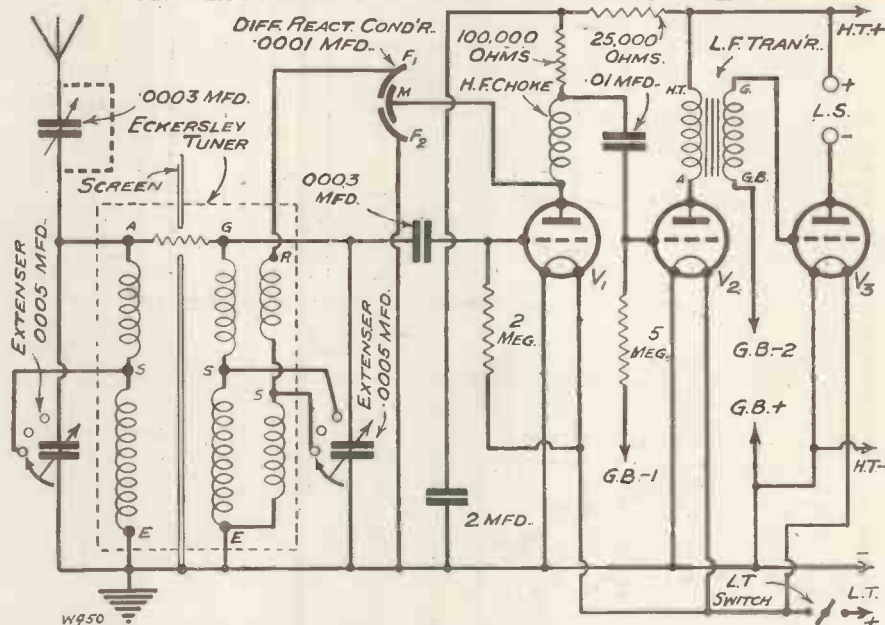
There is, however, a good and a bad way to set about the building of the set, for you can, for instance, make the wiring very much less easy than it should be if you leave the wiring of the on-off switch until all the components are mounted on the baseboard and on the panel.

This switch should be wired up before the Extenser unit is mounted on the panel, so that the terminals on the switch can easily be got at.

Apart from this one component,

tion can be removed by tuning adjustment on the "Eckersley" Tuner itself, and it is only in cases of very bad sideband interference that the high-note attenuator is required.

AN ENTIRELY NOVEL ARRANGEMENT



The "Eckersley" Tuner itself is, of course, quite new, and in conjunction with the Extenser it helps to make a circuit which possesses a most marked degree of originality.

however, all the wiring can be carried out quite easily with every component in position.

It will be noticed that the low-frequency high-note filter that was included in the "Eckersley" Three last month has been omitted from this design, as also has the output filter system. This has been done not because of any disadvantage in such arrangements, but solely to simplify the receiver as much as possible and to keep down the price.

Unless you are going to use a large output valve, such as the P.625A., or a D.C. mains unit, the output filter system is not an essential. It is useful where loud-speaker extension wires are employed, but it is such a simple thing to add that we have left it to the home constructor to include it if he feels he really requires it, and in a great many cases he will not need such a filter.

Filter Can Be Fitted

As regards the high-note attenuator, the inclusion or exclusion of this can also be left to the individual to meet his particular requirements.

A great deal of the heterodyning that interferes with broadcast recep-

Working on the same principle as before, therefore, it is wasteful in these days of financial stress to include things in a receiver when they may not be required. Better is it to try the set without them and then

RECOMMENDED ACCESSORIES

- Loud Speaker.—(Blue Spot, H.M.V., Amplion, Marconiphone, Undy, Celestion, W.B., Graham Farish, Mullard, Epoch, R. & A., B.T.H.)
- Valves.—1 Det., 1 L.F. and 1 super-power type (Mazda, Osram, Mullard, Marconi, Six-Sixty, Cossor, Lissen, Dario, Tungram). High-tension consumption at 120 volts, using average super-power valve, 16 m.a.
- Batteries.—H.T., 120-volt triple capacity (Pertrix, Drydex, Ever Ready, Magnet, Ediswan, Columbia).
- G.B., 9-18 volts, to suit output valve (as above).
- Accumulator.—2-, 4- or 6-volt, to suit valves (Exide, Lissen, Ediswan, Pertrix, G.E.C.).
- Mains Unit.—(Regentone, Formo, Atlas, Tannoy, Ekco, R.I., Heayberd, Lotus, Tunewell). (State type and voltage of mains and give details of set when ordering.)

add (a very easy matter) if they are found necessary.

This addition can be done exactly as shown last month, so for the present

Ample Power For Quality Loud-Speaker Results

let us continue the construction of the set on the assumption that it is more likely than not that such a filter system will not be required.

You will probably wonder why, if I am so keen on keeping down the price, I have used a rather expensive L.F. transformer.

Choice of Transformer

My answer is this. There are plenty of good cheap transformers on the market, but their manufacturers would not wish us, or anyone else, to mislead the public into thinking that, excellent value as it is, a transformer costing only a few shillings is necessarily every whit as good as one costing a pound.

It pays to use the best transformer you can afford, and I consider that this receiver deserves one of the very best. You may not be inclined to go to such an expense, at any rate, at first, and so the list of components gives a selection of alternatives, at varied prices, that will give good results with the set. The final choice I must perforce leave to you.

There is one part in the construction of the receiver that you may be tempted to leave out. It is the auxiliary or extension screen from the main coil screen to the panel, between the two drums of the Extenser.

Apparently rather unimportant, as stability in no way depends upon it, this screen is actually essential to the proper working of the coil, for failure to use the screen would result in a high degree of capacitive coupling between the two tuned circuits, by way of the variable condenser sections.

The Second Screen

Such capacity coupling must be kept down and so the extension screen is a vital part of the receiver's construction. In this set it consists of a piece of aluminium or copper $6\frac{1}{2}$ in. long and 6 in. high, bent at right angles $2\frac{1}{2}$ in. from the end, which is bolted to the side flange of the coil screen.

The larger arm of the extension screen is passed between the two Extenser drums, the whole being kept rigid by the bolts on the main screen and by a couple of screws through the flange on the foot of the screen. This extension screen will, of course, have to be cut away to allow room for the on-off switch, which will have

been wired up before the screen, coil unit or Extenser were placed in position.

A word might be said about the series aerial condenser, which is of the solid-dielectric type. The one used is a Ready Radio new "self-shortening" type, in which the minimum position of the moving vanes provides a short-circuit of the condenser.

This is essential for satisfactory operation on the long waves, and a condenser of this type obviates the necessity for a short-circuiting switch to cut out the series condenser.

Aerial Condenser Adaptation

Should, however, you not desire to purchase a .0003-mfd. solid-dielectric condenser (having one already in stock) you can arrange something of a shorting device by fixing a piece of copper foil across the end of the fixed vanes, in such a position that the moving vanes come down on the foil at their minimum capacity position. The foil, of course, is in

metallic connection with the fixed vanes.

Then, as in the case of the proper commercial article (which, by the way, can also be obtained from Ferranti), all that has to be done is to turn the condenser to its minimum position and it is automatically short-circuited.

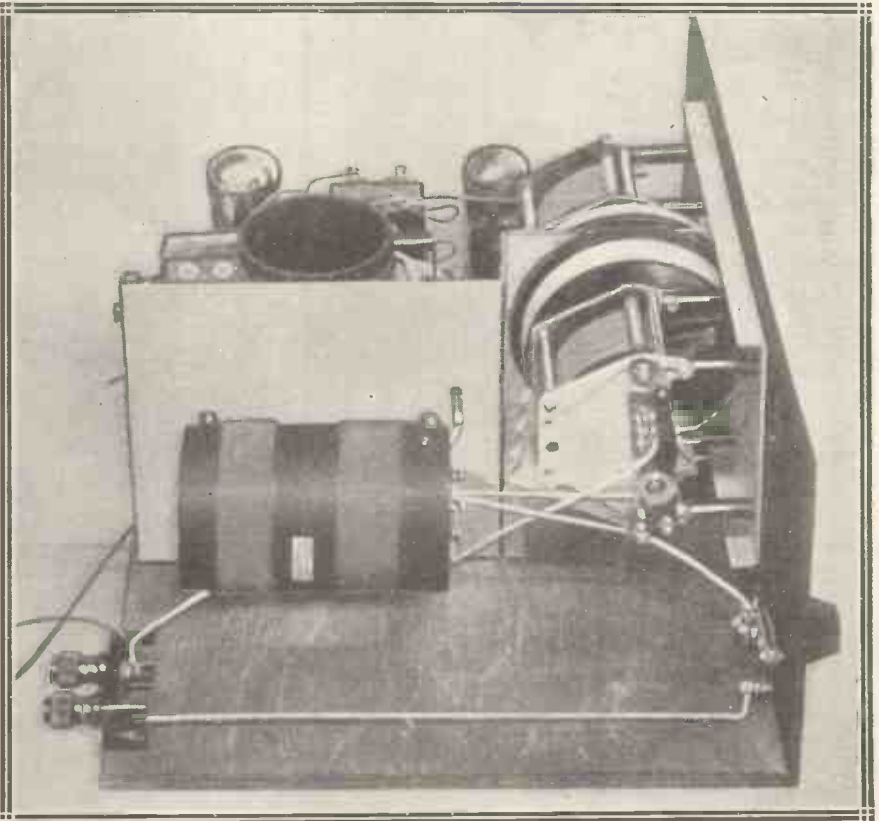
Straightforward Construction

The rest of the construction is perfectly straightforward, though it should be borne in mind that no deviation from our layout should be permitted, as the positioning of the parts of a set of this description is of vital importance.

One H.T.+ tapping is used, the voltage to the detector being sufficiently "broken down" through the anode and de-coupling resistances. So you can go right ahead and use 120-150 volts on the set with every assurance that reaction will be quite O.K. and signal strength above reproach.

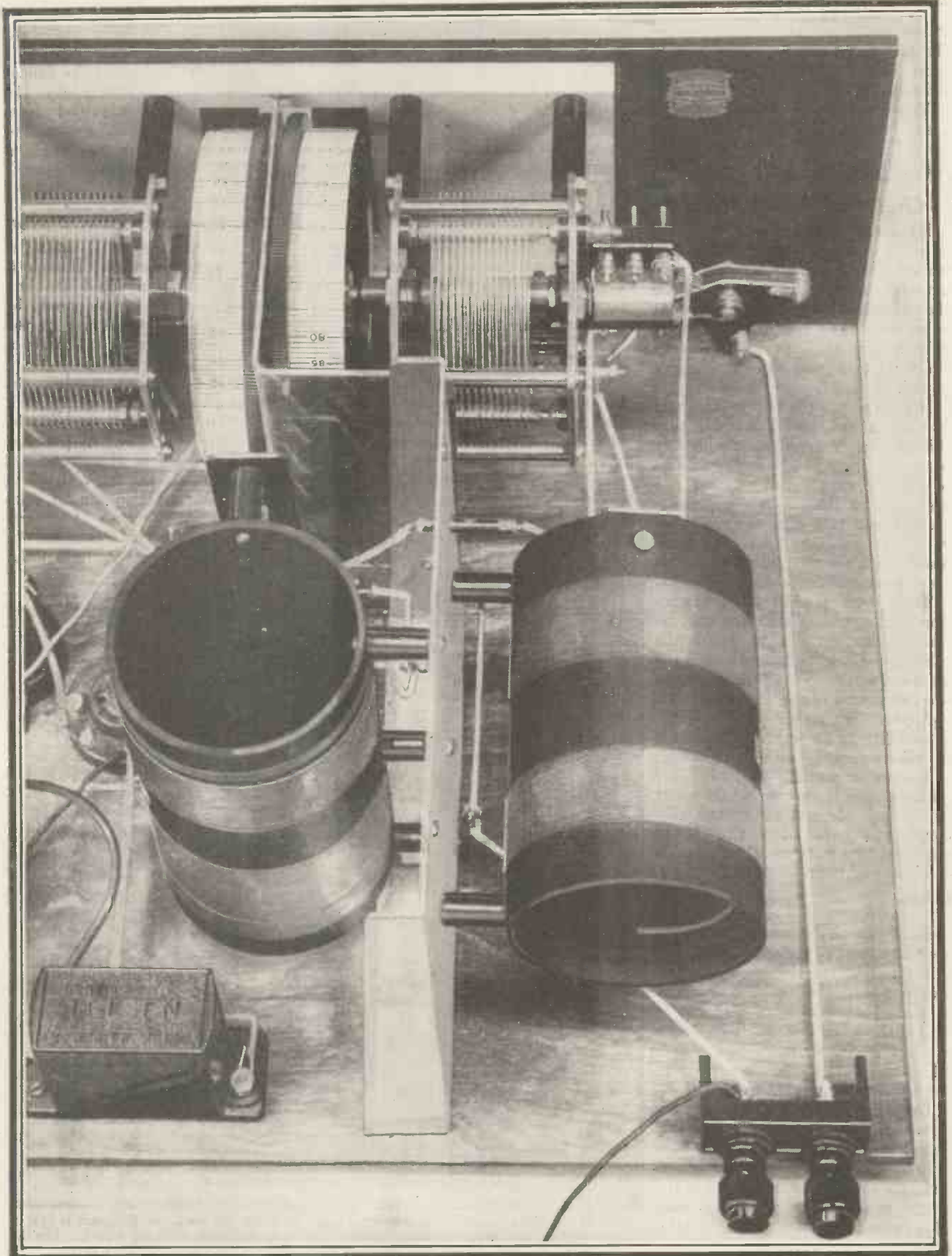
The valves recommended are of the

NO DIAL-READING DUPLICATIONS



One of the most important advantages accruing from the use of an Extenser is that no dial reading can represent two stations (one long and one medium wave). The dial readings run straight up from 0 to 200 and cover medium and long wave-lengths in a logical sequence.

You Will Find it Easy to Separate the Stations



Your "Local" Cannot Spread Over the Dials

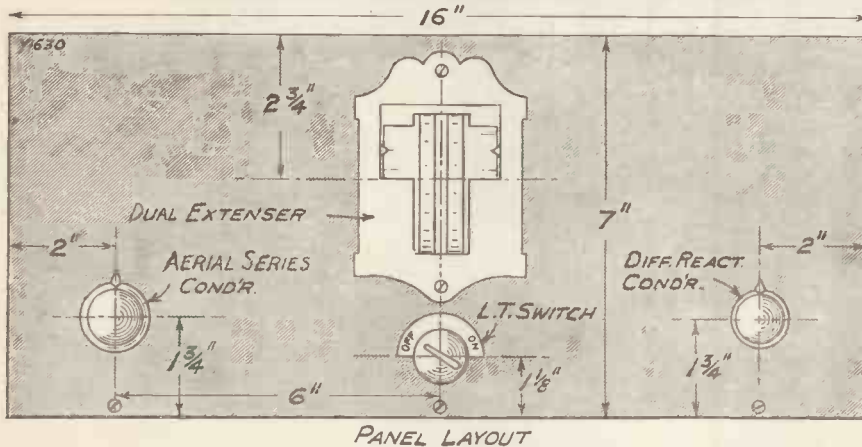
usual types—det., 1 L.F. and power—and those that have been tested with every satisfaction in the set are given in the accessories list.

The long waves are obtained by placing the series condenser at minimum (shorted) and rotating the Extenser drums between 100 and 200

This merely consists of three Spaggetti resistances, a 5,000 and two 10,000 ohms, joined together and placed in series between the .01-mfd. condenser and the grid and grid-leak, instead of the .01 going there direct.

Then from the junctions of the "spags" connect .0005-mfd. fixed condensers to L.T. —.

THE CONTROLS ARE STRAIGHTFORWARD



No control complications of any nature are introduced—indeed the Extenser completely simplifies matters in this regard.

In operation the set is extremely easy, and you can hardly fail to get really good results right away. The right-hand drum of the Extenser is the more critical of the two. And here it should be said that the *centre* screw of the Cyldon Extenser cam should be screwed right home, thus metalically connecting the cam to the moving spindle.

Try the set first on your "local"—say, the London Regional if you are "down south," or the Northern Regional if you are towards the other end of the country. The former will come in at about 50–60 degrees and the latter round the 75 mark. I am talking about the right-hand drum, the readings of which are not affected by aerial size.

The Aerial Condenser

The series aerial condenser should be placed half "in," and the left-hand drum brought up to round about the same figure as the other. Then you will soon locate the station (if you are some distance away, with a "spot of reaction"), when adjustment of the drums and the series aerial condenser will enable you to get the maximum strength or maximum selectivity, as required. Incidentally the series condenser also acts as a very good volume control.

Now find some more stations and make a note of their readings on the right-hand drum, and thereafter you will be able to find them at a moment's notice.

(medium waves being between 0 and 100).

Now, suppose you have burbling, whistling sideband interference on some station. By altering the left-hand drum you should be able to get rid of most of it, or by variation of the series condenser.

If no alteration of the tuning will cure the trouble you might like to add the L.F. filter, as shown last month.

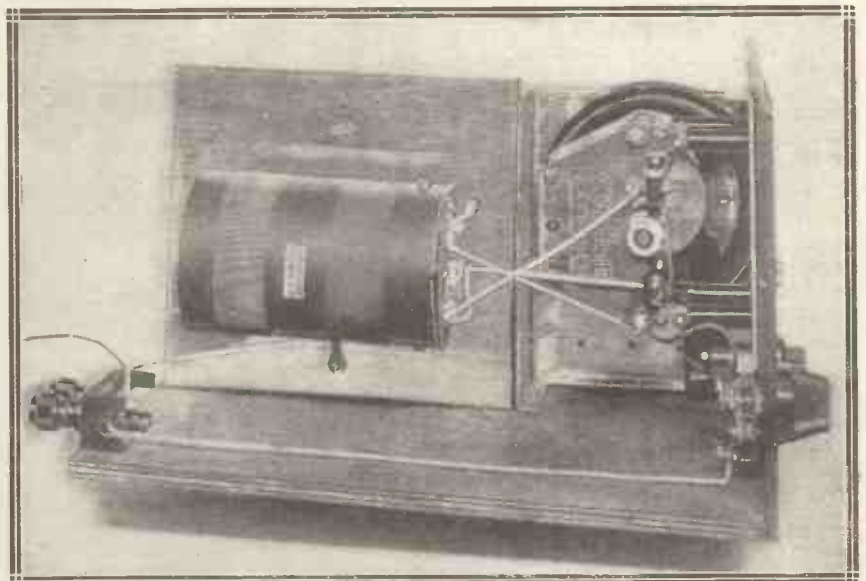
Fitting the Filter

We then have the following connection: .01 mfd. to 5,000-ohm "spag," other side of this to 10,000-ohm "spag" and to one side of .0005-mfd. condenser. Other side of 10,000-ohm "spag" to another 10,000-ohm resistance and to a second .0005-mfd. condenser. End of this 10,000 resistance to a third .0005-mfd. condenser and to grid and grid-leak.

The rest of the circuit is left as before, and the three condenser "free" ends are all joined to G.B.—1.

Now you should know! I wish you the best of tuning. Remember, the circuits are so sharp you'll do well to write down the adjustments for best reception once and for all. Remember the smaller the aerial series condenser the more selective the device, but the weaker the signal. Don't push reaction too far, it's not necessary. Good-bye, good luck!

THE SHARP TUNING WILL ASTONISH YOU



Unlike most ordinary tuners the "Eckersley" Tuner gives razor-sharp tuning without the necessity of numerous tuned stages coupled by H.F. valves. So you must not anticipate that the local station will thump in at almost any dial reading within a wide scale area. It won't. You will need to tune for it just as you do for distant stations—but there'll be none of that volume-loss ordinarily associated with such a spectacular performance.



By "TONE ARM."

A Very Fine Pick-up: the Marconiphone No. 17—G.E.C. Bring Out a New Motor.

ILLUSTRATED on this page is the Marconiphone pick-up model No. 17, which I have just been putting through its paces.

Inside the box is a leaflet showing how the instrument can be used, and what are its characteristics. On test I found the sensitivity a little above the 1 volt R.M.S. which the makers take as their standard average output. In fact, the sensitivity is so great that one has to be careful in employing the pick-up in an ordinary receiver that overloading of the first valve does not take place.

A Fine Pick-Up

To accomplish this precaution it is absolutely essential that a volume control (250,000 ohms recommended) of the usual potentiometer type be placed across the instrument.

As regards construction, the pick-up is of the highest quality, and its curve shows a very valuable response.

I say valuable, because it is so arranged that the failings in the recording curve are largely made up by the response of the pick-up. Thus where the bass begins to drop off badly in the record the curve of the pick-up begins to rise, the final result being a fairly even response from about 80 to 3,000 cycles.

At this figure the response curve of the Marconiphone pick-up falls away rapidly, so that the scratch trouble, so often one of the minor bugbears of electrical record reproduction, does not really make itself felt. Naturally, such an early cut-off has its disadvantages in that the higher harmonics, which are recorded with what may be called the "scratch band" of

the record, do not get their full due in the reproduction. But balancing up the disadvantage of prominent scratch with the advantage of well-reproduced harmonics one is inclined to agree with the Marconiphone engineers and say, as they do in effect: "Cut down the scratch, even if we lose some of the high stuff—it is very much more enjoyable so."

Quite Inexpensive

Yes, the Marconiphone pick-up, which sells by the way for £2 5s., is a really enjoyable instrument. Its sensitivity leaves nothing to be desired, while its bass lift, and the commendable absence of scratch, and indeed its whole curve, as applied to the average record and receiver, place it in the front rank.

The new "Magnet" electric gramophone motor (induction type) just placed on the market by the G.E.C.

has been designed to operate on A.C. mains of 100-125 and 200-250 volts with periodicities between 40 and 60 cycles.

The motor runs at turntable speed, i.e. 78 r.p.m., and functions without hum or noise; an obvious advantage. It develops ample power for its purpose, so that its speed under varying load conditions remains constant, and is not affected by slight variation of voltage.

The G.E.C. Motor

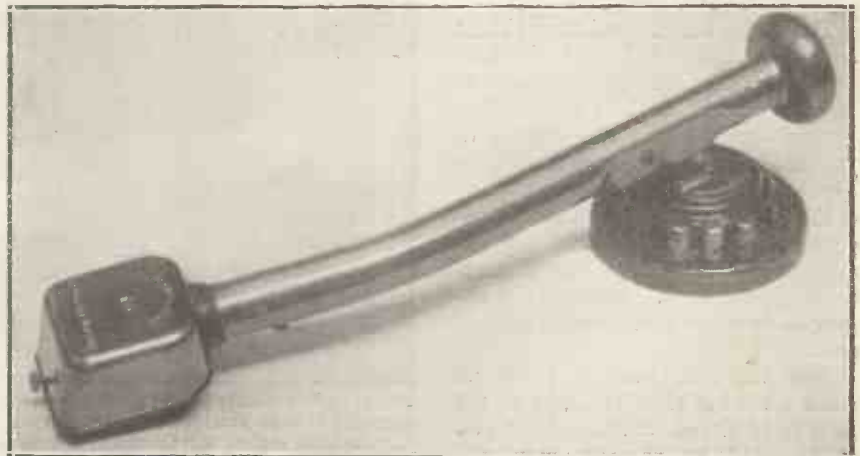
Lubrication of the main motor bearing is effected through an oiling hole provided in the turntable spindle, and as there are no brushes or other wearing parts requiring renewal, the appliance generally requires very little attention. The fixing plate, turntable and switch are finished in bronze, and therefore will tone with any surrounding woodwork.

All metal parts can be earthed by a specially fitted earthing terminal, and the motor being of the induction type there is no radio interference.

Being supplied complete with fixing plate, the mounting of this motor in almost any existing gramophone cabinet is a simple matter. Only one hole has to be cut in the motor board, and the fixing plate is screwed into position with the screws provided in the general equipment. The latter includes a completely automatic starting and stopping switch designed to operate on any record with a run-off groove.

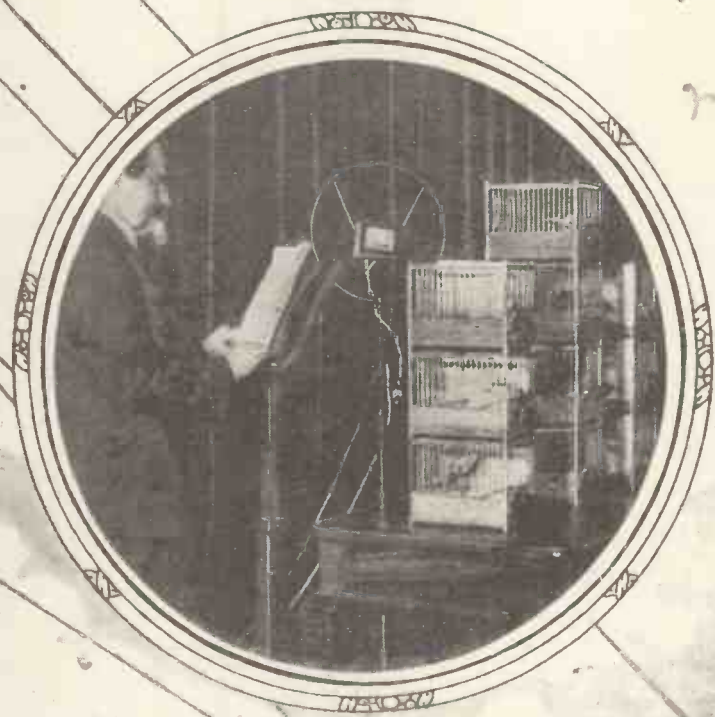
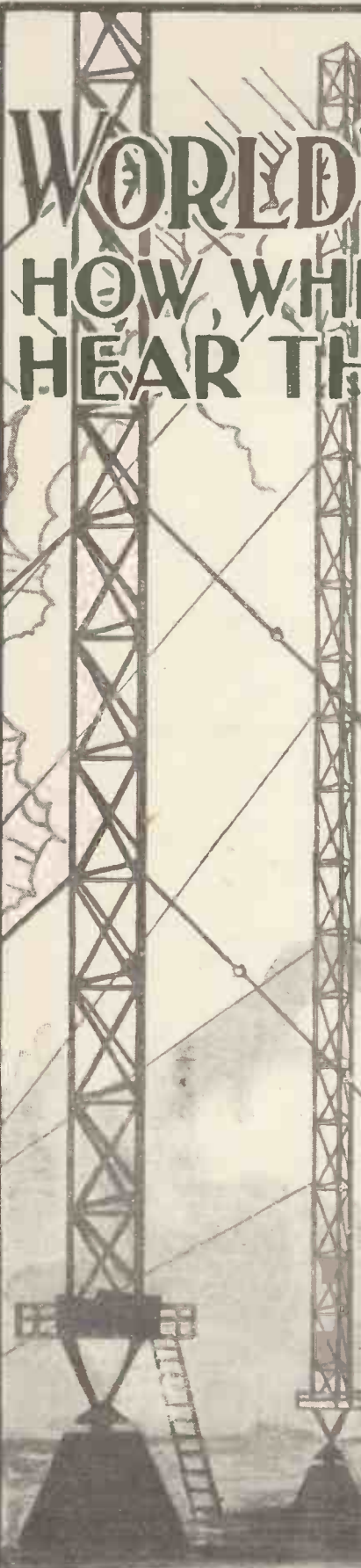
Movement of the pick-up or tone-arm to the outer edge of the record switches the motor on, and it is automatically switched off without any previous setting. The switch also operates a brake, which engages with the inside rim of the turntable, and thus brings it to a standstill.

THE LATEST MARCONIPHONE PICK-UP



A general view of the Marconiphone pick-up No. 17. It is sturdily built and capable of providing excellent record reproduction.

THE WORLD'S PROGRAMMES HOW, WHEN AND WHERE TO HEAR THOSE FOREIGNERS



CANARIES SOMETIMES SING at the Vienna station, so a radio canary concert was arranged one Sunday, and here is a view of the birds just before the microphone was switched on.

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Station Information
Countries to Listen for—Holland
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"The World's Pioneer Broad-
casting Station"
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Doing
The Biggest Ever!
The Pride of Prague

Firm Favourites of the Short
Waves
A Radio Sunday in Spain
The Medium Waves
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STATION INFORMATION

Brief items of interest to the long-distance listener, and news of new stations on the air or in construction.

PEGAU is the actual site of the new Leipzig station, which is to have a maximum power of 150 kw.

RADIO LYONS, which has been testing on a power of 30 kw., will be able to increase this to 60 kw. if needed.

ST. ANDRE DE CORCY, a village on the Dombes plateau, has been provisionally chosen as the ultimate site for the new Radio Lyons high-power station.

licence to lapse, and the Auckland, Christchurch and Dunedin stations will in future be controlled by a governing body under a chairman, very much on the lines of the B.B.C.

ROME is solving the silent-studio problem by having its eight main studios underground in the new Broadcasting Palace.

LUXEMBOURG tests are due to begin about the middle of March, and July 15th is

RADIO FLORENCE has been allotted the old Milan wave-length of 501 metres, the latter station taking 331.5 metres.

FIRENZE (which is Italian for Florence) is a 20-kw. station, and will take its programmes from Milan, Naples, Rome and Turin.

HESTON AERODROME sends out a special series of weather reports for the A.A. on a wave-length of 833 metres. Times: 08.45, 09.30, 10.30, 11.30, 12.30, 14.45, 15.30, and 16.30.

COLOGNE usually relays a 6 a.m. Sunday broadcast from a ship in Hamburg. Wave-length, 227 metres.

PAU, the station outside Bordeaux which is to take the place of Bordeaux-sud-Ouest, will probably be in operation this spring.

WARSAW sometimes relays a peal of sleigh bells as an interval signal—one of the most distinctive sounds on the air.

LEIPZIG expects to be testing its new station next March.



for a very powerful station to serve Italian-speaking Switzerland.

VIENNA, which has lately sounded "off colour," has been using its old War Office transmitter during overhauls of the Rosenhugel station.

BISAMBERG will probably be the site of Vienna's new high-power station.

RADIO CÔTE D'AZUR, 15 miles from Nice, is to work on 286 metres, with a power of 60 kw.

BUCHAREST broadcasts the names of radio "pirates" who are detected listening without a licence.

CANNES is to have a studio linked with the new Côte d'Azur station, to be built near Nice.

CUXHAVEN, the German coastal telephony station, announces itself as "Hier Cuxhaven Radio."

VALENCIA, the Spanish station, uses the first bars of the "Hymn to Valencia" as an opening signal.

BLOEMFONTEIN now has a relay station working on 510 metres.

PRETORIA now broadcasts in the daytime as well as in the evening, on 300 metres.

PARIS P.T.T. breakdowns, which have recently been frequent, have been due to hitches at the power-station supplying it, and not to trouble at the station itself.

CORSICA is to have a station under the General Ferrie radio plan for France:

THE MONTH'S FAVOURITES

Some selected foreign stations which are now coming over well.

	Metres		Metres
Budapest	550	Hamburg	372
Brussels No. 1	509	Stuttgart	360.5
Prague	488.6	Strasbourg-Brumath	345
Schweizerischer Landessender	459	Brussels No. 2	338.2
Rome	441	Bordeaux Lafayette	304
Stockholm	436	Hilversum	298.8
Radio Suisse Romande	403	Heilsberg	276.5
Toulouse	385	Trieste	247.7
		Nurnberg	239
		Radio Normandie	219.9

TRIESTE, like Turin, uses the song of the nightingale as an interval signal. It may frequently be heard on 247.7 metres.

RADIO MAROC has installed a new 5-kw. transmitter.

NEW ZEALAND is allowing the N.Z.B.C.'s broadcasting

provisionally named as the opening day.

MOSCOW-STALIN is the name of the new Russian station working on 424.3 metres.

P C J HILVERSUM, the famous Dutch short-waver, which closed down recently, will resume operations again in April.

ALGIERS arranged an interesting "outside" broadcast when it got the promise of a concert from "The Empress of Britain" as that vessel passed within 400 miles of the port.

MOUNT GENEROSO, near Lugano, is named as the site



Countries to Listen for— HOLLAND

FROM a radio point of view Holland might well be described as the Little Country with the Big Voice. For the Dutch stations, though few in number, are regularly and really well received in this country.

This, of course, is partly due to proximity. Hilversum and Huizen are only just over 230 miles from London, and to parts of Essex, Kent, Suffolk, and Norfolk the service they render is almost that of a second "local." Not only is the intervening distance short, but it is over sea all the way, with consequent gain in reliability and robustness of reception.

Twenty Minutes Ahead!

Dutch broadcasting has several marked peculiarities which render it interesting. For one thing the time observed—twenty minutes ahead of Greenwich—is unlike that of any other country. So that if you hear a station's chimes indicating 12 o'clock when our own clocks say 11.40, you may be sure it is a Dutch station.

Another peculiarity is that of periodical wave-length exchanges. The powerful broadcasting stations at Huizen and at Hilversum have an arrangement whereby Hilversum—nominally a 298.8-metre station—takes the Huizen wave-length of 1,875 metres every three months, while Huizen uses that allotted to Hilversum.

Every Three Months

So in January, April, July, and October of every year the announcements always change round for three months, and "Hier

Hilversum" becomes "Hier Huizen," and vice versa. In fact, the actual transmitters themselves are switched over, and thus the long-wave station at Huizen is sometimes calling itself "Huizen,"

and sometimes "Hilversum," according to the time of year, which governs its studio connections; similarly, the 298.8-metre equipment at Hilversum always sends on that wave-length, though for six months out of the twelve its input is from the Huizen studio.

Successful Short-Waver

As is well known, the Dutch have developed a very successful short-wave technique, and the stations which link Holland to its overseas possessions are among the most successful in the world. At the time of writing, famous PCJ is closed for overhaul, and short-

STATIONS

	Metres
Hilversum	- 298.8
Huizen	- 1,875
Eindhoven (temporarily closed)	

wave enthusiasts are eagerly awaiting the changes now being carried out, in the confident hope that the Dutch short-wave programmes will soon be better than ever—which is saying a lot!

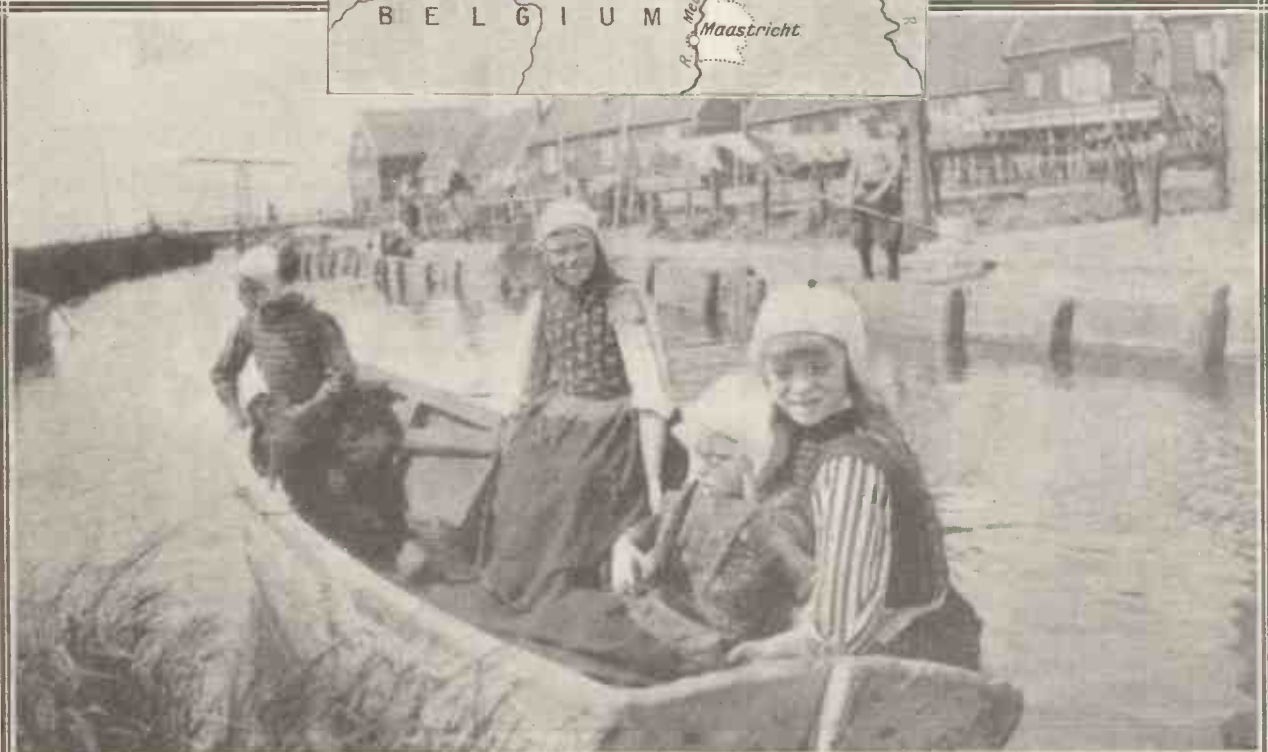
An Enterprising Concern

The experimental aspect of Holland's radio activity is to the enterprise of the great Philips' firm, well known to all in this country interested in radio development. The Dutch broadcasting and short-wave communication services have, in fact, been frequently cited as examples to the rest of the world and have been enviously regarded by countries far greater in area and richer in natural resources than Holland.

Regular and reliable communication is maintained between Holland itself and the Dutch East Indies, and the stations there—Bandoeng, Java, etc.—are known and appreciated the world over by short-wave listeners. With characteristic intrepidity the Dutch were early in the field in high-power, long-distance telephony services, which have proved of remarkable value in maintaining close touch between the distant settlers and home interests.

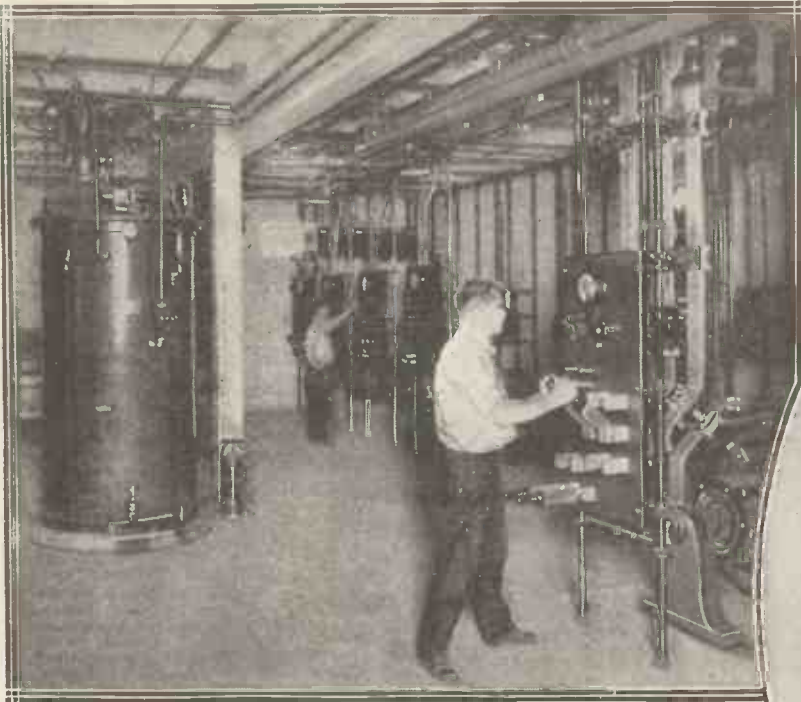
Special Stations

To cope with its large mercantile and maritime interests Holland also has an efficient radio-telegraphic network, backed up by news services in telephony. (Such services are handled by Scheveningen and Bloemendaal.) And the Dutch listener is certainly in an enviable position as regards foreign reception, for he is ringed about by the powerful stations of neighbouring countries.

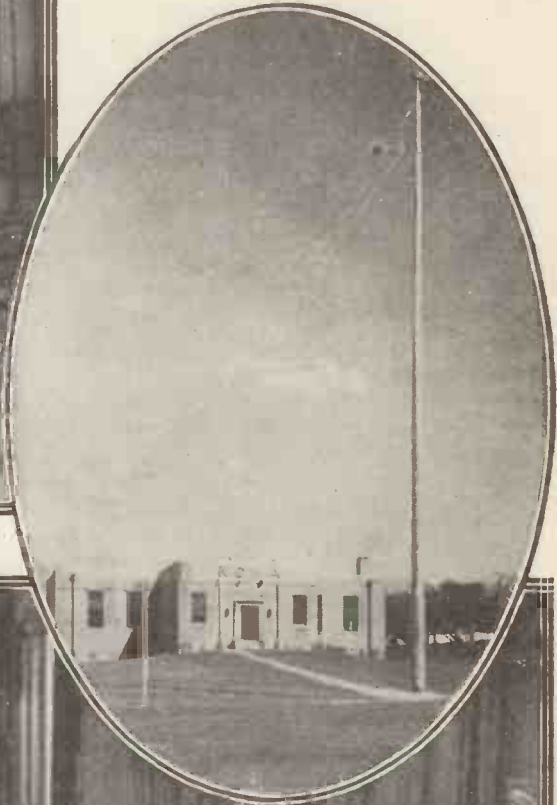


A typical scene on one of the canals that form a network covering the whole of Holland.

KDKA Calling



Some views of the world-famous short-waver at East Pittsburgh, U.S.A.



Above : Starting up the power-plant for the morning programme.

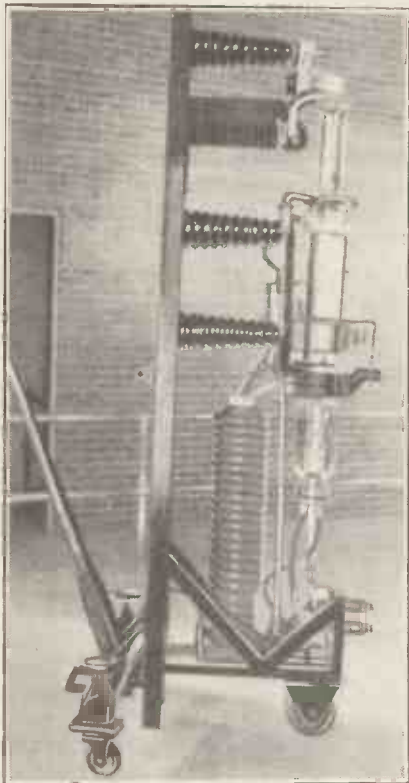


A good idea of the size of K D K A's main studio may be gathered from this view taken just before the beginning of one of the concerts. In the upper right-hand corner is an external view of the entrance to the station buildings.

"The World's Pioneer Broadcasting Station"

Everybody has heard of the K D K A broadcasting station, whose slogan is "The Pioneer Broadcasting Station of the World." Here is an extremely interesting account of a personal visit.

By Our Special Correspondent.



THE VALVE ON WHEELS. One of the 100-kw. "tubes" used at K D K A.

I WAS asked by Westinghouse while in East Pittsburgh to see the K D K A short-waver, where much of the Westinghouse research is carried out; and before having to go back to New York I managed to squeeze in a day's visit.

A friend of R. C. Hitchcock, of the Research Staff, motored me out to the station.

The station building of K D K A is a rather impressive affair—low, fairly long, and of white stone, and the general appearance is not dissimilar to that of Brookmans Park. It is a single-storey building and is set in the middle of a large field.

Special Reflectors

Surrounding it are the low poles of the special aerial system and the counterpoise earth. The main aerial itself extends out about one hundred yards away from the station building, and there are eight tall multi-coloured poles, holding reflectors and wires for the various wave-lengths. Two of the aerials are of the Hertz type, and consist of two long vertical lengths

of wire having small tuning coils hanging in mid-air between the sections—rather a strange sight.

There is a tiny entrance hall to the station underneath the big letters "K D K A, Westinghouse," and station offices on either side.

Relayed in Europe

The actual transmitter room is the least impressive part of the station, and it seems impossible, surveying the small amount of gear actually incorporated in the transmitter, that this miniature station is regularly and reliably heard over most of the American Continent and is constantly relayed by the leading European stations.

We passed from the transmitting room to the power room, which is the machinery which converts the input

energy from the Saxonburgh power station. Enough power to meet the lighting needs of a city of a quarter of a million inhabitants is generated by the big dynamos at Saxonburgh.

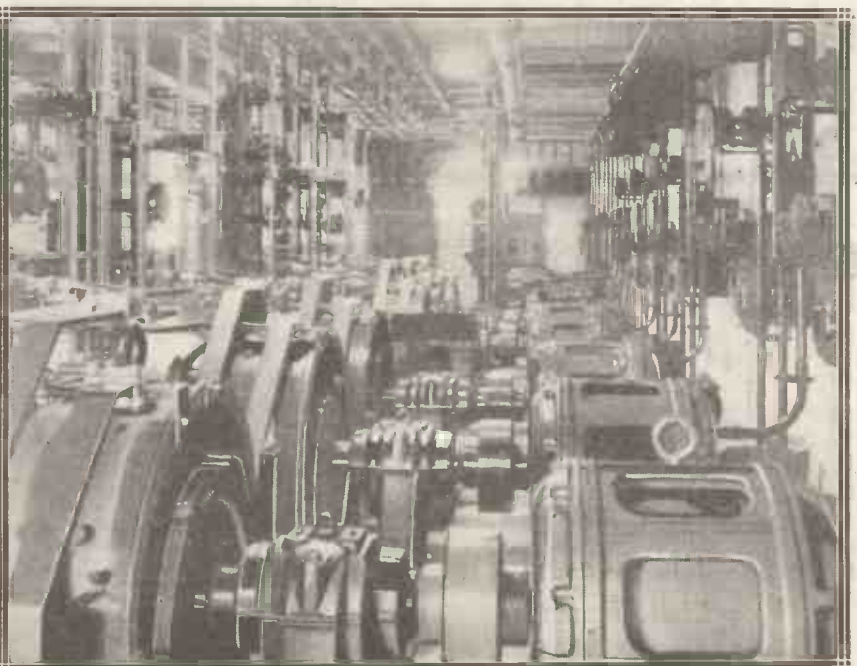
Here also are being tested the new giant valves which later will be used for the short-wave transmissions.

I was told that 50 per cent of the success of K D K A is due to the special aerials. The engineers put great faith in the new aerial system which has been developed by Dr. Frank Conrad, who is Assistant Chief Engineer of the Westinghouse organisation.

Around the Aerials

Right in the corner of the big field, where the special short-wave aerials grow vertically out of the ground like budding telegraph poles, is a

WHERE THE POWER COMES FROM!



This is just a corner of the power-supply room, but it gives an impression of concentrated kilowatts that is in keeping with K D K A's reputation.

Meters Mounted on the Masts

small hut where there are the power transformers, the primaries of which go off to the power lines. The meters which are suspended half-way up the poles are housed in weather-proof boxes, tilted slightly towards the ground, so that by means of a pair of field glasses the outside operator can read the aerial current in each group.

Strong "Sky" Wave

Dr. Conrad has designed this aerial system so that there is a minimum "ground" wave and a strong "sky" wave. This means, of course, that the aerials are placed so that the short waves from K D K A are pro-

paratively very little fading, and certainly not of the kind which one used to get 'way back in 1928.

K D K A is a very stable station, and is regarded over here as a sort of frequency standard.

A check over the records of K D K A during the past three years shows that it has had an average daily deviation of only plus or minus 51 parts in a million. The Federal Radio Commission limit is plus or minus 500 cycles at a million, so that the K D K A variation is ten times better than the requirement.

This measurement of K D K A's frequency is taken daily by R. C. Hitchcock, of the Research Depart-

By measuring the "whistle" or "beat" between K D K A and three standard oscillators compared with the standards of the United States Bureau of Standards, K D K A's frequency can be accurately determined. As has been said, measurements of K D K A's frequency show a deviation of only 51 parts in 1,000,000. The Federal Radio Commission limit is 500 cycles at a million.

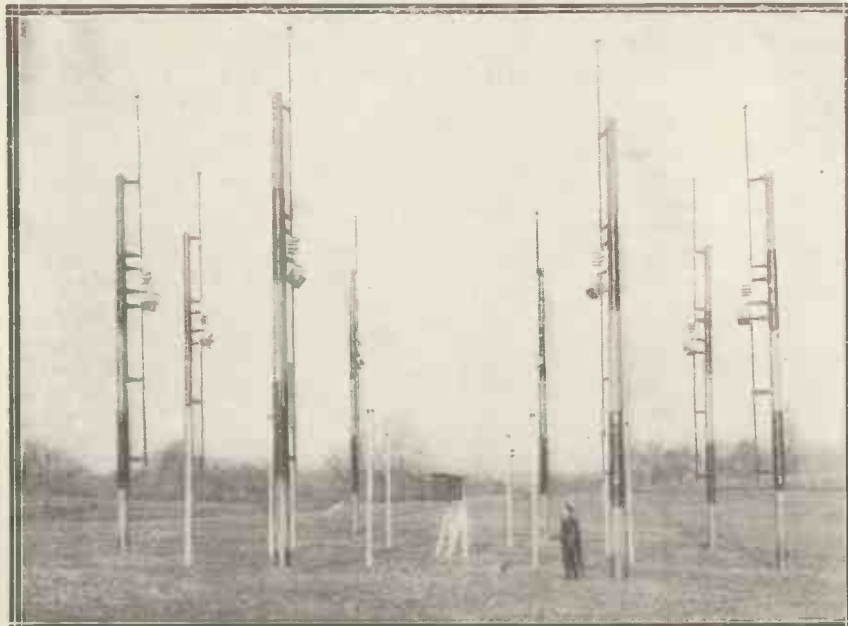
When to Hear K D K A

There are various schedules of transmissions for K D K A and the stations which relay it, and as I have not seen these correctly given in any lists I think short-wave enthusiasts might like to make a note of the times of the W 8 X K relays of K D K A.

On 48.86 metres you will find the K D K A programme on Wednesdays and Saturdays from about 10 in the evening till 5 a.m., G.M.T. Farther down on the dial you will find W 8 X K on 25.25 metres. On practically any day of the week from 5 p.m. till 3 a.m.

At the time of writing experiments are being carried out on 19.72 metres, and you may be lucky enough on Wednesdays and Saturdays between midday and 4 p.m. to pick up these ultra-short-wave test signals.

HAVE YOU PICKED UP A PROGRAMME FROM HERE?



The man is looking up at one of the meters showing how the power from that particular aerial is being radiated. Note the grouping into a ring, which is a feature of the short-wave aerial-system technique.

pagated chiefly by reflection from the Heaviside layer and that the reflection from the earth is cut down as much as possible.

The engineers have found from the reports they get from short-wave listeners all over the world that with K D K A's old aerial system—where there was (as they proved later by checking up with field strength measurers) a big ground wave—long-distance fading occurred.

Very Little Fading

Nowadays you will find that on listening to K D K A three or four thousand miles away there is com-

ment. He is especially noted for his most recent development, an organ which uses valves instead of pipes.

Frequency Checked Daily

K D K A's frequency is checked daily at the Westinghouse research laboratory by a simple method which is very similar to that used in tuning musical instruments.

Audible beats are used in measuring two radio frequencies which are close together. To measure K D K A at its assigned 980 kc., a radio-frequency oscillator of 982 kc. gives an audible beat of 2 kc., approximately the pitch of the third B above middle C.

THE ANGLO-AMERICAN RADIO SOCIETY

THE objects of this society are to aid radio enthusiasts and to promote goodwill and fellowship between nations. Originally a charge was made for membership in the society, but owing to the world depression there are now no fees.

All that is necessary for a person desiring to join is to write to the headquarters, "Kingsthorpe," Willowbank, Uxbridge, England, for an enrolment form, which he should fill in and return. As the society has no funds other than those subscriptions presented for the advancement of the society's work, members should enclose a stamp for reply in all instances. (A reply coupon can be obtained at post-offices out of England, or if unable to obtain either stamp or coupon the society will answer correspondence without either.)

WHAT THE DISTANT STATIONS ARE DOING

Further notes and news from a long-distance listener's log.

ALMOST everyone predicted a good season for long-distance reception, but, unfortunately, reception, like the weather last year, was very erratic. Though reception of European stations has been outstandingly good at times, reception of American medium-wave stations has been, as a rule, poor. However, conditions appeared to change at last, and I received a number of reports of reception of both North and South American stations on the medium waves

A Two-Valver

I was unfortunate enough not to be able to enjoy these good conditions except on a few occasions, as I have been otherwise occupied—sleeping!—after a busy day. On the few occasions I had a "try round the dials" at the correct times I employed—except on one occasion—a two-valve receiver employing detector and one transformer stage of L.F. and 'phones.

On the morning of November 21st I employed my larger receiver (S.G., det., 1 R.C.C., P.P.), and

Normandie), which lasted up until 2 a.m.

I was amazed when I started searching, after the close down of Normandie, by the number of American stations that were coming in at fair strength. The dial simply bristled with them.

Unfortunately, announcements of calls were hard to receive, and I was only able definitely to receive W N A C (Boston), W T I C (Hartford), K Y W (Chicago), K D K A (Pittsburg), W C A U (Philadelphia), W G Y (Schenectady), and W J Z (Boundbrook). Still, that is not at all bad for a two-valve receiver.

Searchers in the early hours will discover two late-nighters, or, to be exact, early-morningers, in the form of Radio Normandie and Radio Belgrade. Both these stations can be heard until around 2 a.m., when they close down.

Increased Power

Whilst on the subject of America I might add that "big things" have been occurring in America with the power of many of the stations. Many of the lesser-known stations have increased

Returning to Europe, conditions have been remarkably good, and it is very difficult to say that one station is better than another as they all seem very much the same as regards volume. Algiers and Rabat, our North African friends, have made their appearance at good strength on various occasions, though of the two Algiers is the better received.

On the long waves the Moscow stations RV1 and RV2 have been received at good strength. RV3 (Leningrad) is another Russian that has come in at exceedingly good strength. Istanbul (Turkey) and Kannas are two other distant stations that have come in well.

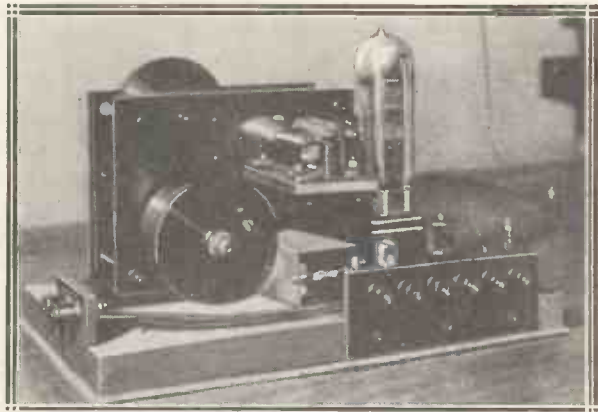
some of the American beam stations as they are quite intelligible. 2 X A F and the other 30-metre-band stations, Rabat, Zeesen, and O X Y, have been very good as a rule. 2 X A D has also put in a better signal than previous.

The 40-metre band is very poor and I have heard very few American stations on that band for some time now. 8 X K and 3 X A L are the two most frequently heard when anything is coming over.

The 50-metre Moscow station is making as much "din" as usual. I say "din" because quality is bad and there is a bad hum accompanying the transmission.

French amateurs appear to have

IN THE INTERVALS



This is the mechanism with which Budapest gives its tuneful signal on 550 metres. It is a nine-note phrase: G sharp, B, A, B, G sharp, B, A, B, G sharp.

Radio Paris is rather erratic as regards power. Whether it is that he is not continuously using his full power or not I cannot say, but, whatever the reason, he is very inclined to be powerful at one time and lack power at another. As this appears general throughout a programme, I think it must be that the power is varied.

Short-Wavers

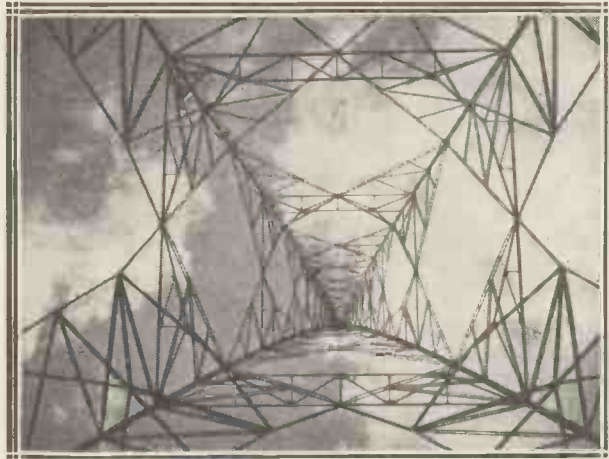
Short waves have been erratic also. Z L W and 2 M R, besides the American telephone stations, have been fairly constantly good. I notice that the "mushers" appear to have been removed from

forgotten where their wave-band is, and one continuously "runs" upon one in some part of the dial he should not be. Portuguese amateur transmitters have been coming over well and one cannot help admiring the quality of transmission compared with the Frenchies.

I am looking forward to the tests from the short-wave Daventry Empire station when it comes. I expect it will "skip" me, but, nevertheless, I am looking forward to its being on the air, as I have not the slightest doubt are many overseas "fans."

L.W.O.

BELOW BEROMUNSTER'S AERIAL



An unusual view, to take which the photographer stood under the huge mast at Beromunster.

received an American station as soon as I started searching. This station turned out to be W A B C (New York), which, by the way, is now employing 50 kw. This was the only American station recognised by call, as though I received various other unmistakable "Yanks," they were unintelligible.

Unknown Mexican

I also received an unknown Mexican station on this occasion in the region of 246 metres. Whether this was X E C, which works on 246 metres, or not I cannot say. Volume from this station was fair, though static was very troublesome.

The next time I had an opportunity to try for America was on November 23rd. On this occasion I was employing the two-valve receiver. I had been listening to the Philco Hour and the programme, arranged by the International Broadcasting Company, which followed it, from Fécamp (perhaps better known as Radio

their power to the region of 50 kw. and, as a consequence, we can expect to hear some new call-signs before the winter is out.

Mexico has also built a new high-power station. This station is situated at Della Acuna and operates with a power of 50 kw. this being the highest-powered Mexican broadcaster.

The call letters of this station are X E R. It is interesting to know that this station announces in English and Spanish.

Two Languages

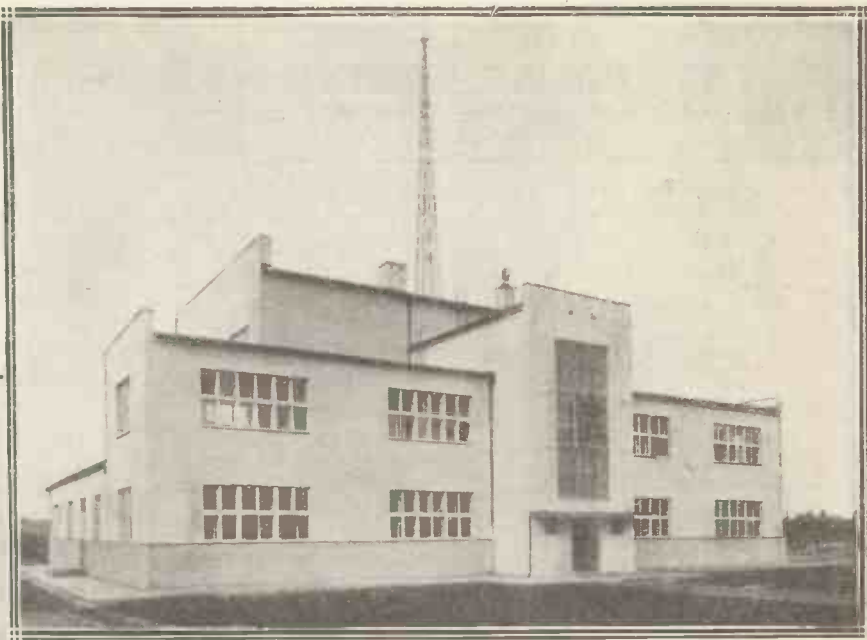
Other Mexican stations that also announce in both languages are X E T Y (Mexico City), X E W (Mexico City), and X E D (Reynosa). Whilst on the topic of Mexican broadcasting it may be of interest to know that though X D A broadcasts fairly regularly on short waves, being a commercial telephone station, X 26 A (at Nuevo Laredo), X I F, X F A, and X F D (at Mexico City) are more or less experimental transmitters, and, as such, broadcast somewhat erratically.

"WE WANT BEER!"



Cries of "We Want Beer" did not disturb President Hoover when they arose during a short-lived demonstration in the middle of his speech to the American Legion. He is here shown before the "mikes."

THE BIGGEST EVER!



Some views of "Radio-Praha," the great new Czechoslovakian station at Prague. It has a 200-kw. transmitter.

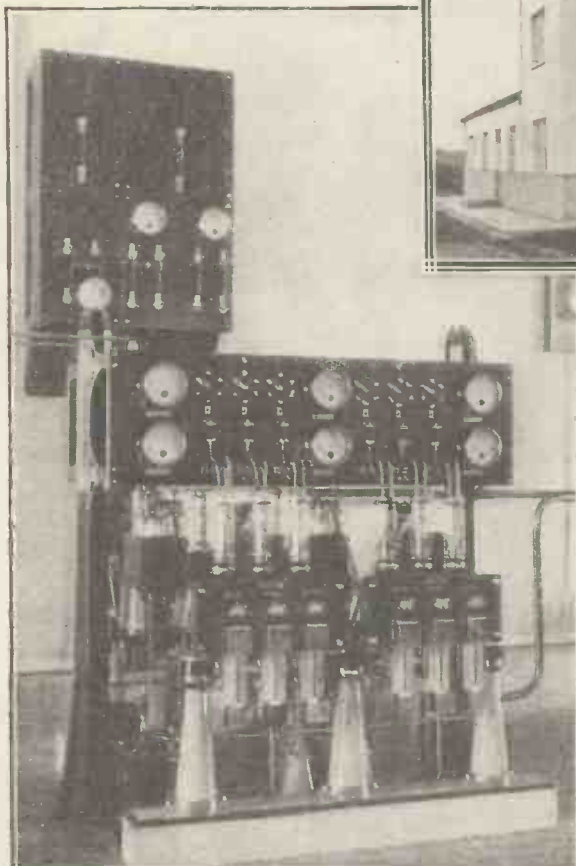
In conformity with modern practice, the station is situated in open country, and not in a city. The actual site of the station building, shown above, is at Cesky Brod.

* * *

To the left is a view of one of the amplifying stages, which is arranged on the push-pull principle. The thick tubes going to the valves are for water-cooling.

* * *

A general view of the Prague transmitter, as it appears from near the control-desk—which is shown in the foreground—is given below. Note the insulating pillars upon which most of the apparatus is mounted.



HAVE you heard the new Prague station? It was not opened until the end of November, and it made its bow on a wave-length of 487 metres, with a power of—hold your breath—two hundred kilowatts!

The big noises of Britain—the London and Northern twin-wavers—use only 70 kw. each. Several Russian stations use 100 kw., and the Warsaw station, hitherto Europe's biggest, has a power of 158 kw. Now comes this new Radio-Prague, with a clear 200 kw.; and as Prague's old station, employing only about 1/36th of the present power, was often received in this country, this new station is of great interest to us all.

Colossal Masts

Technically, it is an extremely interesting achievement, embodying as it does many novel features. The actual site is not in Prague itself, but at Cesky Brod.

The aerial towers, standing about 270 yards apart, are each 492 ft. high. And placed centrally below them, in accordance with modern transmission technique, is a little hut in which the feed lines terminate and the power is transferred to the transmitting aerial.

Like our own Regional stations, the Prague transmitter first generates high-frequency oscillations of low power, which are modulated by the speech or music, and subsequently amplified to the full power of the transmitter. The tuning is held exactly on its wave-length by means of crystal control.

The master-oscillator drives a neutralised amplifier stage, and all the stages of amplification following it are of the balanced push-pull type. Actual details of the plant need not be given here, as they are chiefly of interest to engineers; but a number of striking points likely to be appreciated by listeners call for comment.

British-Made Condensers

Even the casual visitor to the station would note that most of the condensers—about 85 per cent, in fact—are British-made by T.C.C. A real compliment, when paid by the world's most powerful broadcasting station!

A very interesting feature of the second H.F. amplifier is the provision of a circuit-breaker in each anode feed, which operates if the H.T. current becomes excessive. An ingenious little counter promptly scores a black mark against the valve in question, so that a permanent and automatic check is kept upon the behaviour of each valve, and no shirker valve can escape the penalty for unreliable results.

Special Test Aerial

The switching has been well schemed out, and the third H.F. amplifier can be operated in two groups, using twelve valves for full power, or one group of six valves for half-power. The change-over can be made in less than five minutes.

Another point about Prague is the "fake" aerial, which is used for tests, and consists of a non-radiating resistance. By this means circuit adjustments can be made on full power without causing interference to listeners.

The engineer in charge is enabled to look at the quality at the various stages, as well as listen to it. This visual indication takes the

THE PRIDE OF PRAGUE

These details of the giant broadcasting station recently erected at Prague will be of special interest in view of the easy reception of this station on 488.6 metres.

form of cathode-ray oscillographs, showing the wave-form.

On the power side, separate filter circuits consisting of an oil-immersed choke and smoothing condenser smooth the anode supplies; the condensers being designed to operate at 25,000 volts D.C. If anything goes wrong, large meters, visible all over the room, enable the controlling engineer to "see" the fault.

380-volt lighting transformer and the 20,000-volt rectifier transformer. From the former the supply is taken to a distributing board, where it is fed through a contactor and fuses to the motor generator sets, the water pumps and the mercury arc auxiliaries.

This contactor, therefore, is the main 380-volt control, and the feeders for the machines are each led to the change-over boards

factor to the exit from the filter circuit.

From the operational standpoint this is a great asset.

The rectifier system employs glass rectifier bulbs enclosed in oil-filled tanks. It comprises in effect two identical but separate twelve-phase rectifier equipments, each delivering 250 kw. at 10,000 volts; the outputs are connected in series to give 500 kw. at 20,000 volts.

In Case of Breakdown

This has the advantage that should one rectifier suffer a serious breakdown it is possible to operate with voltages up to 12,000 volts, using the remaining rectifier. Under these conditions it would still be possible to obtain something like 50 kw. in the antenna, so with this system something approximating to a duplicate of the rectifier equipment is obtained—a great advantage!

The Prague station was built to the order of the Czecho-Slovakian Government, and the whole equipment was designed by the International Telephone and Telegraph Laboratories.

It was supplied and installed by the Standard Electric Co. of Prague. And the two main studios now in use are in that city, provision being made for extension to ten studios in all in the future.

The high quality of the transmission can be judged from the fact the frequency characteristic is virtually straight from 30 cycles right up to about 10,000 cycles.

Microphone Arrangements

In the big studio three microphones are employed—one of the carbon type, and two high-quality condenser microphones. In the other studio there are two microphones, one of each type.

Provision is made for adding "echo," and also for "mixing" the outputs from the different microphones in any desired proportions. And, apart from microphone-batteries, all this equipment is run from the mains, using dry metal rectifiers.

Underground cables connect the Prague studios to the transmitter at Cesky Brod, so the first step in transmission is to boost the telephoned output by a two-stage amplifier. At this point, also, provision is made for the use of a local microphone to enable the transmitter to be controlled from Cesky Brod if desired, instead of from the studios.

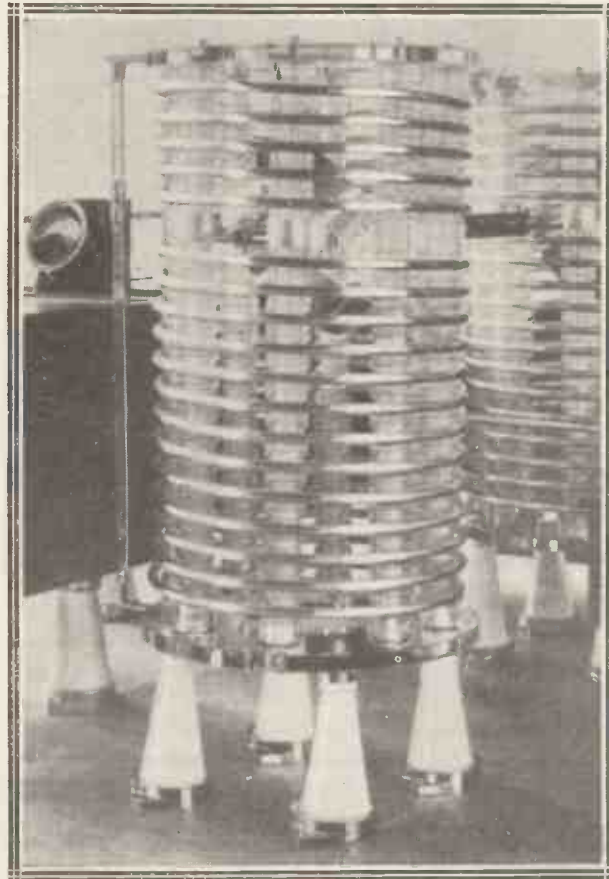
Water-Cooled Valves

The water-cooling for the anodes is extremely ingenious, the water being distributed in a thin sheet over the anode at high velocity and with a streamlined flow. One big bubble on an anode would cause no end of trouble at 25,000 volts!

If the water temperature rises near the safety limit an alarm thermometer promptly rings a bell and lights an alarm lamp, whilst another device watches the water-supply and cuts off the whole power in the event of a failure.

No wonder this great station is now the Pride of Prague!

A CLOSE-UP OF THE COILS



Readers who make their own coils will note how closely Prague's giant inter-stage tuning coils resemble those used in receivers. The "wire" is of large surface-area on account of the high-frequency current's preference for surface travel—the well-known "skin" effect.

There is no danger of serious interruption of the service due to failure of the main power supply, because three separate high-tension lines feeding three separate underground cables are all brought into the station building.

The 15,000-volt incoming supply board energises the 380-volt machine supply transformer, the

(each machine being supplied in duplicate) where they go via a contactor to the machines. The outputs of all the generators are taken to a contactor rack, on which are located the various contactors for the generators, and thence via a filter circuit rack to the radio transmitter.

With this system it has been



FIRM FAVOURITES OF THE SHORT WAVES

NAIROBI 49.5 m.	BOWMANVILLE (VE9GW) 49.22 m.	SAIGON 49.05 m.	BOUND BROOK 46.69 49.18 m.	SCHENECTADY (W2XAF) 31.48 m.
ROME 80 m.				ZEESEN 31.38 m.
				CHELMSFORD 25.53 m.
				PITTSBURGH EAST 19.72, 25.25, 48.88 m.
				PONTOISE 19.68, 25.2, 25.63 m.
				SCHENECTADY (W2XAD) 19.56 m.
				BANDOENG 15.93 m.

ITEMS OF SHORT-WAVE INTEREST

Including some distant newcomers to try for.

SEVERAL changes of wave-lengths and several entirely new stations are in evidence this month. Conditions are not particularly good, but when an improvement takes place there will probably be a surprising number of newcomers to be heard.

Among the lesser-known stations are the following:

Y V Q, Maracay, Venezuela, is working on 16.35 metres.

Z L W, Wellington, New Zealand, has moved to 33.25 metres, and is to be heard often at 8 or 9 a.m.

Bandoeng, Java, is on 26.8 metres, working with Europe, during most afternoons.

VE 9 G W, Ontario, now works on 25.43 metres, instead of the old wave-length of 49 metres odd.

CT 3 A G is "on the air" from Funchal, Madeira, on about 30 metres at irregular times.

Brazil is back "on the air," and is represented by Rio de Janeiro, P P Q, on 25.72 metres.

Readers will note from the above that the 25-metre band of wave-lengths is becoming quite lively once more. It is well worth while spending half an hour or so on this band during the late evening, as the stations are so close together that you may easily be logging a new one, thinking from the dial setting that it is one of the well-known stations.

Among the really distant stations to be heard below 50 metres are the following:

F 3 I C D, Chi-Hoa, Indo-China, on 49.3 metres. This station is being reported from all over the world.

J I A A, Tokio, Japan, on the new wave of 22.93 metres, may be heard during the afternoon and early evening, and sometimes as late as 10.30 p.m.

T I R, Costa Rica, works on about 40 metres, and tests at various times with American commercial stations.

H K D, Barranquilla, Colombia, works on approximately 50 metres at irregular times, and makes an unusual "bag" for this country.

According to a recent "census," the most popular number of valves for a short-wave receiver in this country is two. In the U.S.A. however, the "four-tube" receiver has it, and the "five" comes next. This is on account of the huge advertising campaign for commercial short-wave receivers over there. Very few "twos" or "threes" are made.

AMONG THE MORSE MEN

Interesting details of the short-wave amateurs.

SO many amateurs work nowadays on telephony that it is interesting to log them and to see how well a low-powered signal comes across Europe. Most of the European work is carried out on the "40-metre band," which extends actually from 41.2 to 42.8 metres.

Unlicensed Stations!

The French stations, many of which are unlicensed, often work up as high as 47 metres, but, in general, their transmissions are rather poor and difficult to understand.

The usual formula for announcements among the amateur fraternity is distinctive, if ungrammatical, and is common to all languages. For instance, "Here the British amateur station G 5 C Q, Birmingham, transmitting on 41.5 metres," and so on. Thus we have "Ici la station Belge quatre C F qui travaille avec toutes les amateurs Anglais" from the Belgians, and a similar announcement from the Frenchmen. In general, however, the vast majority of foreign amateur stations speak very good English, and use it when they are "on the air."

A general call from this country takes the form of "This is G 5 C Q, Birmingham, testing," but the French and Belgians use the form "Appelle générale de la station Française. . . ." We, in England, are not allowed to launch a general call quite in these terms, since our stations are supposed to be purely experimental. They, therefore, do not transmit (in theory!) unless they have some particular test to carry out.

Easy Identification

As a rough guide to identify, all British stations have call-signs beginning with 2, 5, or 6. All French stations begin with 8, and all Belgians with 4. The Dutch stations use 0 (zero), and the Germans 4. The "prefix" in the case of Germany is "D," while Belgium is "O N," so that no confusion should exist between these two.

Other countries likely to be heard are Austria (U O), Switzerland (H B), and Denmark (O Z). The Austrians have no particular figure, but the Swiss stations are nearly all "9's," while the Danes are largely "7's," although other figures are used.

RAILROAD RADIO

An experience on the Continent.

EXPERIENCED train radio for the first time when travelling from Vienna to Budapest. At that time only the Hungarian part of the journey could be whiled away by radio; since then the whole line has been equipped.

At the Hungarian borders, customs officers and passport officials and a number of young men in blue overalls boarded the train. Lines had to be laid in non-Hungarian carriages, i.e. cars that had not been wired up permanently for train radio.

Quickly Connected

Then the distributing systems in each car had to be linked up by means of special cables, and by the time the train started off again the engineer in a reserved compartment was already sitting twiddling controls, and two attendants were passing from door to door offering headphones neatly put up in paper bags.

Fortunately enough I was able to meet the director of the company operating the system on the train, and he very kindly gave me information about the working of it. Usually a number of stations can be received free of interference by means of the aerial stretched along the roof of one car.

Every pair of headphones in one compartment are connected in series, each compartment, on the other hand, in parallel. Thus if one pair of headphones goes out of order, only the compartment suffers, but not the whole train.

At the end of the journey the attendants collect the headphones, disinfect them and put them in paper bags again ready for the next journey.



A Radio Sunday in Spain

HERE we are in San Sebastian on a Monday, having arrived via Nice, St. Jean de Luz and Biarritz three days ago. What makes it all the more interesting is that although I know Paris and Berlin inside and out, this is my first visit to Spain—and I'm not very impressed!

At San Sebastian

San Sebastian, a much-vaunted seaside resort to which people come from Biarritz, is a broad-avenued town like Brighton, and why anybody should want to leave the rocky seclusion of Biarritz for anything like Brighton I can't for the life of me imagine!

And after the kindly hospitality of the French Basques, the Spanish Basques (who do not speak English) seem almost hostile. Perhaps they feel a little hostile. They obviously have we English mixed up with the revolution business, and appear to bear a grudge against the English and French for harbouring their ex-king!

But I mustn't start an international discussion! It's not wireless. But it is because of the strange manner I have been received in many of the big shops in this part of Spain, and in one huge radio-electrical shop in particular, that I mention it.

Our Special Correspondent, who has travelled extensively on radio business in France, Germany, and Italy, here tells of reception conditions in San Sebastian on a Sunday.

Radio was really the start of the trouble, so far as I was concerned. I did not take a set into Spain, for fear of customs troubles, but when friends who have a bungalow at St. Jean de Luz offered me their Dutch-built portable set to take into Spain until they came to join me in a few days time I could not resist the temptation.

For Testing Conditions

Partly because I wanted to get some more "Radio Sunday" experience, and partly because I wanted to test the local rumour that American reception is rather wonderful here owing to the direct path across

the Atlantic without any land shielding at all.

That portable was a trouble at the customs. Going into Spain one mustn't take more than a thousand French francs, and any apparatus of that value is also looked on with grave suspicion. Going out one must not take back any Spanish money or valuables.

A Bag of Trouble!

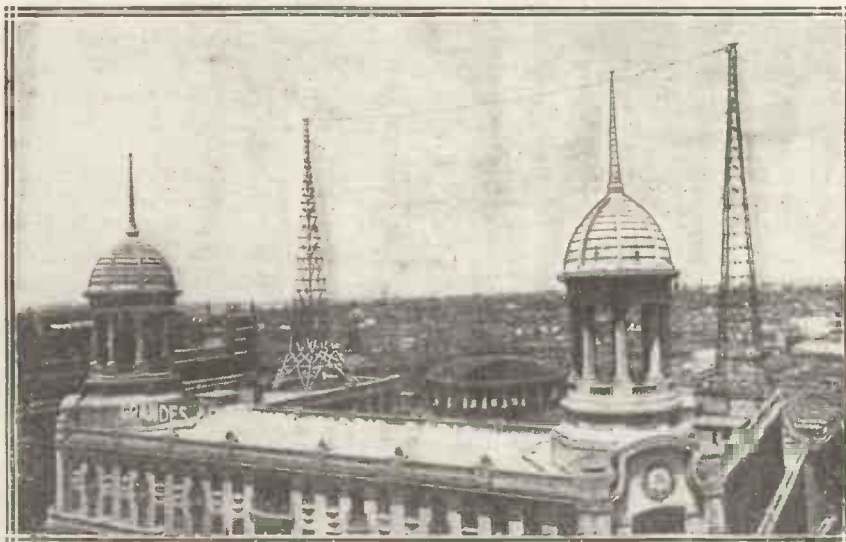
They are very strict, and make a most personal and terrifying examination! They let me pass with my portable and private luggage, but I had forms to fill in, a lot of time-wasting argument, and finally I missed the car on to San Sebastian.

When business had been concluded in the town, and when I had seen one of the staged bull-fights put up for American tourists in the local *course de toro*, I spent an hour in the evening at the hotel putting the portable to

rights and making sure of the tuning. It was then I discovered how low life the H.T. had sunk, and I had my *contretemps* at the radio stores already referred to.

They understood no English, and the French-speaking assistant had gone home. Repetition of "batteries" and "*piles a haut-tension*" had no effect, and finally I had to sketch one of the

THE MASTS OF MADRID



A view of the Spanish capital showing the masts of the Madrid station, which are situated on one of the city's big buildings.

beastly things on a blotting pad! I really won that battery, although I had to pay 18 pesetas (about 9s. 6d.) for it!

Surprising Results

Then came Sunday. I had previously made a round of the dials and discovered that although there are six national stations in Spain, here at San Sebastian I could get only the local E A J 8 (when it was going), Barcelona E A J 1, and Madrid E A J 7.

Bordeaux was, of course, strong, but the other French stations were weak, as were the Germans. Rome I managed to pick up weakly, and listened to it for a while just because two weeks previously I had been listening right in the centre of that city. The B.B.C. stations came in wonderfully, and I'm sure that if only Madrid could put up its power it would be just as useful a standby to British listeners as are Rome and Toulouse.

Nothing Doing!

I was assured that there was nothing doing on Sunday till after lunch, but later I discovered that had I felt inclined to get up at half-past eight in the morning I could have had an early news bulletin from E A J 1, and at nine o'clock another one from Madrid. I'm not sorry I didn't!

As it was, I tuned in to Barcelona at 2 o'clock on Sunday afternoon, and heard a quaint mixture of a sextet playing in the studio with, in the intervals, light orchestral gramophone records. During a very long interval there was a talk which, so one of the hotel porters told me, was about the latest American films, and was, I gathered, a sort of review of forthcoming films.

At half-past three I switched over to Madrid and found a rather high-class concert on. This seemed too good to be true, and I expected to

find that it was an H.M.V. record concert; but, no, it was the real thing.

At the end, though, came the records, and on switching back to E A J 1 I found the same thing going on there. Before going out to tea at about 5 o'clock I made a sort of round of the stations, and found London playing Bach-ish music, Berlin giving an O.B. from the Grunewald race track, and Toulouse giving a military band concert.

Waiting for the "Local"

At 7 o'clock I came back to hear Barcelona's orchestral concert, which reminded me of Gershom Parkington (and no discredit intended), and as

Vienna was giving one of the few operas which I recognised by the tunes—"The Mikado." Milan was giving a broadcast play with plenty of opera-like music interspaced, and from Langenberg, faintly, I picked up something which after a while I resolved as "Rigoletto."

An Amusing Incident

Then something rather amusing happened. The chambermaid came up to my room and showed interest in the set.

I asked her what time the local station gave its Sunday programme. She said: "I don't know, sir, but I'll soon 'phone and enquire!"

Sure enough she did, and I was

told to expect gramophone records and news at about half-past eight—from a transmitter only two miles away. I can picture myself 'phoning up Brookmans Park to enquire when they are next putting out a programme!

A Poor Effort

I left an orchestral concert and agricultural report from Barcelona to hear San Sebastian starting up, but was disappointed. Old records were given, and the

strength was not great. I had hoped to have had my room flooded with music.

At the bureau they showed me a paper giving the Madrid programmes, and I found that at 11 there was to be a relay (weather permitting) from the Paseo de Rosales.

Whether weather permitted or not I shall never know, for I missed the opening announcement, but on 424 metres there was good music. So I stuck to Madrid till the end of the programme—at 1.30 a.m. Monday morning!

On looking out of my window I found San Sebastian still lit and alive. Late-night folk, the Spaniards; no wonder they need an occasional revolution to keep 'em awake!

A SCENE IN THE STUDIO



This view shows part of one of the main Madrid studios. Note the heavy curtains which can be drawn to affect the acoustics of the room if required

this palled after a while I tried Madrid, only to find it silent until 8.30, at which hour, too, the local transmitter was due to start up.

Ideal Position

San Sebastian's transmitter, by the way, is up on the cliffs of the bay to the left, looking out to sea, and should be a wonderful distance-coverer if only it were not always shutting down because of political troubles, and if it could use 60 kilowatts instead of 0.6. The aerials are on an amazing site which the B.B.C. might well envy.

So again it meant trying for other stations if I did not want Barcelona. It must have been a coincidence, but every station seemed opera mad.



THE MEDIUM WAVES

Some practical notes on long-distance reception on the ordinary broadcasting band.



Do you neglect one end of the tuning dial? I have never seen this question raised on paper before, but I have noticed that most listeners to long-distance work tend to concentrate on one particular group of stations to the detriment of others. And I often catch myself being more interested in the 200-300-metre crowd than in the equally important stations just around and below 500 metres.

Partly with the idea of overcoming this tendency I have been keeping a somewhat sharper-than-usual watch on the "top" stations. And they have well repaid the attention given them.

The Star-Turn

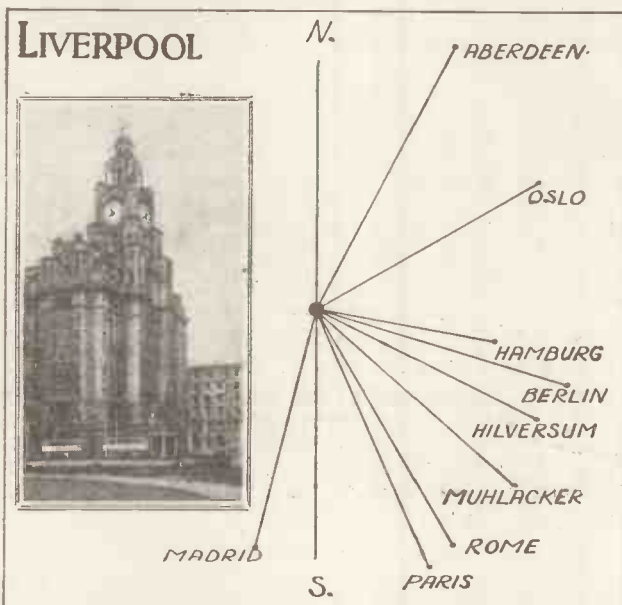
On most sets the "top" stations of the medium waves are Budapest and Vienna. Some sets tune right up to Hanover on 566 metres, and to Ljubljana on 575; but on the majority Brussels No. 1, on 509, is getting very near the limit, and only one, or perhaps two others, higher than this can be tuned in.

It is in the region just below these that some excellent stations are to be found. And the star-turn is undoubtedly the new Prague programme, on 487 metres. This is the outstanding station of the month, for several reasons

Its quality and carrying power are excellent, and the interest of its programmes, item by item, is considerable. Although said to be using 120 kw. at present, it has a capability of no less than 200 kw.—easily the most powerful broadcaster in the world.

The best way to identify it is to

USING A FRAME AERIAL



Frame-aerial windings should be pointed towards the station which it is desired to receive. The directions indicated by the radiating lines show how a listener in the Liverpool area should align his frame aerial.

remember that it lies only a fraction above the North Regional—they are next-door-ether-neighbours—and that the word "Prague" is pronounced like "Pra-ha." The announcer may be a man or woman.

Immediately below the North Regional there is an elusive Russian, and then, in descending order, three excellent stations, viz., Langenberg, Lyons, and "Schweizerischer Landessender," on 473, 467, and 459 metres respectively.

Langenberg, the powerful German, is well known; but Lyons La

Doua is often quite as strong, or stronger, while his programme quality is certainly little if any inferior from the point of view of interesting the British listener who does not understand either language.

He shares a wave-length with Tartu, Estonia, a station not generally received regularly in this country.)

Like a Local

Schweizerischer Landesender is the cumbersome title of the Swiss Regional station situated at Bero-munster. It is nearly 500 miles from London, but sometimes comes in almost like a local.

The programmes sent out emanate sometimes from Zurich, sometimes from Berne, and sometimes from Basle.

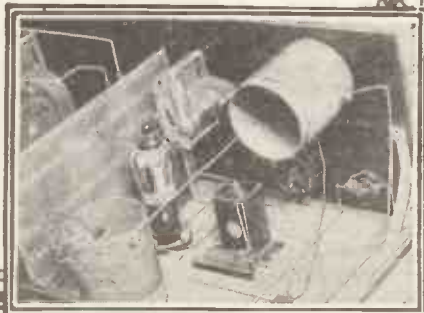
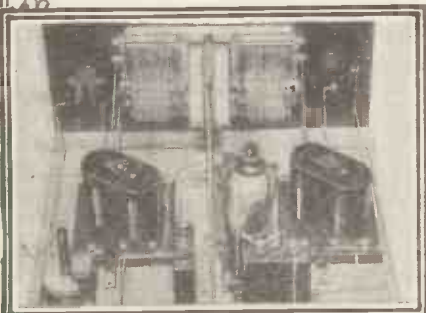
Well below the stations referred to above we come, via common waves and a Russian station, to Rome and the excellent programmes near his.

NEXT MONTH

The February "M.W." will be on Sale January 30th.

ORDER NOW

and make sure of it!



ACROSS SEVEN SEAS



A RADIO TOUR ON A LINER BY T.E. SWINTON

A fascinating article by a man who knows his subject and who has an indisputable gift of expression. You cannot but enjoy this account of his intimately interesting radio experiences.

I WONDER how many of those who use wireless merely as a means of entertainment have any idea of the life and work of one branch of those who earn their living from wireless.

I am referring now to that strange and usually much-harried bunch of individuals, the sea-going operator.

What Is It All About?

Like all seafarers, their life is quite different from that of a landsman, and anything "different" is usually fascinating.

You have, no doubt, said many hard things about the Morse interference you experience around about 600 metres and, to a lesser degree, around 220 metres; but have you ever stopped to consider what it is all about?

The 600-metre stuff is, of course, the conversational efforts of the ocean-going ships and their attendant coast stations, while the 220-metre racket is usually made by fishing trawlers.

If you care to come along we will visit one of the larger vessels, go a voyage on her, and stand beside the operators as they work; ghostly stowaways, seeing all that goes on, and hearing all.

The Gear They Work With

Our vessel is fitted with up-to-date apparatus and, as she is a "first-class ship," maintains a continuous watch throughout the twenty-four hours. This means a minimum of three operators, each working four hours on and eight hours off watch.

The senior "op." has the twelve to four watch, both A.M. and P.M.; the second "op." takes the four to eight, and the third man, eight to twelve.

The gear consists of a 2-kw. I.C.W. transmitter working on the following waves: 600, 705, 800, 2,100, 2,180, and 2,200 metres. A 1½-kw. spark transmitter working on 600, 705 and 800 metres, and a 50-watt short-wave transmitter with a continuously variable transmitted wave from 19 to 50 metres.

There are the associated receivers for these transmitters, an emergency transmitter working from accumulators, a direction-finder and two 250-watt I.C.W. transmitters fitted in motor lifeboats.

"A Pretty Bunch of Stuff"

The operators have a pretty bunch of stuff to look after in addition to their ordinary telegraphic duties.

Accumulator banks usually take up the most time and attention, and there are a goodly number of these monstrosities. Filament heating for the receiver valves and for the direction-finder. High-tension accumulators, and a 24-volt bank of 80-ampere-hour giants for the emergency transmitter.

Taken altogether, with testing buzzers, wave-meters, telephones, lifeboat motor-generators, automatic starters and so forth, there is a respectable array of apparatus.

Most of the work of clearing private messages and routine transmissions is done on the I.C.W. set, the short-waver only being used for long-distance stuff or when the atmospheric conditions are bad on the long waves. All three

transmitters and their receivers can, however, be used in duplex if the occasion should arise.

Everyone is on board, the last of the visitors have been seen safely down the gangway, and the siren is blowing lustily as a warning to the harbour authorities that we are about to get under way.

Small and apparently fussy tugs are waiting to yank the ship into the stream as soon as she commences to move, and forrard, on the fo'c'sle head, a winch is groaning as it heaves in the huge mooring lines. The signal comes: "All clear aft"; a similar advice from forrard.

"Slow Ahead Both Engines"

The engine-room telegraph rings for "Slow ahead both engines," a sharp toot on the siren and the vessel moves slowly away from the quay, the tugs pulling with all their might to swing the ship in the small space afforded in the dock.

Up in the wireless-room, abaft of the funnels, and on the boat deck, very little is happening as yet. The operator who is to take the first watch has switched on the receiver and is listening, without taking much notice, to the babel on 600 metres.

Niton is the first station with which communication will be effected, and when the first lull in the medley of signals comes along he starts up his motor generator and calls: "GNI GNI GNI de GPQZ GPQZ GPQZ TR K." GNI is Niton's call, GPQZ is our ship's call, TR indicates he wishes to send particulars of the ship and her voyage, and K means "go ahead."

Niton answers at once (unfortunately this does not always happen) and sends "GPQZ GPQZ GPQZ de GNI K." Our operator then sends (using the call-signs as previously) "HR S.S.— LOS ANGELES LEAVING SOUTHAMPTON QR U (?) QR U K."

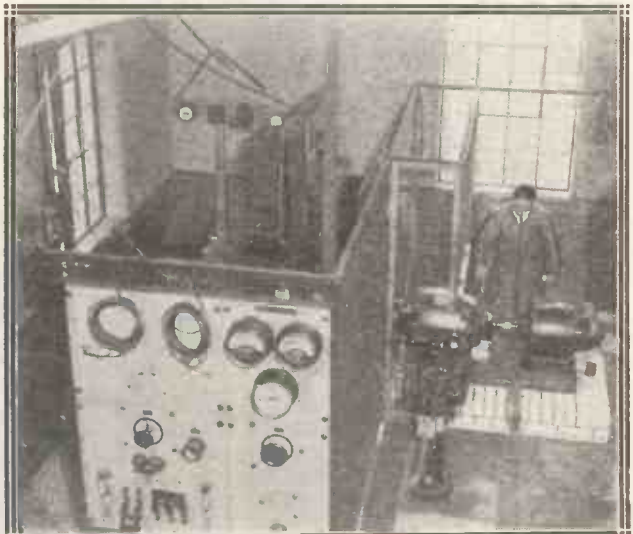
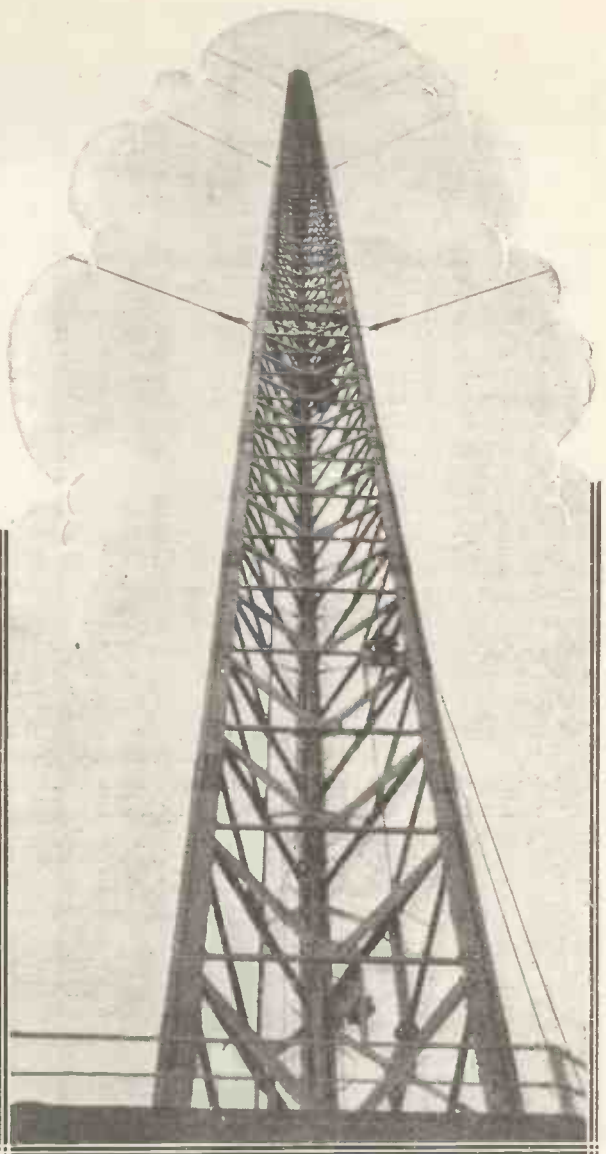
"Have You Any Traffic?"

This is easy of translation: "Here S.S. — bound for Los Angeles, leaving Southampton, have you any traffic for me? I have nothing for you. Go ahead." Niton answers: "R TR QR U VA." (Received TR. I have nothing for you. VA being the "end of work" signal).

Now there is nothing to do except listen to other traffic, make an occasional entry in the log-book and look around. There is plenty to listen to and be interested in if one understands the many abbreviations which are used in the wireless service.

Ships working their way up and down Channel, sending their TR's to Niton. Ships calling with traffic for him, others calling the station at North Foreland (GNF);

A VIEW OF PORTISHEAD



(Top) One of the twelve colossal 820-ft. masts at the Rugby radio station, which claims to be the most powerful transmitter in the world. Besides communicating with ships in all corners of the globe, it handles most of the transatlantic telephone traffic. (Left) A view of Battery Point, Portishead. It is near here that another long-range coast station is situated. It works on wave-lengths around 2,000 metres, and uses the call-sign G K U. (Right) The new transmitter at the Niton (I. of W.) station which gives wireless bearings to ships in all parts of the English Channel.

cross-Channel boats working the French stations FFB and FFC.

Now and again a clear, powerful note comes on, working very fast with an abbreviated call, PCH, the Dutch station at the Hook of Holland. Antwerp, Ostend, Ushant and Land's End all add to the apparent confusion.

Most of the coast stations have a "working wave" somewhere above 600 metres, the exact wave varying for each station. All traffic is cleared on this working wave, leaving the 600 wave for calling and distress traffic. Also, they are nearly all using I.C.W. or pure C.W., and this makes the interference rather less than it was when all stations used spark and all worked on 600 metres.

The operator glances at the clock (11.58), this being the twenty-four-hour method of time notation of showing two minutes to twelve A.M. (Had it been the same time P.M., it would have been shown as 23.58); 11.58, time to prepare for the press programme from Rugby, the world's most powerful transmitter,

Tuning to 18,740 Metres!

Our operator tunes his receiver to 18,740 metres, a colossal wave to the broadcast man who thinks 1,600 is a "long" wave, but there are stations that use even longer waves than Rugby.

The receiver adjusted, the call comes through clearly, but not extra loud: "CQ CQ CQ de GBR GBR GBR." A little extra tuning to remove the worst of the interference from the dozens of high-power stations working around this wave—WCI (America), JFS (Japan),

DFY (Germany) and many others—a press-form slipped into the typewriter and he is ready.

Here it comes, about twenty-five words per minute, automatic transmission: "British Official Wireless press stop Replying to questions in the House of Commons this morning, Mister . . .", and so on for fifteen minutes.

At 12.15 Rugby sends the signal "AS 3 MINS," which means "Wait 3 minutes." The operator tunes back to 600 metres and listens there for three minutes and then resumes with Rugby until 12.45, when he again returns to 600 for yet another three minutes.

Standing By For S.O.S. Calls

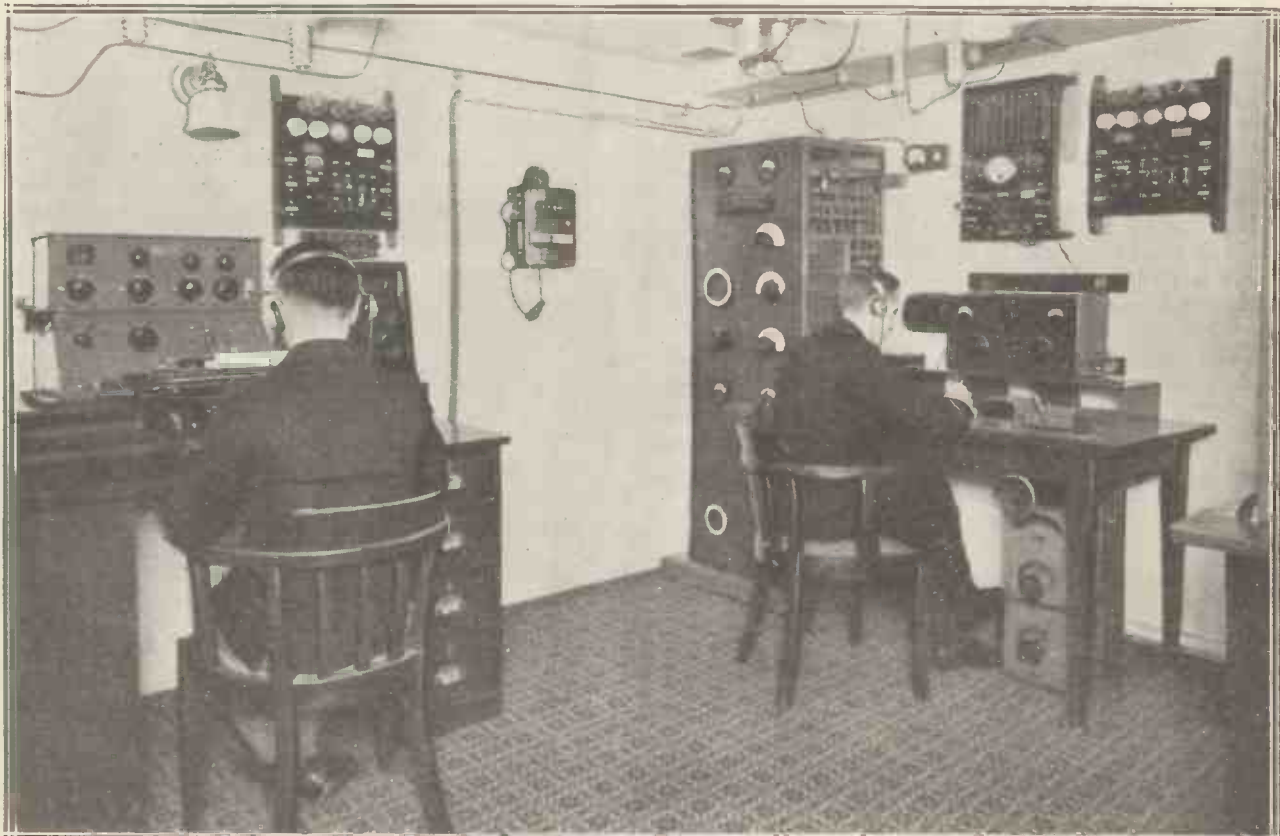
This three-minute stunt is an international effort to help distress calls. For three minutes each half hour, i.e. from 15 minutes to 18 minutes past, and 45 to 48 minutes past each hour, all stations cease transmitting and listen on 600 metres for any distress messages which may be on the air.

If some vessel is in trouble and has been forced to use his emergency transmitter he would have little chance of gaining attention amid the general row which goes on around the coasts. This silence period gives him a chance.

This press schedule which our operator is keeping with Rugby is only the first of many which he will copy during the voyage to Los Angeles. Three times each day he will tune to 18,740 and copy 600 or 700 words of the driest stuff possible.

At 12.48 and 00.48 he will listen to Rugby for messages which are sent out one after the other, each ship copying her own, no receipt being given. The messages are sent

Radio Equipment on Board the "Empress of Britain"



The "Empress of Britain" is one of the most lavishly equipped ships afloat especially from a radio point of view. This is a view of part of the operating-room, with the Marconi short-wave transmitter and receiver for world-wide communication on the right. To the left there is a special broadcast receiver which is used in conjunction with a band-repeater system.

A Busy Hour in the Operating Room

in the first transmitting period after being handed in and then are confirmed in the next period. As Rugby has a world-wide range, ships can receive messages from home when on any ocean (with reservations).

During the time we have been busy with the press, several private messages have been handed in by passengers, and the operator turns his attention to these. The usual particulars, such as date and time of handing in, service instructions, and so on, are filled in, and the motor is started up again.

The transmitter valve filaments glow, the plates soon get hot, and the send-receive relay rattles as the operator rapidly clears the messages through Niton, which is still our nearest station.

This Saves Endless Time

This send-receive relay is a useful piece of apparatus. It is arranged that when the key is pressed and the transmitter is actually radiating, the receiver is disconnected from the aerial and the telephones cut out.

When the key is released, back comes the receiver and telephones. The result is the operator can receive through his own transmissions without any fear of putting his receiver out of action with the powerful aerial currents. The receiving station can stop him whilst in the middle

NORTH FORELAND'S NEW STATION



Another radio station that handles a large ship-to-shore traffic is the G.P.O. transmitter situated at North Foreland. It recently had its spark set replaced by the most up-to-date "I.C.W." equipment. The high tower in the foreground is the famous North Foreland lighthouse.

of a message and ask for repeats, or tell him to wait until interference has stopped, and so on.

It would be most annoying to struggle through a long code message and then to be told to repeat it all again as the interference is bad.

Calm Again Reigns

The messages cleared and receipts obtained from Niton, calm again reigns in the wireless-room, until a strong spark note breaks through with "CQ CQ CQ de GLD GLD GLD QTC FOR." This is Land's End with a list of ships for whom he has traffic. Our op. copies all the call-signs, dozens of 'em, and G P Q Z is among them. As soon as G L D has finished, therefore, he calls for him to go ahead with the messages.

THE ROCKS ROUND USHANT



France's busiest coast station is that located on the rocky coast of Brittany, near Ushant. It communicates with nearly all ships entering and leaving the English Channel, and has received many dramatic S.O.S. messages from vessels in distress in the Bay of Biscay.

This time, however, he is not so lucky, as G L D is busy with other ships nearer to him, and it is not until the third call that G P Q Z gets attention. The messages are sent, and hard on the heels of a receipt comes a traffic list from Ushant, F F U.

Nothing for G P Q Z this time, but the list has to be copied.

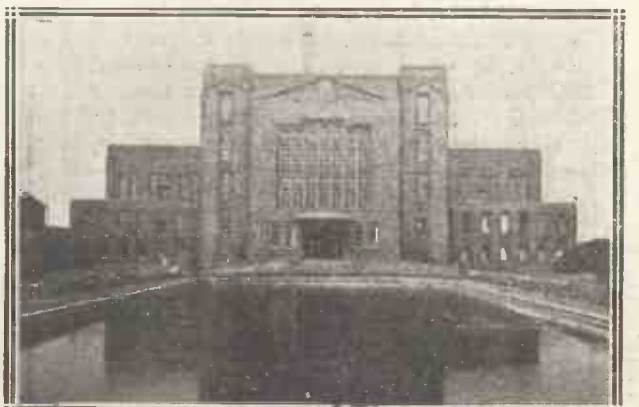
Having a few moments to spare, friend operator makes up his abstract; that is, the account sheet for the messages he has just handled, both transmitted and received. This takes some little time, as a good number of particulars have to be entered on the sheets.

Cheery News from Land's End!

Before he has finished, Land's End spark again breaks through, this time with a series of dashes, forming the letters T T T. This is a navigation warning, and must be copied. Most stations cease transmitting on hearing this alarm signal, and presently, with a background of comparative silence, comes the warning:

"Gale warning. Strong gale from south-west expected all coasts British Isles, Solway Firth to North Foreland, including Ireland ends."

NAUEN'S NEWEST



Germany possesses many powerful wireless links, the largest being the Nauen station, which is illustrated above. It is situated near Berlin, and operates a network of communication channels which covers the whole world.

This cheerful information is dispatched to the bridge, and the op. gets busy answering a call from a ship belonging to the same company and which is in-bound, and has something of interest to report. Affairs in the wireless department are beginning to buck up.

For the next twenty-four hours or so the work is

K F S. This long-distance communication, however, is still a little chancy, and cannot be relied upon. Stations on the east coast of America, such as W M L, W S C and W S L, will be "on tap" regularly.

Apart from this DX work, communication goes on with various stations in turn, on the 600-metre wave; San

Situated Among the Palm Trees of Porto Rico



This station, situated at San Juan, Porto Rico, is set in very picturesque surroundings. But, unfortunately, from the operating staff's point of view, this is counteracted by the fact that in this part of the world atmospherics are extremely troublesome, and, as the author says, they are at times so bad that communication on ordinary wave-lengths is quite impossible.

similar, and practically all on the 600 or 705 wave-length. The gale, coming along, effectively keeps the fog away, and therefore the direction finder is not brought into use. Press schedules, weather reports from the Air Ministry station G F A, and time signals from Nauen and Rugby, together with private traffic and its accounting, keep the operators busy.

Blue Sparks from the Aerial

When our vessel gets well out to sea and Land's End has faded to a mere whisper, things get a little quiet. It is now that the 2,100-metre band is worked. Regular schedules are kept with Portishead, G K U, and weather reports are sent in at regular times for the information of the British meteorological office.

The short-waver is used, too, and regular signals exchanged with Portishead, G K T, G K T, and, perhaps, one night, if the conditions are really good, contact will be made with the short-wave station at San Francisco.

Pedro Miguel, C U G, in the Azores; V P T, Bermuda; then, at night, Palm Beach and Hialeah, Florida, will be spoken to, always providing atmospherics are not too bad.

The amount of Q R N (atmospherics) which is met with in the region of the West Indies is appalling, more especially during the hurricane season.

The crackles carry on most of the day usually, but as soon as the sun sets then things get really lively. Ear-splitting crashes, prolonged frying sounds, and occasionally handsome blue sparks from the aerial equipment, all add to the pleasure of being a marine radio operator.

Practically Impossible to Receive

During the worst of the displays all transmission ceases, for it is practically impossible to receive any coherent message, owing to the continual "wipe out" from the heavily damped atmospheric discharges.

Luckily, the short wave-bands do not suffer so much from these atmospheric disturbances, and nearly all the

Past the Island of San Juan Fernandez

regular transmissions, such as weather reports, hydrographic bulletins and time signals, concerned with this particular area, are transmitted on short as well as long waves.

The route of the vessel takes us through the Windward Passage and past the island of San Juan Fernandez, which was the actual spot of land that Columbus struck on his first voyage to the Indies. A day or so later we approach the Panama Canal and messages are sent through the station N A X at Colon advising the canal authorities of our arrival.

Anchored in Limon Bay

At length our vessel steams slowly between the two breakwaters and anchors in Limon Bay, the engines stop and the first lap of our journey is completed.

It is very beautiful here, the natural stillness being emphasised by the cessation of the throb, throb of the engines, which has never ceased since we left England. As the sun dips lower and lower the inevitable masses of cloud gather, lightning plays blue, green and orange, around their fringes, the western sky turns from yellow to

orange, through red to purple and steely blue, then, finally, to velvety black.

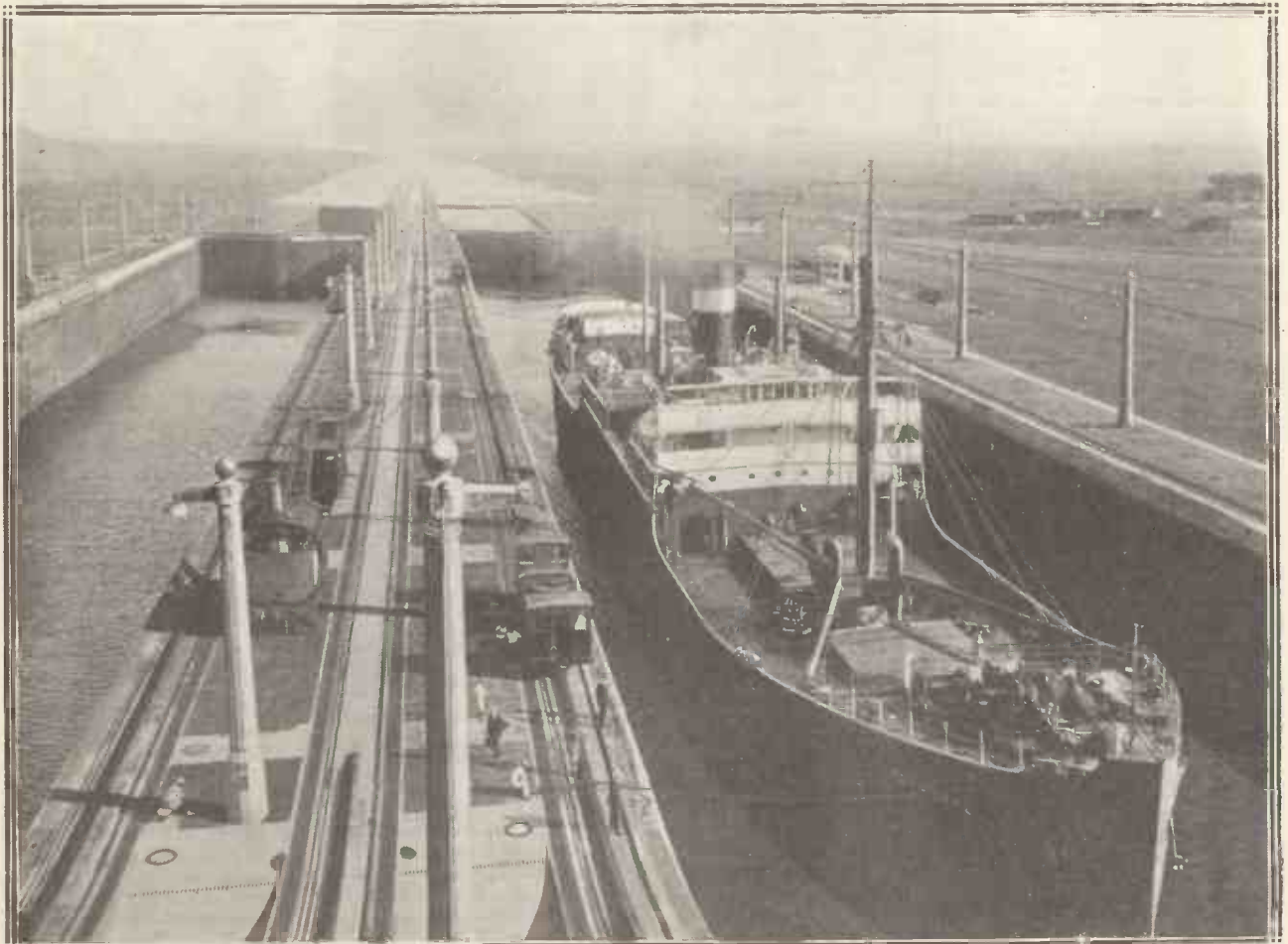
The outlines of the high hills which surround the bay can be seen but dimly, and the evening breeze rustles faintly among the leaves of banana palms. Clusters of lights spring into being on the shore, breakwater lights flash red and green, channel-marking buoys wink and blink and, lord of all the lights, the beacon on Gatun Locks wheels its silver finger over the land and the sea.

With the coming of daylight our vessel moves on, through the Canal into Panama Bay, then rounding Cape Mala, into the blue Pacific Ocean.

Freak Ranges of the Pacific

The run from Cape Mala northwards is, for the first few days, very uninteresting from a wireless point of view. Signals which should be strong are unaccountably weak, short-wave reception from all directions is uncertain, and Rugby, the world-wide station, has disappeared. Once past the Gulf of California, however, things become normal again; in fact, super-normal in some respects. The North Pacific is well known among operators for its freak ranges.

From Atlantic to Pacific Through the Panama Canal



The Panama Canal is the largest man-made waterway in the world. It cuts through that narrow strip of land joining North and South America, and enables the largest ships to pass between the Atlantic and Pacific Oceans, thereby saving them a journey of many thousands of miles. This is a view of the Gatun Locks, through which our contributor passed on his voyage. A large cargo steamer is negotiating them, and if you look carefully you'll be able to see the wireless aerial strung on spreaders between its masts.

HOW MANY PROGRAMMES?

A pertinent question for long-distance listeners.

By W.L.S.

A FRIEND of mine caused me to think hard recently by asking two questions. The first was: "How many programmes can you really enjoy on your set?" And the second: "What type of set will give you the highest possible 'programme value'?"

These are certainly two real posers, particularly the second. The first, unfortunately, was easy, the answer being: "About ten."

"See You!"

Doubtless some of our more superior readers will sniff at this, and say: "Why, I can enjoy more than ten; in fact, about fifty!" The only adequate answer that I can think of to the above hails from America, and consists of two words: "Sez you!" I have never yet met a set giving fifty enjoyable programmes, and I do not expect to for some little time.

Admittedly, many good broadcast receivers will bring in more than fifty stations; one can certainly enjoy the thrill of hearing a clear announcement from some distant part, and possibly one or two items. But programme enjoyment, no! After a quarter of an hour or so the station gradually begins to fade out, or to become mixed up with some other station of its wave, until one turns the dial and finds someone else.

Is it not a fact that, unless one has an exceptional receiver like a really good super-het, one simply "twiddles" from one foreigner to another, instead of sitting back with a sigh of joy and listening to a favourite item from abroad?

A Real Thrill

This is perfectly understandable, for the average Mr. Citizen does not make a sensitive set because he wants to hear what they are doing in Madrid, or Rome, or Paris. He wants a good, 100 per cent reception of the local programmes, mixed with the undeniable thrill of wandering round Europe. He does the latter when he is bored with the local, and probably never stops on one particular station for more than about five minutes.

Contradict me if you will, reader, but this description applies to quite 90 per cent of my radio friends, and, I am convinced, to a large number of yours.

Thus we return to the old question: "What is programme value?" How good must a set be to give you a real programme value on fifty stations? Personally, I have only met one set that could claim to do anything like that, and that was a very expensive eight-valve super-het with switching for the ultra-short waves, in addition to long- and medium-wave broadcast. Never have I heard another receiver that came within a mile of it.

Try it Yourself

Now, we can't all afford radio Rolls-Royces, but we can get enjoyment out of our "radio-Morris'es" or "radio-Austin-Sevens"! I am satisfied, too, that the way to do it is to give up some of this knob-twiddling that becomes a daily ritual, and to settle down to those stations that

with your chosen stations. You will get to know the announcers, even if you cannot speak their language. You will also get to know their regular programme items, and look for them daily or weekly.

A Good Example

One obvious example that occurs to me of a station with real "programme value" at certain times is Hulzen, on 1,875 metres. Not everyone knows that he transmits a most interesting programme of gramophone records from 7.30 a.m. onwards. I receive him well on the speaker with a detector and two L.F., and I confess that I inevitably dress, wash and shave to his musical accompaniment. I know his announcers, and I admire the efforts of one of them to give the titles in English!

Then, if you are fortunate

BOTH SIDES OF THE CHANNEL

A chat about the Paris listener and his programmes.

ALTHOUGH radio would seem at least superficially to be as firmly established in France as in England, in actual point of fact there exists a most remarkable difference in the way in which the ordinary listener of the two nations regards this hobby.

Fair evidence of the demand for any commodity is afforded by the supply, and it is only necessary to compare the purchasing facilities in the two capitals to realise the respective interest which exists among the average working people of all classes.

The Two Extremes!

In Fleet Street and the Strand there are at least six shops selling all kinds of wireless supplies from complete sets down to the smallest components, competition being equally keen in all branches.

It would be difficult to find six radio shops of any kind in the whole of central Paris!

One of the principal streets—the Boulevard Haussmann—contains but one such shop, and that sells only valves and complete sets; the one place in the district in which components in general are obtainable being under the St. Lazare Station.

In view of these facts, it is not surprising to find that home construction is a comparatively rare and expensive business, the major portion of wireless trade being carried on in the lines of ready-made sets and radio-grams, of which some really fine specimens are obtainable.

It is a little difficult to assign any particular reason for this lack of enthusiasm in the average Parisian. It may be, however, to a certain extent due to the fact that the English habit of taking a hobby seriously does not apply in France.

Different Temperament

The Frenchman wants a receiver for his enjoyment of the entertainment which it brings, and not as a vehicle for experiment or education. One thing, however, can definitely be adduced as a deterrent from the point of view of the would-be radio fan in Paris, i.e. the broadcasting system.

The Eiffel Tower is generally good enough in quality and range of programme, but its power is far in excess of Parisian needs, and has the effect locally of blocking out all other reception, except in the case of a really efficient high-power set!

IN TOUCH WITH ALL COUNTRIES!



A young London amateur who recently beat all records for keeping short-wave contact with countries all over the world.

really are within the range of the set.

Just try this. Next time you are seized with wanderlust and go flying round Europe on your dials, pause on a station that seems to be really good and see what sort of a programme he is giving. On my own humble family set, for instance, I should choose Rome, Brussels, Budapest, Radio-Normandie, Heilsberg, and one or two others.

Get to Know Them

Disregard, for the time being, all those weak carrier-waves that you can just resolve into music when they are fading in, and that disappear again a few moments later. Concentrate, in fact, on real, intelligent listening.

Then you will probably find, as I do, that you "make friends"

enough to have a good short-wave set, or even short-wave switching for your ordinary set, you can "make friends" with the Americans, unless you do not like late nights. W2XAF, the famous WGY station, on about 31.5 metres, runs excellent programmes, and among them are certain daily features in serial form that really give one something to look forward to.

There are also weekly "repeats," and I would not miss his turn called "The Stebbins Boys" for anything.

That Personal Touch

His announcers, too, are friendly, and even tell you their names from time to time. I believe they have a "fan-mail" that would perturb even Hollywood!

FROM HERE AND THERE

Brief particulars of station alterations and recent developments.

POSTE PARISIEN, like Radio Paris, is to move to a site outside Paris itself, and will greatly increase its power in the near future.

RADIO TOULOUSE has received a subsidy of £300, voted by the Council of the Haute-Garonne.

RADIO SAIGON has been experimenting with a power of 12 kw. on 25.46 metres on Fridays, 15.30 to 17.30 G.M.T.

NORTHERN NATIONAL uses a vertical wire aerial of one-half wave-length, slung between two 500-ft. masts.

ALGIERS is to equip twenty of its schools with receiving sets, on the lines of the scheme adopted by the B.B.C.

RIGA now uses a power of 15 kw. on 525 metres.

MOSCOW'S new station on 424.3 metres ("Moscow-Stalin") is to increase its present 100 to 300 kw. Its opening announcement is

"Allo! Govoreet Mosca Stanzija iminij Stalina."

RADIO PARIS' Sunday 3 p.m. concerts are announced by a voice familiar to all old-time listeners—the voice of "Uncle Rex" (Mr. Rex Palmer).

NEW YORK'S biggest set, in the Waldorf-Astoria, provides six different programmes to 1,940 guest-rooms in the building.

TENERIFE has been working on 41.6 metres on Saturdays and Sundays, from 21.00 to 23.00 G.M.T.

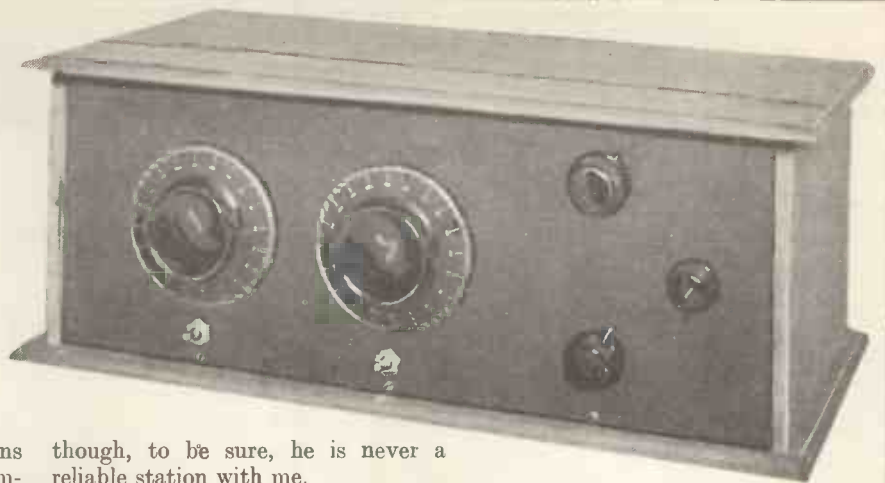
HILVERSUM, always well received on 299 metres in this country when using only 8½ kw., is to increase his power to 60 kw. in May.

BAVARIA'S station buildings are completed and the new transmitter to be erected there is nearing completion in a Berlin factory.

RADIO NORMANDIE has just received a welcome subsidy of £250 from the Department of Seine.

LONG-WAVE LISTENING

Some notes on recent reception conditions above the 1,000-metre mark, and hints on the various programmes to be found on this wave-band.



MOST of the long-wave stations seem now to have comfortably settled down to their full winter strength, and we certainly cannot complain of the results they provide. Conditions have been good, too, during the past few weeks, as was somewhat unexpectedly proved to me by the arrival of Lahti.

A Difficult Station

Normally this is a most uninteresting station, its sole claim to fame being that it is a difficult station to pick up. Distinct reception on an H.F., det. and L.F. receiver is almost unknown in my own district, but for the first time this year I have logged Lahti—not worth listening to as a programme, but something of a feat!

* * *

Immediately below Lahti (who works with 54 kw. on 1,796 metres) is the Radio Paris programme on 1,725 metres. "Uncle Rex," once of the B.B.C., is now announcing the H.M.V. concerts from this station at 3 p.m. on Sundays, so "old timers" who can remember the Uncle Rex regime at 2 L O should not fail to revive old memories by tuning to Radio Paris on Sunday afternoon.

"Punch" From Paris

The other Paris long-wave station, Eiffel Tower, on 1,446 metres, seems to be coming over extremely well considering that his power is now supposed to be so much lower than his neighbour's. Or is "Eiffel" using more than his allotted 15 kw.?

* * *

Motala, 1,348 metres, with not too much kilocycle clearance from the powerful Moscow station on 1,304 metres, has nevertheless been giving a good account of himself. But Moscow Trades Union itself has not seemed quite up to his usual form—

though, to be sure, he is never a reliable station with me.

* * *

An interesting change in the long-wave situation is that this wave-band now no longer holds the world's most powerful broadcasting station. Until

THOSE "OUTSIDE" BROADCASTS



Engineers in the "O.B." department of the B.B.C. have to be ready to tackle all sorts of adventures, including tree-climbing. This photograph shows a "mike" being suspended in Whitehall in the early hours of last Armistice Day.

recently Warsaw could claim that honour with its 158 kws., but now he has been out-reached by Prague, who has installed a 200-kilowatt, working on the medium wave-length of 489 metres.

Warsaw, by the way, has been very good indeed of late. The quality of orchestral items from this station is amazingly good at times, considering its enormous distance—a matter of about 900 miles from London.

* * *

The Vienna experimental station on 1,237 metres has not seemed to be on the air as often as was the case a few weeks ago, though this may have been just bad luck at the times chosen to tune in for him. Does anyone know his schedule? Another elusive programme has been Reykjavik, the Iclander, on 1,200 metres, immediately above Kalundborg.

Lively Denmark

This latter station, by the way, has now settled down more firmly than ever as a favourite, both for quality of entertainment and strength. The Copenhagen orchestra has been enlarged, and this may account for the good musical programmes so often to be obtained from Kalundborg. And they certainly know how to choose lively gramophone records there!

* * *

In B.B.C. circles there is continued talk of improving Daventry 5 X X, but whether this important step will be delayed by the experiments there in connection with an Empire short-wave station remains to be seen. The general feeling seems to be that substantial improvement in Britain's long-waver is overdue.

By the way, Radio-Paris does not seem to have settled down with his new transmitter as yet. At times it seems very difficult to realise that he has increased his power to the extent stated, and, as a matter of fact, we believe he still uses his old set for morning transmissions.

MY BROADCASTING DIARY



Our own Broadcasting Correspondent records the progress of the British Broadcasting Corporation, and frankly comments on the policies in force at B.B.C. headquarters.

The Next Canterbury Festival

THE B.B.C. has decided to co-operate again with the Canterbury Festival Week in 1932. The week will run from June 13th to 18th. The broadcasting will consist of a "Serenade" concert one evening, followed by a more formal orchestral concert the next afternoon, and concluding with a second "Serenade" that same evening.

Television

The surprising thing about television is the way in which it is now accepted in its right experimental, tentative position in B.B.C. programmes. I think the B.B.C. was wiser to change its attitude from one of sulky obstruction to one of critical but constructive co-operation, in its own interests.

The special equipment and adaptation of a studio in Broadcasting House is, of course, a prudent measure. The apparatus there can be changed as the general television situation changes, if it does, but it can no longer be maintained that the B.B.C. has put its head in the sand about television.

Then the special one hour a week B.B.C. television programme should reveal lots of useful data, and incidentally keep the B.B.C. both "programmatically" and technically abreast of possible developments elsewhere.

The Broadcasting Vigilantes

I heard the other night of an interesting new organisation, the "Broadcasting Vigilantes," the nucleus of which appears to be provided by ex-members of the staff of the B.B.C. The basic idea is by no means hostile to the B.B.C., but it is frankly more concerned with broadcasting than with its organisation.

So close is the interest of those who left the B.B.C. even six or seven years ago that they remain eager to make some sacrifice to help or safeguard their old love.

I am bound to say I entirely approve this banding together of the pioneers of broadcasting, and I would like to feel that the B.B.C. were magnanimous enough to place no obstacle in the way of individual members of the staff who might care to join the Vigilantes.

But from what I know of Savoy Hill, I fear obstacles will be so placed.

Of course, Sir John Reith himself should be a leading spirit in the new society, but I hardly envisage the Board

of Governors having the insight to approve such a step on his part.

Still, there will be a fair nucleus, with such possibilities as Captain P. P. Eckersley, Miss Hilda Matheson, Captain Cecil Lewis, Mr. Eric Dunstan, Col. R. H. Brand, Captain West, Mr. R. E. Jeffrey, Mr. Rex Palmer, Mr. Corbett-Smith, Mr. Percy Pitt, Mr. Donald Calthrop, Mr. George Grossmith, Mr. J. C. Squire, Mr. James Agate, Mr. Harold Nicolson, Mr. Gerald Barry, Mr. Francis Hackett, Captain Reginald Berkeley, and Mr. Filson Young. A goodly company, I am sure.

Rehearsing International Emergencies

Last year the B.B.C. had to concern itself with the careful rehearsing of action in the event of internal emergency such as might have followed a financial panic on the suspension of the gold standard. Fortunately it was not necessary to apply the emergency precautions because there was no hint of panic.

Now, however, it is more in the international field that precautions are necessary. Since the recent exchange

RADIO FOR FIRE FIGHTERS



The Rochdale Fire Station and its engines have been equipped with radio, which completely eliminates all communication troubles. The installation is due to the enterprise of one of the firemen, who has developed the scheme in his spare time. The photograph shows the apparatus at the fire station.

Latest News Items for the Listener

between Britain and France about tariffs, and the simultaneous difficulties accentuated in Germany, the Chancelleries of Europe have had seriously to consider certain eventualities which had not been so prominent since July, 1914.

Attendant upon this new phase of international relationships was a consideration of the part broadcasting might and could play in a developing situation.

So now I gather the National Government is examining with particular care how the B.B.C. might be turned to best account in the event of a sudden international crisis.

Of course, the first effort would be in the direction of making clear the pacific intentions of British policy.

A HAPPY TRIO



The Marchese Marconi with his wife and small daughter.

If this failed, then the B.B.C. might be used to influence the civilian population, while at the same time resisting unfriendly propaganda in neutral countries.

All I can say at this juncture is that while I hope these measures will prove as superfluous as were the internal measures last summer, I still think it a good thing to have the whole field of possibility carefully and practically covered "just in case."

Radio Humorists Wanted

My friend, Val Gielgud, Productions Director of the B.B.C., complains bitterly about the paucity of both the talent and the material of radio humour. Nor am I surprised.

Apart from it being unusually difficult to devise humour

that suits this extraordinary medium, the B.B.C. has not put itself out sufficiently to attract either new talent or new material.

The time has come when it is not enough to pick up the left-overs of the stage or music-hall. Listeners are too critical. They want the real stuff for the microphone.

Therefore, I suggest that the B.B.C. would be well advised to authorise and encourage Mr. Gielgud to set up a "nursery" to grow both talent and material for future broadcast humour, particularly that needed for the various branches of the drama.

"Diagonalising Run Riot"

When the B.B.C. reproduces on the Regionals the programme which was starred on the National frequencies the previous night, or vice versa, they call the process "diagonalising," and they justify it on the ground of "alternative programmes and service areas."

I would agree that there are very occasionally "high-light" programmes which deserve this repetition, and benefit from it. But the reason advanced by the B.B.C. is no longer valid.

In fact, there is a growing volume of irritation at the frequency with which diagonalising occurs. I believe the process has received a fillip from the economy scare.

Anyway, I counsel Savoy Hill to draw in its horns a little in this matter! There is an increasingly active demand for real alternatives; also listeners do not like being debarred from picking and choosing, which is what is entailed by "diagonalising run riot."

St. Martin's and the B.B.C.

The relations between St. Martin's-in-the-Fields and the B.B.C. are again under special review. Of course, everyone knows that much that is of real value in the religious broadcasting of the B.B.C. finds its origin in St Martin's, which contributes not only the wonderfully robust and inspiring monthly "S.B." services, but also the daily weekday service at 10.15.

St Martin's is favoured by certain privileges and anomalies which qualify it especially to consider broadcasting its chief parishioner. There is nothing hide-bound or pedantic about St. Martin's.

"Dick" Sheppard gave its modern tradition the courageous bent that has endeared it to millions. Representatives of any other religious persuasions and even "sinners" have occupied its pulpit.

When Dick Sheppard or Pat McCormick or Hugh Johnston wished to let go at any special wickedness or travesty or humbug, well, they just did and that was that, to the considerable discomfiture of evil and the enrichment spiritually of the world at large.

But, of course, certain "vested interests" are bound to get bruised in this exchange, and every now and then there is a more or less determined endeavour to dislodge St. Martin's from its privileged position in broadcasting.

BROADCASTING—

is a world force of incalculable significance to-day. Thinking men will keep abreast of its developments, and will watch its tendencies and implications. No other magazine can keep you in touch so surely and completely as

"MODERN WIRELESS"



RADIO ECONOMIES

How to save money when making your radio purchases.

By H. A. RAMPTON.

It is often difficult for the amateur to judge if inexpensive wireless goods he can buy will be O.K. for a set he intends to build. He is naturally afraid of "spoiling the ship for a ha'porth of tar," and realises that, it not being as yet the policy of manufacturers to give something for nothing, the dearer article should in some way be better than the cheaper.

In wireless it does not follow that because you pay, say, 50 per cent more you are going to get better quality, either electrically or mechanically, because in many cases the extra money pays for the ability to stand up to a heavier voltage—or to provide a larger output.

The H.T.

However, the three main accessories that come in for consideration where money saving is the object are H.T. batteries, loud speakers, and valves. Of these the H.T. batteries hold pride of place.

It sometimes appears that a cheap battery lasts longer than one of standard quality? It sounds queer, but is very often true enough.

It's like this.

You can either have three cheap batteries in a given time, with their consequent short "shelf life," high resistance, and tendency towards "crackling," or you can have two good ones that last about 75 to 85 per cent as long, but give the same voltage as three of the cheaper make.

(That is, after the initial sudden drop.) The reason of this is that a cheap battery drops considerably more than a good one, but ekes out an existence, after its kind, for quite a long time till it finally gives up.

Buy the Best!

If your set has any tendency to L.F. oscillation or motor-boating then plump for the good batteries.

About the second article men-

tioned, the loud speaker, it is rather difficult to advise, because, after all, results vary so much with the particular set used. Again, where one listener likes a certain tone and relative loudness of high and low notes, another, equally critical, will prefer more bass or more treble, as the case may be.

The ideal, as a rule, is "true" rendering of the original, but carefully regulated reproduction may be far more pleasing to the ear. What we are used to is not necessarily the best.

If you want a cheap speaker, do buy from a firm with a reputation at stake, and quality will be at least quite listenable. A very cheap foreign unit can be used if desired, but both quality and volume depend on the make, and also on the type of cone used with it.

Cheap Valves

It is always best to buy good valves. This for many reasons. But, as in other cases, if you must buy cheaply, you will find that they do, at least, work.

As grid detectors they often work quite well, owing to "softness."

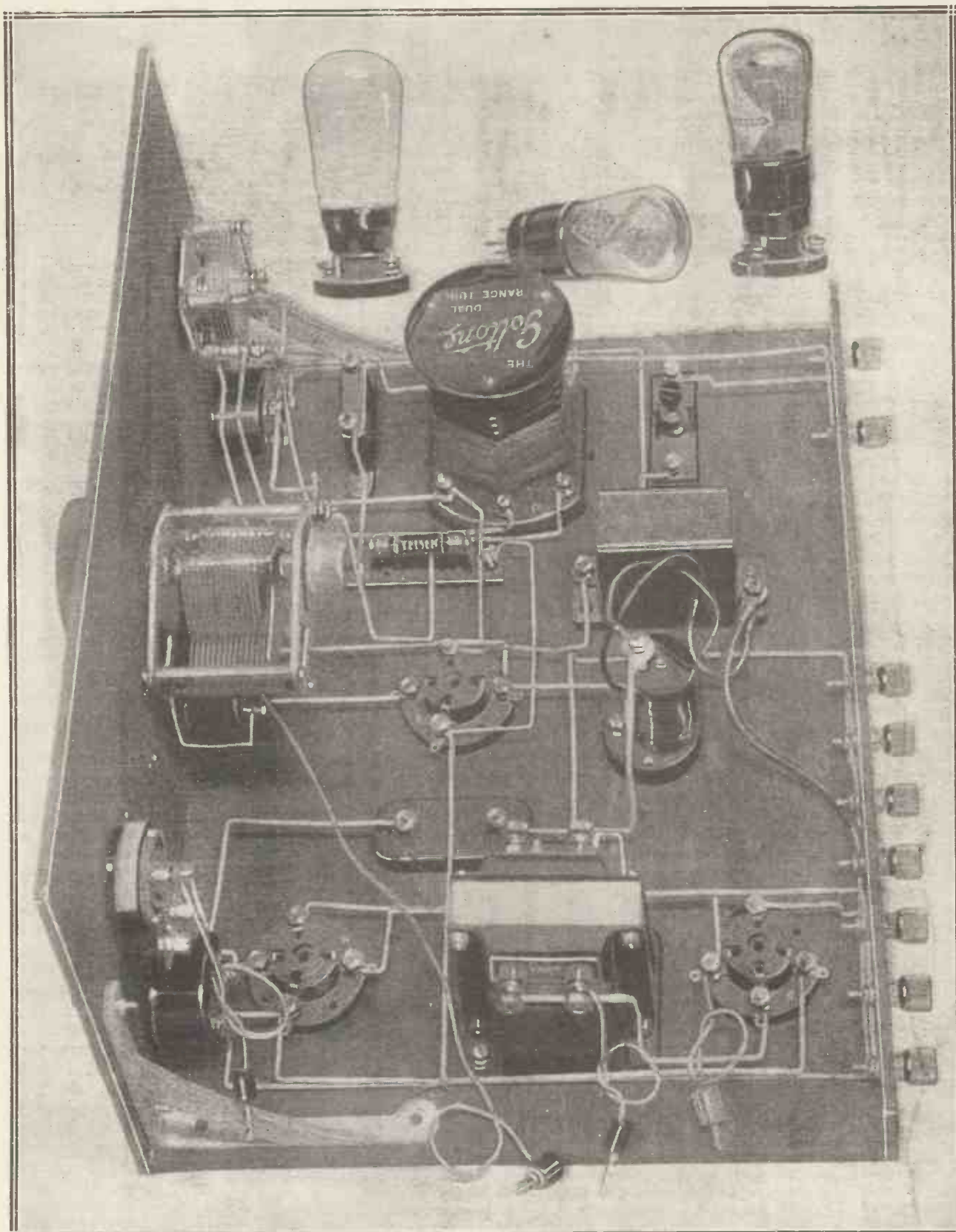
Another thing about a cheap valve is this: Suppose it says max. anode volts 150, for which the recommended grid bias is 8 volts, you may find that better results are obtained by using only 120 volts H.T. and reducing the grid bias in proportion.

MAKE YOUR CHOICE WITH CARE



When buying wireless apparatus it always pays to restrict your choice to the products of those firms which have a reputation to keep up.

Well-Spaced Components Mean Easy Construction

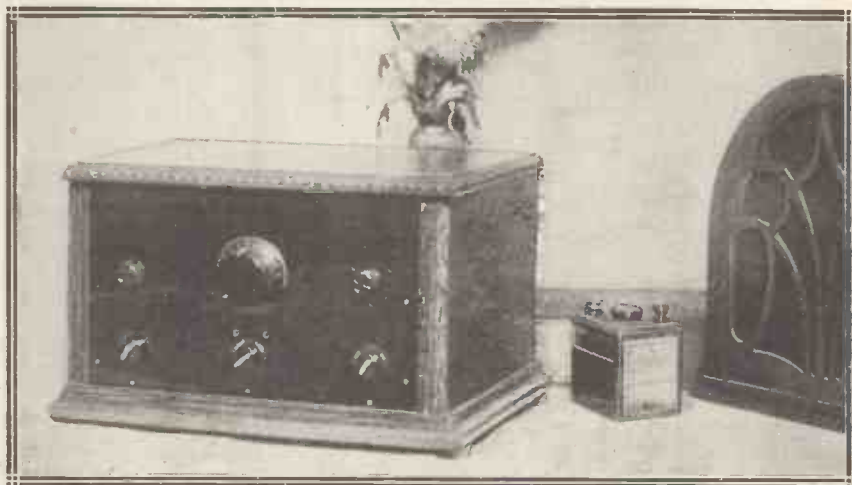


This receiver is exceptionally easy to build, mainly owing to the well-spaced layout. There will be no fiddling about in awkward places, trying to persuade obstinate nuts to behave themselves.

The "M.W." "Uni-Coil" Three

(MODEL "C")

This month we are publishing instructions for building two more excellent sets of the famous "Uni-Coil" series. The first of the pair, the description of which starts below, is known as Model "C," and incorporates one of the well-known Goltone Dual-Range Coils.



Two months ago we described in MODERN WIRELESS a couple of three-valve receivers using well-known commercial tuning coils. These sets were known as Models "A" and "B" of the "Uni-Coil" Three, and followed quite standard practice as far as the low-frequency side went, differing only in minor details and in the design of the tuning circuits.

The Tapped Grid

This month we are presenting two more of these unique receivers, using two well-known and popular tuning units that hail from the north, from the industrious county of Lancashire.

But before we go any farther let us say most emphatically that these sets—and we hope to publish further designs in the same series—are not

in any way placed in order of merit. We are not attempting to classify them, and by our alphabetical listing we do not infer that "A" is better than "B," or "B" than "C," and so on. The listing is purely nominal and the order in which the designs are published is merely that of the order in which the receivers are constructed.

We are not reviewing their merits or demerits—obviously they are not equal in efficiency, but they all come above a certain standard of selectivity and sensitivity which we have set.

This month, as we have remarked before, "northern lights" have been chosen, and a study of the diagram will show that the two tuning schemes differ. Model "C" utilizes the Goltone dual-wave tuner, which is particularly interesting in that the

grid winding is tapped and the aerial and grid are taken off a short way down the tuned winding.

This greatly reduces the damping effect of the grid-filament circuit on the tuned circuit and thereby enhances the selectivity of the system.

Radio or Gramophone

Reaction is applied in the usual way by means of a .0003-mfd. differential reaction condenser, and a rotary type snap switch enables radio or gramophone reproduction to be obtained at will.

Above the radio-gram switch on the panel are placed two sockets to take the pick-up leads, which can easily be removed when the set is used as a radio receiver only and gramophone is not required.

THE COMPONENTS NEEDED FOR MODEL "C"

PANEL

14 x 8 in. (Permcot, Becol, Peto-Scott, Wearite, Ready Radio, Goltone, Parex).

CABINET

To take above, with baseboard 10 in. deep (Pickett, Camco, Ready Radio, Osborn, Gilbert, Peto-Scott.).

VARIABLE CONDENSERS

1 .0005-mfd. (Polar, Utility, J.B., Cyldon, Lotus, Lissen, Ormond, Igranic, Dubilier, Formo, Burton, Wavemaster, Astra, Telsen, Graham Farish).

1 .0003-mfd. (or over) differential reaction (Lotus, Ormond, Polar, Lissen, Parex, Wavemaster, Telsen, Graham Farish).

COMPRESSION-TYPE CONDENSER

1 .0003-mfd. max. (Formo, Lewcos, R.I., Graham Farish, Polar, Goltone, Sovereign, Telsen).

SWITCHES

2 2-point on-off (Ready Radio, Snap, Bulgin, Igranic, B.A.T., Goltone, Lissen, Lotus, Colvern, Peto-Scott, Magnum, Wearite, Telsen, Graham Farish).

1 3-point Radio-gram (Ready Radio, Snap, Telsen, Bulgin, Igranic, B.A.T., Goltone, Lissen, Lotus, Colvern, Peto-Scott, Magnum, Wearite, Graham Farish).

RESISTANCES

1 100,000-ohm Spaghetti (Ready Radio, Lewcos, Telsen, Bulgin, Magnum, Peto-Scott, Sovereign, Graham Farish, Lissen, Varley, Goltone, Igranic).

1 25,000-ohm Spaghetti (Lewcos, Telsen, Ready Radio, Bulgin, Magnum, Peto-Scott, Sovereign, Graham Farish, Lissen, Varley, Goltone, Igranic).

1 2-meg. grid leak and holder (Telsen, Dubilier, Lissen, Ferranti, Ediswan, Igranic, Loewe, Graham Farish, Watmel, Varley).

1 ½-meg. volume control (Igranic, etc.).

VALVE HOLDERS

3 4-pin (Telsen, Igranic, Lotus, Lissen, Clix, Graham Farish, Bulgin, Formo, Wearite, Dario, Magnum).

FIXED CONDENSERS

1 .01-mfd. mica fixed (Dubilier, T.C.O., Ediswan, Lissen, Ferranti, Igranic, Watmel, Graham Farish, Goltone, Mullard).

1 .0003-mfd. fixed (T.C.O., Dubilier, etc.).

1 2-mfd. fixed (Telsen, T.C.O., Mullard, Dubilier, Lissen, Igranic, Ferranti, Sovereign, Hydra, Formo, Helsby).

CHOKES

1 H.F. (Wearite, Lewcos, Peto-Scott, Telsen, R.I., Ready Radio, Tunewell, Parex, Varley, Dubilier, Lissen, Lotus, Magnum, Watmel, Sovereign, Atlas, Graham Farish).

TRANSFORMERS

1 I.F. (Goltone, Telsen, Igranic, Lissen, Varley, R.I., Ferranti, Lotus, Lewcos, Atlas, Formo).

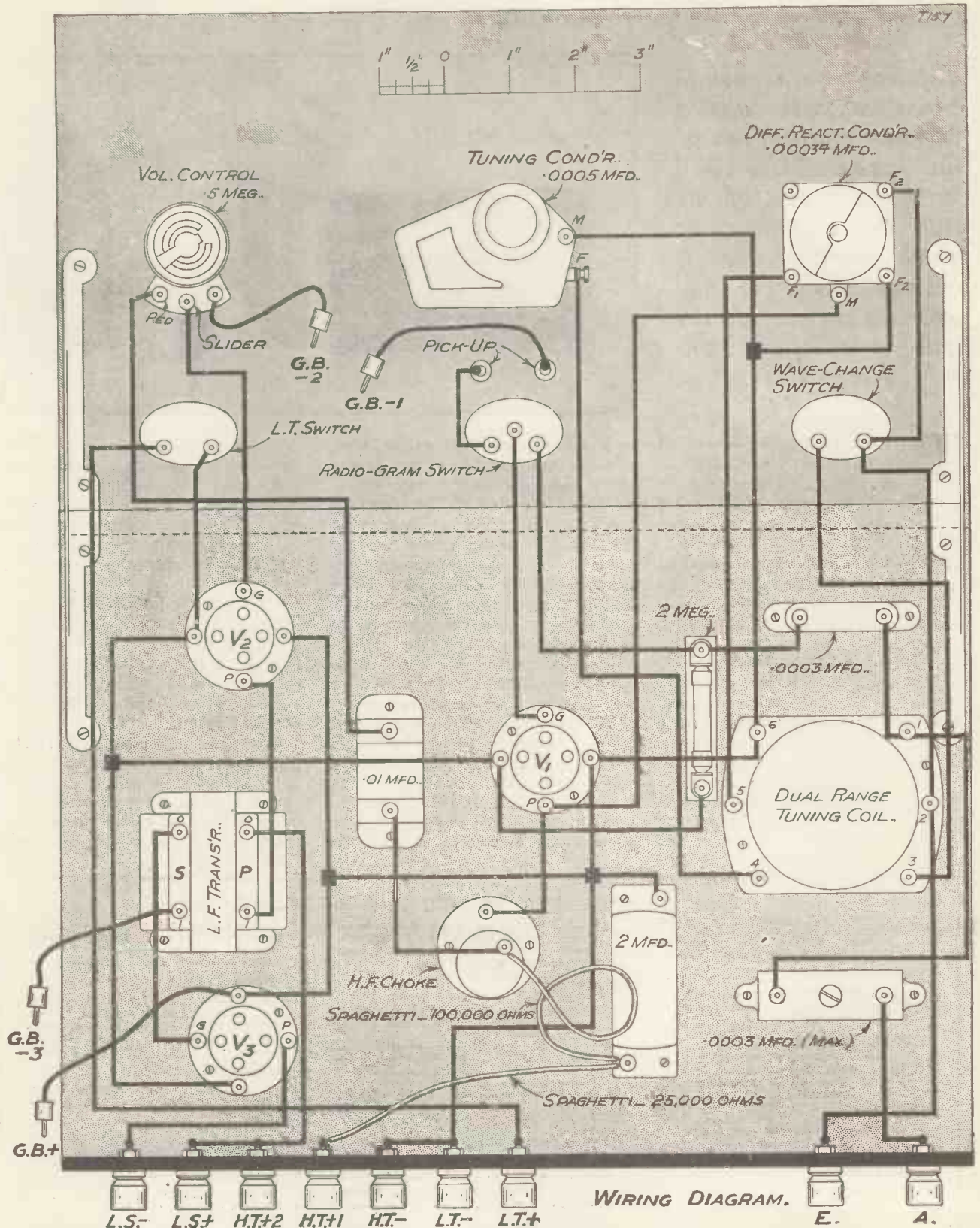
COILS

1 Dual-Range Tuner (Goltone).

MISCELLANEOUS

2 Sockets (Ealex, Clix).
1 Terminal strip, 14 x 1½ in.
1 Pair panel brackets (Magnum).
9 Indicating terminals (Belling & Lee, Igranic, Ealex, Clix, Goltone, Bulgin).
Flex, plugs, screws, etc.
Glazite, Quickwire, Laconline, Jiffilix.

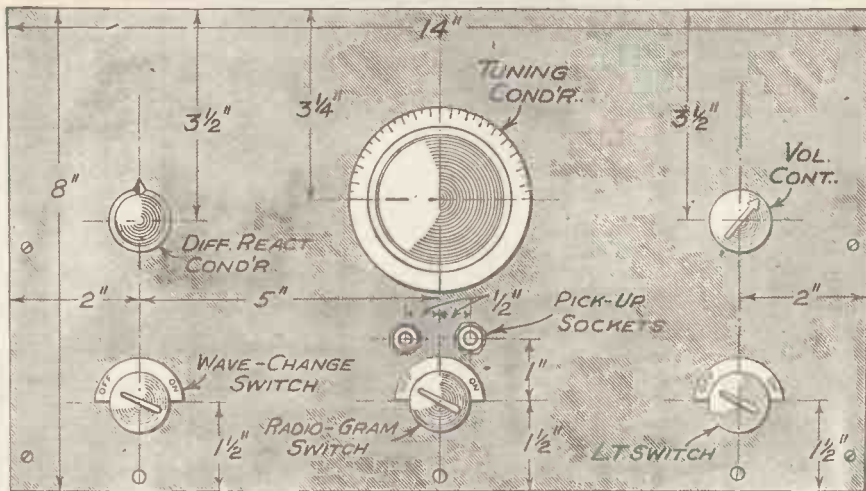
A Straightforward Job With No Complications



Neat "right-angled" wiring gives any receiver a handsome appearance, but if you prefer to do so you can wire up with those handy little connecting links which are supplied in various lengths all ready for slipping over the terminals. But do keep all leads as short as possible.

You Can Use Either Batteries or Mains Unit

GOOD PANEL PLANNING



Y1637

PANEL LAYOUT.

All the required measurements for drilling the panel are given in this diagram. Note that a pair of sockets is provided for the pick-up leads, just above the radio-gram switch.

The rest of the circuit is quite straightforward, resistance-capacity coupling being employed for the first stage and transformer for the second.

It is a well-tried circuit, and we are keeping to it during these "Uni-Coil" receivers because by so doing one can not only size up the advantages or disadvantages of the particular tuning system used in each set, but also enable the best quality-cum-volume to be obtained without having to go in for large valves and high H.T. voltages.

For Quality and Volume

It is surprising what good quality and what excellent volume can be obtained with this well-tried L.F. circuit if proper valves are chosen and overloading is avoided.

It is because of the danger—no, almost inevitability—of overloading on the local station that a volume control has been included in the second stage, controlling the input to the first L.F. valve. By the judicious use of this and the series aerial condenser, good volume (dependent, of course, on the valves employed) and good quality from the local station are assured, while with reaction many distant programmes can be received at excellent strength on the loud speaker.

But, as we said before, the quality and the volume obtainable depends on the valves used. We generally specify in our accessory list the rough types of two-volters that can be employed, but this must not be taken

to mean that 4- or 6-volt valves of similar characteristics cannot be used.

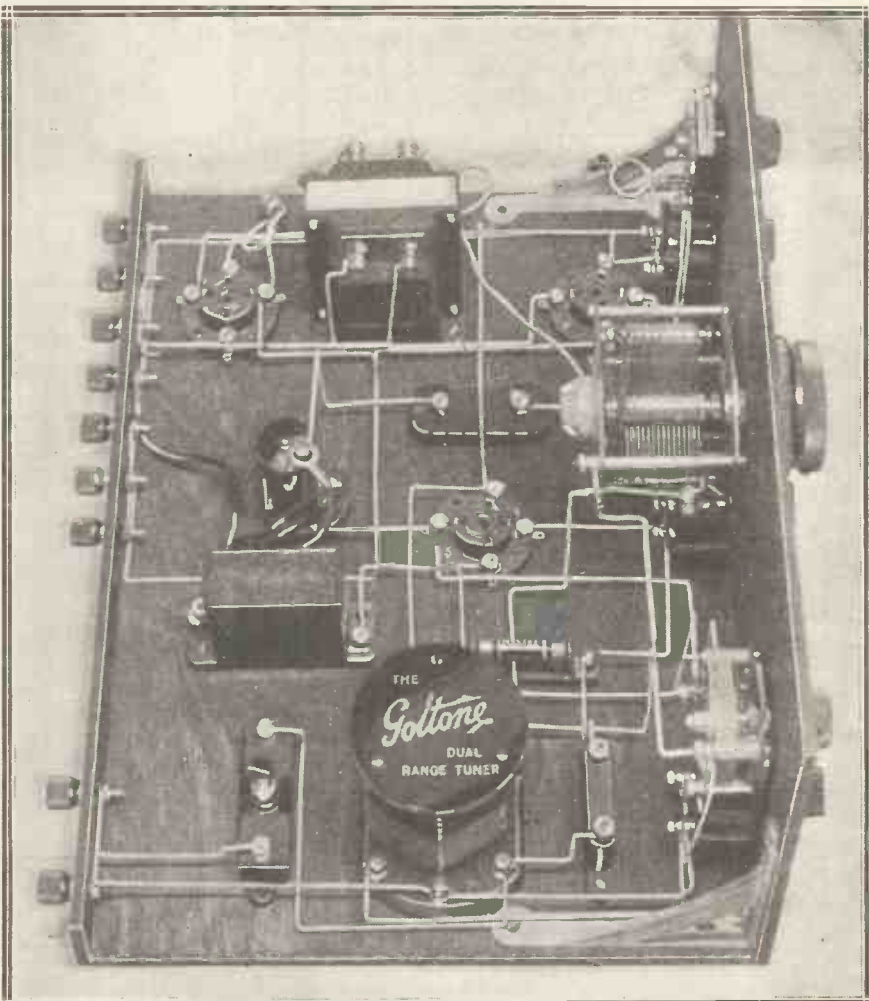
As a matter of fact, if you have 4- or 6-volters and plenty of H.T. (say, from a mains unit) it would be an advantage to use such a valve as the P.X.4 or P.625 in the last stage, for these valves have as yet no equivalent in the 2-volt class, and they will handle a surprising amount of power.

The Power Supply

In radio, however, as in other spheres, one cannot get something for nothing. If big volume is required—i.e. a big power output—the requisite power must be supplied. The valve is not a power generator, it is merely a power controller, and the energy must come from the H.T. and L.T. batteries.

Why all this about power, you will

AT THE AERIAL END OF THE SET



A general view of the finished set showing the dual-range coil in the foreground. A little to the left of this coil there is the small pre-set condenser which is connected in series with the aerial for adjusting selectivity.

Powerful Programmes of Unquestionable Quality

ask? Well, it can be summed up as follows. If you want plenty of volume on the local you must pay for it in H.T. current. If you have a mains unit, so much the better; but from dry H.T. batteries real "beef" is going to cost something, for it means a current drain of 18-24 milliamps if the largest 2-volter output valve is used. We refer to the P.240, which will handle quite a good volume.

Next in size is the P.220A., 230S.P. class, which takes about 16 milliamps at 120 volts H.T., and will give medium power without overloading.

About the Valves

The P.2, P.M.202 and so on are next, and are very useful general-purpose output valves. They do excellently for local and distant work, but will not handle as much as the P.220A.

As a matter of fact, we prefer this latter class of valve, as it does give adequate volume without distortion for the ordinary size living-room, and will operate a moving-coil speaker quite well.

Re the other valves—and this talk about valves also applies to Model "D," which follows—the usual detector is required; something like the Cossor H.L.210, Marconi H.L.2, Osram H.L.2, Mazda H.L.2, S.S.210H.L., or S.S.210

RECOMMENDED ACCESSORIES For Model "C"

Valves. 1 Det. (Cossor 210H.L., Mullard P.M.1H.L. or P.M.2D.X., Mazda H.L.2, Six-Sixty 210D., Osram H.L.2, Marconi H.L.2, Tungoram, Dario, Lissen, Fotos.)

1 L.F. (Mazda L.2, Marconi L.210, Mullard P.M.1 L.F., Cossor 210 L.F., Six-Sixty 210 L.F., Osram L.210, Tungoram, Dario, Lissen, Fotos.)

1 Power or super-power (Marconi P.2, Mazda P.220A., Cossor 220P.A., Mullard P.M.202, Six-Sixty 220S.P., Osram P.2, Tungoram, Lissen, Dario.)

(Total anode current 16 milliamps or more.)

Batteries. H.T., 120-150-volt super-capacity (Pertrix, Drydex, Ever Ready, Lissen, Magnet, Columbia, Ediswan).

G.B. to suit output valve, 15-18 volts (Pertrix, etc.).

Accumulator. 2-volt, 20-30-amp. hour actual (Exide, Lissen, Pertrix, Ediswan, G.E.C.).

Pick-up. (Marconiphone, H.M.V., Blue Spot, Celestion W.5, "Audak," Graham Farish, B.T.-H., Lissen, A.E.D.).

Loud Speaker. (H.M.V., L.S.7 Marconiphone, Blue Spot, Celestion, Amplion, B.T.-H., Graham Farish, R. & A., Undy, Epoch, W.B.).

Mains Units. To give 20 milliamps at 120 volts minimum (Tannoy, Regentone, R.I., Formo, Heayberd, Lotus, Atlas, Tunewell, Ekco).

Det., or Mullard P.M.2D.X., being eminently suitable. But because the stage is resistance-capacity coupled, don't try and use an R.C. valve. It is neither required nor advised in this case.

The middle valve is a plain L.F. type, of the order of the 210L., which is a member of every valve manufacturer's lists.

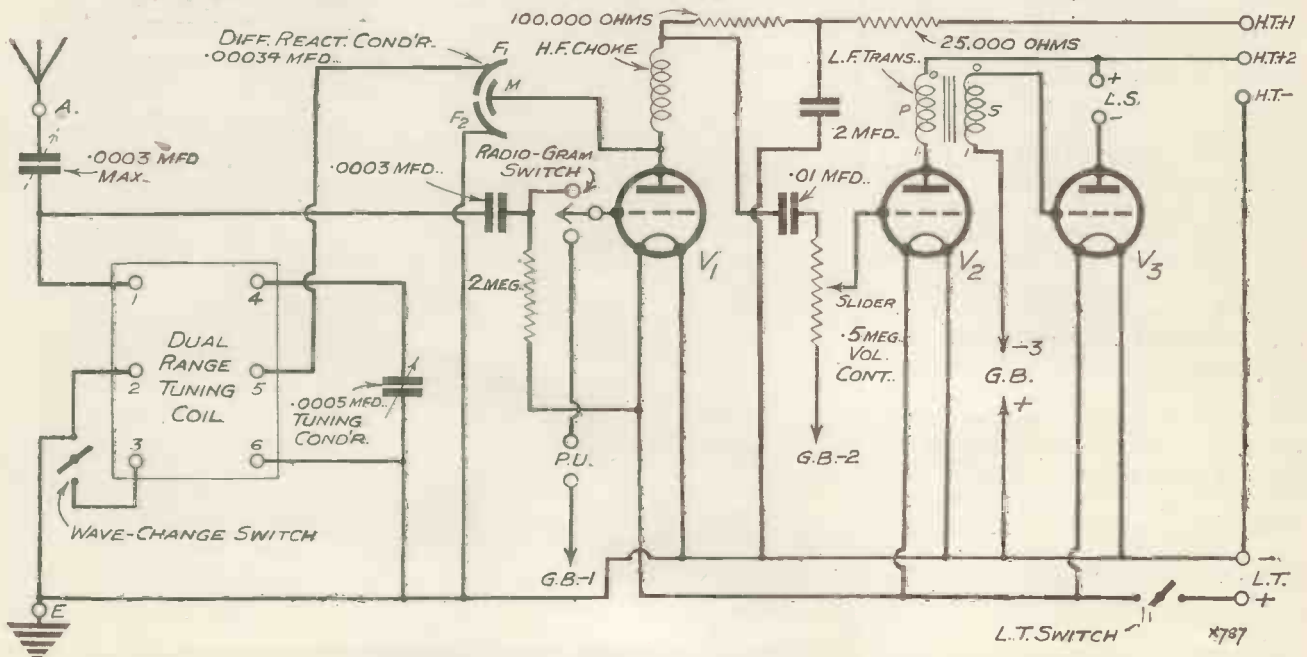
Milliamp Requirements

Finally, however, do not forget that a largish H.T. battery will have to be used. The super-capacity 120- or 150-volt type is advised, or a mains unit capable of supplying at 120 volts at least five more milliamps than is required by your output valve. With most valves, therefore, a 20-milliamp unit will just be O.K., but if you can get one for 25 or 30 milliamps it is a good investment.

In conclusion, one word concerning the operation of the set. Tuning and reaction are carried out as usual, grid bias is used to suit the valves employed, and selectivity is adjusted to its best degree, consistent with adequate sensitivity, by varying the series aereal condenser.

The set is an extremely simple one, it is inexpensive, and it should not fail to work even in the hands of the veriest tyro where radio is concerned.

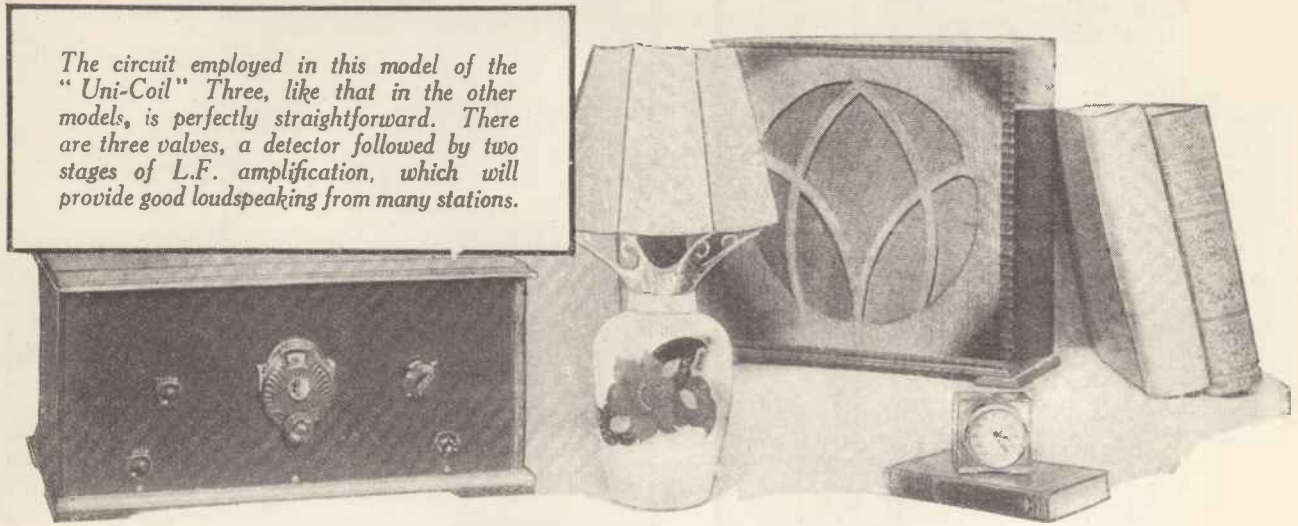
The Theoretical Conception of This Interesting Set



A detector and 2 L.F. circuit using a combination of resistance and transformer coupling in the L.F. stages. This arrangement is productive of amazingly good quality, with plenty of punch behind the programmes.

The "M.W." "Uni-Coil" Three

The circuit employed in this model of the "Uni-Coil" Three, like that in the other models, is perfectly straightforward. There are three valves, a detector followed by two stages of L.F. amplification, which will provide good loudspeaking from many stations.



MODEL "D"

On this and following pages we present the fourth of this interesting series of sets in which a commercial dual-range coil is made the basis of the design.

THIS is the fourth of our series of receivers containing well-known commercial tuners and circuits recommended by their makers.

As in the cases of the three foregoing receivers, quite a straightforward L.F. circuit has been employed, and in this model the pick-up switch and terminals have been omitted.

Circuit Details

As will be seen from the theoretical diagram, the tuning system is of the wave-change variety, the long and medium wave-bands being covered by means of paralleling or dis-

necting a second inductance with the main coil.

One reaction coil suffices, with a .0003- to .00035-mfd. reaction condenser, to provide sufficient regeneration over both wave-bands, and selectivity is provided by a series aerial condenser of the compression type.

This gives adequate selectivity with good volume for most cases when the nearest "local" station is not less than a dozen or so miles away. When closer the capacity has to be reduced to rather a low value and consequently the reception of distant stations near the local in wave-length is rendered more difficult.

The coils in the Lotus wave-change unit are wound on two vertical cylindrical formers, and are totally enclosed in an aluminium screening-box. The wave-change switch control is carried out by an extension rod through the panel, and is of simple rotary type.

Particularly Simple

Thus the construction of the receiver is particularly simple and no wave-change wiring has to be done.

Plenty of room has been left on the baseboard, so that the wiring between components is particularly easy.

ALL THE PARTS YOU NEED FOR MODEL "D"

PANEL

16 x 7 in. (Permeol, Peto-Scott, Becol, Ready Radio, Wearite, Goltone, Parex).

CABINET

1 Cabinet to take above, and baseboard 10 in. deep (Peto-Scott, Pickett, Camco, Ready Radio, Gilbert, Osborn).

VARIABLE CONDENSERS

1 .0005-mfd. with slow-motion drive (Telsen, Cydon, Polar, J.B., Utility, Ormond, Astra, Graham Farish, Wavemaster, Formo, Dubilier, Igranic, Lotus, Burton).
1 .0003- to .00035-mfd. reaction condenser (Lotus, Telsen, Polar, Wavemaster, Graham Farish).
1 .0003-mfd. maximum compression (Sovereign, Formo, Colvern, Goltone, Igranic).

COIL

1 "Binocular" dual-range (Lotus).

L.F. TRANSFORMER

1 (R.I. "Dux," Telsen, Varley, Lotus.

Goltone, Graham Farish, Climax, Igranic, Atlas, Formo, Ferranti, Leweos).

VALVE HOLDERS

3 4-pln (Formo, Telsen, W.B., Graham Farish, Lotus, Wearite, Magnun, Bulgin, Lissen, Clix, Igranic).

FIXED CONDENSERS

1 .0003-mfd. (Lissen, Telsen, Ready Radio, Mullard, T.C.C., Dubilier, Ediswan, Watmel, Ferranti, Graham Farish, Igranic, Sovereign, Goltone).
1 .01-mfd. mica (Dubilier, etc.).
1 2-mfd. (T.C.C., Ferranti, Telsen, Igranic, Helsby, Hydra, Dubilier, Lissen, Formo, Sovereign).

RESISTANCES

1 Grid leak and holder, 2-meg. (Ferranti, Telsen, Ready Radio, Mullard, Igranic, Graham Farish, Loewe, Varley, Watmel, Dubilier).
1 ½-meg., with terminals or with holder (Graham Farish, etc.).
1 100,000-ohm Spaghetti (Bulgin, Varley

Igranic, Telsen, Sovereign, Leweos, Peto-Scott, Goltone).

1 25,000-ohm Spaghetti (Peto-Scott, etc.).
1 ½-meg. volume control (Ready Radio, Clarostat, Wearite, R.I., Sovereign, Varley).

SWITCHES

1 Rotary-type snap switch (Bulgin, Clarostat, Ready Radio).

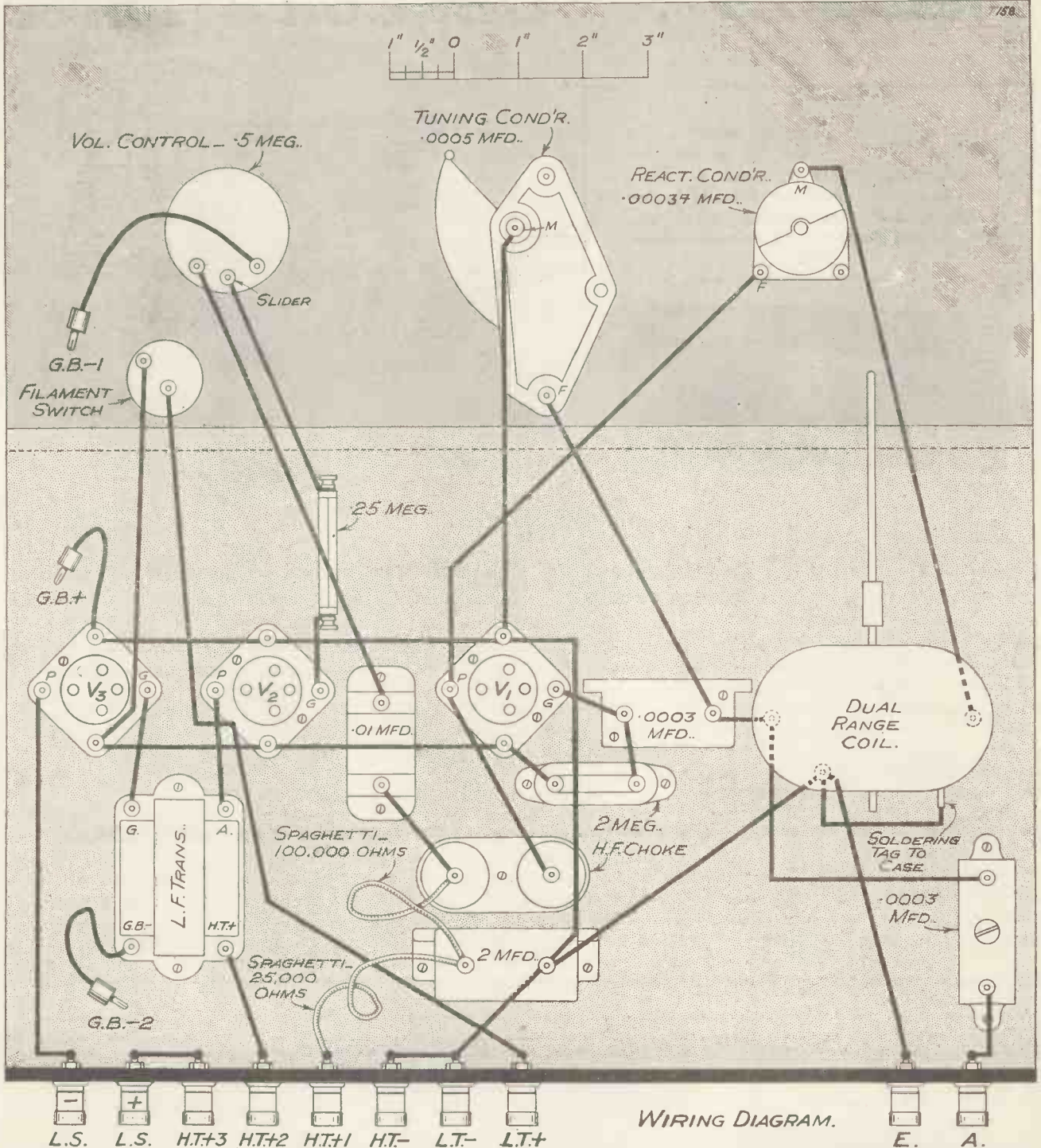
H.F. CHOKE

1 (Climax, Leweos, Telsen, Varley, Ready Radio, Sovereign, Atlas, Peto-Scott, R.I., Watmel).

MISCELLANEOUS

1 Terminal strip, 16 in. x 1½ in. (Peto-Scott, etc.).
10 Indicating terminals (Igranic, Belling & Lee, Bulgin, Ealex, Clix, Goltone).
Jifflix, Glazite, Lacoline, Quickwire.
Flex. screws, etc.
G.B., H.T. and L.T. plugs and spade terminals (Clix, Ealex, Igranic, Belling & Lee).

Linked With Links That Lend Themselves to Easy Wiring



WIRING DIAGRAM.

The wiring of this inexpensive receiver is greatly simplified by the use of ready prepared connecting "links." They consist of various lengths of tinned-copper wire, covered with sleeving, and having handy loops at the ends ready to slip over the terminals.

nothing being cramped and thus making wiring difficult.

But although it may seem that the large space of the baseboard might quite easily have been reduced, and a smaller and more compact receiver designed, the layout has been carefully arranged.

In a simple detector and two L.F. scheme it may seem an unnecessary

waste of time to spend any lengthy period studying the layout of the few parts necessary in such a circuit. But it is not, and with modern high-mag. valves it is really most essential that reasonable care be taken with even the simplest layout.

If you examine the positions of the components in this Model D you will notice that all the valves are in a

row, and that with the exception of the lead from the .01-mfd. condenser to the volume control, and back from there to the grid of V_2 , all grid and plate leads are really short.

This not only makes for neatness, but also is essential to efficient operation. Then, again, the L.F. components are carefully laid out, so that no interaction can take place.

FOR ALL YOUR RADIO use—

“W.L.S. 1932 SHORT-WAVER”

Kit “A” (less valves and cabinet) £4:7:6

OR BY EASY PAYMENTS

8/3 down and 11 monthly payments of 8/3.

Kit “B” (with valves, less cabinet) £5:18:0

OR BY EASY PAYMENTS

11/- down and 11 monthly payments of 11/-.

Kit “C” (with valves and cabinet) £6:15:6

OR BY EASY PAYMENTS

12/3 down and 11 monthly payments of 12/6.



Any component can be obtained separately if desired. Full list on application.

See page 73.



ECKERSLEY'S SET

Kit “A” (less valves and cabinet) £5:6:6

OR BY EASY PAYMENTS

9/9 down and 11 monthly payments of 9/9.

Kit “B” (with valves less cabinet) £6:17:0

OR BY EASY PAYMENTS

12/9 down and 11 monthly payments of 12/9.

KIT “C” (with valves and cabinet) £8:2:0

OR BY EASY PAYMENTS

15/- down and 11 monthly payments of 15/-.

APPROVED LIST.

	£	s.	d.
1 Ebonite panel, 16 in. x 7 in., drilled to specification		5	0
1 Polished oak cabinet, 16 in. x 7 in. x 12 in.	1	5	0
1 Cyldon .0005 double drum Extender, Ex.2.T5	1	19	6
1 ReadiRad .0003 solid dielectric self-shorting type condenser		3	6
1 ReadiRad .0005 differential		2	6
1 T.C.C. .0003 fixed condenser, type 34		1	6
1 T.C.C. .01 fixed condenser, type S.		2	6
1 T.C.C. 2-mfd. fixed condenser, type 50		3	10
1 ReadiRad 2-meg. leak and holder		1	4
1 ReadiRad .5-meg. leak and holder		1	4
1 Lewcos 100,000-ohm Spaghetti resistance		1	8
1 Lewcos 25,000-ohm Spaghetti resistance		1	6
1 R.I. "Eckersley" Tuner	15	6	
1 Lewcos H.F. choke, type M.C.		2	6
1 ReadiRad "on/off" snap switch		2	9
1 R.I. L.F. transformer, type G.P.	10	6	
3 Junit 4-pin valve holders		2	0
2 Sovereign terminal blocks		1	0
4 Belling Lee terminals, type B.		2	0
1 Aluminium screen, 6½ in. x 6 in.		2	0
5 Belling Lee wander plugs		10	
2 Spade terminals		3	
1 Pkt. Jiffilinx		2	6
3 Valves as specified: 1 P.M.2D.X., 1 P.M.1L.F., 1 P.M.252	1	10	6
Flex, screws, etc.			8
	£8	2	0

JIFFILINX FOR SIMPLER WIRING

Always use Jiffilinx for wiring. They eliminate soldering, give perfect contact and are the most convenient, rapid and neat method of wiring a set.

Forty Jiffilinx in various lengths, fitted with shake-proof connectors —price 2/6. Send for a packet to-day.

A READY REFERENCE TO RADIO.

Every constructor should read Kendall's Book, "10 Hours for Modern Radio Constructors," 6d. post free. Send four 1½d. stamps for your copy now. You should also have a copy of the new Ready Radio Catalogue containing full details of all the most up-to-date radio equipment. Price 1/-, post free.

Head Office and Works: Eastnor House, Blackheath, S.E.3. 'Phone: Lee Green 5678. 'Grams: Readirad Blackvil. Showrooms: 159 Borough High Street London Bridge, S.E.1. 'Phone: Hop 3000.

TO INLAND CUSTOMERS.—Your goods are despatched Post Free or Carriage Paid.

TO OVERSEAS CUSTOMERS.—Everything Radio can be supplied against cash. In case of doubt regarding the value of your order, a deposit of one third of the approximate value will be accepted and the balance collected by our Agent upon the delivery of the goods. All goods are very carefully packed for export and insured. All charges forward.

CASH or C.O.D. ORDER FORM To READY RADIO LTD., Eastnor House, Blackheath, S.E.3.

Please dispatch to me at once the following goods.....

for which (a) I enclose (b) I will pay on delivery (Cross out line not applicable) £.....

Name

Address

M.W.1/32

EASY PAYMENT ORDER FORM To READY RADIO LTD., Eastnor House, Blackheath, S.E.3.

Please dispatch to me the following goods.....

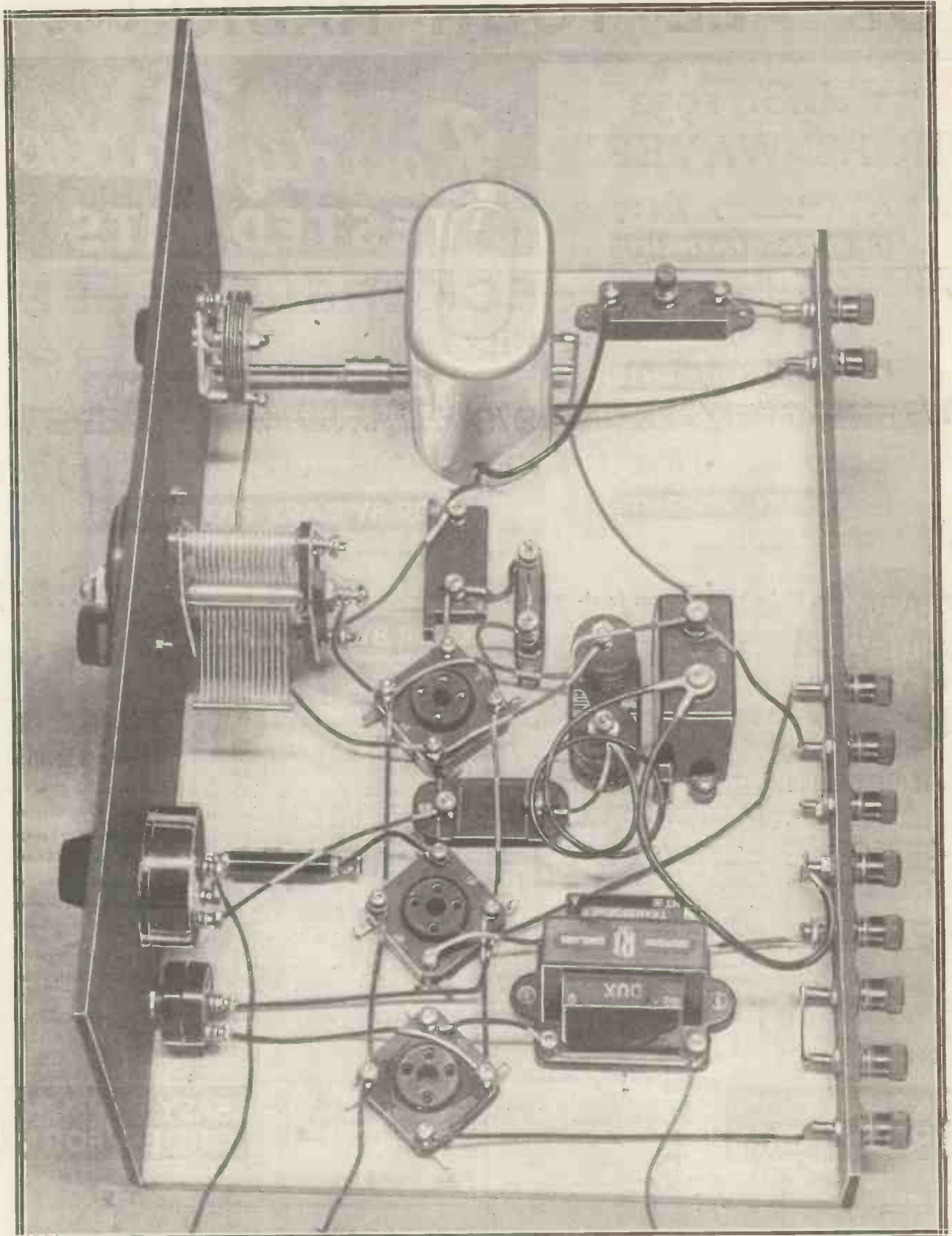
for which I enclose first deposit of £.....

Name

Address

M.W.1/32

A Fully Screened Coil is Incorporated



Ample spacing between the components, and at the same time efficiently short and direct grid and plate leads, are largely responsible for the simple nature of the design, a feature which ensures ease of construction.

Inexpensive Components of High Efficiency Are Used

The trouble that is most likely to arise in a detector and 2 L.F. receiver is coupling between, say, the H.F. choke and the L.F. transformer, or between the output filter choke (if one is used) and some previous portion of the circuit—say, the same H.F. choke, or the tuning coils.

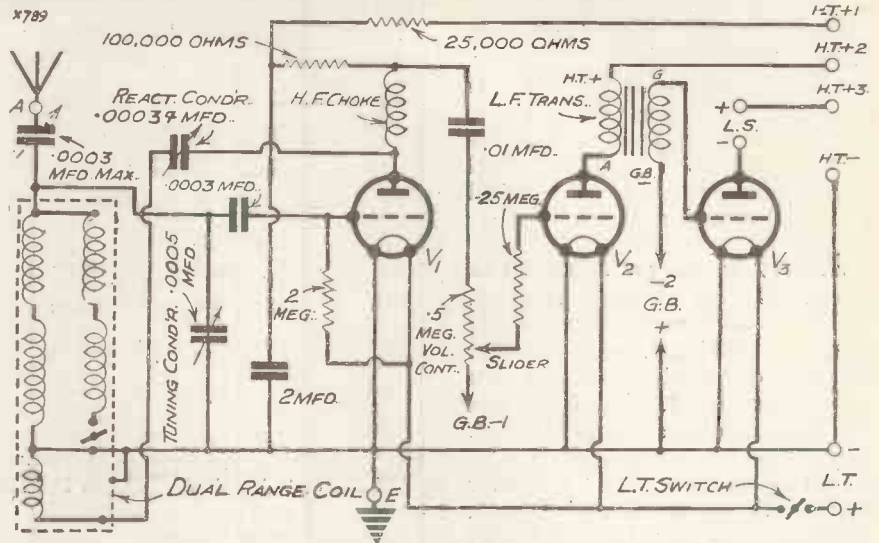
Avoiding Interaction

Time and time again such interaction has proved the downfall of otherwise successful receivers. Consequently in this set we have kept any parts likely to interact in such a way reasonably far apart.

Also, to simplify the design, keep the cost down, and to further decrease any possibility of interaction (from an L.F. point of view), a well-known portion of the circuit has been omitted.

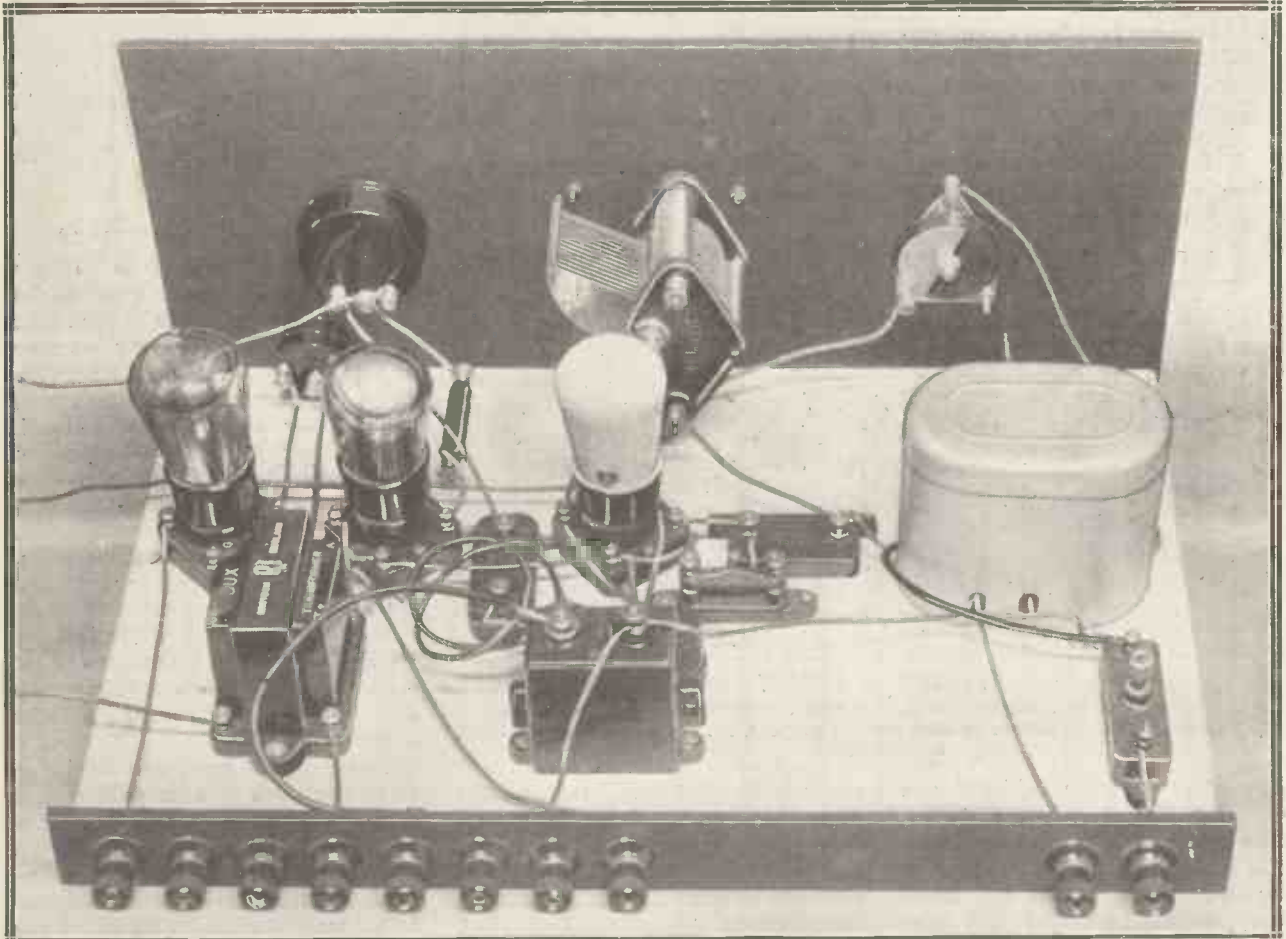
We refer to the output filter choke, which, peculiar as it may seem, can

A CIRCUIT OF QUALITY



This circuit arrangement includes several fine features. The two L.F. valves are resistance- and transformer-coupled respectively, and an adequate volume control provided.

Ready to Reward You With Europe's Best



When the work of building this interesting set is finished you will be well rewarded for your labours. It will bring you programmes from many of Europe's high-power transmitters, and render them with power and faithfulness.

Single-Knob Tuning Simplifies Control

cause quite a lot of trouble in home-construction sets.

The filter choke system is a good servant, but an intolerably bad master. It may act superbly as a de-coupling agent where mains units or old H.T. dry batteries are used, but it has round it a very intense L.F. field and consequently must be treated with the respect it deserves.

Plenty of Amplification

Make the set nice and compact, with the choke too near the detector end, and instability, or a peculiar shrillness of reproduction denoting a strong tendency to that fault, will be almost certain to make itself felt.

In this set, as in the "Eckersley Star" Three described on other pages, it will be noted that the output filter system has been omitted. This, and the careful layout of both sets, ensures complete L.F. stability, and enables the most to be got out of the sets by using really "hot" valves, with plenty of amplification.

We have been criticised recently by a well-known component manufacturer for using so many resistance-transformer sets, and not many two-transformer receivers. Our "defence" has always been that with modern valves you can get quite sufficient out of such a set, with

willing to accept just a little less volume.

It would, however, be interesting to hear readers' views on the subject.

RECOMMENDED ACCESSORIES

Accumulator. 2-volt 20-30-amp.-hour actual (Ediswan, Pertrix, Exide, Lissen, G.E.C.).

Batteries. H.T., 120-150-volt super-capacity (Ever Ready, Drydex, Pertrix, Lissen, Magnet, Ediswan, Columbia).

G.B., 15-18 volts, to suit output valve (Ever Ready, etc.).

Loud Speaker. (Amplion, Blue Spot, Marconiphone, W.B., B.T.-H., Undy, Epoch, Graham Farish, Celestion, R. & A., H.M.V.).

Mains Units. To give 20 milliamps at 120 volts or more (Regentone, R.I., Formo, Heayberd, Ekco, Atlas, Tannoy, Lotus, Tunewell).

Valves. 1 Det. (Mazda H.L.2, Marconi H.L.2, Osram H.L.2, Mullard P.M.2D.X., Six-Sixty 210D., Cossor 210H.L., Tungsum, Dar'co, Lissen, Fotos).

1 L.F. (Cossor 210L.F., or suitable L.F. valve of above makes).

1 Power or super power (Osram P.2, or suitable valve of above makes).

(Total anode consumption, 16 milliamps.)

We are of the opinion that the great majority of our readers would prefer reasonable quality and a few less

construction of the set which we should mention before leaving it. This concerns the earthing of the metal screen covering the tuning coils. No screw or tag is provided by the manufacturers for this purpose, and so we recommend the insertion of a soldering tag underneath the metal base of the screen and so placed that one of the fixing screws of the coil also goes through the eye of the tag.

No Trickiness

In this way quite efficient contact between the screen base and the tag is arranged, and a soldered lead from the tag to the earth terminal of the set or to the earthed terminal of the coil unit completes the necessary connection.

We have remarked upon the entire simplicity of the layout of the set and its construction, and it remains to discuss briefly the actual operation, assuming you have built it or are interested in reading all you can about it.

Obviously, there can be no trickiness about the handling of the receiver, and what adjustments, other than those on the panel controls, are necessary concern the series aerial condenser.

Selectivity Adjustment

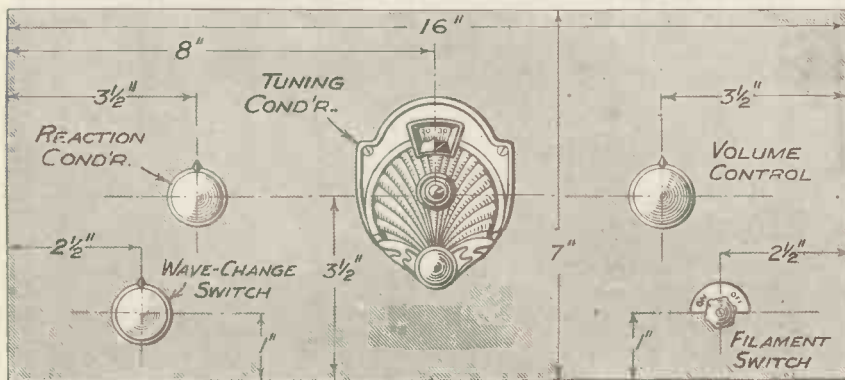
The best thing to do is to tune in the two medium-wave local stations and then decrease the series condenser (if necessary) till you get a reasonable gap on the tuning condenser between the two transmissions. Then you are O.K. for the medium wave-band.

On the higher wave-lengths of this band it is advantageous to increase the value of the series condenser by screwing it down a bit, especially for distant-station reception, while on the long waves the maximum capacity should be used.

The coil switch is controlled by turning the knob, which moves either clockwise or anti-clockwise; no stop being provided to govern the amount of its movement.

This being the case, it is advisable to set the knob with the pointer in a definite position so that the rotation to one side or the other will give either the long or medium wave-band. If this is not done some confusion may arise as to which of the two wave-bands is being used at any particular time.

HERE ARE THE PANEL MEASUREMENTS



PANEL LAYOUT.

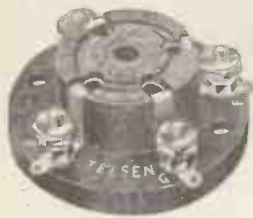
Mark out your panel in readiness for drilling with the assistance of this diagram. A sharp-pointed instrument should be used for this purpose, but not a pencil, as blacklead is conductive.

purity of reproduction, while if you go in for two transformer stages, unless you have a rather inefficient aerial input, due to a small aerial or poor tuning system, you will invite stage overloading, and will risk losing a great deal of the quality you could have had were you

stations at "full belt" than all the noise they can get and "go hang" to quality. Hence in this set, as in the others in this issue, we have plumped for our old friend, resistance-transformer; a little less volume, but less risk to quality.

There is one point about the

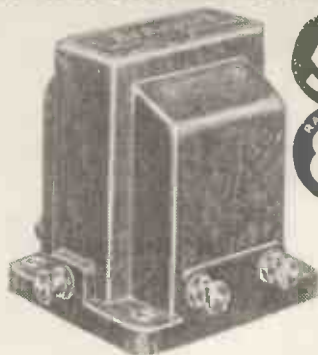
TELSEN RADIO COMPONENTS



6d

TELSEN VALVE HOLDERS (Prov. Pat. No. 20286/30). The Telsen four- and five-pin valve holders embody patent metal spring contacts, which are designed to provide the most efficient contact with split and non-split valve legs, and are extended in one piece to form soldering tags. Low capacity and self-locating.

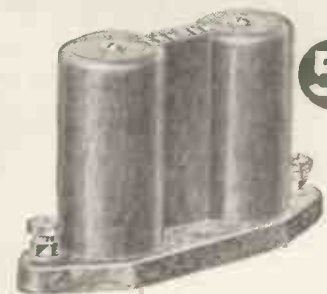
Telsen 4-pin Valve Holder Price 6d.
Telsen 5-pin Valve Holder Price 8d.



5/6
RADIOGRAND
8/6

TELSEN L.F. TRANSFORMERS

Ace, ratios 3-1 and 5-1 5/6 each
Radiogrand, ratios 3-1 and 5-1 8/6
Radiogrand, ratio 7-1 12/6
Radiogrand, ratio 1.75-1 12/6



5/-

TELSEN BINOCULAR H.F. CHOKE

Hailed unanimously by the leading experts as the perfect H.F. Choke. The Telsen Binocular Choke is called for wherever highest efficiency is desired. Its highest inductance (180,000 microhenrys) and exceptionally low self-capacity (.000002 mfd.) ensure a very high impedance at all wave-lengths, and its excellent efficiency curve is free from parasitic resonances. Price 5/-



5/6

TELSEN LOUD-SPEAKER UNIT

The Telsen Loud-Speaker Unit is pleasing to the most sensitive ear. The deep notes of the bass, the brilliance of the soprano, and the crispness of diction are clearly reproduced without distortion.

It employs cobalt steel magnets, and the detachable rod which carries the cone is fitted with cone washers and clutch. The entire unit is enclosed in a beautifully moulded bakelite dust cover Price 5/6

TELSEN

100% BRITISH
RADIO COMPONENTS

Output Transformers	12/6
H.F. Chokes	from 2/-
Output Chokes	8/-
Power Grid Chokes	8/-
L.F. Coupling Chokes	5/-
Slow-Motion Dial	2/6
Fixed Condensers	6d.
Pre-set Condenser	1/6
Variable Condenser	4/6
Spaghetti Resistances	from 6d.
Loud-Speaker Chassis	5/6
Fuse Holder	6d.
Grid-Leak Holder	6d.

Send for the "Telsen Radio Catalogue" and book of "All-Telsen Circuits" to The Telsen Electric Co., Ltd., Aston, Birmingham.



7/6

TELSEN DUAL-RANGE AERIAL COIL

It incorporates a variable series condenser and is suitable for all districts. It has been tested in various parts of the country, and down to distances of five miles from Regional stations a single tuned circuit will definitely separate the Regional programmes. A reaction winding is provided Price 7/6
Telsen H.F. Transformer and Aerial Coil. Price 5/6



9d

TELSEN GRID-LEAKS

Telsen Grid-leaks are absolutely silent and non-microphonic, and practically unbreakable. They cannot be burnt out and are unaffected by atmospheric changes. Telsen Grid-leaks are not wire wound and therefore there are no capacity effects. Their value is not affected by variation in the applied voltage.

Made in values from 1/4-5 megohms.
Telsen Grid-leak Price 9d.



2/-

TELSEN BAKELITE DIELECTRIC CONDENSERS

The moving vanes are keyed on to the spindle and there is a definite stop at each end of the travel. The connection to rotor is made by a phosphor-bronze pigtail so there is no crackling due to rubbing contacts. The connection to the stator vanes is absolutely positive—a very important point. All Telsen Bakelite Condensers are supplied complete with knob.

Differential Condenser—
Capacities .0003, .00015, .0001, Price 2/-
Reaction Condenser—Capacities .0003, .00015, .0001, Price 2/- .00075, .0005, Price 2/6
Tuning Condenser—
Capacities .0005, .0003, Price 2/-



1/3

TELSEN PUSH-PULL SWITCHES

(Prov. Pat. No. 14125/31).

The Telsen Push-Pull Switches employ a proper electrical knife switch contact and are soundly constructed on engineering principles. The centre plunger is wedge-shaped so that as it is pulled out it forces the inner fixed contacts outwards, tightly gripping the moving contacts. There is no fear of crackling with Telsen Push-Pull Switches. Their low self-capacity makes them suitable for use in H.F. circuits.

Two-point Price 1/-
Three-point Price 1/3
Four-point (2 pole) Price 1/6



BROADCAST

SIXPENCE a side is no great price to pay for a gramophone record, but that is the remarkably low figure at which the Broadcast nine-inch records are selling. Here are descriptions of some of the latest.

Sandy Powell continues his comic career with Sandy Buys a Greyhound (775), a typical "Sandy" item.

Mellow and Rich, the popular duettists, provide Nevertheless and I Love You in the Same Sweet Way, on 777; while a popular disc will be 778, on which Henri Benito's San Marino Accordion Band gives us Selections of Present-Day Hits.

This covers such items as "Ain't That the Way It Goes," "Just One More Chance," and "Smile, Darn Ya, Smile"

SUPER-TWELVES

The Super-Twelve records that we have received include a very good suite from Noel Coward's "Cavalcade"—Tunes from 1899 to 1930. Recorded on No. 3121, this provides a really excellent disc, recalling many of the old favourites that used to gladden our pre-war days, coupled with those tragedy-mingled tunes that accompany our memories of those terrible years of strife.

Thus we proceed, step by step, through "Soldiers of the Queen," "Good-bye, Bluebell," "Soldiers in the Park," "Goodbye, Dolly Gray," "Everybody's Doin' It Now," and "Alexander's Ragtime Band" to more modern hits in "Tipperary," "Long, Long Trail," "Pack Up Your Troubles," "Keep the Home Fires Burning," and out of the war years to "Dance, Little Lady," "O' Man River," and finally "Land of Hope and Glory." It is an excellent disc and should certainly be heard.

Further down the Broadcast list we come to a fine vocal record by Terence O'Brien (tenor), on which he records Vienna, City of My Dreams, and that haunting melody, The Song of Songs (3122).

The ever-popular Poet and Peasant Overture is provided on 3123 by members of the State Opera House Orchestra of Berlin, and finally in the dance numbers we must refer to the Manhattan Melodymakers' recording of Song of Happiness and The Twilight Waltz (3125).

COLUMBIA

In our opinion, the outstanding Columbia record of the latest releases, judged from a musical point of view, is Isobel Baillie's Ave Maria and Oh, for the Wings of a Dove, which are recorded on DX301.

Isobel Baillie has the perfect recording voice. It is clear, and free from that too often cultivated fault, vibrato, and, moreover, her diction leaves nothing to be desired. Every word is not only clearly enunciated, but every note is true and unflinching, even at the topmost limit of her voice. The former item in the above record, as in the case of her "Ave" from "Cavalleria Rusticana," is a sheer delight to listen to, while the second side is also extremely delightful.

A novel record in the same style as the Paramount film, "Paramount on Parade," has been made by Columbia under the title Columbia on Parade. This is excellent entertainment, and should have a very ready sale.

It consists of a "review" in which nineteen famous Columbia artistes "appear" before the microphone and give brief snatches from their repertoires. Fading-in on Jack Payne's "Say It With Music," we are introduced by Norman Long to Clapham and Dwyer, Layton and Johnstone, Harry Tate, Stanley Holloway, Len Filis, Harry Dearth, Raymond Newell, Flotsam and Jetsam, Binnie Hale, Albert Sandler, Debroy Somers and his Band, etc., who contrive together to make a really breezy entertainment.

Equally good in its way is the Layton and Johnstone Favourites, a twelve-inch record which takes us back to such old favourites as "What'll I Do?" "All Alone," "Who?" "It Ain't Gonna Rain No Mo'," "Tea for Two," and so on. Perfectly recorded, and sung with that artistry which these two duettists have created and made all their own, this disc (DX306) will be a ready

seller. It is perhaps a little saddening to hear the old lines again and to realise the passing years, but there is no gainsaying the excellence of the record.

Yet another "pot-pourri" type of recording is on the same Columbia list. This time it is made by Jack Payne and his B.B.C. Dance Orchestra.

Entitled Tunes of the Times, it takes us via a fade-in of "Say It With Music," through "Just One More Chance," "Smile, Darn Ya, Smile," and many other favourites, to a final fade-out on "Say It With Music" again.

Jack has been wise in this record, in that he has not played merely snatches of the tunes in a sort of musical switch, but has provided really adequate length of each selection, together with vocal chorus where necessary. It's a record worth hearing. (CB371.)

Our last two records in this release are CB376 and DB663. The former is a Savoy Hotel Orpheans' recording of Sweet and Lovely, with There's a Time and Place for Everything. We do not care for the vocalist in these numbers; he is far too exaggerated and, in our opinion, should be replaced before further recordings are done. His voice is neither musical nor pleasing, and he does a great deal to spoil the former number with his unmusical whining. Please try another voice next time.

DB663 is a plain cinema organ rendering of The Song of Songs and Serenade (Standchen), by Quentin M. Maclean. It is good, but not outstanding in any way.

A brief selection from some of the records released during the month. They have been chosen because of their special interest to the pick-up user.

H.M.V.

The Gramophone Co. have fully realised the value of Christmas and New Year records, and have turned out a striking variety of discs of special "Party" appeal. Even the tiny tots have not been forgotten, and in our review we will deal with their own special records first.

As old as the hills is the child's plea for a bedtime romance, and here in these records we have it, with a wealth of convincing detail and settings which bring the pantomime into the home for all time.

Two of these novel discs for children of all ages were made by Charles Penrose, the world-famous laughing comedian, his eleven-year-old son Peter, and a company of musicians and actors.

In Careless Peter Visits the Land of Topsy Turvy (B3974) the boy is whisked off by a clockwork train to the upside-down land, where, after enjoying the zoo and its chorus of comical noises, he unknowingly offends the emperor and is marched off to the castle by the ceremonial guards, a realistic effect conjuring up all the pageantry of the theatre.

Peter's second adventure in dreamland, Big Chief Deerfoot (B3975), brings in an aeroplane to take the place of the magic carpet and transfers us to an Indian encampment where the braves set out on the warpath to defy Captain Kidd and his pirates of the Spanish Main, the thrilling events being vividly enacted to capture the juvenile imagination.

Uncle George's Party has made a fine singing record, Nursery Rhymes (B3893), introducing such favourites as "The Babes in the Wood," "Pussy Cat, Pussy Cat," and "Mary, Mary, Quite Contrary." George Baker's ringing voice is heard at its best in Hums of Pooh, whimsical verses by A. A. Milne to the music of H. Fraser-Simson. These reminders of Christopher Robin are valuable additions to any collection of records.

Out in time for Christmas was a series of special Christmas records, including Christmas Melodies by choir of the Temple Church singing four carols. These are recorded on B3976, and include See Amid the Winter's Snow, Christmas Lullaby, and Lullay My Liking, with There is No Rose of Such Virtue.

But pride of place for originality in recording ideas must be given to the special party records. Here they are: Try Your Fortune, Part 1 for ladies, Part 2 for gentlemen (B3979); Limerick Puzzle Record (B3986); Guess the Tunes (C2298); and Musical Chairs (C2301).

The first is a record that will provide lots of fun. All that has to be done is to ask a member of the party to lower the pick-up or sound-box on the outer edge of the record, and the record does the rest. It is so grooved that you cannot tell which of six different readings on each side will turn up. The result can be well imagined.

The limerick record is spoken by Claude Hulbert (there could be no better for the purpose), and contains thirty-six different limericks on each side.

It is done in this way. On each side there are six five-line verses—the last line separated from the rest. Starting the record in the usual way, you may hear the first four lines of any of the six, without the last lines. Then lift the needle to the inner ring of grooves, and you complete the limerick with any of six last lines.

The tune-guessing is carried out in a similar way—the answers to the snatches of lines being recorded separately, while the musical chairs is an excellent party diversion—as is the Paul Jones, a fifth record for the Christmas and New Year season (C2291).

Cicely Courtneidge, in our opinion, is wasted on All Baba's Camel, and we cannot endorse the opinions of the catalogue writer who says of that record: "There is nothing on a record funnier than the interpolated skit on the desert (complete with Arabs)." Cicely Courtneidge deserves better stuff than this. (B3085.)

The Laughter-Makers in their Diner à Deux and Laughter on the Line are mildly amusing (or are we getting old and staid?), but we could not call the record "hilarious," at least not in effect, though the "Laughter-Makers" themselves seemed hugely amused. A little on the crude side. (B3932.)

Lover of My Dreams ("Cavalcade") is sung by Noel Coward in his own peculiarly unmusical yet attractive style. His is a strange voice, but one which he uses to full advantage and with good result. On the reverse side is Twentieth Century Blues, also from "Cavalcade," and excellently played by the New Mayfair Orchestra. (B4001.)

Talking about this really fine dance band combination, we must mention The Haunted House and Speedboat Bill, a disc of real distinction. (B6088.) The latter was written in honour of Kaye Don, the world's speedboat record-holder with "Miss England II," and is recorded with fine effect. The Haunted House is superb in its orchestral effects, and forms an excellent comedy number. You should hear it.

ZONOPHONE

At the new price of 1s. 6d. the Zonophone record is truly remarkable value. The London Orchestra, on 5972 and 5973, record some popular hits. The first is called Miracle Melodies, and include such favourites as "I'm Happy When I'm Hiking," "Fiesta," and "Time On My Hands"; while the second record, Popular Song Hits and Rhapsody in Black includes "The Queen Was in the Parlour," "Parade of the Minutemen," "Lady of Spain," "You Can't Stop Me From Loving You," etc. They are all good recordings. Just One More Chance is getting far too hackneyed, and Maurice Elwin should have recorded his version (or it should have been published) months ago. There is no denying his artistic rendering of that popular melody and of Kiss Me Good-night, but time is against him, and he is out of date. (5975.)

Poor Kid and Soul of the Violets, by the Salon Orchestra, is a tuneful disc (5970), as are most of that combination's recordings.

Clarkson Rose and Company are amusing in A Leakage in the Tank (5981), but most interesting of all are the Jack Hyton recordings we mentioned last month. This is the full list up to time of going to press. Guilty and The Wooden Rocking Horse (5992); Got a Date With An Angel and For the Love of Mike (5993); On a Cold and Frosty Morning and Life's Desire (5994); This is the Missus and Life is Just a Bowl of Cherries (5995); Over the Blue and 'Neath the Spell of Monte Carlo (5996); Rhymes (5997); Dreaming of You and The Birthday Kiss (5998); Time Alone Will Tell and I Believe in You (6013) A goodly list, my masters, and one which should hold many a popular appeal.

Finally, let us mention for inclusion in your party or dance records the Paul Jones, by the Arcadians Dance Orchestra, on 5985. It is an excellent record and of real practical dance value, not merely a medley recorded for aural entertainment only.



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Ask your radio dealer for your Free Copy of the Meteor III Folder, which includes Full-Size Plan and Wiring Diagram with complete building instructions. You can build the Meteor III in an hour or so—the most fascinating radio set ever designed. It gives world-wide reception on ALL WAVELENGTHS—Long, Medium and Ultra-Short. In addition, with pick-up connected, the Meteor becomes an electrical reproducer of gramophone records at a flick of the radio-gram switch.

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1—P.M.2 .. 10 6	or
Batteries	Celestion Chassis
Pertrix 120v. Super capacity 1 5 6	type M.12 .. 1 15 0
or	or
Pertrix 120 v. Standard v. 15 6	Blue Spot Special chassis & 66 P. Unit .. 1 15 0
or	
Ever Ready 120 v. Popular Power 1 4 0	Gramophone Pick-Up
Pertrix 9 v. G.B. 1 6	B.T.H. Minor .. 1 7 6
or	or
Ever Ready 9 v. G.B. .. 1 0	B.T.H. Senior .. 2 5 0
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Puller 2 v. 20 amp. type S.W.X.H.5 .. 8 3	RéadiRad 5 meg. 5 9
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Daily demonstrations of this wonder receiver at the Ready Radio Showrooms: 159, Borough High Street, London Bridge, S.E.1 (2 minutes from London Bridge Station).

ALL BRITISH

Even if you are not in immediate need of a new receiver you should read the Meteor Folder. Ask your radio dealer, or if he is out of stock, post coupon now to Ready Radio Ltd., Eastnor House, Blackheath, S.E.3.

READY RADIO

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M.W.1/32 BLOCK LETTERS—IN INK—PLEASE.

By the
Technical
Editor

On the



A Good Moving-Coil Speaker

IN a loud speaker which gives a comparatively poor response on the higher frequencies there is a great deal to be said for a deeply concave diaphragm. This will produce a sharp focussing of high notes, and when you are near and close to the instrument the reproduction will sound brighter than it otherwise would.

But that in itself is no fundamental argument in favour of such a form of construction. It is obviously better to work the other way and start with a diaphragm so fashioned and "baffled" that it will provide a wide and balanced distribution of all frequencies, and then arrange to drive this with an efficient unit.

AN R. & A. REPRODUCER



The R. & A. "100" Permanent-magnet Moving-coil Reproducer and the special output transformer for use with it.

The 120-degree angle found in the diaphragm of the R. & A. "100" Permanent-Magnet Moving-Coil Reproducer is something of an ideal, for it fulfils the above conditions and also has the correct mass-stiffness ratio.

The R. & A. "100" has a low resistance of 8.5 ohms, and this fact, which makes a suitable transformer necessary, must not be construed as a practical weakness. On the contrary, it is a virtue, for it is now universally recognised that the lower the resistance of the "speech coil" the better, if its characteristics are to remain uniform at all frequencies. It is left to the transformer, which can be given generous windings and plenty of iron, to "buffer" the output stage.

The R. & A. "100" at 45s. (a suitable three-ratio transformer is available at 12s. 6d.) appears to us to be a worth-while contribution to the art, and can be heartily commended in that it is assisting nobly to bring "full moving-coil results" within the reach of millions more listeners.

The "Kinva" Screened H.F. Choke

The more efficient our sets become the more necessary it is that we should pay closer attention to details which used hardly ever to enter our minds. Three or four years ago few would have seriously considered screening an H.F. choke.

Even to-day it may be entirely unnecessary in many outfits, but with very compact "high-mag." constructions it is a detail deserving examination.

That is why the "Kinva" Screened H.F. Choke is of particular interest. Many constructors may be asking

themselves whether there are any objections against screening an H.F. choke.

There certainly are—if the choke has not been designed for screening. The neat and attractive copper shielding of the "Kinva" is bound to reduce the inductance of its windings, but that does not matter a scrap if it has been designed accordingly. And our tests show that it has.

A further item on the credit side is that the shield makes for great robustness and provides a complete mechanical protection for the windings.

Useful for Constructors

Messrs. Ward & Goldstone have produced two new lines of special interest for home constructors. Gol-

A NEAT COMPONENT



The baseboard-mounting model of the "Kinva" Screened H.F. Choke. There is a second model available for "chassis" mounting.

tone Screened Panel Wiring is a rubber-covered, metal-sheathed conductor which both electrically and mechanically has many advantages over ordinary wire.

It has an extremely high insulation resistance and can easily stand up to six or seven hundred volts. It also possesses high degrees of flexibility and robustness, and its uses are so obvious that it will be quite unnecessary for us to draw them to your attention.

Goltone Metallic Flexible Screened Tubing is for slipping over those leads

Test Bench

R. & A., "Kinva," Goltone, Magnum, Blue Spot and Lissen products form the subjects of this month's impartial reviews.

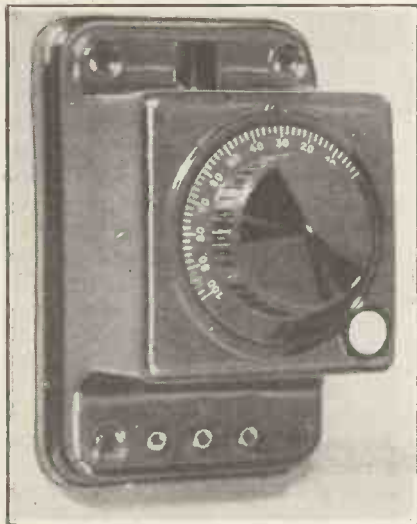
it is desired to screen, and it provides air-spacing into the bargain. And it should be noted that very low self-capacities and dielectric losses are imposed.

Both of these materials are available at low costs.

Magnum Spaghetti Resistances

Those readers who may have experienced trouble with Spaghetti resistances should not dismiss all makes of "spags" as not being worth consideration. There are now many makes that are quite dependable provided they are not subjected to unfair overloading.

AN EFFICIENT REJECTOR



The Blue Spot Rejector Wave-trap.

For instance, Messrs. Burne-Jones are in production with a new and improved Magnum Spaghetti, which is a definitely reliable article, as the tests with our samples clearly prove.

Two Fine Blue Spot Lines

Of a number of Blue Spot productions recently sent us for test we shall have space adequately to deal with only two in this issue. The Blue Spot Rejector Wave-trap costs 15s., which is quite a bit more than many wave-traps which are on the market.

But, then, the Blue Spot Wave-trap

is much more efficient than most. It is an attractively neat and well-made device, and its adjusting knob enables a close adjustment easily to be made, for it is of generous proportions and has a smooth movement.

Three alternative connections give varying degrees of trapping. It can be quickly connected to any set and covers the medium wave-length band very adequately.

Within a few miles of one of the powerful London transmitters we experienced no difficulty in silencing either one on a most inselective set. And there was no appreciable loss of volume from the other.

The Blue Spot 70R. Speaker, which is illustrated at the top of this page, incorporates the famous 66R. Blue Spot movement, about which little need be said, for "M.W." readers will be well acquainted with its virtues.

But even a good unit have no will chance if it is bottled up in a cabinet of poor design. But, of course, this does not happen in the case of the 70R. Its handsome walnut cabinet does not muffle the response, and is not merely a resonating chamber in which all that traditional Blue Spot brightness and attack is smothered in favour of a disagreeable over-accentuation of one or two bass notes.

And, in conclusion, we must say that the 70R. is as pleasing in appearance as it is efficient as a reproducer.



The Blue Spot 70R. Speaker.

Remarkable Value for Money

At the time of writing, Messrs. Lissen are giving the necessary materials with their 5s. 6d. loud-speaker unit that are necessary for the easy assembly of a complete cabinet loud speaker.

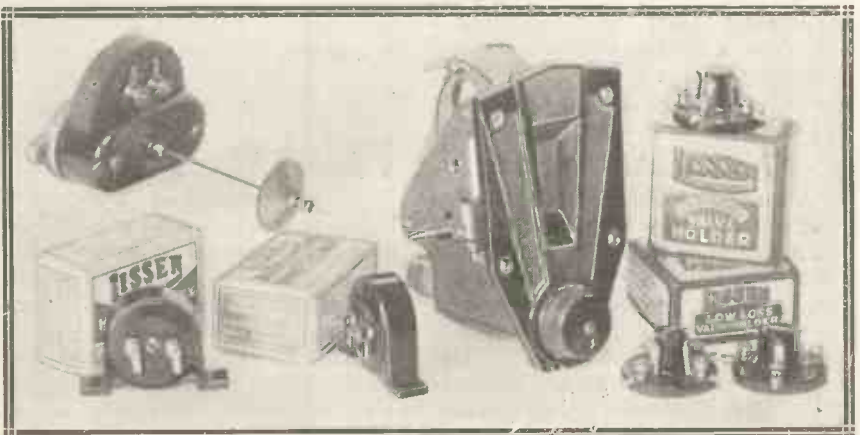
It is true that you have to supply the cardboard on which the imitation wooden cabinet is built up with the assistance of lithographed walnut-grained paper, but most of us would have sufficient cardboard on hand.

At a short distance one of these Lissen speakers bears the appearance of a moderately expensive instrument!

As to results, well—the Lissen unit is not, of course, comparable with a moving-coil type, but we have no hesitation in saying that, bearing its cost in mind, its reproduction is very good indeed.

Among other current Lissen productions, samples of which we have received, and which deserve the attention of constructors both on account of their inexpensiveness and standards of efficiency, are the disc H.F. choke, illuminated drum control, and rigid valve holder shown in the photograph.

FOUR VALUE-FOR-MONEY LISSEN PRODUCTIONS



The Lissen Loud-speaker Unit, Illuminated Drum Control, H.F. Choke, and Valve Holder.



Jones Has a New Year Dream

WELL, patrons, how are you feeling on this the gladdest, maddest day of all the bright New Year? Old Jones calling, a trifle hoarsely, owing to a cold which I brought forward from last year's reserves, but otherwise not too bad. Anyway, this summer can't be worse than last. Here's to 1932 and all of us!
(*He goes into a trance.*)

Another yee-ar has fled. The realities of 1931 have passed into the region of memory, but their ghostly fingers still reach out to mould, be it ever so slightly, the present and the future.

New realities crowd upon us, but with them come dreams, their antidote. But even the dream too often has a kick in its mitt, generally at the moment of waking. Ah, me!

But begone, dull care and all this tripe! I inherited the tripe-disease from great-uncle Solomon Sweetbread, who was head of the Huddersfield Third Branch of Reformed Rat-catchers. Listen to the story of a peach of a dream, dreamed by me, Jones; a dream whose glamour still lingers, though slightly less peach-like with each succeeding performance.

How It All Started

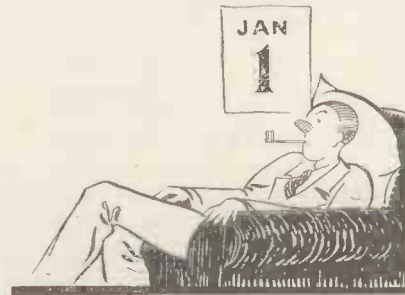
A man went over Waterloo Bridge and into the water with a lovely plop. In my dream I followed him, without fear or precautionary removal of my watch, wallet, and boots. Seizing him by the collar I swam swiftly to the Surrey side, where I deposited him in a taxi and took him to a house in Park Lane. He was not a millionaire, but something far more valuable—a trusted servant of one; he was, in

fact, Pierpop Horgan's private Welsh rarebit roaster.

The gratitude of the millionaire was overwhelmingly dollarful. It seemed that he would sooner have lost a whole board of directors, or a couple of aunts, than Spike Maloney, for such was the name of my bit of flot and jet. P. Horgan well nigh lived on W. rarebit, and Spike alone could adjust them satisfactorily to his rickety digestive system.

"Come," pleaded old moneybags,

"COLD STORAGE!"



"Old Jones calling, a trifle hoarsely, owing to a cold which I brought forward from last year's reserves."

"ask me! Ain't there anything you want? What about them Elgin Marbles? Gainsborough's "Blue Boy," or a couple first editions of W. Shakespeare's *com-plete* woiks?" But as it did not appear to me that any of these things would fit very happily into my bed-sitting-room in Soho, I remained silent and aloof.

"Mr. Jones, you've handed me a man-sized obligation, and it's up to me! Say, now! How about a block of debentures in United Cheese Bye-Products, Inc.? Or a control holding

in the Embalmers' and Morticians' Merger (1931), Inc.—nice snappy little nest-egg! The E. & M. Patent All-Spice Mummy Process guarantees one hundred per cent fixation of the individool poisonality! No? Well, gosh, darn it——"

In my dream I turned to him and said, simply and without passion:

Buying the B.B.C.

"Noo! This is my chance to see what power Gold really possesses. Therefore—give me the B.B.C., lock, stock and epilogue, or may your Welsh rarebit architect develop a King Alfred complex, and for ever after burn 'em at all four corners!"

He just reached for the telephone. "Baby," he said, "collect one B.B.C., complete in velvet-lined lock-up box."

At eight-fifteen on the morning of the second day the postman dropped a packet through the letter-slit. It contained a key, and a note which ran: "Key of front door. Step around and bid them jump to it. The British ether is yours, and that darned Board of Governesses ain't got so much as a wiggle left since P. Horgan got on the wire."

"Down with Bach"

So far, so good. I presumed that he had accepted the B.B.C. in part payment for the war debt. Anyhow, the thing was mine, down to the leastest littlest time-signal. What a lark! Sing ho! Sing hey! For Broadcasting House in a taxi—for I had borrowed (*sic*) ten thousand quid from Pierpop, merely to get a few clothes and whatnot in lieu of the



The Original ECKERSLEY TUNER

PERFECTED AND IMPROVED TO GIVE BEST RESULTS IN ECKERSLEY CIRCUITS

The fact that R.I. was the first firm to be entrusted with the constructional planning and development of the Eckersley Tuner is significant of their reputation for producing Radio components that are the most reliable in the world.

The amazing selectivity given by the Eckersley Tuner is due to the novel principle employed in the design. R.I. produced the original model for Captain Eckersley, and the thousands of R.I. tuners, which are already being used, are equal in performance in every way to the original model.

They are, however, mechanically improved by the use of beautiful bakelite mouldings for the terminal panels and coil supports which replace the temporary fittings used in the original model.

Every R.I. Tuner is tested in an "Eckersley 3" circuit, on all broadcast wavelengths covered by the Tuner, as described in "Modern Wireless."

RI have produced their model of the Eckersley Tuner to give satisfaction and not to merely sell on a name and price. Write for the Eckersley Tuner Technical Leaflet or ask your dealer for one.



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No. 29404. 22.10.31.

Size : 7 ins. x 7½ ins. x 6½ ins. high

15/6

SPECIFY **RI FOR GREATEST SELECTIVITY**

"General Alarm" at B.B.C. Headquarters

duds I had spoiled whilst fishing for his cheese-icinerator.

At the entrance of Broadcasting House I gave the password, "P. Horgan," and it went with a wow. The be-medalled commissioner made obeisance. I liked that; it was a change of air for poor old Jones. So I said:

"Do it again, and say 'Down with Bach!'"

"It's as much as me job's worth, sir," he gurgled.

"P. Horgan!" I hissed.

The Anti-Criticism Dip

"Aw ri"—but perdeck me from His Nibs if he 'ears me blarsfeeming thusly, as yer might say.

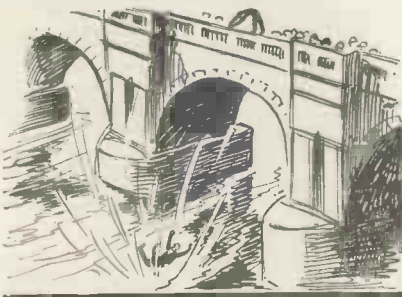
"Good," I replied, after he had downed Bach. "Now say 'Talks is all rot!'"

He paled and seemed to stagger.

"Sir, sir," he stuttered, "heven the very walls has hearholes! 'Ow can you, a Ker-ristian man—"

But I would no longer dabble my blade in the blood of an innocent. Giving him half a crown, I plunged into the B.B.C. and perambulated therein at my will, none saying me nay—except one of Mr. J. Payne's "boys," who gave me a bit of lip because I borrowed his saxophone and lent it to a charlady, bidding her play till her proud heart broke. Ah! I was frolicsome!

A WET RECEPTION



"—into the water with a lovely plop."

The first room which I peeped into was the Clinic, where young and soft-shelled officials were treated with Anti-criticism Dip. Before dipping, these little creatures would blush and stammer at the sight of a letter objecting to a course of talks on "Bones and Offal."

After dipping, they were eager to write letters in defence of the propagation of knowledge concerning bones, offal, corpses, worms, ghosts, maggots—always relying on something in the

Encyclopædia Britannica, preferably by Macaulay—a man held in the greatest awe by the "Radio Times."

Hastily tiptoeing past the Council Chamber of the Board of Governesses, on which was engraved: "We are the blokes and Wisdom shall die with us" (Job), I went into a room devoted to "Talks Designs." The staff at play here consisted of an actuary, a statis-

MAXIMUM OUTPUT



"Mr. Jones you've handed me a man-sized obligation and it's up to me!"

tician, a pestologist, a political economist, a chartered accountant, a man borrowed from the Income Tax Branch of the Inland Revenue, a retired Inspector of Nuisances, a solicitor's clerk and an expert on the history of medieval ecclesiastical polity—in a word, all the most interesting people you could find in a day's—broadcasting.

They were hammering out the synopses of those brilliant and tonic series of lectures which cocaine the sick and aged into their after-lunch naps.

In withdrawing I bumped my head against a large bell. "What's this afor?" I asked of a janitor who was seated on a stool, repeating aloud from the Official Pronouncer's Bible, "Dog's-b'dee, not Dog's-body."

"That, sir, is the General Alarm. All the staff, except Robert the Bruce, lines hup in the Main Stoodihoh when that is rung, which it never ain't."

Thereupon I rung the General Alarm good and plenty. With a rumble and a roar they poured into the Main Studio and stood at attention. I made an Assistant Brass Band Selector touch his knees while I leapt lightly upon his back and addressed my slaves.

"Gentleman," I said, "I have great news. I am going to give you all a half holiday. Not that you are free to leave your posts! O, no! But you are free to sleep at them and dream

of increases in salary—except the engineers, who will carry on as usual.

"For this evening the programme will be at my discretion—and you can turn back Professor Boleface and Doctor Grigglebow; also Madame Tremolo and Signor Piccolo. And if we are advertised to perform anything never before performed in England—well, we ain't going to perform it, because it's bound to be frightful."

I lined up the Programme Department. "Sweep the 'halls' of their stars and bring 'em here. Get men who have been through great adventures by sea and land and air. Bring here all the available explorers and several old sea-captains and soldiers. Collect a gang who can sing and play from the musical comedies from 1897 to 1918. If you have anyone with a personal ghost story—trot him out!"

"Secure Harry Lauder and Mr. Ramsay MacDonald and make them debate. (A scream!) Enlist M. Stephan and the German Ambassador and make them talk about Dutch cheese!" (Cries of "impossible.")

"Further, I bid you, ask Mr. G. Robey to discuss Art with Miss G. Cooper, and Mr. Harold Nicolson to discuss literature with the Editor of the 'Girl's Own Paper.'"

BOSSING THE B.B.C.!



I made an Assistant Brass Band Selector touch his knees while I leapt lightly upon his back and addressed my slaves.

With a tortured cry these heroes as one man cried, "I resign," and as I stepped forward and downward from the vertebrae of my Assistant Brass Band Selector, the birds began their morning songs, and I awoke to the light of day and the salutory regime of the good old B.B.C.

If you eat Welsh Rarebit before retiring, you are bound to dream!

THE NEW TUNGSRAM POWER DETECTORS



T.3123

Here are three types from the complete new TUNGSRAM range, particularly suitable for portable receivers; PD220—a new and specially-designed anti-microphonic detector valve; P220—a new and extremely efficient low-current consumption power valve; L210—an entirely new valve which is mainly suitable as detector or first low-frequency amplifier. Characteristics are given below.

Type.	Fil. Volts.	Fil. Amps.	Max. H.T. Volts	Amp. Factor	Anode Resistance (Ohms)	Mutual Cond. m/a V.	PRICE
L210	2	.1	200	16	16,000	1.0	5/6
PD220	2	.2	150	17	10,000	1.7	6/3
* P220	2	.2	150	9.5	3,200	3.0	7/9

* Date of general release to be announced very shortly.

Write to Dept. S.T.2 for full particulars of the complete new range. Prices from 5/6 to 19/-. Tungsramp Barium Valves are manufactured under one or more of the following Patent Nos.: 289,762, 289,763, 311,705, and 313,151.

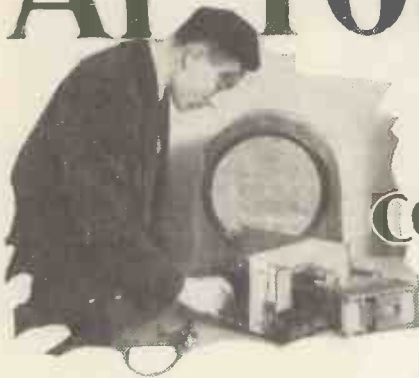
TUNGSRAM ELECTRIC LAMP WORKS (GT. BRITAIN), LTD. Radio Department, Commerce House, 72, Oxford Street, London, W.1.
Makers of the famous Tungsramp Electric Lamps. Branches in Birmingham, Bristol, Cardiff, Glasgow, Leeds, Manchester, Newcastle, Nottingham, Southampton

Lamp, Valve and Glass Factories: Austria, Czecho-Slovakia, Hungary, Italy and Poland. I.F.S. Organisation, Tungsramp Lamps & Radio, Ltd., 11, Burgh Quay, Dublin.

Tungsramp photo-electric cells: Nava "E" (for scientific measurement), £2 17s. 6d.; Nava "R" Red sensitive cell (for colour matching devices), £3 3s.; Nava "FH" (for talkie work), £3 13s. 6d.

THE NEW 2 VOLT SUPER DETECTOR AND POWER VALVES

AT YOUR SERVICE



by OUR TRADE COMMISSIONER



Fuller Batteries

WE have received some interesting illustrated leaflets concerning the well-known Fuller batteries. These range from small 1.5-volt dry cells and H.T. and G.B. batteries up to large accumulators of 120-amp.-hour capacity.

Also, most useful data on the care of radio batteries is included, which should be invaluable to many set owners.

A specially interesting feature of the Fuller accumulator is the new type of terminal. This patent arrangement is fitted with two grease-filled cups, preventing the terminal itself and the battery connection from corrosion. Also, not only is the polarity clearly marked on the top of the terminal, but the two terminals are threaded differently so that even if they are removed from the battery they cannot be placed on the wrong poles.

A Shilling a Week

Just over a shilling a week—4s. 6d. per month—for eleven months is the minute cost of the new model J.1 Epoch P.M. loud speaker under hire-purchase terms. Or you can get the larger permanent-magnet moving-coil Epoch (A.2) for 6s. 4d. per month over the same period. The cash prices of these two excellent speakers are 45s. and 63s. respectively.

Another Fine Loud Speaker

And while on the subject of moving-coil loud speakers we should mention the W.B., of which three permanent-magnet models are available. The original P.M.1 model, but with new chassis, costs 5 guineas, while the next size (P.M.2) is available at £3 10s.

An entirely new model completes the range at 45s. (P.M.3), for which a grained oak cabinet can be acquired for 30s.

Here is some varied news of the trade that should interest all readers, whether or not they are connected with the radio industry. Manufacturers, dealers, home constructors and general readers are invited to send items of interest to be included under this heading.

The multi-ratio output transformer for these speakers are extra and specially designed for modern power and super-power work.

S.P. Receivers

Following on the unprecedented success of the Varley Square Peak coil, a range of "Square Peak" receivers has been brought out—with no little success.

These contain the Square Peak canned coils and consist of a four-valve mains set, a four-valve console

model, three-valve mains receiver, a console radio-gram and an upright radio-gram, which latter is similar to the console model but is built on a smaller scale. The prices range from 24 guineas for the three-valve mains set to 85 guineas for the D.C. console radio-gram.

Compare Your Valves

A useful valve comparison chart has been issued by the Electrical Trading Association, Ltd., makers of "Eta" valves.

It shows to what valves in other makes any "Eta" valve is equivalent, and consists of two cardboard discs with a radial slot in the smaller of the two. By revolving this disc the desired "Eta" type number can be seen in the slot, and the equivalent valves of other makes can be read off immediately.

TESTING SETS AT TALLIS HOUSE



Members of the "M.W." Research Dept. busy testing out sets and components. In the foreground an experimental receiver is being "laid out."

SEVEN GIANT T.C.C. CONDENSERS

used by 200 K.W.
PRAGUE



Here is illustrated one of the seven giant 5 mfd. condensers standing 6 ft. 6 ins. high.

T.C.C.

ALL-BRITISH
CONDENSERS

The Telegraph Condenser Co. Ltd., Wales Farm Rd., N. Acton, W.3.

WITH an output of 200 K.W. Prague becomes the world's most powerful medium-wave broadcaster—and it has come to Britain for its condenser equipment. Each of the 7 T.C.C. Smoothing Condensers has a capacity of 5 mfd. with a working load of 25,000 volts D.C. Other T.C.C. equipment supplied to this station includes H.F. Condensers—mica dielectric immersed in oil—which are called upon to work up to 50,000 volts peak load!

This order was secured in open competition and is a remarkable testimony to the efficiency and reliability of T.C.C. All-British Condensers.

More Factories being Built in Britain

Ormond Loud-Speaker Unit

Messrs. Ormond Engineering have added another unit to their list of loud speakers, the new model selling at the extremely low price of 5s.

HOME CONSTRUCTION



The cover of the new Telsen publication.

This unit, No. 4, operates on the moving-iron principle, and is totally enclosed in walnut-finished bakelite.

The "Eckersley" Tuner

The success of the "Eckersley" Tuner, designed by Capt. P. P. Eckersley, has been so startling that enormous

numbers of units have already been sold. It is useless to give figures, for the reason that by the time this is published those figures will be well surpassed, but three days after the "Eckersley" Three appeared in "M.W." one firm's sales had exceeded five figures, and, of course, sales are rapidly increasing.

For the information of dealers and set constructors alike the following list of firms shows who are making the coil under approved licence to the designer up to the moment of going to press. Radio Instruments, Ltd., Arthur Preen & Co., Wright & Weaire, Sovereign Products, E. Paroussi, Ward & Goldstone, London Electric Wire Co. and Smiths, Ltd., Melbourne Radio.

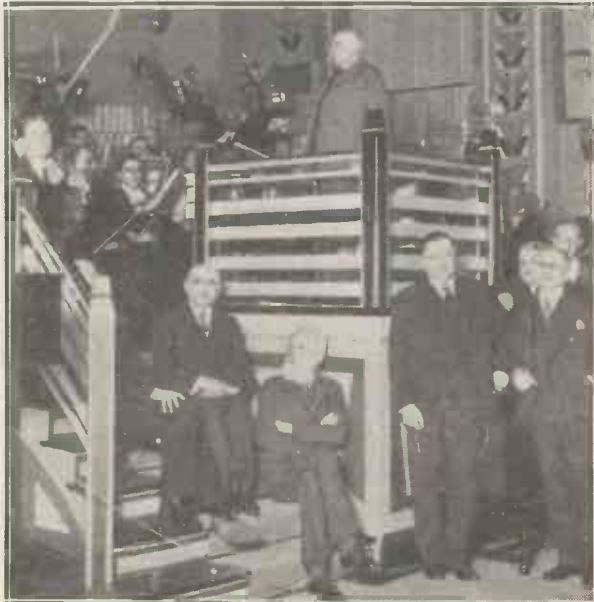
There is no doubt that the coil is the finest unit in dual-range tuners yet placed on the market, and Capt. Eckersley's scheme of personally passing samples from all manufacturers before a licence is granted ensures that all the authorised tuners are well up to scratch.

More Factories

New factories and increases in the floor space of old ones are reported from all branches of the radio trade.

H. Clarke & Co., makers of the famous "Atlas" products, are extending their Pirtoid producing plant, while Belling & Lee, on the Cambridge arterial road at Ponders End, are building a new factory.

H.M.V.'S NEW STUDIO



Sir Edward Elgar and the London Symphony Orchestra during the making of an H.M.V. record at their new recording studio at St. John's Wood. Sir Landon Ronald and Mr. Bernard Shaw are sitting on the stairs in the foreground. The new Hall holds 1,000 musicians and vocalists.

FROM FERRANTI



The Ferranti A.C. electric clock is an extremely neat instrument.

The first section, I understand, will cover 20,000 square feet, though there is room on the site to treble this area.

Reproducers & Amplifiers, Ltd., the R. & A. loud-speaker manufacturers, are faced with the need for more room, owing to increasing demands; and Whiteley Electrical Radio Co., Ltd., having extended their factory, are thinking of further additions, owing to pressure on their output.

"Build Better"

"They Build Better than they know who Build on Telsen"—so ends the introduction to the first number of The Telsen Radio Magazine, a copy of which has recently come to me.

It is a fascinating little book of thirty-two pages, and contains, in addition to full descriptions and illustrations of all Telsen products, a number of circuits designed for simple construction.

The circuits recommended are not issued as kits, but have been designed for construction with standard Telsen components. Full wiring diagrams are given of four excellent economy receivers, and in addition many useful tips on construction are provided, and valuable information is given about such vital but often forgotten things as the aerial and earth system, batteries and loud speakers.

The magazine is well thought out and excellently produced. It should give great assistance not only to the consumer, but also to the dealer.

THOSE D.C. SETS!

SINCE my article on D.C. valves in last month's MODERN WIRELESS readers have been given ample opportunity to test out the anti-hum precautions laid down by valve manufacturers where "dirty" D.C. mains are concerned.

A friend of mine has recently moved from a district where D.C. is pretty good to one where it is hardly recognisable as D.C. at all. As a matter of fact, without inquiring of the supply company, I feel sure that the D.C. does not start as D.C., but is generated by alternators, then rectified by mercury arc rectifiers and sent out unsmoothed.

A Bad Bargain

Anyhow, from a beautiful, almost rippleless 210-volt supply my friend's apparatus has been transferred to this mountainous travesty.

Having rigged up his set, switched on, and listened to it under the new conditions for about two minutes, he enlisted my aid. Would I come down for the week-end and have a busman's holiday, and see if I could do anything?

I went. I listened, and I must confess I was staggered. Having heard the set before under its D.C. conditions, I was expecting to find just a little awkward ripple, showing that though the results before had been satisfactory, just a bit more smoothing was necessary under the new regime.

What I did hear was a good, healthy full-loud-speaker-strength "musical" note of about 500 cycles (octave above middle C). A note that defied all one's efforts with the volume control and successfully blotted out all but the loudest broadcasts.

Unadulterated L.F.!

Changing over to "pick-up" proved that the annoyance had nothing to do with the H.F. end of the set. It was definitely low frequency—far too definitely for my liking.

*Have you D.C. in your house?
If so, you will be particularly
interested in this account of actual
experiences with the "worst
mains" in the country.*

By K. D. ROGERS.

There are four "cures" for really bad D.C. The easiest is to leave the district and go on to A.C. The next is to use batteries; the third is to convert the D.C. to A.C. by means of a motor generator, or rotary converter; and the last is to tackle the problem directly and see if it can be solved without such drastic measures.

I need hardly say that the latter—though somewhat less expensive—is the most difficult course to take, but as the owner of the set couldn't very well move and didn't want to use batteries or a converter, we decided to tackle the nuisance directly.

We tried a few odd smoothing chokes and condensers in a half-

hearted way, for it was almost obvious that such half measures would be of no avail, and at the end of the week-end I returned home, promising to come back on the following Saturday with some necessary anti-hum devices and renew our attack.

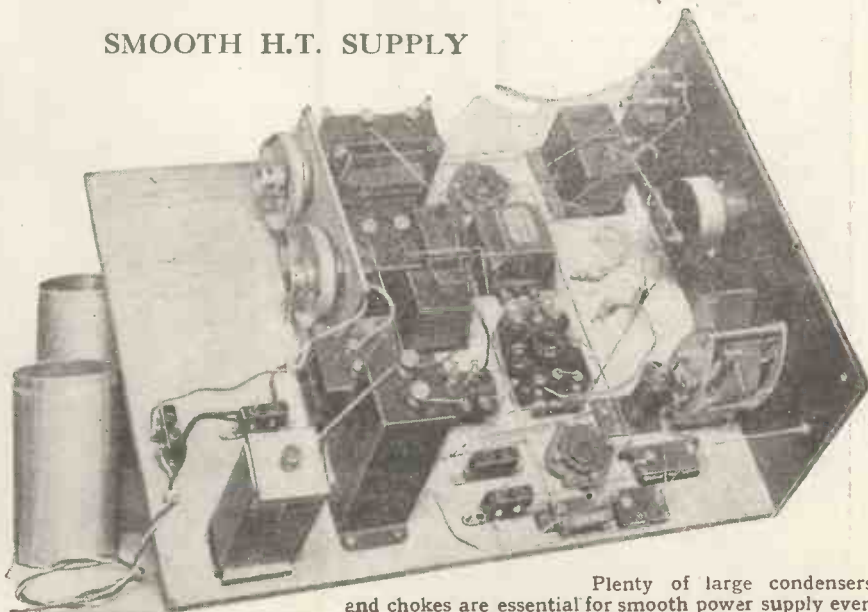
The Best Course

During the week I thought over the problem carefully, and two courses made themselves abundantly clear. Both must be taken if any good was to be done. The first entailed shielding the whole of the L.F. side, including smoothing units, from the valves, and also shielding the heater wiring; and the second demanded a tuned filter across the mains to cut out that annoying hum.

That it was round about 500 cycles we had proved by resorting to the family piano, and so I had to work out the necessary choke and condenser values from the well-known formula:

$$F = \frac{1}{2\pi \sqrt{LC}}$$

SMOOTH H.T. SUPPLY



Plenty of large condensers and chokes are essential for smooth power supply even if the mains are so-called D.C.

Careful Shielding is Essential for Complete Success

The result achieved, and armed with a tinned iron box which I knew would go in the amplifier end of the set, and a mass of chokes and condensers, I returned to the battle on the following Saturday.

Rebuilding the Set

There was nothing for it but to rebuild the set, incorporate elaborate smoothing, including heater circuit smoothing, and enclose all the mains part of the set in an iron box.

It was a bit of a job, and took most of the available time, but we finished at last, and with resonance filter across the mains, with L.F. and H.F. chokes in the heater leads, and L.F. and H.F. chokes in the anode leads, with a total of something like 28 mfd. and 140 henries, we succeeded in reducing the hum to almost inaudible proportions.

There is, at the moment, a faint ringing noise which can be heard near the speaker when no programme is on, but as soon as music commences the noise is drowned.

Not a *cure*, you will say. No, not a cure, but a valuable reduction. I rather think we have not got the resonance circuit quite right, and a little experiment in values of choke, and condenser here will, I imagine, reduce the trouble to silence.

It is most important when faced

with dirty mains to make absolutely sure that everything carrying unsmoothed mains supply is shielded from the grid leads of the valves.

Heaters should be wired up with metal-covered leads, the covering being earthed, and substantial iron boxes should be used to take the H.T. and L.T. smoothing circuits.

Earthing the unearthed main through a condenser sometimes helps if your earth is a good one. If not, it may cause more trouble. In gramophone circuits shielded pick-up leads are valuable, and so is a comparatively low value of volume control—say, 250,000 ohms.

That Resonant Filter!

Heater smoothing chokes are also useful, but the resonant filter across the mains is the best thing of all in providing a shunt for any particularly virulent low-frequency note that is accompanying the mains supply. D.C. mains have the reputation of being far worse than A.C. to deal with where radio is concerned, and unless they are really good mains this stigma is justified.

There is something "clean and healthy" about the hum one gets from A.C., but the mixture of ripple, hum and irregular interruptions that come along with the D.C. supply in many cases taxes one's ingenuity to

the most when any attempt is made to clean up the "juice."

The indirectly-heated D.C. valve has done a lot to help the unfortunate user of D.C. mains, but these valves must not be looked upon as hum-proof just because they are provided with indirectly-heated cathodes.

Special Valves

The separate heater circuit assists in keeping hum down, but elaborate precautions should be made to assure that the valves are given a proper chance to show their mettle. They are all capable of providing very high amplification, and so it must not be forgotten that if carelessly used they will, if necessary, amplify any hum that strays into their grid circuits.

Those D.C. Sets

And once that hum gets into the set it may for a long time defy your efforts to eradicate it, for it is not the steady 50- or 100-cycle note that one associates with A.C., but something that makes itself heard in the middle or upper register of musical frequencies.

But hum *can* be got rid of, by some means or other if perseverance is employed, though how difficult it is can be judged by the number of commercial receivers in which a residue of hum is plainly discernible when no programme is being received.

The Equipment at Bombay's Big Broadcaster



A view of the 12-kw. Marconi G Type transmitter that has recently been installed at Bombay.

WEARITE COMPONENTS

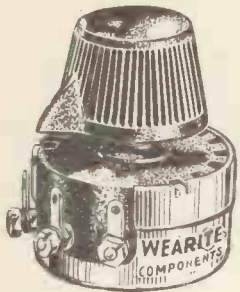
for ECKERSLEY THREE STAR

AND OTHER RECEIVERS DESCRIBED IN THIS ISSUE

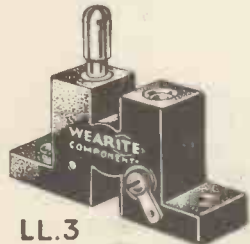
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SIMPLIFIED CONTROL

The ECKERSLEY TUNER is employed to its "logical conclusion" in this "STAR" receiver—the wave-change switches are included on the Extenser Condensers PRICE 15/6

WRIGHT & WEAIRE LTD., 740, High Road, Tottenham, LONDON, N.17

'Phone: Tottenham 3847/8/9.



... ON THE ... SHORT WAVES

By W.L.S.

—who wishes readers a successful New Year with plenty of DX. He also has some very interesting news about the improving conditions on the 20-metre band.

BEFORE I begin my notes, may I wish all my readers—young or old, rich or poor, at home or abroad—a Happy and Successful New Year? There is no reason to suppose that 1932 will not hold some pleasant surprises in store for us, and for short-wave folk in particular it should be an interesting year. So here's all the best!

Will It Last?

Now to get to business. It is rather unfortunate that I am writing this on a particular day when conditions have suddenly bucked up. I shall not know for three or four more days whether this is merely a freak or whether it really means that things are on the up-grade once more. The day before I started writing, I can safely say, is one of the best I remember in the history of short-wave radio.

During the early afternoon only I heard Australia, Java, South Africa, India, Ceylon, Canada (East and West), and the whole of U.S.A. ! All this took place in the 20-metre amateur band, and at one time I logged Australia, Canada and South Africa within two minutes of each other.

No one can talk about "poor conditions" when this sort of thing happens. The question is: "How long will it last?" And, I wonder, is it some obscure effect of the orange-brown London fog that I can see as I write?

Rome Has "Romed"!

What I call "Station News" is somewhat scarce this month. There are no newcomers of particular interest, but a few changes in wavelength of well-known stations, chief among them being Rome. He (or she) has apparently settled down on 80 metres once more. The strength is distinctly good; better, I think, than has been the average on 25.4 metres.

One of the very few newcomers is Havana, Cuba working with the call-

sign C M C I. He works on 50 metres and may be heard between 10 p.m. and midnight.

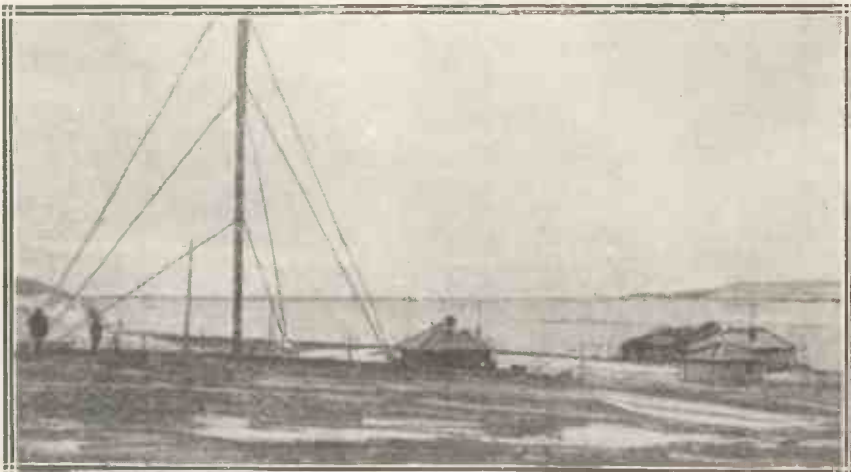
The only other one worth mentioning is T I R (Costa Rica), operating rather irregularly on about 40 metres. I have not yet found him, but I hear on good authority that he is receivable in this country.

wave as 31.86 metres instead of the customary 15.9. This 30-33-metre band is certainly filling up nicely. It will not be long before it sounds like the "200-600" crush!

An Experiment

Having more than the customary amount of time on my hands during

THE METEOROLOGICAL STATION AT NOVA ZEMBLA



Living in the frozen wastes of Northern Europe, the staff of the meteorological station at Nova Zembla collect much important information about the movements of Polar air masses. They then send in their reports by radio, to the interested authorities.

At my own "home station" I appear to be poorly situated for all Central Americans, although I seem to receive everything that is going in North or South America. Even the Mexicans, like X D A, are far weaker than they ought to be, considering the strength of people as far distant as K G O and the other Californians.

Did anyone happen to hear the two special programmes broadcast by J I A A (Tokio) during November? One was on the 2nd and the other on the 11th. I was unable to listen myself, but a friend of mine particularly wants details from anyone that *did* hear them.

P L E, the well-known station at Bandoeng, Java, has shifted for the winter. At all events, I have heard him several times announcing his

a week just recently, I performed a rather complicated but interesting experiment. I made *two* short-wave receivers, both two-valvers, and as nearly as possible identical in every respect except the cabinet. One was given an ebonite panel and put in a wooden cabinet, while the other was built into an aluminium box of the same size.

"Canned" Sets Best!

So far as I could, I duplicated the components used in every detail, even down to using the same make of grid leak, condenser, spaghetti's, etc.

The result has taught me quite a lot. The metal-box set behaved perfectly from the start, and the other was a positive nightmare. The metal

PILOT AUTHOR'S KITS

Exact to Specification

"ECKERSLEY" TUNER
DELIVERED FROM STOCK **15/6**
—C.O.D.

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Cabinet to specification **..16/6**

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(See last month's issue).
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Cabinet to specification **£1:0:0**

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"ECKERSLEY STAR THREE"

IMMEDIATE DELIVERY

KIT "A" Author's Kit, exactly as specified. Less valves and cabinet. **£5-16-2**

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USE THIS LIST OF PARTS WHEN ORDERING ITEMS SEPARATELY.

		£	s.	d.			£	s.	d.
*1	0005 Cyldon Double-Drum Extensior	1	19	6	1	Goltone 25,000-ohm resistance	1	0	0
*1	Wearite "Eckersley" Tuner	15	6	0	1	Leweos H.F. choke	2	6	0
1	panel, 16 in. x 7 in. Ready drilled	5	0	0	1	Ready Radio switch (on-off, snap-type)	2	9	0
1	12-in. baseboard	1	0	0	1	R.I. Hypermu L.F. transformer	1	1	0
1	Ready Radio 0003-mfd. solid-dielectric variable condenser	3	6	0	5	wander plugs	10	0	0
1	Lotus differential reaction condenser, 0001-3 mfd.	4	6	0	3	Graham Farish 4-pin valve holders	1	6	0
1	Dublilier (type 670) 0003-mfd fixed condenser	1	0	0	Screws, wires, etc.	2	0	0	
1	Dublilier 01-mfd. fixed condenser	3	0	0	2	Belling-Lee terminal blocks	1	4	0
1	Telsen 2-mfd. fixed condenser	3	0	0	4	Belling-Lee terminals, type "B"	2	0	0
1	Graham Farish 2-meg. grid leak	10	0	0	1	extension screen, 6½ in. x 6 in.	1	3	0
1	Graham Farish 5-meg. grid leak and holder	1	4	0	2	spade terminals	4	0	0
1	Varley 100,000 Spaghetti resistance	1	6	0	Author's Kit "A," Cash or C.O.D. £5 16 2				

Any parts supplied separately. If value over 10/-, carriage paid C.O.D. All post charges paid.

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12/6

45/-

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"Wireless Trader" Test Report, Nov. 14th, 1931—
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The R. & A. "100" will satisfy YOUR most critical demands.
Ask your dealer to demonstrate and refuse a substitute. Write us for descriptive leaflet. Post Free.

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FREE

NAME

ADDRESS

M.W.9.

W.L.S. Tries an Interesting Experiment

fellow did not "threshold-howl" at the start, and could not be made to do it. The other nearly split my eardrums, and it took me a whole day to cure it. It was not stable until it had 1 megohm across the transformer secondary and an increased amount of de-coupling for the detector, in addition to such dodges as lowering the filament voltage minutely.

Well Worth It

Even then it had a nasty background of A.C. hum (although it was a battery set) which I have not traced even yet! It is pick-up of some kind from the various stray mains wires about the place, but what part of the set is doing the picking-up I have not found out.

So far as I can see, the extra hour or so spent in making a set straight into a metal box is more than repaid. I must have spent at least four hours on the other one before I began to be satisfied, and I hate the thing even now!

Failing the use of a metal box, I think the best thing to do is to standardise on either a metal panel and a baseboard "underlined" with copper foil, or to build on an aluminium chassis. I feel sure some of those who deride "all-metal" sets would change their tune if they were to try one and compare it with their present set. Unless, that is, their present set is very good indeed, and has had lots of pains expended on it.

Fellowship of the Ether

I wonder how many of my readers are members of any kind of short-wave club? There are several in existence, and one cannot help being struck by the "camaraderie of the air." We used to talk of the "Fellowship of the Road" when motor-cars

were scarce; but, unfortunately, one doesn't notice it much nowadays. Let us hope that the Friendship of the Air will not disappear in the same way.

Personally, I have regular correspondents in the U.S.A., Australia, South Africa and Brazil. We write to each other merely to exchange news and views, and we all know each other thoroughly well, although we have never met and probably never shall.

We even exchange foreign stamps with one another, as a sign that we are human beings with other interests in life besides radio! What other hobby, though, can provide one with distant friends in this way?

Instead of exchanging correspondence, I should very much like to exchange receivers occasionally. I do

The ideal for those who can afford it is to have a "stand-by" receiver that is known to work well and that can be relied upon. Then, while one is in the throes of taming other circuits and sets, one can always take a rest and listen-in on the set that one knows from A to Z.

The Vicious Circle

This is all very well in theory, but the usual result is that one wants a Spaghetti, or an L.F. transformer, or a volume control, from the stand-by receiver to put into the new one, and out it comes! One is then left with an incomplete receiver that *would* work and a complete one that *doesn't*.

Thrilling as short-wave reception is, there must be few of us who are content to sit and listen on the same old set for more than a month at a time. However satisfied with it we may be, there is always the feeling that there are some stations we don't get at all well, and others that might be heard with a better set.

Having made the "better" set, we find, perhaps, that some of the people that used to come in well on the old one are missing. And so we pass on to a third, and so the vicious circle continues, much to the joy of the component manufacturer.

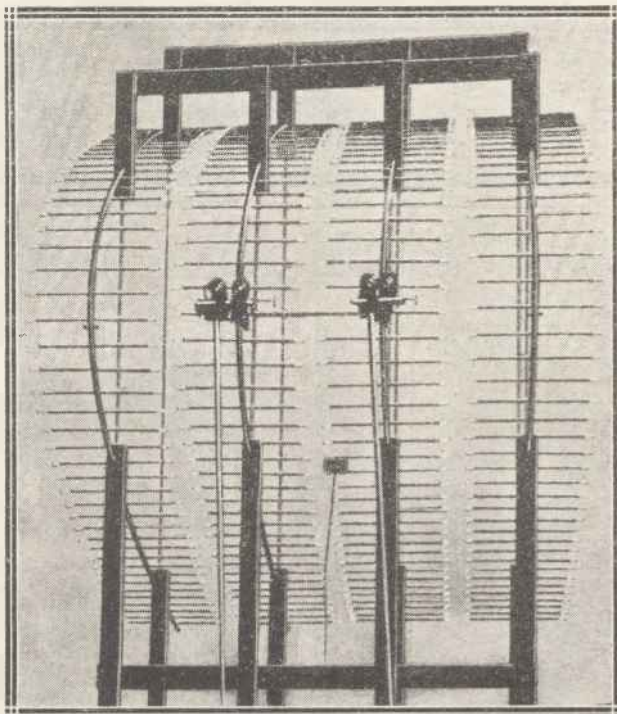
In the Early Hours

The early hours of the morning are apt to be rather thrilling at this time of year, particularly if one is concerned with reception of amateur signals. On the 40-metre band the Americans (amateur and broadcast) fairly romp in between midnight and 3 a.m. Happy is the short-wave man that has a set by the bedside! Unless, that is, he is like myself, and falls asleep over it. Unless I am up and dressed it takes something *very* exciting to keep me awake!

At the other extreme we have those hardy souls (mostly transmitters) whose gear is housed in a "shack" in the garden. Imagine crossing the frosty ground in pyjamas at 3 a.m.! It makes me cold to think of it.

"Shacks" have another disadvantage, too. Unless they are really well built the gear inside them is apt to become distinctly damp. Some form of heating is essential, and if a paraffin stove is used, constant supervision is necessary unless one is prepared to de-carbonise **everything** when occasion arises.

TELEPHONY ON 50 CENTIMETRES



Wireless telephony on a wave-length of 50 centimetres was successfully demonstrated in Italy recently. This photograph shows the novel transmitting aerial used in these demonstrations. The distance covered on this occasion was about 25 miles

not mean by this that I want to palm off my "duds"—like the set I have been talking about! But it does us all good to study other people's ideas of set design now and then, and it prevents us from sticking in a rut. Once you have made a certain circuit work really well there is a natural tendency to stick to it for good instead of doing some real experimental work.

PERFECT PAIR TO PERFECT RADIO TAKE THE WAY



Wander plugs in the PERTRIX H.T.? PERTRIX L.T. connected up all right? Then switch on. You never realised radio could be so good, did you? That's the best of getting the Perfect Pair—they work in perfect harmony with each other and with your set, giving you just Perfect Radio. And they last longer, too . . . infinitely longer.

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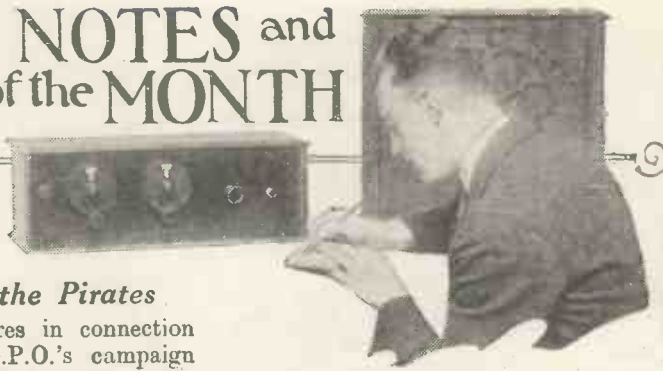
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Advert. of BRITANNIA BATTERIES LTD., 233, Shaftesbury Avenue, London, W.C.2 Telephone: Temple Bar 7971 (5 lines) Works: Redditch

RADIO NOTES and NEWS of the MONTH



Frightening the Pirates

FACTS and figures in connection with the G.P.O.'s campaign against wireless pirates in October are slowly trickling through the barrage of official secrecy. It appears that in the London area alone during October the G.P.O. used four detecting vans, with the result that 239,000 extra wireless licences were taken out as compared with 25,000 in the same month for last year.

At the end of November, 1930, there were approximately 3,250,000 licences in use, and consequently in one year very nearly a million new licences have been issued.

Saving the Scottish Orchestra

There is a chance that the B.B.C. will come to the aid of the Scottish Orchestra. The latter is the leading

musical organisation in Scotland, and it has been passing through a very difficult time lately. Recently a circular was sent out to all the guarantors and subscribers of the orchestra outlining the full gravity of the situation. It was thought at the time that the B.B.C. and the Carnegie Trust were two possible sources of potential help.

B.B.C. to Help?

An official of the B.B.C. recently stated that the B.B.C. was definitely interested in relieving the present position of the Scottish Orchestra, and that it was likely it would come forward with a scheme to help.

Toning Down the Talks

Critics of the B.B.C. are accusing its officials of adopting a ca'canny policy with regard to talks. The B.B.C. has announced the approval of a new policy—that of substituting general talks for every controversial item. Such a policy is condemned as reactionary. The B.B.C. says that it has to consider listeners and nothing must be broadcast which would offend the susceptibilities of a maiden aunt or a child!

Asking for It!

This is the sort of policy which makes the Aunt Sally at a fair such a popular object for those who want to throw things, and the B.B.C. must not be annoyed if critics start throwing, if not bricks, at least plenty of ink at the officials at Savoy Hill for promulgating such a wishy-washy policy.

What a Pity

We anticipate a considerable re-organisation of the Talks Department at Savoy Hill, however. Miss Hilda Matheson's resignation has concentrated attention on this particular department of the B.B.C. In the past the talks have undoubtedly been

(Continued on page 92.)

ENJOY

Short-Wave Reception on your present set (if battery operated) by means of a Magnum Short-Wave Converter.

Connected in a few seconds, no extras are required.

Including 2 Coils 20/40 and 40/80 metres, Plug and Adaptor.

Sent on 10 days' free trial against cash.

£3 : 15



WE SPECIALISE

in the "Eckersley Star" 3, "Uni-Coil" 3, "W.L.S. 1932 Short Waver" and all "M.W." sets, which can be supplied as constructional kits or ready wired and tested. Comprehensive lists, including a list of leading short-wave stations and a booklet describing the "Stenode." Free on request.

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Telephones: Hop 6257 and 6258.

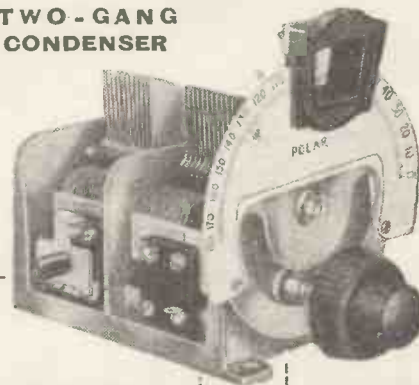
Scottish Agent: Mr. Ross Wallace, 54, Gordon Street, Glasgow, C.1.

POLAR FOR GANGED CONDENSERS

THE "UNIKNOB"

TWO-GANG
CONDENSER

21/-



★ **MINIMUM TRIMMER**
For balancing circuit capacities.

★ **DIE CAST FRAME**
Ensuring rigidity under all conditions.

★ **SLOW MOTION DRIVE**
Fitted with illuminated scale.

★ **AIR DI-ELECTRIC TRIMMER** ★
Controlled by centre knob ensuring the same degree of accuracy as that obtained by two single tuning condensers, but with greater ease and simplicity of operation.

Specified by the technical press. Standardised by leading set manufacturers.

24-page Catalogue "M" Free.



GANGED CONDENSERS

WINGROVE & ROGERS, Ltd., 188-9, Strand, W.C.2 Polar Works, Liverpool

Depth behind
Panel 2 3/8
inches.



RIGID
ROBUST
ACCURATE

for the
W.L.S. 1932
SHORT WAVE

Use **ORMOND** SMALL LOG
CONDENSERS SLOW MOTION

as recommended

Ormond designed this condenser to follow the Logarithmic Law, and expressly for use where extremely high efficiency is required, though space is limited.

The whole construction is very robust. The bright brass vanes are perfectly rigid, and the heavily nickelled and polished skeleton end-plates ensure minimum eddy current losses. Special ball-bearings give a smooth action, facilitating precise tuning adjustments with noiseless operation. The moving vanes are connected to the frame, thus eliminating stray capacity effects.

Supplied complete with 3-inch Dial engraved 0 to 180 degrees, and Slow-Motion Control Knob (ratio approximately 55 to 1).

Cat. No. R/306. Capacity .00013. Price 11/6

Also supplied in capacities .00025, .00035, .0005, with or without slow-motion movement.

THE ORMOND
ENGINEERING CO., Ltd.,
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Permanent Magnet
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Amazing
Tone-Purity

The extraordinary purity of tone, combined with brilliant clear-cut reproduction of voice and music, will satisfy the most critical ear.

Size of Cone 10 in. dia.
Supplied complete with
Input Transformer.

May we arrange a
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PRICE
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THE



PRICE 15/6

"ECKERSLEY
COIL"



The Coils are accurately wound and rigidly fixed in position. Individually tested and guaranteed to achieve the wonderfully high efficiency claimed for the set. Make sure of perfect results by using the Formo Eckersley Coil.

"FORMO" SLOW-MOTION CONDENSER is particularly suitable for use in the Eckersley circuit in conjunction with the Formo Eckersley Coil. Silky action, enclosed pigtail, thoroughly reliable. Price 6/-.

Obtainable from all Radio Dealers. Complete Catalogue on request from—
ARTHUR PREEN & Co. LTD.
GOLDEN SQUARE, PICCADILLY CIRCUS, LONDON, W.1.
Crown Works, Southampton.

RADIO NOTES AND NEWS OF THE MONTH
—continued from page 90

rather pedantic and lifeless, and it is a pity now that there is a chance of their waking up a little that the B.B.C. should state its intentions of extending a more rigid censorship.

Mere Generalisation?

The idea appears to be that the B.B.C. wants its regular broadcasting critics to discuss tendencies in literature and drama, etc., without current illustrations. But surely if criticism is to be of any value at all it has to make reference and draw parallels, etc., with particular regard to affairs of to-day?

A Matter of Mystery

In other words, the B.B.C.'s New Year resolution with regard to talks is: "Be more cautious"—no more controversial discussions, anger-raising criticisms about books, plays, etc. How on earth the B.B.C. expects its critics to broadcast valuable and informative criticisms on these lines is a matter of mystery.

Crossword Puzzles!

There is a possibility that the new censorship will apply to the supervision of political and religious matters as well. This censorship policy is really going too far. If it goes on like this it will mean that the B.B.C. book critic will broadcast about a book and criticise it—and yet leave the listener in complete ignorance of the title or the author!

Wireless Bed-Warmers!

It is reported that an enterprising firm, having read the other day about Marchese Marconi stating in an interview that on beam waves of 20 to 50 centimetres the whole body begins to warm up if one stands in their path, intends developing the idea of wireless bed-warmers.

The idea, of course, is utterly fantastic, but it just shows you how the layman, reading about technical experiments in the lay press—which as it is often make technical matters far more confusing than they might be!—seizes upon ideas which from a practical viewpoint are almost as outrageously fantastic as perpetual motion.

Very Misleading

The "Evening News" recently indulged in a leader entitled "Death Rays and Others," and concluded with the following; "What we would welcome just now is a wave-length that would enable us to buy turkeys at 3d. a pound; but that, we are assured, would merely accentuate world-wide depression, beget unemployment, and cause trouble all round."

We don't know about causing trouble, but we are certain that such leaders cause a good deal of misunderstanding about important radio experiments, and about science in general.

New Governors

Before this number of "M.W." is in the hands of the public there should be some reliable information about the appointment of four new Governors for the B.B.C. Tenure of office of the B.B.C. Governors expires at the end

NEXT MONTH

An Eckersley Mains Set for Constructors

FEBRUARY

"MODERN WIRELESS"

On Sale Jan. 30th. Price 1s.

of 1931, and the retiring Governors are: Lord Gainford, Sir Gordon Nairne (a director of the Bank of England), Mr. Montague Rendall (former headmaster of Winchester), and Viscountess Snowden. The Chairman, who was appointed last year, Mr. J. H. Whitley, was formerly Speaker of the House of Commons.

Our Radio Trustees

It must be remembered that the functions of the Governors are not executive. Their responsibilities are more general and they are really trustees to safeguard broadcasting service in the national interest.

Parliamentary Control?

The appointments are made by Order-in-Council, and not by the House of Commons; but judging by press notices recently, the Labour Party is very anxious to be given an

opportunity of discussing the question, as they are keen on securing greater control by Parliament of the activities of the B.B.C. The Labour Party particularly object to the use which was made of broadcasting during the last General Election.

WORTH-WHILE RADIO LITERATURE

Describing some publications of special interest to the constructor and user of radio receivers.

By A. S. CLARK

WE have received copies of three new publications by the McGraw-Hill Publishing Co., Ltd., Aldwych House, London, W.C.2. In spite of these books having their origin in America, they are particularly useful for enthusiasts over here.

First, there is "Television," price 12s. 6d., by Edgar H. Felix. All aspects of the subject are dealt with, both technical and otherwise. Heavy reading is completely avoided, and the various stages of the television process are dealt with in separate sections which cover the different methods of effecting the particular stage under consideration.

All About Valves

The other two books are by the joint authors, James A. Moyer and John F. Wostrel, and are both priced at 15s. each. There is the second edition of "Radio Receiving Tubes," which covers the operation of valves under all conditions met with in modern receiving practice, and "Radio Construction and Repairing."

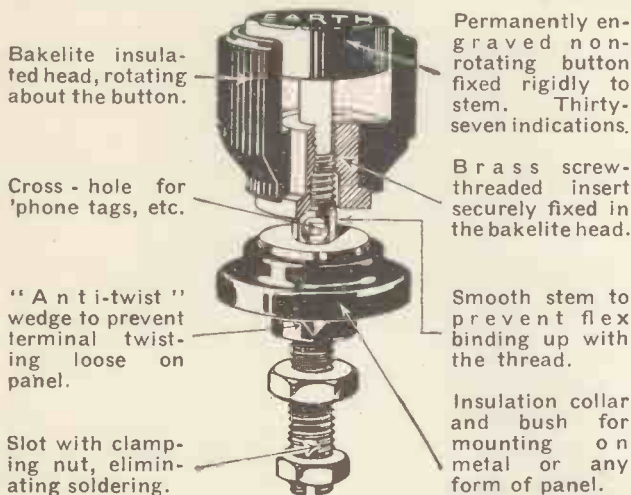
Not only does the former book tell you what goes on inside valves of all types, but it explains valve practice in such a way as to make clear the reasons for the various schemes used in the composition of valve circuits.

How to Find Faults

The other book is a third edition, and caters for those who merely operate a set, those who make up their own receivers and the man who has to look after sets, or "service man" as he is known across the Atlantic.

The amount of information contained in this book is really surprising. Large parts of it are devoted to the tracing and rectifying of faults in sets, and there are special sections on the installation of receivers and the tools that are needed in the construction of sets.

WHERE ELSE CAN YOU FIND THESE SPECIAL FEATURES?



Bakelite insulated head, rotating about the button.

Cross-hole for 'phone tags, etc.

"Anti-twist" wedge to prevent terminal twisting loose on panel.

Slot with clamping nut, eliminating soldering.

Permanently engraved non-rotating button fixed rigidly to stem. Thirty-seven indications.

Brass screw-threaded insert securely fixed in the bakelite head.

Smooth stem to prevent flex binding up with the thread.

Insulation collar and bush for mounting on metal or any form of panel.

TYPE "B" Price 6d.

THE WORLD'S MOST FAMOUS TERMINAL

BELLING-LEE

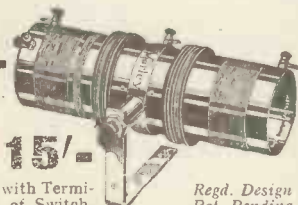
FOR EVERY RADIO CONNECTION

Advt. of Belling & Lee, Ltd., Queensway Works, Ponders End, Middlesex.

SQUARE PEAK

COIL

(Model BP5).



15/-

(Model BP7, with Terminals instead of Switch, same price.)

Regd. Design Pat. Pending

The ideal pre-selective device for every set—S.C., Reacting Detector or Superhet. Gives 9 kilocycles separation over both wavebands. Makes wave-traps unnecessary. Needs no screening.

Write for section B C of the Varley Catalogue.

Varley

"SQUARE PEAK" COIL

Recommended by the leading radio journals, "Amateur Wireless," "Modern Wireless," "Popular Wireless," "Wireless Constructor" and "Wireless World," and used in their Star Circuits and Exhibition Sets.

"SQUARE PEAK" MAINS RECEIVERS AND RADIOGRAMS. Amazing selectivity with superb reproduction. Illustrated Colour Folder free on request.

Advert. of Oliver Pell Control Ltd., 103, Kingsway, London, W.C.2. Telephone: Holborn 5303.

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"POPULAR WIRELESS"

and

"WIRELESS CONSTRUCTOR"

must be made to the Sole Advertising Agents,

JOHN H. LILE, Ltd., 4, Ludgate Circus, London, E.C.4.

'Phone: City 7261.

Use the condensers with a world-wide reputation



Dubilier condensers are famous the world over for their infallible accuracy and uniformity. Therefore, when you buy condensers, always demand Dubilier, the condenser in which you can place absolute reliance. They are made in England by British workpeople by a British company.

This latest range of moulded-in mica types fulfils the long-felt need for the best possible condensers at an extremely low cost, built as only Dubilier can build them.

All radio dealers stock them.

PRICES

TYPE 65

'0001, '0002, '0003 mfd. 6d. each.

'0005 mfd. 9d. each.

TYPE 60

'0001, '0002, '0003 mfd. 1/- each.

'0005, '001, '002 mfd. 1/3 each.

'005 and '006 mfd. 1/6 each.

TYPES 610 and 620

Prices from 1/8 to 3/- each

DUBILIER

CONDENSER Co. (1925) LTD.

DUCON WORKS, VICTORIA ROAD, N. ACTON, LONDON, W.3

BEWARE THE POWER THIEF

Is Electrical leakage robbing you of money—and of the power your Set needs?

SMOOTH-top H.T. Accumulators with their 10-volt single glass cells provide direct electrical connection between terminals. Thus power leaks away, causing serious waste. In the Lively 'O' H.T. Accumulator this cannot happen. Each 2-volt cell is separated from its neighbour by an air-gap. This air-gap definitely prevents leakage. All the power you have paid for is stored up, being released *only* when working your Set—there can be no "falling off" in voltage—your Set gets *all* the power it needs. Write for free booklet that tells you all about it.

TWO TYPES
Standard 10-volt
Unit.
(4,750 milliamps)

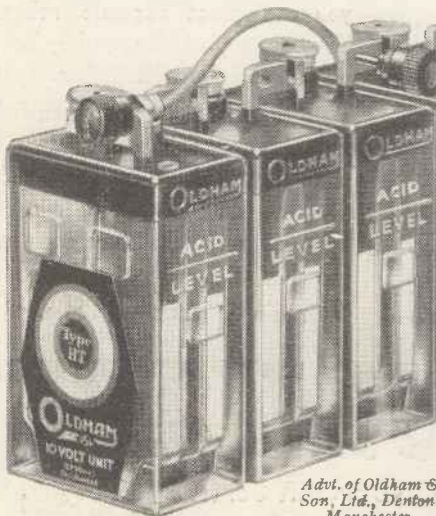
5/6

Extra large capacity
(5,500 milliamps) per
10-volt Unit.

6/9



**LIVELY 'O'
H.T. ACCUMULATORS**



Adv. of Oldham & Son, Ltd., Denton, Manchester.

DO CONSTRUCTORS SCORE?

—continued from page 10

valves so that the receiver can the more easily face the robust rudeness of mass production.

Mr. X claims that commercial sets are built up by skilled workpeople, but actually the majority of workers in the big radio factories are girls of limited skill who know nothing at all of the theory of radio. And the main aim of commercial set designers and work managers is to see that their designs are perfect repetition jobs, calling for the fewest and simplest processes of assembly.

Down to Production Standard

Mr. X states that steps are taken to ensure that every production instrument reaches the "same high standard as that originally achieved by the designer in his experimental models."

Some little while ago Mr. K. D. Rogers and I happened to be visiting the then Chief Designer of the very concern which employs Mr. X. This "commercial designer," whom I will style Mr. "O," had just completed his final tests of a set which was destined shortly to go into production.

"I'd like to do this, and I'd like to do that," sighed Mr. O, "but it's impractical in a commercial set. However, it has turned out pretty well." And he wandered over from one of his original models to that one upon which the factory design was to be based. But he was careful to point out that it might be necessary to make further slight adjustments in order "to get it into a good production pattern."

The Spacing Question

Further—and I want Mr. X to note this—he added: "It will lose at least a further twenty-five per cent of its efficiency in production." And I will leave it to Mr. X to ask Mr. O to explain exactly why!

The next point ventured by Mr. X is that whereas home-constructor designs are usually somewhat spread-out affairs, commercial sets are compacted into stamped-metal chassis.

I submit that the commercial designer has been forced into this *inefficient* method of construction by the very people whom Mr. X claims it is a virtue to serve. When you have to design a receiver which must appeal to the least mechanically-

minded sections of the population, you have to make sacrifices which wring the hearts of conscientious technicians.

Since certain firms began to compress their sets into chaste, compact articles of furniture, the whole industry has, to a large extent, been obliged to follow suit. Your completely non-mechanical listener cannot be expected to differentiate between different makes of sets on entirely technical bases of comparison, whereas the mere fact that a man is prepared to take up pliers and screwdrivers is at least *prima facie* evidence that he will make allowances in favour of higher efficiency even if it means some aesthetic sacrifice.

The absence of elaborate screening and the existence of a spreading out in component layout is surely an indication of the possibility of higher electrical efficiency. Shielding is always accompanied by an increase in the effective resistance of the shielded circuit (*vide* Radio Research Board Report), and so it is the deliberate aim of the designer of home-constructor sets to reduce his screening to a minimum.

Current Designs

And it is his advantage that he is able to take his readers into his confidence and explain the whys and wherefores of such things, the while he describes the assembly of the receiver.

I do not admit that permanence of assembly is a gain. On the contrary, the more a set becomes a solid welding of component parts the lower its replacement value.

When this year's commercial sets are out of date they will constitute dead losses to their owners, whereas the home-constructor set is easy to dismantle, and many of its component parts can be used again and again.

Next May the commercial designers of some firms will be preparing sets for the 1932/33 season, and these sets will remain "current" until September, 1933. Supposing some new and temptingly attractive development of the art is revealed in the winter of 1932; the home-constructor can pull down his old set and, at the cost perhaps of only a few shillings, take full advantage of the new development.

The Care of the S.G.

It has happened before many times. The screened-grid valve is a case in point. Many constructors were enjoying the benefits of this innovation long before the majority

(Continued on page 96.)

GOLTONE SELECTED

FOR THE

UNI-COIL 3 GOLTONE ULTRA-SELECTIVE DUAL RANGE COILS

Scientifically designed to give the high degree of Selectivity necessary under Modern Broadcasting Conditions. These Coils incorporate a tapped Grid winding, and are wound with High Grade Instrument Wire on a Genuine Bakelite Air-spaced Former and Base.

Adequate reaction is obtainable over both medium and long wave bands. Range 200 to 600 and 1,000 to 2,000 metres. Illustration shows Type DW/8 with Base and Terminals (as selected for the "UNI-COIL" 3). Price 5/-.

FREE

With every coil a diagram is given of connections and particulars for several circuits, incorporating "GOLTONE" Dual Combination Coils.

The outstanding performance and excellency in finish of "GOLTONE" COMPONENTS leads to their specification in ALL "Modern Wireless" and "Popular Wireless" Circuits.

PRICE
5/-
EACH



Full particulars of the "GOLTONE" "ECKERSLEY" SUPER DUAL RANGE TUNER, Price 15/6. will be sent on request

WHO'S THIS?

YOU know her, don't you? Incomparable MARLENE DIETRICH, with red-gold hair and blue eyes. Do you know what film it was that brought her fame? PICTURE SHOW "WHO'S WHO ON THE SCREEN" will tell you all about her, for it contains

500 BIOGRAPHIES and 200 PHOTOS of famous Stars

Sixty illustrated casts of the year's best films and fourteen full-page Portrait Plates in Photogravure. Never was there a finer sixpennyworth for the film lover. Every page is packed with interesting facts. Order your copy TO-DAY.

PICTURE SHOW WHO'S WHO ON THE SCREEN

6d.

1932 Edition, On Sale Wed., Jan. 6th.





"M.W." Mains Unit

Specially designed for the A.C. "SUPER-QUAD"

"Modern Wireless" displayed their confidence in the sterling qualities of Heayberd Mains Units by choosing this unit for their "Star Set," the "Super-Quad." Also suitable for other all-mains receivers.

Model M.W. Output: 200 v. at 40-50 ma. Three H.T. tappings: 60-80 v. variable S.G., 180 v. fixed, 200 v. fixed. L.T.: 4 v. 5 amps. for A.C. valves. Neat steel case with bakelite panel. Complete and ready to switch on

127/6

Send 3d. stamps for lists of Mains Units, Transformers, etc., with circuit diagrams.

10, FINSBURY ST., LONDON, E.C.2.



ELEX

T. 14 Plugs and Sockets
 Finished in six colours and supplied with forty different kinds of name-plates, the last word in efficiency. Sockets 1d. each; Plugs 3d. each; Name-Plates 1d. each.
 Write for List H11.
J. J. EASTICK & SONS
 118, Bunhill Row, E.C.1.

The Picture Paper with the MOST News—
SUNDAY GRAPHIC
 and SUNDAY NEWS.

PERMOL

Nothing looks worse than a dull and discoloured panel. Use mirror polished PERMOL, the new Ebonite which is guaranteed never to discolour. Its beauty and polish will delight you, and its cost is less than 3d. per square inch. Don't spoil that set, but insist on PERMOL, the modern permanent colour Ebonite.
 From all dealers or direct
The British Hard Rubber Co., Ltd., Middlesex.
 Ponders End,

DO CONSTRUCTORS SCORE ?
 —continued from page 94

of firms were able to incorporate it in their "commercial designs."

Supposing the B.B.C. starts to broadcast on 7 metres next spring, who will be the first with sets able to take in that new wave-band in addition to the normal channels ?

Why, the home-constructor, undoubtedly, and his new "all-wave" set will cost him only something under a pound or so at most, for he will be able to use practically everything that at present graces his "base-board."

Some Telling Facts

The final argument introduced by Mr. X completes his own undoing; he has the temerity to mention costs ! I have shown how completely the home-constructor must inevitably score when the time for set replacement occurs, but he also scores in respect of his initial outlay.

I venture to suggest that all but a few manufacturers have been driven right out of the battery set market by home-construction. Let me introduce some figures to prove my point. We know that last year 150,000 "M.W." dual-range coils were sold, and it so happens that these must largely have been used for battery sets. In addition, however, we know many constructors wound their own dual-range coils, and it is no exaggeration to figure these at 50,000. But there were many other extremely popular "P.W." and "M.W." sets which did not employ that particular unit.

So I am being most conservative when I state that at least 250,000 of our battery designs were constructed. We are further given to understand that the sales of proprietary battery kit sets for home assembly totalled at least 350,000 (my figures being gathered from the five largest suppliers only).

The Grand Total

The grand sum is then 600,000, without taking into consideration the efforts of our journalistic contemporaries and various others.

Looking through a recently published wholesaler's catalogue, I find that out of one hundred commercial sets listed only twelve are battery types. Surely the inference is obvious.

But just consider the prices. The

cheapest three-valve battery set lists at £3 3s., while the cheapest kit set of a similar type retails at 39s. 6d., and its assembly is such that all but a few could tackle it.

With the rather more complicated apparatus the comparison is still more striking. A battery superheterodyne receiver is listed at over twenty pounds, but the cost of assembling an "M.W." "Super-Quad" is only about eight pounds. And we can note in passing that there is no commercial set available which incorporates the "modern technique" found in that notable design.

Overwhelming Evidence

There are many other things I could say to support the case for the constructor, but I have already presented an overwhelming mass of evidence.

Mr. X may "come again" if he so desires, but I warn him that I have many more shots in my locker—some of which are pretty heavy ones ! I have left much unsaid on account of space limitation, so he must not jump to the conclusion that I have skipped a single thing for fear that it won't stand close examination.

Finally, may I be permitted to render a definitely personal observation. I am in the unique position that I have had ten years of concentrated experience of this home-constructor business. But, unlike Mr. X, my interests range over all the other aspects of the science as well.

What of the Future ?

I have visited practically every radio factory of importance in the country, and have had personal conversations with large numbers of their most important executives. I have also conducted tests on sets emanating from every radio workshop of significance.

And I am able to say that it is my earnest conviction that the constructor movement was never better placed or more vitally alive than it is to-day. Big developments are ahead which may make even Mr. X wonder whether he was so very right in his dogmatic assertions after all.

But a word of warning. There is considerable money in the making of components, but only for those who are experienced in meeting the discriminate demands of the home-constructor. Many firms have gone out of the business in the past because they were unable to keep in step with these, and maybe it is these firms that started the rumour

(Continued on page 97.)

DO CONSTRUCTORS SCORE?

—continued from page 96

that the component market is a decaying one.

It very decidedly is not, although it is increasingly intriguingly peculiar. And if a new firm, lured by my figures, decides there must be a huge business for L.F. transformers and H.F. chokes, it may find itself facing keen disappointment very quickly.

There are already dozens of firms manufacturing excellent transformers and chokes who are quite able to supply all requirements. But such firms do not exist entirely on such lines as these, for they know that components of that nature are the very ones which constructors move from set to set—they definitely are not the "consumables" of radio!

You cannot measure the strength of the constructor army in terms of transformers and chokes sold—indeed, it is doubtful whether there is anything which will give a really close estimate of the national economics of "home construction." However, we do know this; it is often that set which uses the least number of new parts which proves the most popular—which, in view of the figures I have given, makes one's mind reel at the thought of what the potentialities of the movement may in fact be!

SUNDAY BROADCASTING

—continued from page 6

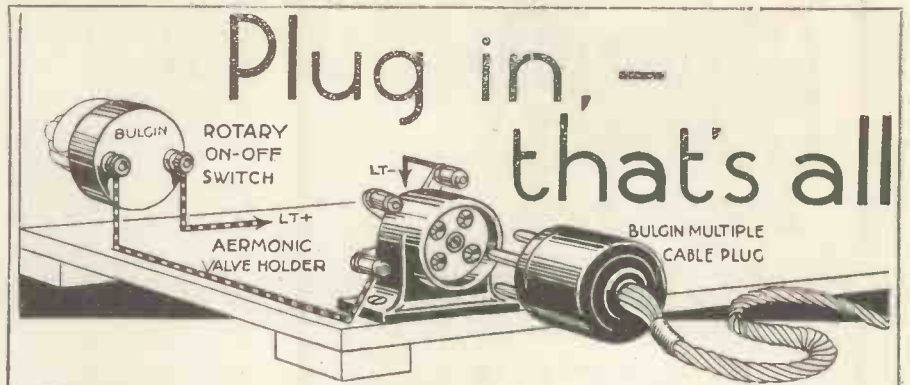
for those who are drifting away leaderless and disillusioned, a form of lay preaching, manly, direct and inspiring, which left the forms of Christianity alone but recaptured its spirit.

I would like a Dick Sheppard to come and lead a new movement with these ideals in view. It would be a wonderful move if the B.B.C. could persuade him to come and try.

Thus I ask that one wave-length should continue as to-day, because we know many appreciate the type of programme sent out, but on the other wave-length let us have our freedom to hear the lay sermon, the greatest music, the gaiety that comes with true goodwill.

No one will then be denied, and each

(Continued on page 98.)



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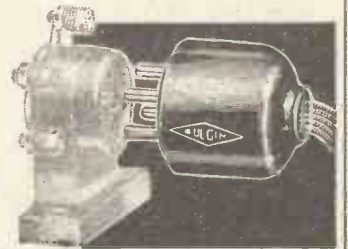
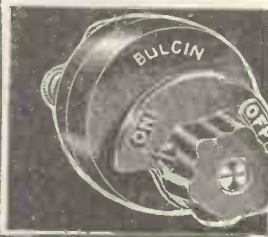
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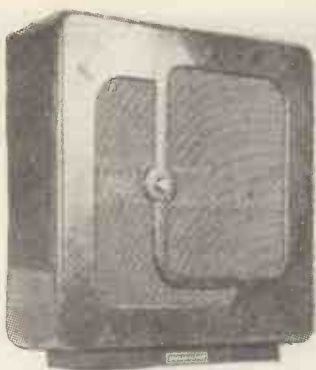
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**SUNDAY
BROADCASTING**

—continued from page 97

can say, in deference to the other: "You like this, I like that. On the whole the B.B.C. is very fair, do you not think?" To-day people are becoming really bitter at this policy of denial foisted upon us against the will of the great majority. I am not for "Variety" on that day or vulgarity on any day. I do feel that millions are waiting to have a Sunday programme which gives, not one which denies.

To those who still, in spite of all I have tried to say, agree with the B.B.C., remember it is not proposed to change by one iota that which you now receive on Sunday; all that is asked is an alternative programme to accord better with other thoughts and feelings.

**THE ULTRA-
HETERODYNE**

MANY of the world's greatest inventions and discoveries were the outcome of chance, rather than the result of careful planning. James Watt might never have evolved the first steam engine had his mother not left the kettle over-boiling, and the arrival of artificial silk might have been delayed a whole century if Sir Joseph Swan had failed to notice the lustrous gleam of certain of the flimsy threads he was experimenting with in an endeavour to fashion an electric lamp filament that would really last.

Blazer's Bewilderment

Scores of queer ideas and fantastic inventions are brought by their hopeful originators to John Dare for his opinion during the course of the year, but the Langworth-Jones proposition represented a veritable "high-light" in more than one sense of the term.

"You see," the radio consulting engineer explained to his old friend, Blazer, "the scheme is so completely absurd, it may even be feasible!"

"I don't see," grunted the ex-C.I.D. man, helping himself from the open cigar-box that was always to be found on either the desk or side-table in Dare's office.

"Perhaps that was rather paradoxical," admitted the other. "What I ought to have said is that the idea

is so basically sound in its general lay-out, as it were, that we shouldn't scoff at the apparently fantastic results claimed until we have had an opportunity of examining same."

"I don't get you."

Blazer chewed at his unlighted cigar and stretched out his legs luxuriously.

A Queer Visitor

"Your presence at the demonstration will be most helpful, Blazer. No; I mean that. I've never wanted your solid, unimaginative old bulk behind me more than I do to-day. We start with marvellous premises, but where will they lead us?"

"You said it," grinned Blazer, his eyes roving appreciatively around the well-appointed room.

"Pre-mises, you uneducated old ruffian, not premises!"

"They're posh, anyway. When does the show start? And what is it, any-old-how?"

"I'll spin the whole yarn again. Do try not to go asleep with your eyes open this time," Dare laughed, although there was just a trace of exasperation in his voice as he once more described the visit of Mr. Langworth-Jones the previous day.

It will be quite unnecessary to give Dare's account verbatim, for he indulged in considerable elaboration for the benefit of his comfortably inert companion.

In brief, it appeared that an elderly man describing himself as Mr. Victor Langworth-Jones had presented himself for a consultation with the young engineer, with a view to obtaining advice regarding the exploitation of a machine he had invented. This device he styled the "Ultra-Heterodyne." Its avowed purpose was the detection of the so-called Cosmic Ray, which is a mysterious emanation thought by scientists to originate in the far reaches of inter-stellar space. Mr. Langworth-Jones had proposed to detect the ray in this manner.

The Principle of Beats

If you combine two sounds of high pitch you produce a low note that represents the difference in pitch or frequency between the two individual notes. In that way a low "woomph-woomph!" is often heard when the two engines of a twin-propeller aeroplane are running. Likewise, as every radio listener knows, the combination of two wireless waves, which in themselves are so high-pitched that they could never be detected as sounds, can result in a squeal.

(Continued on page 99.)

THE ULTRA-HETERO-DYNE

—continued from page 98

Mr. Langworth-Jones argued that similarly it should be possible to "heterodyne" waves of tremendously high frequency, such as X-rays, or even the still higher-pitched cosmic rays, and produce a "beat" which the human eye could distinguish as light.

And, further, he claimed that by using special optical devices, photo-electric cells and so on, he had done that very thing!

Ghostly Results

Later he discovered the astonishing fact that his "Ultra-Heterodyne," as he styled his instrument, incidentally revealed the presence of rays hitherto entirely unsuspected by the most imaginative scientist. He described them as unearthly light rays composing the pictured reflections of supernatural beings who live in an attenuated medium as filmy, in comparison with the ether of space, as the ether of space is to air, or as air is to water.

"Ghosts?" broke in Blazer, sitting bolt upright at this point in the narrative.

"I'm repeating the story for your benefit, as I've said. I don't want you to duplicate your asinine interruptions, Blazer," protested Dare, with real irritation. "You said exactly the same thing at the same place before, so I suppose there's nothing for it but to repeat my response. Well, then, as I have already observed, the mere presence of extra-terrestrial beings is no proof at all that said beings are the phantoms of departed humans."

"But am I going to see these extra-terri—these shadow pictures?" grinned the unruffled detective.

A Shadowy Theory

"The inventor has promised to bring his gear along this afternoon and give a demonstration. Now mind you don't start your guffawing. Some of these inventors 'get the needle' mighty quickly, I can tell you."

"I'll be as solemn as a judge, laddie. Now where did you say these extra-terri—these shadows hang out?"

"I didn't say; I don't know. They may only exist in the mind of this inventor bloke, for all I know. According to the theory, though,

they may be anywhere. Swimming around and in the earth, for instance?"

"Whossay?"

"I don't blame you for not getting that viewpoint, Blazer. But bite on this. Water can easily soak through the big pores of a sponge, air can soak through the close mesh of fine-spun fabrics, and you can't see the air and can only just feel it. The ether of space can soak through all things from sponges to 'solid' iron, and you can't either see it or feel it. Conceive of a substance a million times 'thinner' still in consistency, and you've got some notion of the stuff these Langworth-Jones beings are supposed to be made of!"

"The stuff *dreams* are made of!" grunted Blazer disparagingly, not realising he was quoting poetry.

"You——" started Dare, but stopped as there came a tap at the door, quickly followed by the entry of Sneadle to announce the arrival of the inventor himself.

The Inventor Arrives

Mr. Langworth-Jones strode into the office, and proffered his salutations in a surprisingly deep voice.

"Have you not brought your gear?" asked the radio expert subsequent to the necessary introductions.

"Certainly, sir, certainly. Bring in my case and do be careful, I pray you, not to jar it as you lower it on to the floor."

Mr. Langworth-Jones addressed the latter sentence to a man who had advanced to the door. This worthy staggered in with a large box which he deposited on the side table and quietly withdrew, closing the door behind him as he did so.

"The Light-Microscope"

"Shall I proceed to show you what my little—er—light-microscope will do, Mr. Dare? Light-microscope! A very good name, don't you think?"

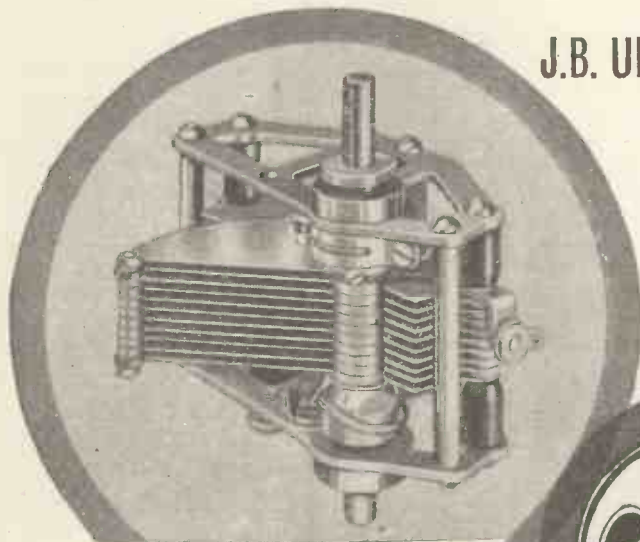
"Go ahead, Mr. Langworth-Jones," smiled the engineer.

The inventor opened the case and revealed a compact medley of wires, batteries, prisms and weird-looking glass tubes. Humming gently to himself, and ever and anon pausing and reflectively stroking his short grey beard, he proceeded to adjust the apparatus. At length three of the glass tubes began to glow with a pale violet light and he applied his eyes to a funnel-like aperture.

Dare glanced at Blazer and saw that although his friend's face was an expressionless mask he was biting at his cigar with unwonted energy!

(Continued on page 100.)

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PRECISION INSTRUMENTS

THE ULTRA-HETERO-DYNE

—continued from page 99

Dare himself was feeling mildly excited, yet the brightly sun-lit office was no setting for mysterious wraiths. No, he decided, midnight, a dim moon and the panelled library of an old country mansion were more in keeping with such a demonstration. But what on earth was he thinking about? Ghosts! Colney Hatch was more the place for that bearded old ass and his nightmare instrument!

Suddenly:

"Splendid!" exclaimed Mr. Langworth-Jones, starting back and twisting round. "Look quickly, my dear sir!"

Dare Gets a Shock

The radio expert walked over and peeped into the instrument. At first he could see nothing but a square patch of bluish phosphorescence that glowed fitfully, and across which specks of white danced like tiny snow-drops blown in the wind. Then a dark blob swam into view, shivered for a few seconds, and began to form itself into an orderly pattern. Life and movement were evinced as in a wriggling jellyfish covered with deep-coloured spots. It was repulsive but supremely fascinating! Finally, the movements quickened, there was a convulsion of patterning and a clearly defined face met Dare's astonished gaze. A face fashioned from unearthly violet light and set in a frame of pitch blackness. But a face with moving, living features; glowing eyes with shifting pupils, and a mouth that opened and shut as though trying to

convey speech-sounds. The countenance was, however, unrecognisable as that of man or woman.

"Blazer, look at this," he cried.

The old detective levered himself up from his chair and sauntered across to the "Ultra-Heterodyne."

"You see the face, Mr. Blazer?" pressed the inventor excitedly.

"Two of 'em," announced the detective soberly, "the first one's just moved up and t'other's come sliding in. What the heck are they?" (He whistled quietly.) "Them's ghosts!"

People of the Ether!

"People of the ether! Being-pictures from the ultra-ultra region of the spectrum!" chattered the inventor, bobbing up and down from behind, as if attempting to see into the machine over Blazer's shoulder. The detective wrinkled his brows, scratched his head vigorously and craned over farther with intense concentration.

"Let me have another look," suddenly said Dare, who had been standing thoughtfully in the background.

Blazer moved away, still scratching his bristly grey hair and chewing at his cigar, while the radio expert again took command of the instrument.

For fully ten minutes Dare studied the eerie visions. At last he straightened up.

"I know what they are," he exclaimed.

"You think they are the ghosts of departed humans, my dear Mr. Dare? You think that we can now look-in to the world of phantoms through my light-microscope? Pierce the barrier that lies between—"

"No," interrupted Dare, shaking his head. "I don't think we can do anything of the kind. All the same, I believe you have a wonderful invention here. You are picking up television pictures with comparatively simple apparatus, and without moving mechanism—though I can't for the life of me see how you've managed to hit on it without going out of your way to synchronise your instrument, and so on. These pictures are coming from across the Atlantic—I've recognised them as American television items!"

And that is how the Langworth-Jones television system was born. It started as the vision of a visionary with the highest of "high-frequency" ideas, and ended as a practical (but none the less valuable!) system of radio-vision having extremely important possibilities.

"But it was a pity they wasn't ghosts we saw," observed Blazer regretfully some few weeks later.

"Why?" queried Dare.

"Well, if you could only see a ghost you'd know there was a real chance of being one yourself, and not be left to face the possibility of a complete black-out at the end. It'd be nice to know you was going somewhere, after all," replied Blazer sombrely.

"Don't worry about that, my morbid old policeman," said Dare kindly. "You need have no doubts as to where you're going!"

"THE W.L.S. 1932. SHORT-WAVER"

—continued from page 21

I am assuming all this time that you know your detector valve to be above reproach as regards emission. If you have any doubts at all, try another.

Smooth Reaction

The L.T. battery, naturally, is another possible source of trouble unless it has been recently charged.

What I am getting at is that you should find no difficulty in arriving at such a point that your reaction coil does not have to be as large as the grid coil to produce smooth oscillation over the whole range.

If you find that you cannot arrive at this point, as a last resort you may increase the voltage on the screen of the detector. This is done by raising the value of the Spaghetti resistance that goes from the screen to earth. Instead of using 50,000, go up to 60,000 or 75,000 ohms. But remember that this should not be done *except* as a last resort.

I will simply say that unless conditions are absolutely *bad* for the particular direction in which you wish to "reach out" you should hear the station you want whenever he is on.

With any of the commercial sets of short-wave plug-in coils, the 9-turn coil, used in the grid circuit, will cover about 60-32 metres; the 6-turn about 36-22 metres; the 4-turn, roughly 28-16 metres; and the 2-turn coil will probably be of very little use to you.

Next month I hope to give a few short notes on the actual settings of stations heard during the month.

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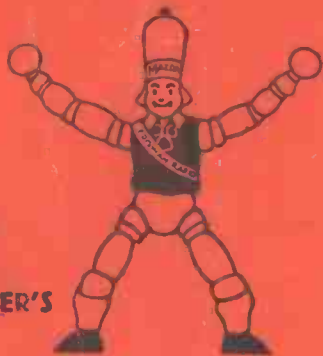


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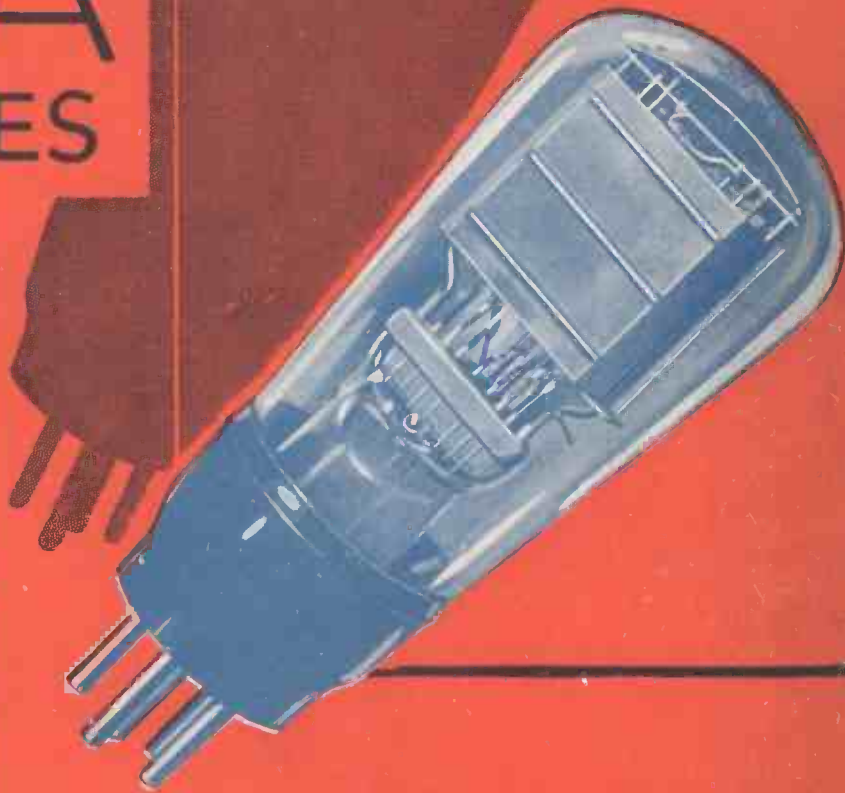
THE AMAZING

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Filament Voltage - 2.0 volts Anode Current (Max) - 12 mA
 Filament Current - 0.2 amps. Screen Voltage (Max) - 150 volts
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Being typical of all Mazda valves, it is outstanding in its efficiency. Mazda 2-volt valves, both metallised and clear bulb types, are sold by all good radio dealers.

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