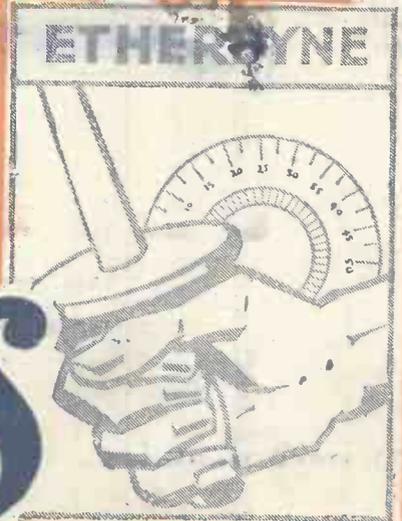


FREE "ETHERDYNE" PHOTO-CHART INSIDE

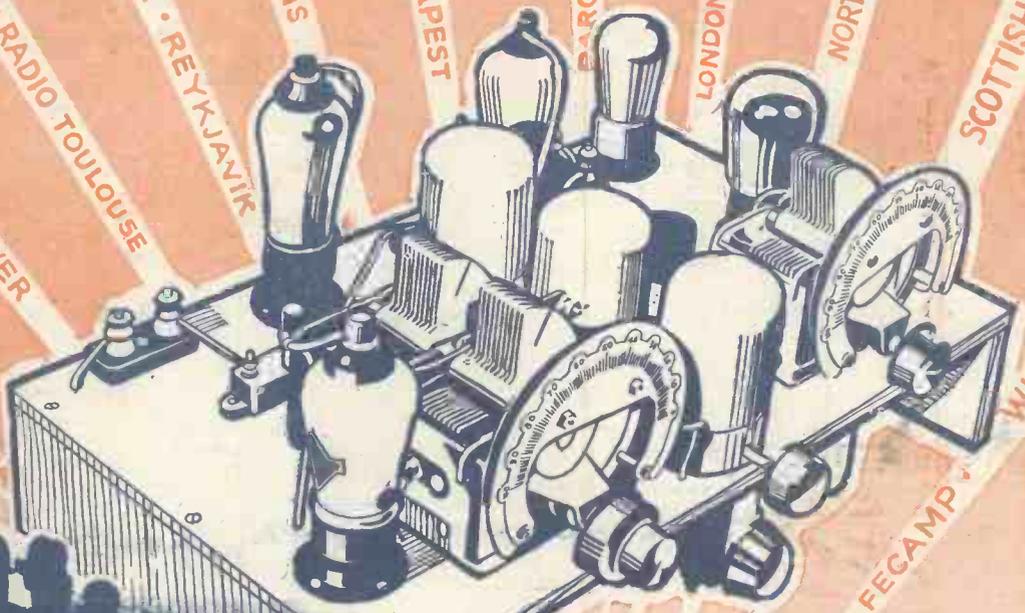
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A Set That Will Beat All Records!

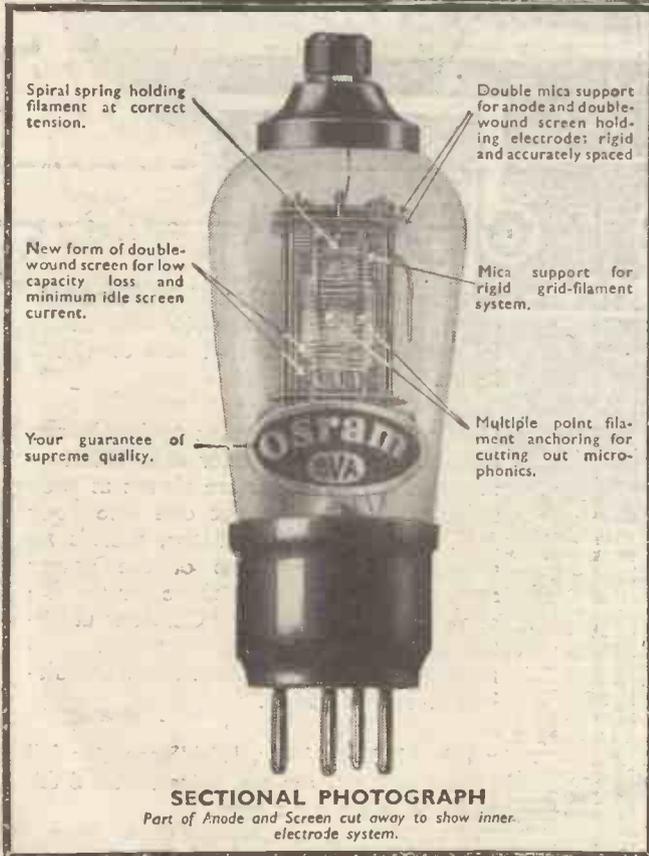
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Screen-Grid Valves mean —

- 1 GREATER SENSITIVITY WITH COMPLETE STABILITY—owing to low capacity and higher impedance.
- 2 ENTIRE ABSENCE OF MICROPHONICS—due to latest multiple anchored filament.
- 3 H.T. CURRENT CONSUMPTION FROM 1.5 M.A. ONLY.



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Valves

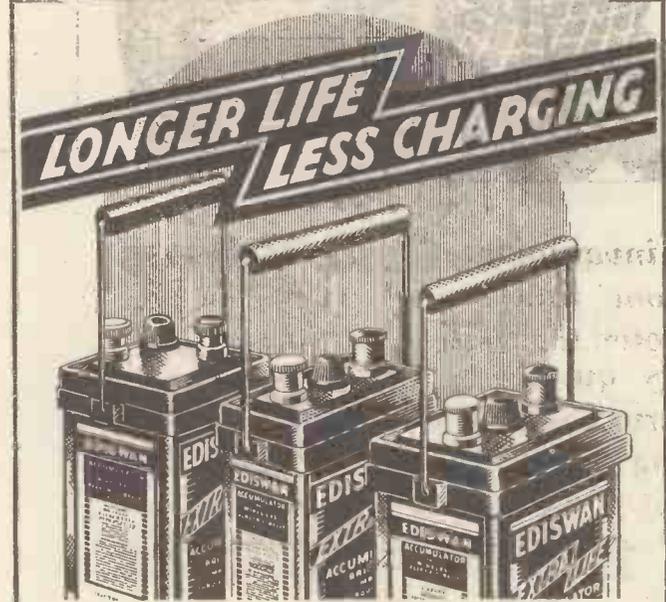
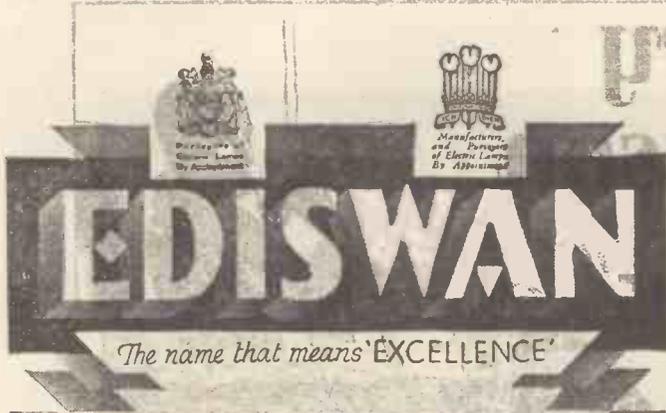
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Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2.

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**the modern
method of
rectification**



Get to know more about METAL rectification—the only method which has successfully withstood a full-load test of 45,000 hours.

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"The All Metal Way, 1934" contains full particulars, circuits and prices. Send 3d. to Dept. A.W. for a copy.

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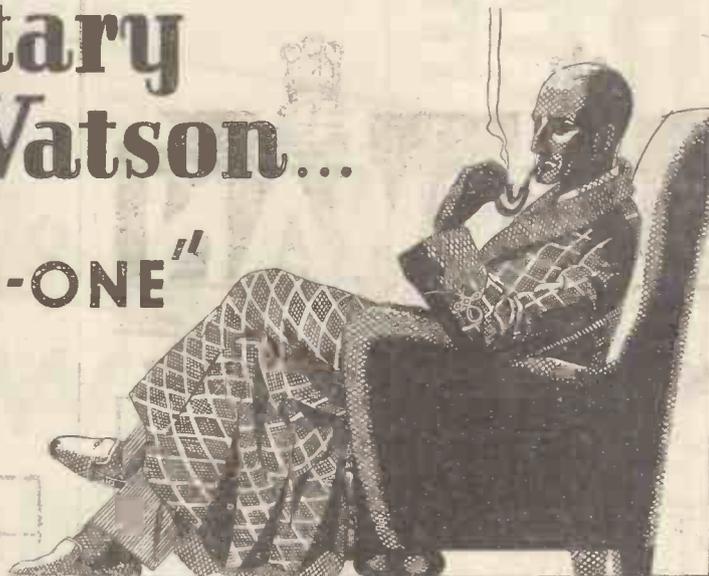
METAL RECTIFIERS

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WITH AN ALL-IN-ONE"**



Standard Model
"All-in-One" Radiometer
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"The invaluable assistance of an 'All-in-one' Radiometer enabled me to track down the trouble with this radio set very quickly. The transformer was burnt out. If the fault had been anything else, however, I could have traced it just as easily and as quickly with this marvellous instrument to help me."

The "All-in-One" Radiometer well deserves its name—"The Sherlock Holmes of Radio." Every radio owner needs it, because by its aid he can be assured of perfect radio performance at all times. The "All-in-One" tests valves, circuit, batteries, condensers, transformers, and any other components, registering a verdict on each in a few moments.

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ALL IN ONE
RADIOMETER

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FREE RADIO MAP of EUROPE with every copy of WIRELESS MAGAZINE

for NOVEMBER

Every copy of the November "Wireless Magazine", which is on sale this week, contains a FREE Radio Map of Europe and Broadcast Compendium, which can be used with every home-built or factory-constructed receiver.

Drawn up by a skilled cartographer, every place-name on the map is that of a broadcast station that can be heard on the average set in the British Isles.

Down each side of the map are identification details of nearly 100 stations in order of wavelength. The calls are spelled out phonetically so that the listener can easily recognise them. This is the most complete Broadcast Map of Europe ever presented free.

The recent controversy as to whether car radio is safe is dealt with extensively in this issue—Earl Howe, Earl of March, Sir Malcolm Campbell, etc., give their opinions as to the possibilities of this new development.

In all there are over thirty features of interest to every owner of a radio set, and it is certainly an issue that you should not miss. This November Number, price 1s., is on sale at all newsagents' and book-stalls this week. Get your copy without delay.

This FREE
Map measures
20" by 15"

In the November issue of "Wireless Magazine" W. James, the famous designer of the famous "Super 60," describes how to build his latest receiver, the "Super-Straight Six." This uses an up-to-the-minute circuit incorporating two variable new pentode high-frequency stages, a pentode detector and push-pull output.

There is also the "New Class-B Five," an economical battery set of great output, and the "Duo-tone Three," a straightforward battery-operated three-valver with the latest type of tuning circuit using the new iron-core M.I.R. coils.

OTHER CONTENTS OF WIRELESS MAGAZINE (NOVEMBER)

FOR THE CONSTRUCTOR

A Test of the Super-straight Six. Test Report and Station Log of the new Class-B Five. A Transmitter for 5 Metres, by Kenneth Jowers.

TECHNICAL FEATURES

Surface Scratch on Records, by H. Courtney Bryson. Latest Pushpull Methods Compared, by Marcus G. Scroggie, B.Sc., A.M.I.E.E. Measuring Sound Intensity, by Harry Hawke. That First Stage, by Noel Bonavia-Hunt, M.A. We Test Before You Buy, by the "W.M." Set Selection Bureau. Koster-Brandes Model 333. H.M.V. Concert Seven. Varley Five-valve Super-set. Philips Super-inductance Receiver, Model 634a. Portadune A.C. Super-set. Home Television Section.

A Micro-drum Television Hook-up, by H. Cornhill. First Steps in Cathode-ray Television, by J. H. Reynier, B.Sc., A.M.I.E.E.

Tests of New Apparatus

GENERAL ARTICLES
Guide to the World's Broadcasters, by Jay Coote. Wavelengths of the World's Broadcasters. Is Car Radio Safe? The Truth About Russian Broadcasting by J. Godchaux Abraham. Murder in 301. By Kenneth Udyett. Distonaradio! By Samuel Johnson. Radio Milano. Beromünster. Behind the Scenes of Radio Weather Bulletins. New Jobs for Photo Cells. Musical Terms Explained, by Whitaker-Wilson. Radio Medley, by B.M.P.R. Music of the Month, by T. F. Benn. On the Crest of the Waves, by Jay Coote. On 10 Metres in the States, by Kenneth Jowers.

GRAMOPHONE FEATURES
Choosing Your Records. By Whitaker-Wilson and Chopetick.



ON
SALE
THIS
WEEK

TELSEN

SCREENED H.F. CHOKE

specified for the A.W.

"Etherdyne Super"

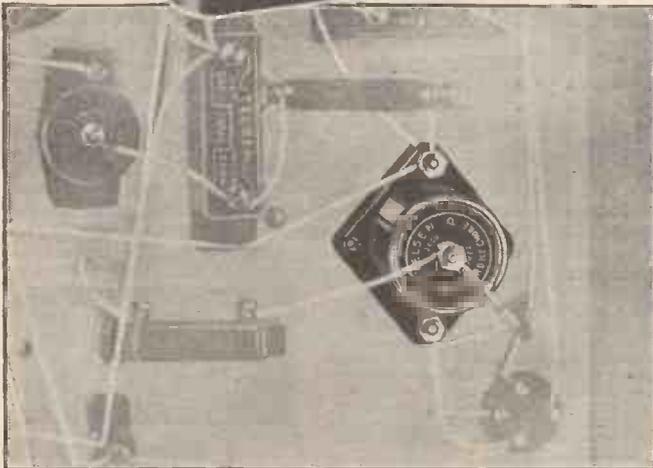


THE "Etherdyne Super" justifies its claims for up-to-the-minute efficiency by its use of the latest screened components, one of which is the new Telsen Standard Screened H.F. Choke. The metal screen, which is connected to an earthing terminal, entirely prevents reaction with other components, the design and construction throughout being such as to ensure consistently high efficiency over the entire waveband for which it is intended.

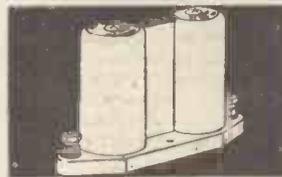
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100 to 2,000 metres

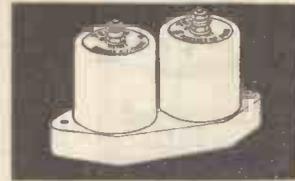
TELSEN COVER EVERY H.F. CHOKE REQUIREMENT



The illustration above shows the position occupied by the Telsen Standard Screened H.F. Choke in the built-up Etherdyne Super.



TELSEN BINOCULAR H.F. CHOKE 3/6



TELSEN ALL-WAVE SCREENED H.F. CHOKE 4/6



TELSEN SHORT WAVE H.F. CHOKE 2/6



TELSEN STANDARD H.F. CHOKE 1/6



TELSEN SHORT-WAVE SCREENED H.F. CHOKE 2/6

TELSEN FOR EVERYTHING IN RADIO
ANNOUNCEMENT OF THE TELSEN ELECTRIC CO., LTD., ASTON, BIRMINGHAM

Advertisers Appreciate Mention of "A.W." with Your Order

A 7 Valve Superhet set that you can build yourself — with a CERTAINTY of SUCCESS!

NO KIT SET EVER BEFORE HAD 6 STAGE BANDPASS FILTER

NO KIT SET EVER GAVE EXACT 9/Kc TUNING CHANNELS

NO KIT SET INCLUDED REAL AUTOMATIC VOLUME CONTROL

NO KIT SET AT ALL EVER COULD EMPLOY THIS DIODE PENTODE VALVE

NO KIT SET OFFERED LISSSEN CLASS 'B' OUTPUT



CHASSIS KIT COMPLETE WITH SEVEN VALVES
£8.17.6

SEE the Constructional Chart giving most comprehensive, most detailed instructions and you will want to build the MOST, AMBITIOUS Kit Set ever made available for Home Constructors!

HOW TO OBTAIN FREE CHART POST COUPON OR ASK YOUR DEALER

Never before has there been any receiver for Home Constructors on such an ambitious scale as this new Lissen "Skyscraper" Seven-valve Superhet. It embodies every up-to-the-minute advance and refinement of the most luxurious factory-built superhets — it gives the constructor the opportunity to build a £20 receiver for less than half that price. The circuit of the Lissen "Skyscraper" Seven-valve Superhet incorporates a 6-stage bandpass filter, giving exact 9-kilocycle channels and, therefore, providing a standard of selectivity never before achieved by a home-constructor's kit set and very rarely found except in laboratory apparatus. Amplified Automatic Volume Control is provided, a special valve for this purpose

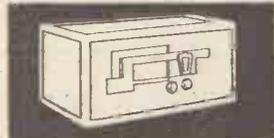
having been produced by Lissen for use in this receiver. The use of this Amplified Automatic Volume Control constitutes an entirely new experience in listening; no "fading," no "blasting"—you will find yourself enjoying every word of every programme, however near or however distant, without the slightest temptation to interfere with the receiver once you have tuned it. This is radio listening as it should be enjoyed! Lissen Class-B Output through a new full-power Lissen Moving-coil Loud-speaker—glorious rich tone and majestic volume, actually more faultless in its reproduction than anything you ever heard from even the most powerful mains receiver, yet working economically in this Lissen "Skyscraper" from H.T. batteries.

To LISSSEN, LTD.,
Publicity Dept., Isleworth.
Please send me FREE CHART of the "Skyscraper" Seven-valve Superhet.

Name.....
Address.....
..... A.W. 1134



Lissen have published for this great new "Skyscraper" Seven-valve Superhet a most luxurious Chart, which gives more detailed instructions and more lavish illustrations than have ever before been put into a constructional chart. It makes success certain for everybody who decides to build this set; it shows everybody, even without previous constructional experience, how they can have a luxury receiver and save pounds by building it themselves. A copy of this Chart will be sent FREE in return for coupon on the left, or your radio dealer can supply you. Get your FREE CHART now!



"SKYSCRAPER" SEVEN VALVE SUPERHET



Please Mention "A.W." When Corresponding with Advertisers



Britain's Leading Radio Weekly for Constructor, Listener and Experimenter

Editor: D. SISSON RELPH
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Published by BERNARD JONES PUBLICATIONS, LTD., 58/61 Fetter Lane, London, E.C.4. Telephone: Central 4341 (four lines). Telegrams: "Beejapee, Fleet, London." Subscription, post paid to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Published on Wednesdays and dated for the following Saturday

Radio Gossip of the Week

The Etherdyne Super is Here!

SO great an importance do we attach to our new super-het—the Etherdyne Super—that most of our pages this week are devoted to it.

Veritably a super set! Conceived way back in the early part of the year, it is a set with an amazing pedigree of experimentation behind it. Designed and built throughout by our highly qualified Technical Staff, it is the set you have dreamed of.

Fight ether chaos with a super-het, we exhorted you last week. And now we say fight that chaos, which grows daily more serious, with the "super" super-het—the Etherdyne Super!

Sabotaging the Lucerne Plan

AS we go to press disquieting news reaches us about the Lucerne Plan, that panacea of European broadcasting timed to come into operation next January. Unless agreement is reached by the members of the International Broadcasting Union at their Amsterdam meeting now in progress the whole idea may be sabotaged.

Should the Lucerne Plan fail you will more than ever need a highly selective set to cut through the ether interference. And we can think of no better set than the Etherdyne Super for this formidable task.

Penny an Hour Radio!

JUST how keen the Nazi's are on spreading the habit of wireless reception is once more emphasised by the latest radio hiring scheme in Germany.

You first pay a small deposit, which entitles you to a set that will give sixty minutes reception on placing a 10-pfennige coin—equivalent to one penny at par—in the slot.

Every month the accumulated coins are collected, until they mount up to the price of the set. So far the idea applies only to three-valve battery sets, but it will probably be extended to mains apparatus in the near future.

Crystal Sets Still Used

FEW listeners in this country seem to rely nowadays on the humble crystal, but according to recently issued statistics in

France the valve set is by no means supreme there. Of 1,400,000 set owners registered on August 15, over 300,000 had simple crystal sets.

It is thought that at least another 500,000 such sets can be added on account of the innumerable "pirates" rampant in France, the land where anything in the nature of a tax, however just, is plain anathema.

Wireless Waves of Life

OUR doctors of the future will be more radio engineers than medical men if we can believe Dr. Crile, the noted surgeon and biologist of Cleveland, Ohio.

ETHERDYNE FEATURES

Two-colour Photo-chart and Listener's Compendium (presented free with every copy)
 Full-size Blueprint (on pages ii and iii of cover)

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They will tune in to the various life rays said to emanate from the organs of the human body, on wavelengths extending from ultra-violet through the visible spectrum to infra-red. It seems that our protoplasm—the stuff we are made of, so to speak—emits rays of varying length, according to the state of our health.

At some future time it may be possible, thinks Dr. Crile, to tune in these waves to find out whether we are playing a symphony of health or sending out an S.O.S. of sickness!



CAN YOU TUNE THIS IN?

One of the new high-power stations—Vienna on 120 kilowatts, situated on high ground at Bisamberg

Mind the Copyright Owners!

NOW that the Performing Rights Society has won the day in the Court of Appeal over the payment for loud-speaker reproduction of broadcast works of a copyright nature, we shall all have to look out.

The position of a hotel or inn-keeper is obviously clear—he will have to pay dues if he allows the public to listen to his loud-speaker. But what about the ordinary listener?

Supposing, for example, you have a radio in your car—or you take a portable to a friend's house—you also, in theory anyway, are liable to pay dues if any of the reproduced matter is the subject of copyright.

No doubt the Society sees this fatuous side of the affair in the right light, but in law we are all nevertheless vulnerable.

NEXT WEEK! A STATION IDENTIFIER IN TWO COLOURS

News from Broadcasting House

By Our Special Commissioner

Stars and Stripes for Ever!

WENDING my nimble way up Regent Street to collect these notes from the Oracle at the B.B.C., I beheld a sight that would make an Empire Crusader blanch with horror—the flag of the Stars and Stripes waving proudly from the masthead on the roof of Broadcasting House.



William S. Paley, head of the Columbia broadcasting system of America, is impressed with Broadcasting House

—William S. Paley, President of the Columbia broadcasting system. He is with Sir John even now.

I could have cried with relief. For was it not this same "Czar" who came over here three years ago, and did he not tentatively suggest that within one year from that date television would arrive? Even Czars may be too optimistic, seemingly.

Welcome to these shores, O Czar. And the least you can do is to see that a nice large Union Jack waves a welcome to Sir John Reith when he goes over to America in November to open Radio City.

A Sort of Wavering

DO you notice it of London National—a sort of wavering on sustained notes, especially at night? You may well do so, if you live in the southern districts of London. For that is one of the peculiar effects of having synchronised London National with the new West National. And it is apparently something the B.B.C. lads cannot cure.

So far, only a few letters have been received, but as the dark evenings draw in it is feared that many more missives will begin with the opening phrase: "Sir,—Cannot something be done, etc." No, it cannot; so tune up to Daventry, my hearties.

Droitwich Testing in May

AS the autumn deepens into winter, and you wallow in fogs and mud and slush, think of the merry month of May, of the spring of 1934—think of it and be gay, for then you will be hearing the first fine care-less signals of Droitwich testing.

They are rushing on the lid of the building, and throwing up into the sky those towering 700-foot masts, as quickly as they can, before winter really sets in. Then they can get on with the installation of the plant

About the Aerial Design

FOR the technician I might add that the aerial eventually supported between the two 700-foot masts will be a plain T type, specially designed to avoid top-note "cut-off." Already one of the masts has risen to a height of 600 feet, but long before the aerial itself is in position ask yourself this question: *Is your present set capable of appreciating top notes on its long-wave tuning?*

Many sets are not, you know.

Baird Gets Down to It

GOOD for you, John Logie Baird! I congratulate you on having got on the air at Broadcasting House with your ultra-short-wave film television. I note you are using a wavelength of 7.75 metres, and that you are transmitting 120-line pictures.

This should silence the doubting people who surround you, and give you strength to go ahead with that sound accompaniment. You have a wonderful chance, now. Make the most of it!

Too Much Dance Music?

NO more of those pleasant hours of dance music in the main evening programmes. That is the result I gather from the B.B.C. pundits' decision that listeners get quite enough dance music from the regular teatime and late evening periods.

Big outside bands not regularly broadcasting will therefore have to look for dates in light feature programmes. That this is the way out seems clear from the booking of Jack Hylton for an October 28 vaudeville.

It beats me. They think of a good idea, put it into practice, find the public likes it, and then scrap it. This bureaucracy!

Farewell to the Savoy, Too!

AS if the above decision were not blow enough, the B.B.C. has now, after all these years, discovered that the Savoy Hotel is technically unsuitable for broadcasting.

So that means good-bye to Carroll Gibbons and the Orpheans—except when we very occasionally hear them in a light evening show in the studio. "Isn't it a blooming shame!"

Breathe Freely, Bournemouth!

HAUNTING fears that Droitwich would mean the shutting down of the Bournemouth relay station can now be set at rest. True, the B.B.C. anticipates a strong National signal in the Bournemouth district, but they want residents in that salubrious resort to have a chance of an alternative programme.

So they propose to synchronise Bournemouth with Plymouth, letting these two stations take their pick of the programmes from the various regional centres. Has the Mayor been told about this?

A Handful for Stanford!

AFTER my note last week about the Theatre Orchestra growing up under Stanford Robinson, you may be surprised to hear that that energetic musician has now taken over the conductorship of the B.B.C. Wireless Singers as well.



Stanford Robinson, conductor of the Theatre Orchestra, has now taken over the Wireless Chorus as well

I seem to recall that it was Stanford who did noble work with those Singers in the early days of their formation. So he ought to be able to conduct them with one hand and the orchestra with the other—on his head. Acrobatic, decidedly!

He Plays by Ear!

EVER vigilant John Sharman has discovered a real-life Goopy Gear, who really can play by ear. An infant prodigy, no less. His name is Derek Abrahams, ten years young. As yet his little fingers cannot span an octave, but he can do things to a piano that our Winnie will never be able to do if she lives to be a hundred.

Look out for Derek in one of those amazing "First Time Here" programmes on Saturday afternoons. But don't hope to hear him in the evening programmes—the L.C.C. will probably forbid that.



Jack Hylton, ever popular, is on the air with his band in a vaudeville show on October 28

Football Scrum Continues

AS a last effort the "O.B." Director of the B.B.C. has been seeing the managers of Chelsea and of Charlton Athletic football clubs to test the feeling about broadcasting commentaries on the matches. Not a hope, apparently.

All that stay-at-home footer fans can hope for now from the B.B.C. are commentaries on some of the matches played by the Austrian team coming over here next month.

I Was Right, You See!

WHEN I vaguely hinted last week that the St. George's Hall might be leased by the B.B.C. I was almost certain it would be. Now the B.B.C., speaking from its Olympian heights, is pleased to confirm.

For years a hall of magical illusion, St. George's will make a very fine broadcasting studio, especially for musical hall and vaudeville shows. Line up, lads, and take your turn.

Wavelength Fight at Amsterdam

SQUABBLE over long waves is raging at full blast as I close for press. If, by the time you read me, the delegates of the International Broadcasting Union at Amsterdam have not smoothed over the troubled waters we shall be in the soup next January.

We all ought to worry about this plan, because if it fails listeners to local and foreign stations alike will be pestered with all the ills an overcrowded ether is heir to.

Holland and other claimant countries are sticking out for long-wave channels. Our 1,500-metre wavelength for Droitwich is definitely in danger. *Hands off!*

What is the Colonel?

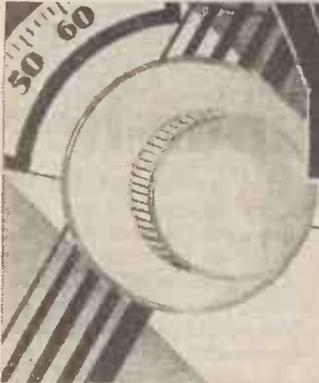
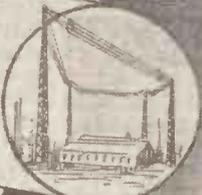
WHEN he first came to Portland Place we were told that Colonel Alan Dawnay was Director of Output, but now I see he is referred to as Programme Director.

Which leads one to ask: *When is an output not a programme?* For which the right and proper answer ought to be:

When it is a B.B.C. publication. Am I right or am I right?

You Need a Super-het To-day!

HÖRBY
FRANKFURT
LONDON NATIONAL
LILLE
BARI

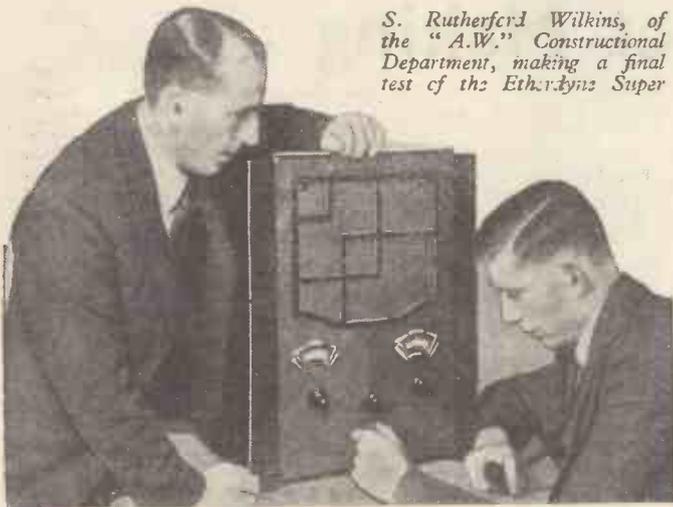



Here four prominent radio manufacturers—men who know what they are talking about because they have been years in the industry—tell you why you need a super-het to deal with to-day's ether conditions

EVERYBODY knows that a super-het is the most modern type of receiver—and the type that is receiving the most attention. At all the radio exhibitions staged this year the super-het has had pride of place on most manufacturers' stands, for the reason that it is the Set of the future—to fight ether chaos!

But not every listener knows why a super-het is the set to have this autumn. Here we present the views of four important manufacturers—the names of whose firms will be familiar to every listener—on this important subject. Their opinions will be read with interest by everybody:

S. Rutherford Wilkins, of the "A.W." Constructional Department, making a final test of the Etherdyne Super



From Graham Farish, of Graham Farish, Ltd.

I think your idea of publishing as your boom set this time a super-heterodyne which can be built for the very small sum of £8 is one which will gain great favour with the listener.

Experience has taught me that the conditions which already apply abroad are rapidly becoming in evidence here. I refer to the congestion of the ether, and I am sure that at the moment the super-het is the only satisfactory circuit to effectively deal with modern conditions.

You have undoubtedly done what the constructor wants in the Etherdyne Super and, more important still, you will be enabling the listener to enjoy a much greater variety of programmes than is usually possible with the normal type of receiver.

From W. Scott Worthington, of the Peto-Scott Co., Ltd.

It is with great satisfaction that I note from advance information that your new boom set, the Etherdyne, will be a super-het.

As you know, I have studied the interests of the home constructor since 1919 and felt that this year the outstanding need of a great section of home builders, namely a super-het, was not going to be catered for.

However, you have come to their rescue at the crucial moment and my carefully considered opinion after the recent tests and the examination afforded me at your laboratory is that you have provided exactly what was required, namely a sound job, up to the minute in theory, design and practice.

The low price of the kit and the incorporation of iron-core coils, wood chassis, battery economiser and anti-break-through unit ensures for the builder of the Etherdyne the possession of a set far more up to date than any mass-produced set now on the market.

I predict that the Etherdyne will be an even greater success than the Century Super, which created such a furor in the constructional world two years ago.

From J. M. G. Rees, of Varley (Oliver Pell Control, Ltd.)

My company have for years been firm believers in the straight set, but obviously the last two or three years have made it abundantly

clear that owing to the congested state of the ether and the rapidly increasing power of Continental stations, the only solution to the problem of selectivity lies in the direction of the super-het.

This is reflected in the fact that the majority of the receivers put out by my company this year are carefully designed super-hets.

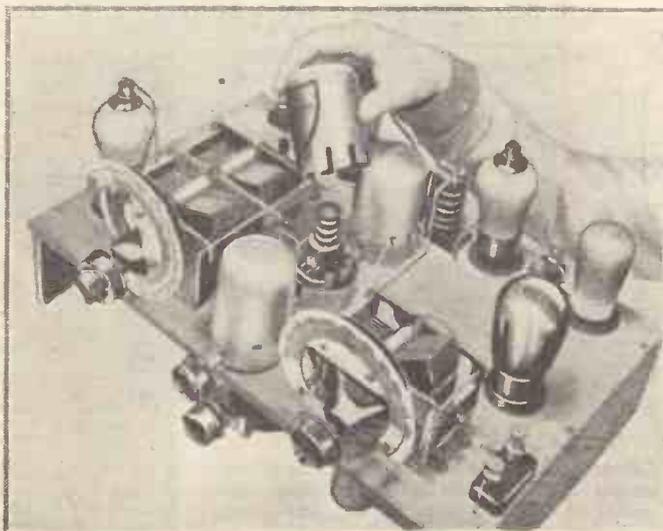
From G. S. Taylor, of the Whiteley Electrical Radio Co., Ltd.

It is gratifying to hear that your constructor receiver, the Etherdyne Super, employs a modern version of the super-heterodyne principle; for, in the writer's view, a set of this type is the only one which can be expected to give good results, not only at present, but for some time to come.

Ether congestion is increasing so steadily and to such an extent that even at present only a good modern super-heterodyne can, on account of its selectivity and simplicity of tuning, give range and ease of control such as can be obtained in no other way. It is inevitable that the present conditions will continue in an aggravated form for some time yet, and you are to be congratulated upon the foresight you have exercised in your readers' interests.



This photograph shows the completed Etherdyne Super, which is assembled on an efficient metal-covered wood chassis that can be handled easily by the constructor. A two-colour Wiring Chart is given with this issue.



The Beginner's Introduction to the Super-het

WHAT exactly is the super-heterodyne principle? I've read a good deal about these sets lately, but I don't know how they work. I have been told, too, that it has now "come back".

You know, of course, how what we may call the "straight" receiver operates? If a station with a wavelength of 400 metres, which corresponds to a frequency of 750 kilocycles, is coming in we tune the high-frequency and detector stages to that frequency to select the desired signal.

Yes, I am quite clear about that.

You know, too, that if there are two transmissions, one with a frequency of 750 kilocycles and one with a frequency of 745 kilocycles, a beat or heterodyne note will be produced.

I have found that when receiving foreigners!

The pitch of that beat note depends upon the frequencies of the two stations causing it. If the figures are those just mentioned the note will have a

frequency of 5,000 cycles a second.

That's quite clear.

In the super-heterodyne set we deliberately heterodyne the incoming signal by means of an oscillator valve, beating it up to the frequency to which the succeeding amplifying valves are tuned.

What valves are these?

They are known as the intermediate-frequency amplifiers. Before passing a signal on to them we rectify it by means of a first detector.

What is the advantage of beating up like this and of using intermediate frequency stages?

There are two good points. The first is that tuning becomes very sharp since the difference between the frequency of the aerial circuit and that of the oscillator must be exactly equal to the frequency of the intermediate stages.

And what is the other?

The higher the wavelength (or the lower the frequency) the greater the

amplification that we can get out of valves. Thus, by beating up our 750 kilocycles or 400-metre transmission to, say, 50 kilocycles or 6,000 metres we obtain very high magnification in the intermediate frequency stages.

What happens after this intermediate frequency amplification?

A second detector is required to convert signals to audio frequencies. Then there follow in the usual way one or more audio-frequency stages.

The super-heterodyne used to be very popular. Do you think that it will return to favour?

I think that it will. It went out of fashion largely because the designers of early sets did not realise that the second detector was usually hopelessly overloaded owing to the enormous amplification of the stages preceding it. The result was that the word super-heterodyne became almost a synonym for appalling quality, but that is a thing of the past.

Easy Radio-cabinet Making By v. Hill

IT is not every radio amateur who has an expensive array of carpentry tools, yet it very often happens that those who have not are the very people who would like to be able to build a simple cabinet to their own design.

Even the cheapest bought cabinet can be too dear for the man without much money, added to which is the further disadvantage that the bought article is not always large enough to give adequate baffle requirements. This latter is of some importance, since lack of "area" can nullify the advantages of a good loud-speaker and a super-power valve.

Simple Tools Needed

The following is a description of how a cabinet of reasonable proportions, fit to live in any drawing-room, can be made using wood, panel pins, hammer, and fretsaw only.

A simple design is necessary. Fancy ornamental woodwork is not possible; neither is it desirable, since the basis of modern design, whether of radio sets, furniture, or houses, is characterised by a stark utility and simplicity.

Shall the loud-speaker be at the side or on the top of the chassis? The latter is the better, since it will give a more even baffle area. For the same reason a square front is more desirable than one of rectangular shape. A side length of 22 in. is very suitable, because this results in pleasing proportions without being incommensurable. The minimum depth of the cabinet should be 2 in. greater length than the chassis; 12 in. is a suitable size.

Plywood of 1/2 in. or 3/4 in. thickness should be used. This can be obtained in either oak or mahogany-faced finish. In the interests of

good acoustics it is better to have no back, thus the amount of wood required based on the above measurements and a ply thickness of 1/2 in. will be one piece 22 in. square, two pieces 23 in. by 12 1/2 in., two pieces 22 in. by 12 1/2 in. The cost of this will be about 6s. or 7s. A shelf will be required to hold the batteries and accumulator, but this can be of cheaper material.

Get the wood cut to the exact size at the dealers. A shilling or two extra given to the carpenter for this purpose is money well spent.

Cutting the loud-speaker and panel frets is the next operation. Careful measurement of the latter is absolutely necessary. It is as well to allow a large enough hole to be able to see the condenser readings clearly. The loud-speaker fret should be simple in design. The more wood cut away the better (within the limits of the moving-coil diaphragm diameter, of course). A single, narrow piece of wood

running diagonally across the circle is quite effective.

Sandpapering should be adequate. This does not mean a half-hour's leisurely scrape over with an old, worn piece of paper, but several hours hard rubbing using plenty of elbow grease and varying grades of material. The surface of the wood should then feel like softest silk.

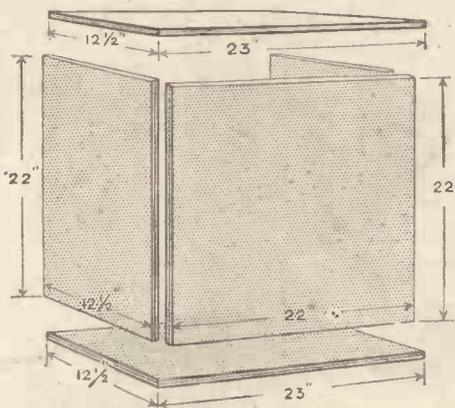
Avoiding That "Amateurish" Look

This applies with even greater force to the end pieces of the ply, since, owing to the method of construction, some of these will show. A word of advice. Do not cover these up with beading; nothing looks more amateurish than beading, whereas the end pieces of ply, with their thin, parallel lines look very effective.

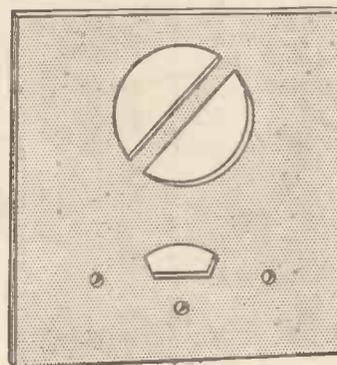
The pieces are now ready to be nailed together. Panel pins are used. This should be done with the utmost care, in order to set the surfaces flush with one another. It is better to have an assistant to hold the wood. The nails are driven in at equal distances of 1 in. apart and then punched down, the resultant interstices being filled with plastic wood. The shelf and baseboard rests are then nailed inside at their requisite distances.

The cabinet can now receive its finish. In oak it can be waxed and a pleasing mellowness is the result. Or it can be left unstained and polished with white shellac, which gives brilliance and depth. If mahogany, a french polish is best. Again be careful to see the ends receive as thorough an attention as the surfaces.

The result, if all has received due care, should be simple, rich, and dignified, all at a cost of under 10s.

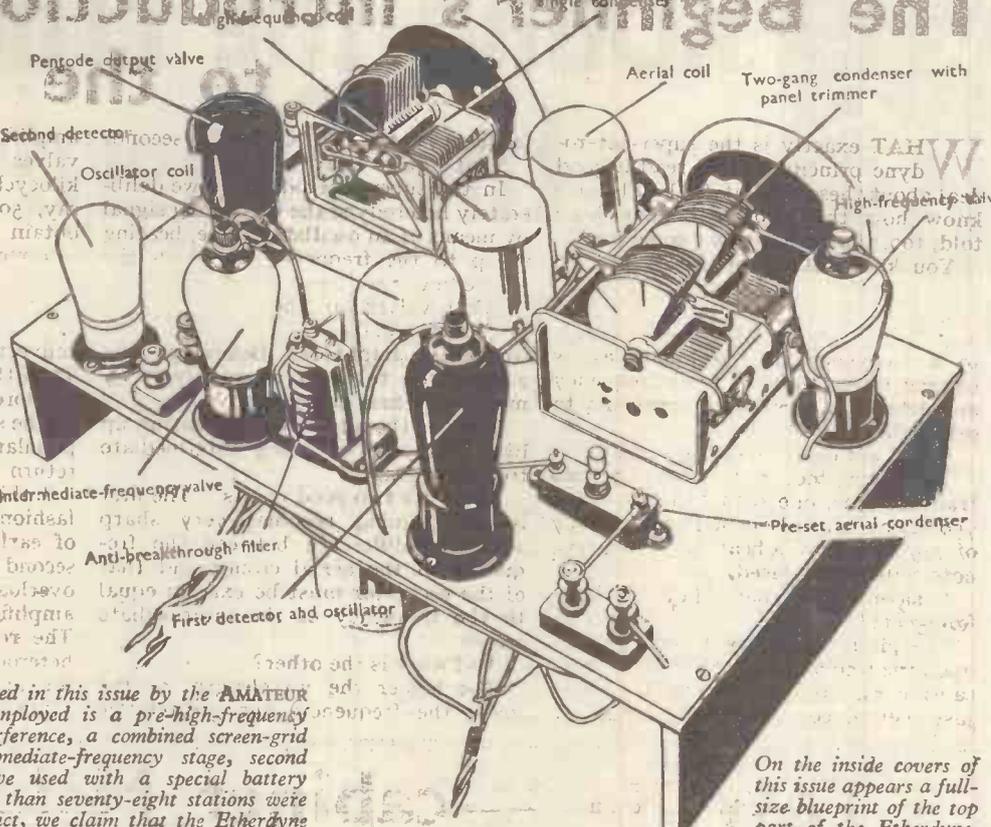


Simple Cabinet Assembly for the Amateur



(Above) Here you see the five pieces of wood needed to assemble the cabinet. (Right) Holes drilled in the front panel for the loud-speaker tuning escutcheon and control knobs

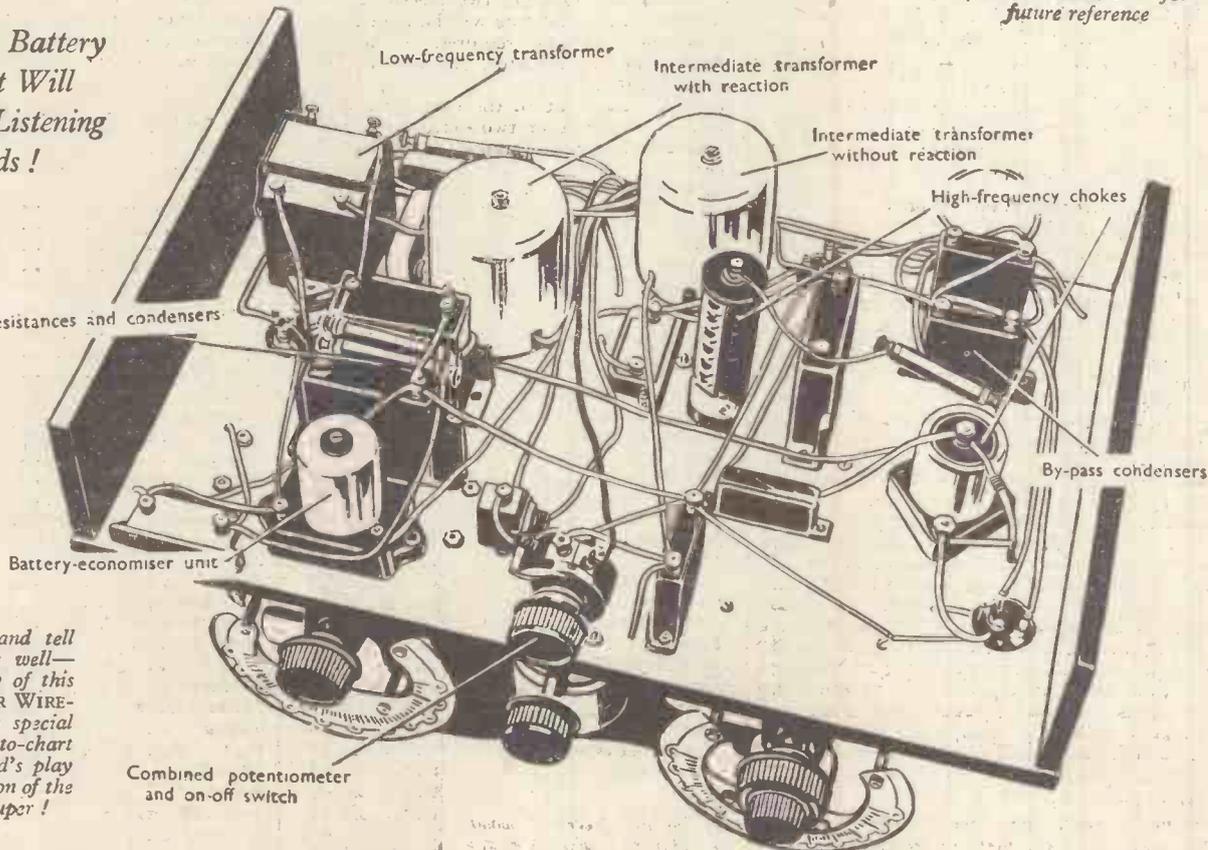
Leading Features of the Etherdyne Super



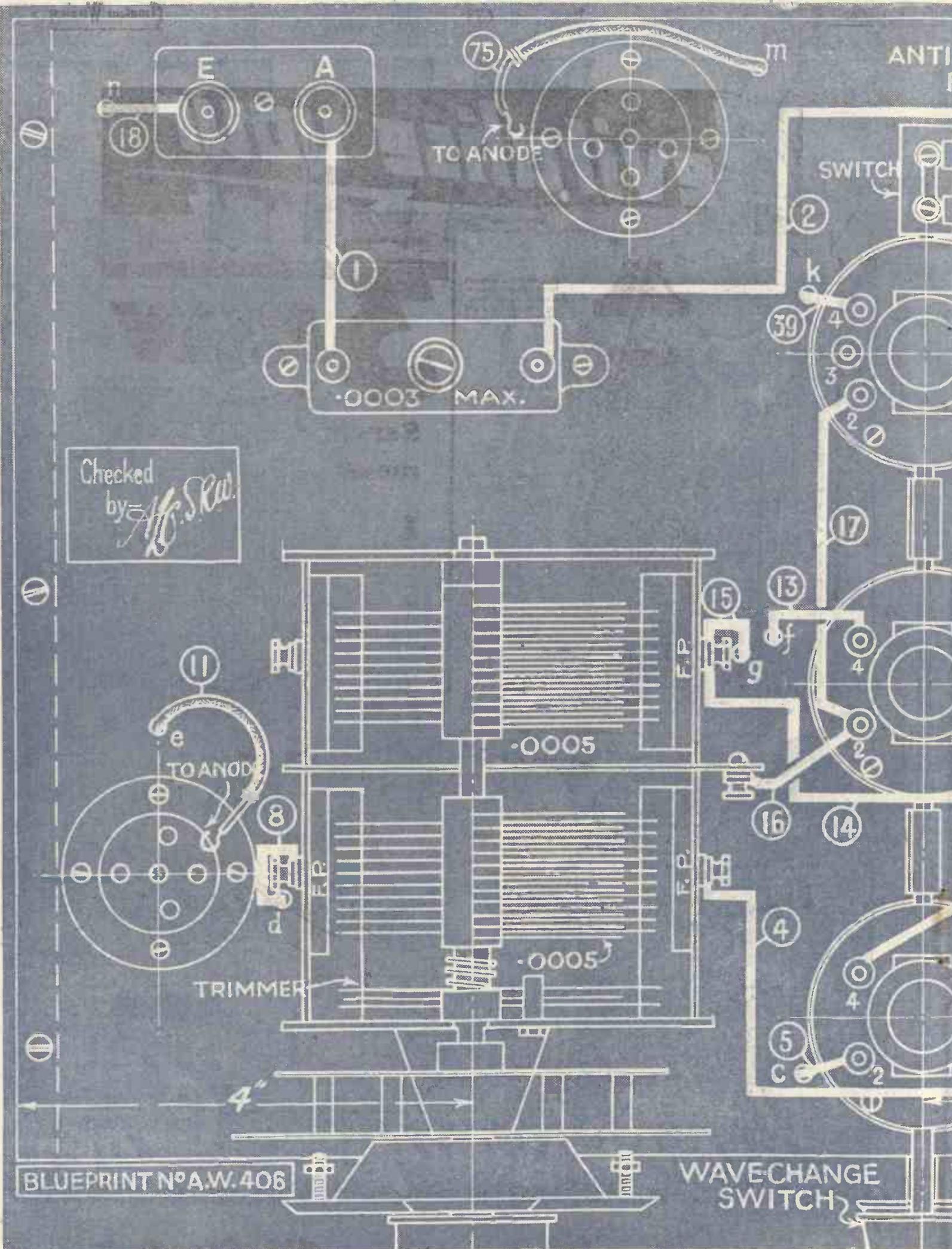
On this page we present two sketches of the Etherdyne Super that show clearly the leading features of the design. The set has been developed after months of experimental work carried out in the AMATEUR WIRELESS laboratories under the direction of S. Rutherford Wilkins, and is described in this issue by the AMATEUR WIRELESS staff. The combination employed is a pre-high-frequency stage to prevent second-channel interference, a combined screen-grid detector-oscillator, variable- μ intermediate-frequency stage, second detector, and a pentode output valve used with a special battery economiser. In one evening no fewer than seventy-eight stations were picked up on the loud-speaker. In fact, we claim that the Etherdyne Super definitely leads the way in super-het technique for 1933-4!

On the inside covers of this issue appears a full-size blueprint of the top part of the Etherdyne. Next week's issue will include a full-size blueprint of the under side of the chassis—keep both numbers for future reference

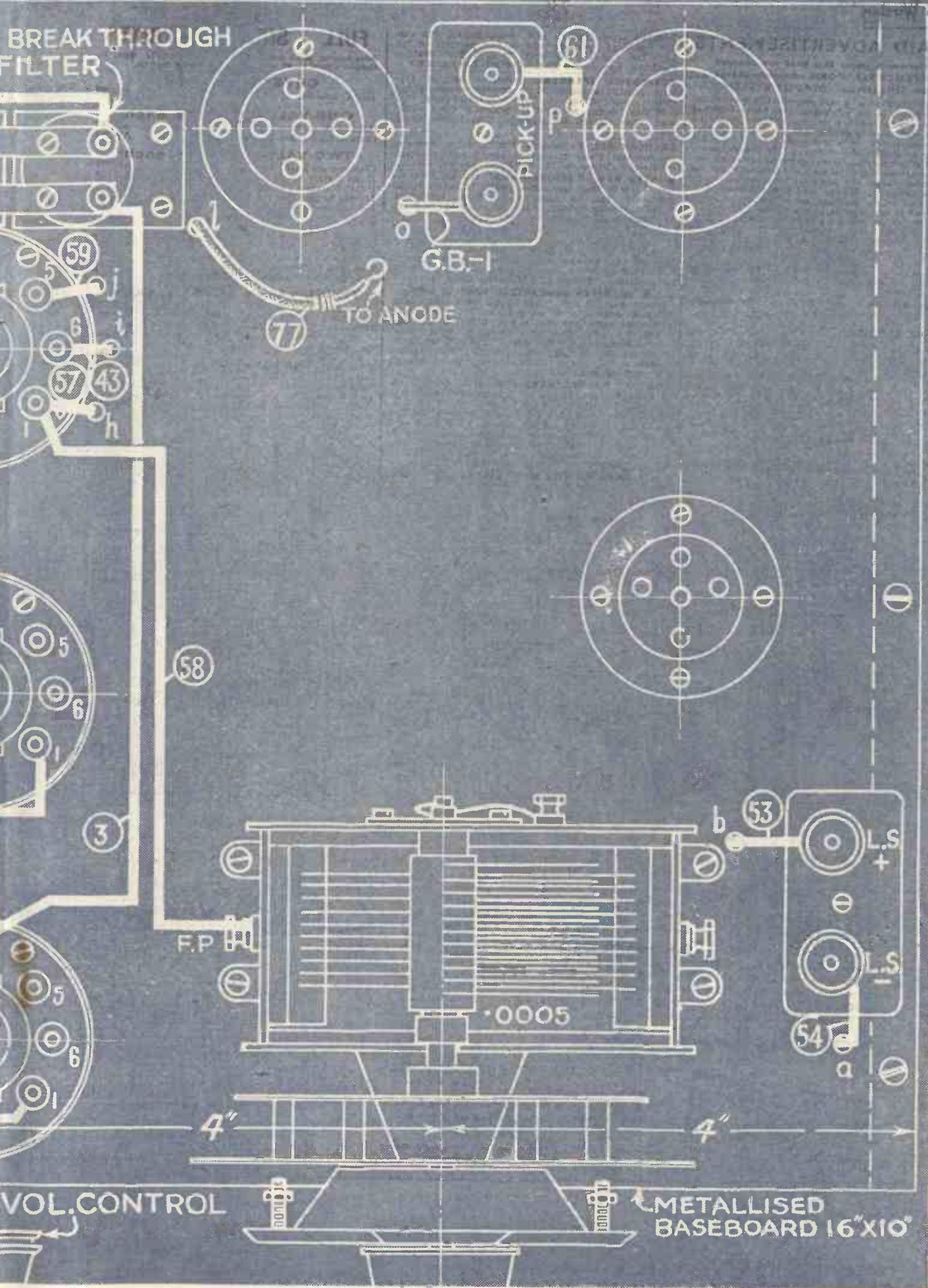
The New Battery Set That Will Break All Listening Records!



Remember — and tell your friends as well — that every copy of this week's AMATEUR WIRELESS contains a special two-colour photo-chart that makes child's play of the construction of the Etherdyne Super!



BREAK THROUGH
FILTER



G.B.-1

PICK-UP

TO ANODE

F.P.

VOL. CONTROL

METALLISED
BASEBOARD 16"X10"

59
6
57
43
j
i
h

58

3

b

53

L.S

+

L.S

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4"

4"

200

200



Round the Ether with the Etherdyne

Amazing Results of a Single Evening's Test

"JUST how many stations do you think I can get on this Etherdyne and what will they be like when I get them?" These are questions many of you must be thinking about at this moment.

You have noticed the list of seventy-eight stations on this page and on the chart. These were received during the very short period of three hours. But that is not all. Of this seventy-eight, at least four-fifths of them were really of programme value.

Imagine that you are sitting with me in front of the Etherdyne in my house in South London. The set is connected up with all the specified accessories, the aerial is a single wire, 35 ft. long, leading straight from the top of a 20 ft. post down to the window of my room; the test bench in front of the window.

In With A Roar!

The set is switched on. A few random twists of the two tuning dials and London Regional comes in with a roar. The volume control is adjusted to suit my own requirements and a pause is made to gather the first reflections from this new "super."

Quality is good; there is no trace of the foreigners on either side of London and the volume is enough to fill quite a fair-sized room. Right. That is good wholesome entertainment. Now for the first test of importance. Both hands on the dials and a slight turn in an anti-clockwise direction, Mühlacker, the bugbear of all unselective sets used in London, arrives; not very loud so a slight twist of the volume control and there is *entertainment*.

Just one word of advice. The super-imposed trimmer on the aerial tuner should be adjusted for every station. Mühlacker was obtained entirely free. Let's continue turning those dials. Algiers at fair strength, after that a sound like a hundred sirens—the common wave of 368 metres—and then Hamburg, famous for its fine light-music broadcasts.

No overlap—no interference!

Glance again at the list and imagine all those medium-wave signals coming in one after another as the dials are turned. No overlap, no interference and only with a few stations was the strength below that standard we call full loud-speaker strength. Leipzig and Toulouse entirely free; Jean Roy and the Toulouse gong did not spoil the good concerts by the Leipzig Symphony Orchestra.

And so you will find that eighty per cent. of the medium-wave stations will give you really fine entertainment. If you live in Aberdeen you will have plenty of spare room below your local station on the medium band. This also applies to Plymouth and Newcastle listeners.

Remembering that L is for Long, the next avenue of exploration was the long waveband; the wavechange switch is turned to the left. Habit demanded that I should start from the top and work downwards.

A little searching and in came Kootwijk, the Dutch 50-kilowatt, at good strength and quality with no trace of Paris. I spent a minute searching for Kaunas which, when found, provided a thrill though not real entertainment in the strict sense of the word. Selectivity on this band was especially good

and most of the signals logged were really worth hearing. Luxembourg, particularly, was a splendid signal. This station does send out some interesting programmes.

When you come to think that out of all the hundreds of stations on these two wavebands, seventy-eight were easily received in a three hours test. It makes one wonder how many stations would have been recorded on the log if the test had been carried out over several nights. I will not be rash but perhaps a hundred and something would not be a foolish guess.

After I had finished the run round the dials soon after 11 p.m. I took stock of the general performance. All the main British and foreign stations had come in well; background noise had been so negligible that I had forgotten all about it; the wonderful experience of hearing the weak station normally crushed between two high-power stations as good as the neighbourly giants; and a host of other things together gave me the impression that I had had a wonderful evening.

Before packing up for the night a quick run round both wavebands at 11.45 produced no fewer than thirty stations on the medium band and six on the long. Now then, you ether tourists, do you want anything better than that?

Another little stunt test that I made was to find, more out of curiosity than anything else, how many stations I could log at fair strength on a piece of twin flex, 15 ft. long, laying on the floor. The answer was about thirty stations. Flat dwellers, please note!

No test of a set is complete without a run round on a Sunday morning. This is where the real radio fan will enjoy himself. I found that Brussels Nos. 1 and 2, Lagenberg, Poste Parisien, Huizen, Fécamp and a couple of other small Frenchmen could be received at definitely good signal strength on the medium waveband and nearly all the long-wave stations.

I have told you very simply what I have got from the Etherdyne. It is a fine performance and shows what a really advanced super-het design will do.

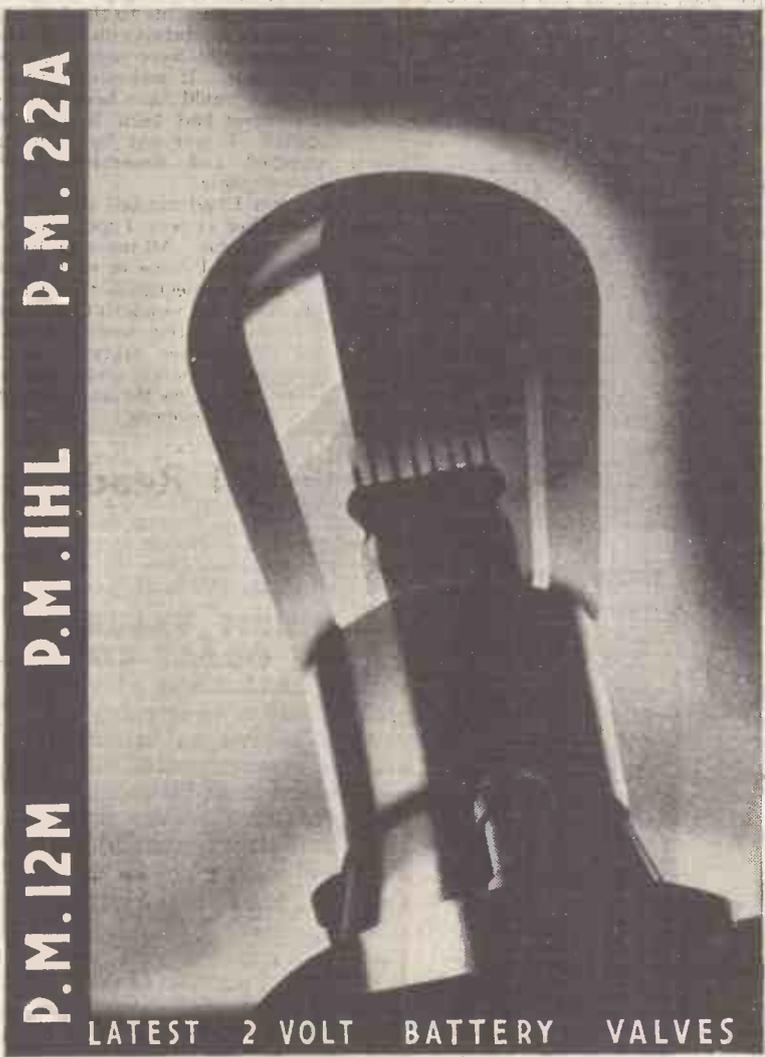
T. F. H.

Dial Readings for Seventy-eight Stations

LONG WAVEBAND			
Station	Osc.	Dial	Osc. Dial
Croydon	20	Eiffel Tower	65
Oslo	40	Moscow	66
Kalundborg	45	Daventry	70
Luxembourg	52	Berlin	74
Moscow	57	Radio Paris	81
Motala	59	Kootwijk	90
Warsaw	62	Kaunas	96
MEDIUM WAVEBAND			
Aberdeen	10	London Regional	46
Plymouth	12	Mühlacker	47
Cork	13	Algiers	48
Fécamp	14	Common Wave	49
Bordeaux	16	Hamburg	50
Nurnberg	17	Scottish Regional	51
Belfast	18	Toulouse	53
Trieste	19	Leipzig	54
Gleiwitz	19.5	Midland Regional	56
Horby	20.5	Sottens	57
Frankfurt	21	Katowice	58
London National	22	Athlone	59
Lille	23	Rabat	60
Bari	25	Berlin	61
Turin	26	Moscow	62
Heilsberg	27	Stockholm	64
Bratislava	28	Rome	65
Lyons	29.5	Paris	66
Scottish National	30	Milan	68
Hilversum	31	Beromuenster	70
North National	32.5	Langenberg	72
Bordeaux	33.5	North Regional	73
West Regional	35	Prague	74
Genoa	36	Florence	76
Naples	37	Brussels No. 1	78
Goteborg	38	Vienna	80
Breslau	39	Riga	82
Poste Parisien	40	Munich	83.5
Milan	41	Palermo	85
Brussels No. 2	43	Sundsvall	86
Strasbourg	44	Budapest	88
Graz	45	Grenoble	94

Because results have proved them the most reliable valves in the world, because performance has proved them the finest design in the world, because public choice has proved them the most popular valve in the radio industry, three million aerials today lead down to Mullard Master Valves. And three million aerials can't be wrong.

ASK T.S.D. Whenever you want advice about your set or about your valves—ask T.S.D.—Mullard Technical Service Department—always at your service. You're under no obligation whatsoever. We help ourselves by helping you. When writing, whether your problem is big or small, give every detail, and address your envelope to T.S.D., Rel. B.V.R.



P.M. 12M P.M. IHL P.M. 22A

LATEST 2 VOLT BATTERY VALVES

Mullard

THE MASTER VALVE

The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2.

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Columbia's amazing radiogram offer!

A FOUR-VALVE ALL-ELECTRIC RADIO-GRAMPHONE WITH MOVING COIL SPEAKER AT

23 GNS.

SPECIAL FEATURES: 1. Band-pass circuit. 2. Flood-lit scale calibrated in wave-lengths with station-finder. 3. Energised moving-coil speaker. 4. Provision for additional speaker. 5. Universal automatic brake. 6. Volume control common to both radio and gramophone. 7. Induction motor (A.C. model). 8. One knob tuning with reduction gear. 9. Three aerial tappings. 10. Mains aerial device. 11. Low running costs.

SPECIFICATION

Circuit—Bandpass aerial circuit, screen-grid high-frequency amplifier, followed by tuned-grid power-grid detector. Parallel-fed low-frequency transformer coupling to pentode output. **Speaker**—Energised moving coil. Provision for additional speaker of high or low resistance. **Controls**—Gramophone LW, MW, 'Off'. Switch, single knob tuning for three-gang condenser. Volume control which also operates on pick-up. **Motor**—Induction type (A.C. model). **Cabinet**—Walnut. **Valves**—AC model: MS4B, MH4, MPT4, U12. **Output**—1½ watts. **Current Consumption**—65 watts on radio, 95 watts on gramophone. **Wave-lengths Range**—200-550 medium-wave metres; 1,000-2,000 long-wave metres. **Voltage Range**—200/250 volts, 50/60 cycles. **Size**—34 ins. high, 23½ ins. wide, 16½ ins. deep. **Price**—23 guineas. **Hire-Purchase Terms**—Deposit £2.8.6 and 12 monthly payments of £1.19.0.

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Here is the chance of a lifetime to buy a luxury radio-gramophone at an amazingly low figure. For 23 GNS. you are offered an instrument that embraces every material advancement of radio and gramophone science—combined in an instrument which needs but plugging into your electric light supply to bring you the finest programmes that modern broadcasting has to offer, and superb rendering of gramophone music—both with an amazing fidelity of tone.

Columbia have never had more confidence in an instrument than they have in this—representing as it does the greatest value for money to-day—an instrument that might reasonably be priced at many pounds more. This radio-gramophone is a standard product of the great Columbia factory—the largest in Europe—and like all Columbia instruments has undergone nearly eleven hundred tests as part of the routine of manufacture—which explains Columbia's confidence in this product. Read the brief specification given—then take the first opportunity of seeing and hearing it at any Columbia dealer's. Remember, this is a chance not to be missed!



Columbia

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COUPON: To the Columbia Graphophone Co., Ltd., 98 Clerkenwell Road, E.C.1.

Please send me particulars of the new Columbia all-electric Radiograph-Four, Model 620, without obligation.

NAME

ADDRESS

AW 211033

On Your Wavelength!

By Thermion

A Hush-hush Valve

LATELY I have heard reports about the development of a new valve which has all the advantages of both quiescent push-pull and class B, but scores over the latter by not requiring a driver in front of it to make good the losses caused by the flow of grid current. I have heard some details, but I am not yet allowed to say very much about them.

The truth is that the valve is still in its more or less experimental stages and it may be some little time before it is released. If it is as good as it is reported to be it will be a great boon, for one of the drawbacks of both class B and Q.P.P. is that the necessary components take up so much room that you cannot always fit them into existing sets.

For Q.P.P. you require two pentodes instead of the original output valve and for class B you need a driver and the twin last-stage valve.

Producing Matched Values

TALKING of Q.P.P., the Marconi and Osram people have solved the problem of matching pairs of pentodes in a very neat way. At the valve works pentodes suitable for Q.P.P. purposes are arranged in three groups.

Every valve in any one group will work in double harness with any other from the same group. The group letter is sandblasted on to the bulb of each pentode.

If, therefore, you already have a pentode marked "X" any other "X" pentode of the same make will work well with it. Also, you can match up pentodes of different groups quite well without the use of a milliammeter, for the screening-grid sockets on the special high-tension battery are marked with the group letters of the pentodes for which they are intended.

More Ultra-short-wave Telephones

SO satisfactory has been the wireless link across the Bristol Channel that the Post Office is putting up new stations near Weston-super-mare and Cardiff to enable simultaneous six-line working to take place.

Transmissions take place on the ultra-short wavelengths and any noisiness introduced by the wireless link is automatically filtered out before speech impulses reach the landlines.

It is interesting to note that it was across the Bristol Channel that Marconi carried out his first practical wireless tests a good deal more than thirty years ago.

Ousting Submarine Cables?

WIRELESS links are going to be used also to span the Irish Sea and St. George's Channel. There are at present seven submarine cables connecting this country with Ireland, but in those rocky seas the upkeep has always been something of a problem. The wireless links will be found vastly cheaper to maintain and operate.

Wireless In The Villages

RECENTLY I spent a brief holiday in a minute village lying amongst the fells and dales of Westmorland. It is just about as much out of the world as any place in this

country can be, especially when winter timetables for buses and trains have come into operation.

What particularly impressed me was that almost every home in the village, from the smallest cottage to the biggest house, had its wireless set and that most of them seemed to be going during the greater part of the day and the whole of the evening.

Many of those living in this remote spot told me that wireless was the greatest blessing of their lives and that they simply couldn't imagine how they ever got on without it in the old days.

Settling That Lucerne Plan

AT the moment of writing news of the progress of the Wireless Conference at Amsterdam is not forthcoming. Its object is, of course, to settle the many problems left outstanding after the Lucerne meeting and to rope in, if possible, the eight countries which have still not signed the dotted line.

I do hope that they will be successful in their efforts, for unless they are we cannot hope for a propitious send-off for the new wavelength scheme on January 15.

Remember, it isn't only the long-distance listener who is affected. Failure to get the Plan working properly may mean that there will be serious interference with local transmissions.

Why The Plan is Important

DURING the summer a good many people have said to me: "What's all this nonsense about a new wavelength plan? Matters can very well be left as they are; why, only last night I picked up thirty foreign stations without a sign of a whistle."

Yes, it's perfectly true that during the summer there was very little mutual interference between stations. The reason is that the small fellows at considerable distances don't come through at all in summer time and so give rise to no interference.

As the evenings draw in all-round field

strength increases and heterodynes at ranges of a couple of thousand miles or more are not unknown. There is much more interference on the medium waveband now than there was a few weeks ago, and that is the reason.

Why I Am "Pro" Super-Het!

AN Ilford correspondent whose letter appeared in a recent issue of "A.W." goes for me for so staunchly advocating the super-het. He tried a super-het against his straight four-valver and found that, though the former would receive more stations, there was greater freedom from crackles and background noises with the "straight." This being so, it was a case of "straights" for him every time.

The noises of which he complained when the super-het was in use were in all probability due to man-made interference. I quite admit that in localities where such interference is rife the super-het, owing to its greater sensitivity, will probably be noisier than the "straight." But it must be a very bad locality indeed where only four foreign stations can be received clear of interference with the big set.

Objection to "Straight" Sets

MY chief objection to the "straight" when used for long-distance work is that it must rely to a considerable extent upon reaction and this, unless you use tone control, means that the quality varies as you pass from station to station.

The reason is that by using reaction you make the set more selective and therefore increase its sideband-cutting propensities when you tune in a weak transmission, and less selective when you tune in a strong one. With a super-het the selectivity remains constant and the quality does not vary.

Super-hets for Anti-fading

AS I have mentioned before, tightening the reaction coupling in order to bring a weak and distant station up to good volume increases the effects of fading at times when signals are waxing and waning.

Broadcasters You Should Hear By Slade



Having no reaction, the super-het does not exaggerate fading and if automatic volume control is fitted it seems to work more evenly than it does in a "straight."

Then there is the question of simplicity of operation and freedom from liability to cause interference with one's neighbour. In both of these respects the well-designed super-het scores heavily.

High-quality Talkies

ONE day last week I sat amid a crowd of film experts in the Western Electric Company's private cinema at Bush House, London. We were listening to talkie equipment reproducing frequencies of 30 to 10,000 cycles per second—from both film sound tracks and hill-and-dale records.

It will probably surprise you if I say that Western Electric sound-on-film recording already covers a range of 30 to 9,000 cycles. But I do say it. The recording engineers have been steadily advancing since the advent of the talkie and now it is only the loud-speakers in the cinemas that prevent you and I from hearing "canned" music that is honestly practically indistinguishable from the real thing.

The new loud-speaker—or rather, reproducer—I heard demonstrated consisted of three moving-coil units. One imitates drums so well that only a drum itself would know the difference; another handles the middle registers; and the third, a tiny horn type known as the Bostwick, the 5,000 to 9,000 cycle notes. Actually it can reproduce up to 15,000 cycles, but filters with a 9,000 cycle cut-off are used with the normal films.

One film showed a musician in Cab Calloway's band thumping a double bass. On the standard speaker all that one could really detect was the slapping of his hand. With the switching in of the new speakers, everyone of the deep notes was unmistakable. As for trumpets, cymbals, pianos and voices, they came over with a crispness and attack that was—well, like life.

A Nip of Magnetics!

NOT long ago someone suggested a scheme for radiating power in bulk through the ether, the idea being that one could use the garden aerial for lighting and heating the home, instead of being wired up to the nearest generating station as at present.

The inventor went on to explain that in summer the radiated energy could also be used to produce artificial "cold" after the fashion of the domestic refrigerator plugged into the mains.

The whole idea may seem to verge on the fantastic, but it is a curious thing that scientists have just succeeded in producing the lowest temperature ever by making use of magnetic action. By placing solid helium between the poles of an electromagnet and slowly reversing the field, they have got down to within a fraction of a degree of absolute zero—where heat simply doesn't exist and all molecular motion ceases. Of course this is going a bit too far, but one never can tell what is going to happen next.

By the time we get another really sizzling summer like the last, the B.B.C. may be able to temper it down a bit by radiating the right kind of magnetic "coolers."

Outsize in Electric Clocks

THE electrically-driven clock undoubtedly combines simplicity with extreme accuracy, but the one they have just erected on the Eiffel Tower in Paris also beats the record for size. The dial is approximately seventy feet in diameter and the usual moving hands are replaced by radial rows of different coloured lamps.

These are switched on one after the other in regular succession to indicate the passing minutes. Five-minute intervals are indicated by alternate groups of red and green lights. Every quarter of an hour a special line of red lamps appears, whilst the half-hours and hours are indicated by similar lines of blue and white. Although it may not actually strike the hours it certainly does the imagination.

More About the Iconoscope

IT now appears that the sensitive material used by Zworykin in his latest development in television consists of an emulsion of minute silver globules treated with caesium. In effect the prepared surface consists of hundreds of thousands of minute light-responsive cells.

When the view to be televised is focused upon this sensitised area, the effect is very similar to that of an ordinary photographic plate, except that the latter is exhausted when one picture has been taken.

The Iconoscope, however, is maintained in a constantly-responsive condition, so that it can respond to successive changes in light and shade, thus reproducing the effect of motion.

Although the Iconoscope is still definitely in the experimental stage, it undoubtedly possesses very remarkable possibilities.

Another Free Gift Next Week!

Included in every copy of next week's AMATEUR WIRELESS there will be a large-size station-identification chart, printed in two colours. This will prove indispensable to every keen listener.

Another point to note about the next issue is that a full-size blueprint of the underside of the Etherdyne chassis will appear on the inside covers.

Tell all your friends about these two special gifts—and order a copy of AMATEUR WIRELESS from your newsagent in advance if you want to make certain of getting one!

An Accumulator Point

SOMETIMES I see sets containing from four to six or even seven valves being operated from low-tension accumulators of the type with thick single plates. This is really a mistake, for cells of this kind are designed for a comparatively slow discharge rate. They are excellent for working two- or even three-valve sets, but they can hardly do themselves justice with bigger outfits.

With even a 60-ampere-hour single-plate cell the maximum economical discharge rate is not more than .5 ampere, and a six-valve super-het will require nearly twice as much. Multi-plate accumulators for multi-valve sets is a sound rule. Cells with three or four positives and a similar number of negatives can deliver a much heavier load without running down unduly rapidly.

When Condensers Break Down

I HAVE had an epidemic of condenser breakdowns lately. It has been entirely my own fault, because I have been putting about 1,500 volts on condensers rated to work at 800.

The interesting point has been the manner in which the condensers "blew up." Every now and then, usually at a somewhat critical juncture, there has been a quiet pop from one of the condensers and the whole equipment has shut down. A test on the condenser then

shows a dead short-circuit right across the terminals.

As a matter of interest, I dismantled one of these condensers to examine the puncture. I had no difficulty in finding it, for I discovered that a thickness of about four layers of foil and paper had been completely punctured by a hole rather more than $\frac{1}{16}$ in. diameter, just as if they had been shot through by a small-calibre bullet. The puncture was extraordinarily clean and, as I say, had gone through several layers.

By the circumstances, the complete short-circuit across the condenser was quite understandable, since the edges of the hole had carried the foil with them and made definite contact with the next layer. I do not recommend this treatment for condensers; it is apt to be expensive.

Screens that Don't Screen

WE are inclined to regard screening as an invaluable remedy against interaction. This is by no means the case, particularly with some of the flimsy screens which are used to-day.

I had a rather striking demonstration of this point recently. An oscillator had been built up operating on about 30 kilocycles. It was completely enclosed in a small cubical screening box about 6 in. wide, and it was fondly hoped that outside the box the amount of radiation would be negligible.

Actually, a small pick-up coil of about ten turns of wire placed within a couple of inches of the outside of the screen picked up 2.5 volts from the oscillator coil inside the screen.

The total voltage across the oscillator was only about 35; so that getting on for 10 per cent. of the voltage was being picked up outside the screen.

As a matter of fact, putting the pick-up coil right inside the screen only produced about 5 volts pick-up; so that the screening was singularly ineffective in this instance.

Synchronised Broadcasting

AN interesting paper has recently been read before the Institute of Radio Engineers in America on the subject of synchronised broadcasting. This means the transmission of the same programme from two transmitters operating on the same wavelength. The results of the analysis are a little contrary to what one might expect at first.

The paper shows that the interference is not too serious if the two transmitters are relatively close together (about 20 to 35 miles apart), whereas serious interference and distortion will result if they are farther apart.

Further, the author shows that very small delays of the order of one ten-thousandth of a second between the transmissions will give rise to serious distortion. For this reason, he concludes that the modulation of the two transmitters independently is not practicable, since the various circuits cannot all be identical and delays are bound to arise (that is, the modulations in one transmitter will be very slightly late or early relative to the other) to a far greater extent than the 100 microseconds allowed.

To Replace Giant Transmitters

HE concludes with the rather interesting suggestion that a series of transmitters should be put up at points twenty miles apart, all fed from a central source with actual radio-frequency modulated current.

The transmitters themselves would, in fact, be nothing but amplifying stations which would take the current and, after suitable magnification, apply it to the aerial.

It is claimed that this would result in a far more even distribution of field strength at a much smaller expenditure of power than the present giant broadcasting stations.

OCTOBER 21, 1933

THE ETHERDYNE BRINGS THE WORLD TO YOUR FIRESIDE!



You can tune in Graz, which works on an adjacent wavelength channel to London Regional. Here you see a view of the station buildings at Graz.



Germany's most powerful station, Leipzig, roars in like the local on the Etherdyne. You will hear a really representative selection of Germany's musical tastes from Leipzig. Light concerts, banquets, and more Nazi talks, can be tuned in at your command.



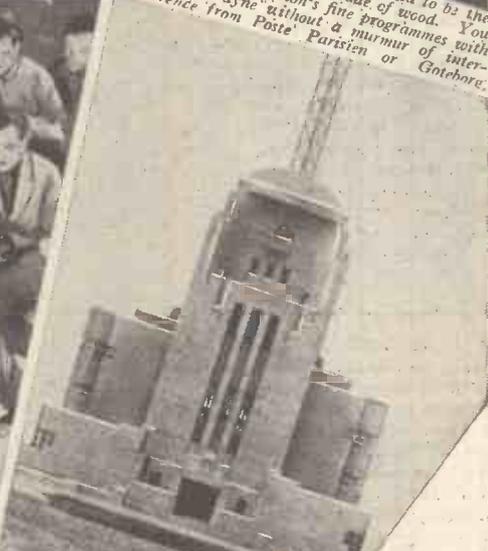
Brestan's huge aerial mast, reputed to be the highest in the world, is made of wood. You can hear this station's fine programmes with the Etherdyne without a murmur of interference from Poste Parisien or Goteborg.



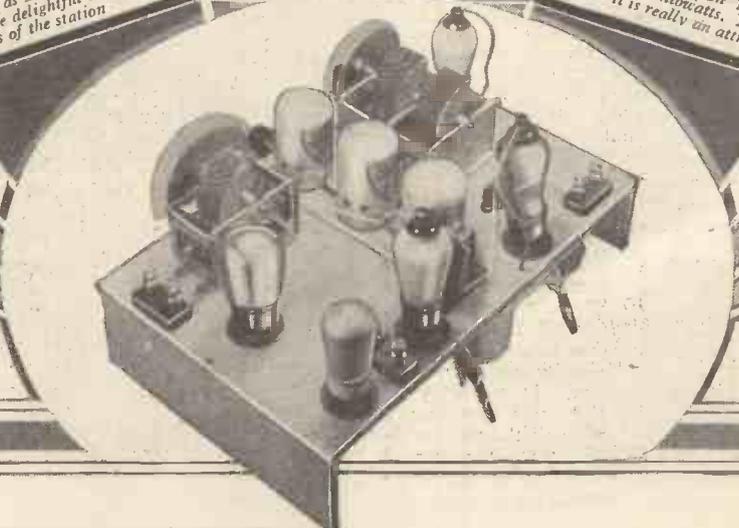
"Schweizerischer Landessender" is the official title of this famous Swiss station, which is better known as Beromuenster. This photograph shows the delightful countryside surroundings of the station.



The Etherdyne will bring you music by strange performers from Moscow. Regularly concerts played by an orchestra of convicts are relayed from one of Moscow's largest prisons.



A view of Holland's latest high-power broadcasting station. Known as Kootwijk, the station broadcasts on 1,875 metres with a power of 50 kilowatts. You will agree that it is really an attractive building.





The Super-het with a Pedigree!

How the Etherdyne was Evolved after Months of Research

It all began last spring. Now don't smile—that is true. We know it is the fashion for set-designers to try to impress readers with the many months of alleged research work that have gone to make the final design. But we have to risk that, because in this article we are trying to trace the Etherdyne.

But bang went the sensitivity! Already, you see, we were weakening from our initial resolve, but then we were trying to be eminently practicable as well as rather clever.

So our new line-up became this: First high-frequency amplifying valve (for aiding the pre-selection of the signal before it ever reached the mixer stage), followed by a combined oscillator detector valve as before, feeding a screen-grid intermediate-frequency stage, coupled to a Westector for the second detector, and a pentode output stage.

Very fine it was, too. Especially on loud stations. But where were all the smaller fry? *Non est*, as the Romans used to say. Simply not there. A little crestfallen, admittedly, we congratulated ourselves on having practically cut out those whistles, anyway.

Then we had another look at the hook-up. Some bright lad suggested increasing the value of the aerial coupling to give us back those weak stations. So we did this, and sure enough in came the weak 'uns. But so, unhappily, did some whistles.

Were we beaten? We were *not*! What we decided was that for the moment we must abandon the four-valve idea and go in for a *pukka* five-valver, so that we could gain our absolutely essential pre-selection to cut out the whistles and at the same time have enough power in hand to bring in all the stations on the air.

Ready for Anything

With a sequence of pre-high-frequency-amplifying valve, combined oscillator-detector, intermediate-frequency amplifier, second detector and pentode output, we were ready for anything—even for a big splash issue of AMATEUR WIRELESS.

Modifications did not cease at that. We took out the screen-grid second detector we had been using, and put in a triode valve in its place—for the sake of economy. But we were not going to lose any signal strength on any account.

Which brought us to the last move—the putting in of a spot of reaction on the secondary of the intermediate-frequency transformer before the second detector. Up went the signal strength and the Etherdyne burst upon a laboratory of wondering technicians.

Have you ever heard of a home constructor set with such a pedigree? Of course you haven't. And that's why we are all so very sure of ourselves in offering you the Etherdyne now.

It is the culmination of an initial ideal, worked out with a rare honesty of purpose. Go to it!



Super right back to its first conception. Which, as we say, takes us back to the spring of 1933.

Someone wanted to know how four valves could be most simply arranged to give good reception. We argued. Came to the conclusion that given X number of band-passes we could make a straight four that would please everyone.

Tracing A Pedigree

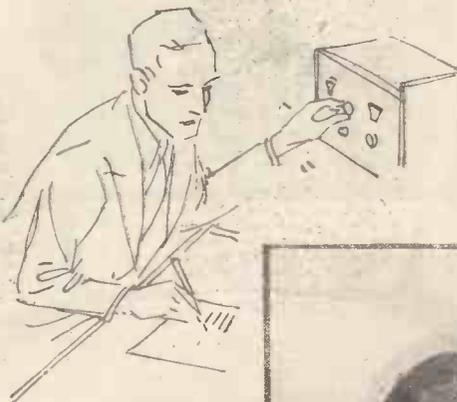
But, you will say, what's all this about a four-valver—isn't the Etherdyne a five? Yes, it is. But we are tracing a pedigree, and it happens that the present five was sired, so to speak, by a not uninteresting four.

It was a four-valve super-het. Selective and sensitive to a marked degree. The snag? Oh, yes, there was a snag, all right! Whistles! More than we could tolerate. We had to reduce them, somehow.

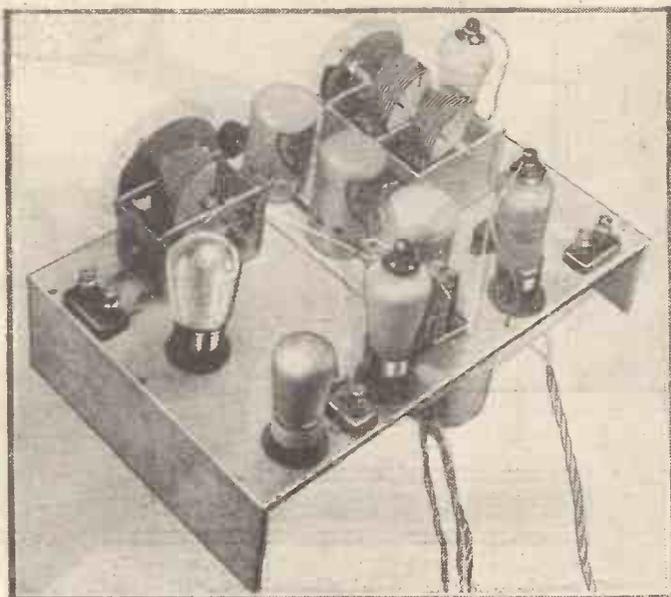
For this combination we were using one screen-grid valve as detector and oscillator. That was the cause of the whistles, we decided. A valve working as an anode detector and oscillating at the same time was bound, we discovered, to generate harmonics. And those harmonics were causing the whistles.

Not to be beaten, we tried all sorts of dodges to cut down the whistles. We knew that if we could make the aerial input sufficiently selective the harmonics generated in the first combined stage would not be able to set up whistles.

So we tried this and that method of sharpening up the aerial tuning. Band-passing obviously came in for a trial. With the very smallest coupling condenser in this system we certainly got selectivity, and certainly cut down, though not to the point of elimination, those horrible whistles.



(Above) S. Rutherford Wilkins, designer of the Etherdyne, at work on a preliminary five-valve hook-up in the AMATEUR WIRELESS laboratories. (Right) The Etherdyne with all its five valves in position ready for reception. It will bring all Europe to your fireside and will decisively combat the over-crowded condition of the ether during the coming winter



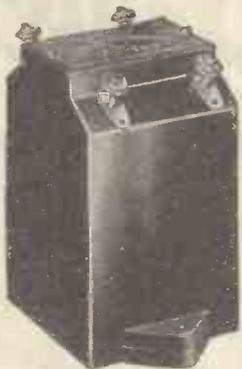
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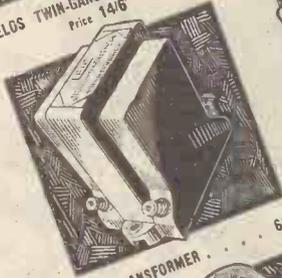
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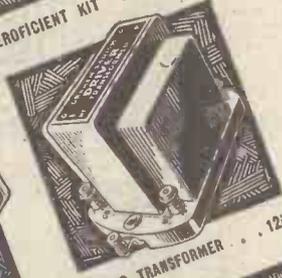
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HUIZEN



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Because it incorporates every worth-while radio development, the new Cossor Melody Maker has "All Europe" range and adequate selectivity—it will bring you the best Continental programmes free from local or other interference. Its reproduction is rich, full and true-to-life. This remarkable set will give you everything—performance, appearance, ease of operation—that you'd expect from a costly Receiver. Yet, despite its remarkable efficiency, the Cossor Melody Maker is so simple that you can assemble it—Meccano-fashion—at home. *No wireless knowledge is necessary.* Send the coupon below for a Constructional Chart which tells you how you can own this powerful Receiver for the bare price of the parts.

FOUR MAGNIFICENT NEW MODELS

BATTERY MODEL KIT 341
PENTODE OUTPUT
 Balanced Armature Loud Speaker

Complete Kit of Parts for assembling Cossor Melody Maker, Model 341, similar to illustration, including Cossor Variable-Mu Screened Grid, Cossor Detector, and Cossor Pentode Valves. Fully screened coils, Double-Gang Condenser, Combined Volume Control and On-Off Switch, all-metal chassis, and all the parts for simple home assembly. Handsome cabinet 18" x 12" x 10", space for batteries and accumulator. Balanced Armature Speaker: provision for Gramophone Pick-up Plug and Jack. Wave-length range 200/530 and 900/5,000 metres. Price **£6.7.6**

Hire Purchase Terms 16/- deposit and 10 monthly payments of 12/6, or alternatively 20/- deposit and 6 monthly payments of 20/-.

BATTERY MODEL KIT 342
MOVING COIL LOUD SPEAKER
 Complete Kit of Parts similar to Model 341 described above, except that it is supplied with a Permanent Magnet Moving Coil Loud Speaker. Price **£7.2.6**

Hire Purchase Terms 17/6 deposit and 9 monthly payments of 15/6.

BATTERY MODEL KIT 344
CLASS "B" OUTPUT
 Complete Kit of Parts as Model 341, described above, but with four Cossor Valves, Class "B" Output Stage and Permanent Magnet Moving Coil Speaker. Price **£8.2.6**

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ALL-ELECTRIC MODEL KIT 347
 Complete Kit of Parts, similar to Model 341 described above, but with four Cossor A.C. Mains Valves (incl. Rectifier) Power Unit and Mains Energised Moving Coil Loud Speaker. For A.C. Mains only 200/250 volts (adjustable) 40/100 cycles. Price **£8.19.0**

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To A. C. Cossor Ltd., Melody Dept., Highbury Grove, London, N.5.

Please send me a Constructional Chart which tells me how to build a Cossor Melody Maker.

Model.....

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You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers

Why You Must "Etherdyne" This Winter



"A.W.'s." Super-het to Fight Ether Chaos

IN our exhaustive tests we have been Etherdyning for months now; during the coming winter you must Etherdyne, too.

What is this new verb "to Etherdyne"? We now explain. To Etherdyne is to receive broadcasting stations at full loud-speaker strength without interference. A somewhat unorthodox verb but full of a new significance.

Another way of explaining this new form of listening, or rather this immeasurably superior form of listening, is to say that it is the fully fledged super-hetting of all incoming signals so that at the loud-speaker we get a strong, clean signal of programme entertainment value.

A Power in the Ether!

There now; enough of what our newly coined verb is—though we cannot refrain from adding one further comment on the etymology of Etherdyning—it is the state of being powerful in the ether.

Not bad, either. For our new set certainly is a power in the ether—a power for good, for your better selection of the programme you want from the hundred and one you do not want at any particular moment.

Physical scientists say we all live in a sort of "warp" or curve of space—that we are part of a space-time continuum; while it is freely contended that the ether permeates all that space, if ether there is.

At any particular moment you want this or that station, and you want it free from interference, do you not? Time, as represented by the moment of your desire, impinging on all-pervading ether—what a thought!

Yet this miracle—it is not far short of that—can be done by Etherdyning, perhaps only by Etherdyning this winter, for the ether is sadly twisted up, thanks to the man-made impressions upon it of well over one hundred different stations in Europe.

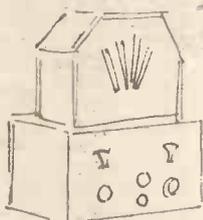
But we forget ourselves. We are to tell you why you must what we are pleased to call Etherdyne this winter. We will do that—mainly because we want you to know that by Etherdyning you really can hope for good programmes this winter, instead of a jumble of incoherent noises.

Well, why must you Etherdyne? Why, that is to say, must you use a super-het, as so admirably exemplified by the Etherdyne Super? Need you really ask? Have you not heard of the Prague Plan? Do you not know, as well as we do, that the Prague Plan is observed on sufferance only—and by an ever-diminishing percentage of the broadcasting stations of Europe?

Of course, you know all this. You know, too, that there is a Lucerne Plan timed to come into action next January, a new plan of wavelength distribution that seeks to give every country a place in the ether, if not exactly the size of place each country could have wished for.

It is a sad business. Because, you see, there are seven countries—eight if we include the buffer state known as the Grand Duchy of Luxembourg—who simply won't sign on the dotted line.

And, believe us, if those eight cannot be persuaded by the International Broadcasting Union to fall into line—well, well, the rest of



them might have saved the ink in their gold fountain pens.

In the nature of things a wavelength plan cannot work unless everybody using the ether agrees to it. At the moment eight countries do not agree, and that is that. Short of international arbitration—shades of the Hague Court and the League of Nations!—there may well be a proper "muck up" next January 15.

Good, Bad or Indifferent Ether

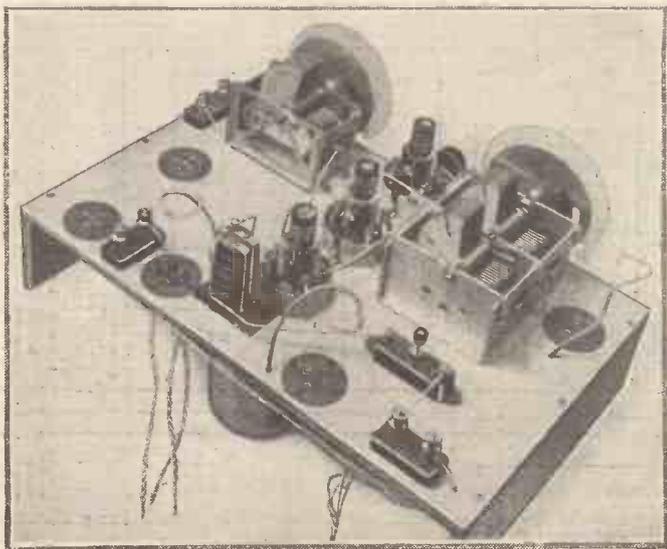
Which brings us right back to Etherdyning. Good, bad or indifferent as the ether may turn out to be this winter, you can see how important selectivity is going to be? If you knew as much about selectivity as we think we know, you would agree that the super-het is the only set that will stand a dog's chance against refractory Swedes, Dutchmen, and other queer fish refusing to dot the i's and cross the t's of the Lucerne Plan.

Etherdyne selectivity is essentially simple selectivity.

We can promise you in the Etherdyne the ultimate in selectivity, the separation of adjacent high-power foreigners with ease, and the cutting out of the local powerful stations in favour of adjacent foreigners.

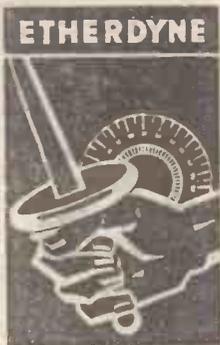
So tell your friends not to panic over wavelength plans, but to Etherdyne as you are going to do. How do we know you are going to do? Well, you would hardly have read this far if you were not pre-disposed that way. And we flatter ourselves that, having got this far, you simply cannot draw back. Why should you, anyway?

Etherdyning is not a penance—it's loads of fun!



(Top) Members of the AMATEUR WIRELESS Technical Staff making certain that the Etherdyne really does what is claimed for it

(Left) This photograph of the Etherdyne, taken from the back, shows the simple nature of the assembly. The leads from the valve anodes can be clearly seen



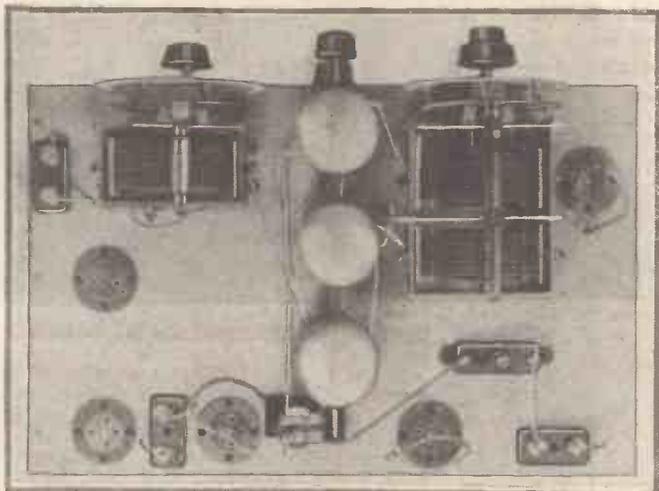
The Etherdyne is the Best Super Yet!

The Fan's Guide to the Latest Super-het Circuit

UNLESS you are a real fan, well versed in technical ways, do not worry your head over this particular article—read all the others, which are purposely written as non-technically as possible. This is a bit technical and is intended to give the *pukka* amateur the real “lowdown” on a super-het circuit—the Etherdyne Super.

We refer you to the circuit at the bottom of the page. Let us go through it together, starting as usual at the aerial end.

A somewhat peculiar aerial circuit, isn't it? Trace it through and you will see that in addition to the usual tapped tuning coil and parallel variable condenser across the grid circuit of the first screen grid valve there are two series components.



Photographic plan view of the top of the Etherdyne chassis condenser, with covers removed. Note the leads for connection to the anodes of the screen-grid valves

which, by the way, makes use of an iron-core coil—part of a three-coil unit, in fact.

We tuned-grid couple this first stage to the mixer stage—to the valve acting as combined oscillator and first detector. Here again we have a screen-grid valve, but not a variable-mu.

There are three important circuits to this mixer. (1) The tuned grid circuit, which is quite normal. (2) The tuned-anode circuit, which is actually the intermediate-frequency transformer. (3) The oscillator circuit, whereby the valve's oscillations are injected into the filament circuit.

There they mix with the incoming signal, producing the familiar beat or super-het frequency, which encounters the tuned primary of the intermediate-frequency transformer and is amplified at that frequency, passing on then to the detector through another similar transformer.

This intermediate stage of amplification is done with just the same sort of valve we use for the first or input stage—a variable-mu screen-grid. Both these valves are coupled up to a grid-bias potentiometer, which in controlling their sensitivity also controls the output volume.

We come to the detector, a perfectly straight arrangement—a triode. From its anode circuit, though, we throw back some high-frequency, and

gain an appreciable amount of “boost” by reacting on to the secondary of the preceding transformer. This gives us just that little extra amplification the high degree of selectivity demands.

Moreover, you will understand that as this transformer is fixed tuned we can use a fixed amount of reaction, by means of a small fixed instead of variable condenser.

Decoupling Arrangements

Which brings us to the transformer coupled pentode, again a straight enough arrangement, but note the decoupling in the primary circuit of the transformer and in the screening grid circuit of the pentode.

So we arrive at the last circuit point of real importance—the battery economiser associated with the pentode output valve. You may be familiar already with the general idea. We overbias the pentode with a separate grid-bias battery.

As one end is not at earth potential we cannot common this with the high-frequency or pick-up bias. This condition of bias is right for the distortionless reception of weak signals, which come in with minimum anode current.

Opposing The Grid Bias

When stronger signals arrive part of the anode current is rectified by a Westector unit, and the D.C. is passed through a resistance, the voltage drop across it being in *opposition* to the grid bias.

The result is that a strong signal will reduce the bias automatically, and thus bring the valve back to its normal working point for distortionless reception.

In a circuit of this type, where we are dealing with the question of five separate anode currents, the saving in the output is obviously well worth while.

So much for the bare bones of the Etherdyne circuit. Read all our other special articles for further details.

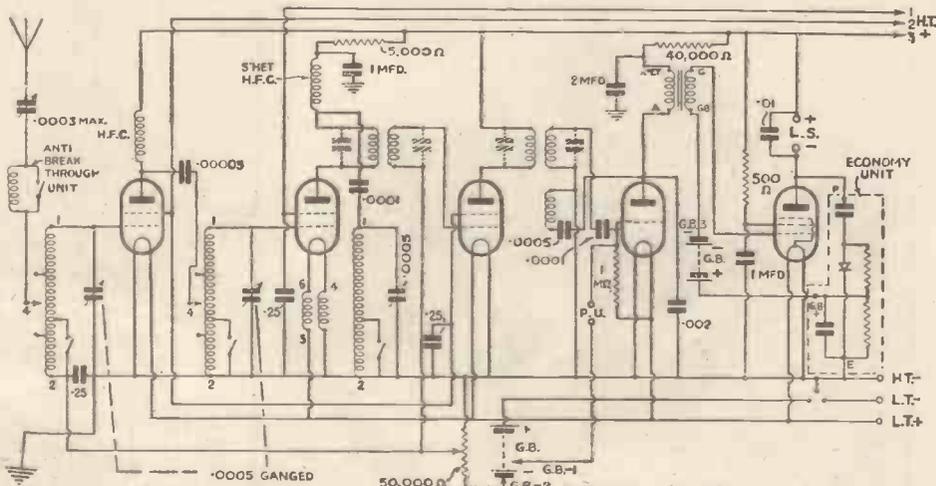
The first of these is the aerial preset, whose function is well known. It reduces the input, so that the maximum selectivity can be obtained consistent with volume requirements on any signal. Below that is a choke, called an anti-breakthrough filter—for a very good reason.

Avoiding Break-through

Its function is new, so far as we know. What it does is to avoid any suspicion of medium wave resonance in the aerial circuit when that circuit has been switched over to the long waves. It avoids, in a phrase, medium wave stations “breaking through.”

Actually it is most important in this circuit to prevent any breakthrough, in order to suppress the generation of medium-wave harmonics—which would mean whistles on the long waves.

We come to a perfectly straightforward variable-mu screen-grid high-frequency-amplifying valve, whose job is to boost up the signals after they have passed through the highly selective aerial-tuning circuit,

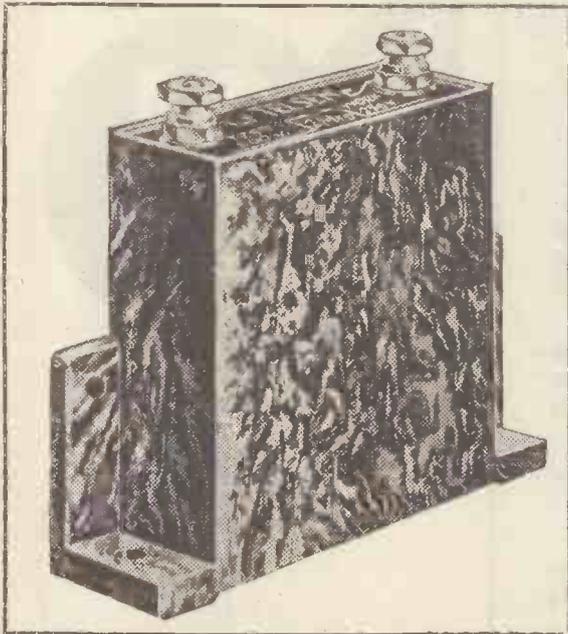


There are many special features in the Etherdyne circuit, two of the most important being the anti-breakthrough filter and the battery economiser

TELSEN PAPER CONDENSERS

Specified for the A.W.

"Etherdyme Super"



THE designer's choice of six Telsens Paper Condensers for use in the Etherdyme Super is an eloquent tribute to their lasting efficiency. Built to Post Office and Admiralty standards, they are rigorously tested at every stage of manufacture. Self-sealing, absolutely non-inductive and hermetically sealed.

The illustration below shows the position occupied by Telsens Paper Condensers in the built-up Etherdyme Super.



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PAPER CONDENSERS.**

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Cap. .01 ... 1/3	1/9
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„ 1. ... 1/9	2/6
„ 2. ... 2/6	3/6

TELSEN COVER EVERY CONDENSER REQUIREMENT

TELSEN PAPER BLOCK CONDENSERS from 4/9.	TELSEN HIGH VOLTAGE ELECTRO- LYTIC CONDENSERS from 3/6.	TELSEN LOW VOLTAGE ELECTRO- LYTIC CONDENSERS from 2/6.	TELSEN FIXED MICA CONDENSERS from 6d.	TELSEN TAG CONDENSERS from 4½d.	TELSEN PRESET CONDENSERS 1/3.

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Better 'Class B' with..

MARCONI



Marconi B21 brings better 'Class B' performance to all battery sets because of these important features :

- It operates with grid bias. Hence quality is better because the anode current cut-off is less sharp and the currents in the two halves overlap. This reduces spurious oscillation and gives less distortion at low output levels.
- For the same reason and also because two grids are used in each half, the sensitivity is higher, because the input impedance is higher and less power is needed from the driver valve.
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SUPER RESULTS FROM SUPER-HETS!



A Special Article by PERCY W. HARRIS, M.Inst.Rad.E.

IT needed very little observation at the radio exhibitions to which we have been treated this season to observe that this is indeed a super-heterodyne year.

For, in spite of the pessimism which gripped so many manufacturers a year or two ago when the "super" circuit was discussed, the difficulties and disadvantages which were thought by them to be inseparable from such a circuit have, like most bogies, vanished on approach, or else have been very ingeniously overcome or circumvented.

The home constructor, too, has taken very kindly to the super, thanks to the excellent designs which have appeared—and not forgetting to give acknowledgment to the brains and skill of component manufacturers who have provided him with the necessary parts.

First Amateur Super-het

Anyone, such as myself, who has been connected with home construction from its birth in this country, has a tendency (far better repressed) to "reminisce." Irritating as this habit may be, I feel I cannot refrain from recalling the first super-heterodyne built by an amateur for use in this country.

It was brought over from America in December, 1921, by Paul Godley for the first Transatlantic amateur tests on what were then thought to be short waves (200 metres!). It was truly a fearsome affair with nine valves which individually took an ampere each, and after a great deal of trouble had been taken to get it to work at a selected spot in Scotland it did not prove so satisfactory as a detector and two low-frequency stages with critical reaction, mainly due to its terribly noisy background, which more than balanced the additional sensitivity. Incidentally, its intermediate frequency was just about 107 kilocycles.

Later, when a few experimental super-heterodynes were made for broadcast reception, their sharpness of tuning was very noticeable, but they all suffered badly from terribly noisy background, a quality of reproduction which was considered poor (even in those days, when we put up with heaven knows what distortion for the sake of novelty!) and a terrible extravagance both in high- and low-tension consumption.

Indeed, it might be wondered why anyone bothered with the circuit, for obviously sharp tuning was not required in days when broadcasting stations were scattered both geographically and in wavelength separation, but it must be remembered that then the super-heterodyne was the only effective means of getting a real high-frequency gain, for neither screen-grid valves nor even the neutrodyne circuit was at that time available.

Nowadays considerable high-

frequency gain is possible in a single stage with but any bother—far more than we ever obtained with all the stages we could put together at the time I am speaking of, for the simple reason that no means were known of overcoming instability, which arose immediately any appreciable gain was had.

It is just as well to review affairs from time to time to save ourselves getting into a groove or being misled by superstitious. Even to-day there are many misconceptions regarding the super-heterodyne. The circuit, as such, is no more sensitive than a straight one, and actually for the number of valves used it is possible to get just as much, if not more, gain with the "straight" circuit.

But, as happens with so many inventions, the original purpose of the super-heterodyne has now been forgotten, and merits which were not thought of at the time of its first introduction have determined its retention and development!

Brought out first of all with the idea of getting, for the first time, appreciable high-frequency gain (by using an intermediate frequency which could be made stable) the super-heterodyne circuit is now popular because it reduces the complexity both of control and construction.

The tuning of the vital high-frequency circuit or circuits in a super-heterodyne is fixed—that is to say, has not to be changed with every change of wavelength in reception—whereas to get adequate gain in a straight circuit each high-frequency stage must be separately tuned. When I say "separately," I do not mean one after the other or on separate dials, but by means of individual tuning condensers—which, of course, can be ganged.

Percy Harris's name is respected throughout the British home-constructor world as that of one of the leading designers. He has catered successfully to amateur needs for many years, and his opinion on super-hets will be read with interest by everybody who has at heart the future of radio development. In this article he explains how the present-day super-het has been developed and why it is the set every listener should use.

It might be wondered why the super-het—invented a number of years ago—is rather late in arriving in the commercial field. The answer is quite a simple one, for in America—where there has been the most rapid development in broadcast apparatus—the owners of the vital patents refused to licence them to other firms and consequently only the Radio Corporation of America manufactured super-heterodynes for broadcast reception up to a year or two ago.

Intensive Development Campaign

The patent was then made available by licence to other firms and an intensive development campaign began, helped greatly by the arrival of the screen-grid valve and later by the variable- μ valve.

At one time it was advanced as a reason against the adoption of the super-heterodyne that it was bound to be an affair with a very large number of valves, but the modern valves, which do so many things within the confines of one bulb, are changing all that.

The relative merits of a separate oscillator valve and combined first detector and oscillator have been discussed on many occasions, and as a matter of fact it had been generally agreed that, other things being equal, two separate valves give better results than the combined gives.

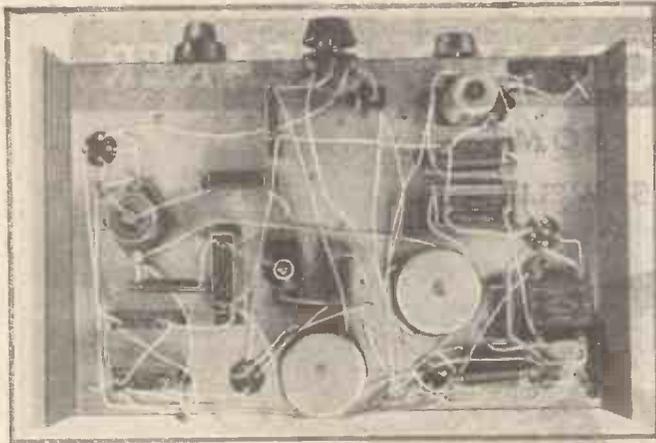
This has now been changed, however, by the evolution of the new valves with many electrodes in which one can get all the electrical benefits of two valves with one, so that it is likely that in the future the double-valve scheme will pass right out.

Then, again, we have a tremendously high gain possible with the modern screen-grid valve in one stage, and so a multiplicity of intermediate stages, once thought requisite to get big gain, will doubtless give way to a single intermediate stage in a large number of cases.

Detector overloading, which was a serious limitation in early super-hets, has been successfully overcome,



This view of the Etherdyne, the new "A.W." super-het dealt with in this issue, shows the effectiveness of the wood-chassis type of construction



A plan view of the underside of the chassis of the Etherdyne, the new super-het that will break all records!

while the power-handling capacity, combined with economy, first of pentodes, then quiescent push-pull and later class B has shown several ways out of this difficulty.

A special super-het problem—found in no other type of circuit—is known as "second-channel interference." The principle of the super-het, as you know, is first of all to take the received frequency and mix with it another locally-generated frequency slightly different from it, this mixture producing "beats" of a third frequency which is equal to the difference between the received and the locally generated frequencies.

Fixed-tuned Amplifier

This new or intermediate frequency is magnified up in what may be called a fixed-tuned amplifier, as it is unnecessary to change the adjustment when it is so simple to maintain a constant difference between the local oscillation and the one received.

The trouble about this scheme, however, is that there is always the possibility of this locally-generated oscillation, beating with two different wireless stations, the one we want and one separated by exactly the same frequency difference in the other direction, and which, of course, we do not want.

How much of this second one we get will depend on several factors, most important being the sharpness of tuning in our normal receiving circuit into which the signal we want first goes. To give you a practical example let us take two wireless stations, the Midland Regional, which works on 752 kilocycles, and Graz, which works on 852 kilocycles; there is thus 100 kilocycles difference between these two.

Typical Practical Example

Let us imagine now that we have chosen 50 kilocycles as our intermediate frequency. If we want to receive Graz we must therefore set our oscillator at, say, 802 kilocycles, for the 802 kilocycles local oscillation beating with the 852-kilocycle one from Graz will produce a 50-kilocycle beat note. The trouble is that the Midland Regional station works on 752 kilocycles will also give a 50-kilocycle beat so that in this case both signals from Graz and the Midland Regional will go through our intermediate amplifier to be magnified.

With the multiplicity of stations on the air you can easily understand that an incorrect choice of intermediate frequency will bring in lots of "pairs" of stations if we are not careful; interference from the one we don't want, or from the "second channel," as it is termed, brings about second-channel interference.

How can we avoid this? Obviously by arranging our first tuned circuit so that it gives a maximum response to the station we

want and a minimum one to stations separated by twice the intermediate frequency. In other words, we must make our first circuit very sharp in tuning so that there is practically nothing of the second station in it to produce a beat.

You might think that on any reasonably sharp-tuned circuit a station about ten channels away—such as is the case in our imagined problem—would be negligible, but actually it takes a very small signal to cause interference, and you will be surprised how much trouble can arrive from second-channel interference even in some of the best commercial sets.

It must be remembered that sometimes one desires to receive a very weak station to which one is tuned, whereas the station separated from it by twice the intermediate frequency may be exceptionally strong—a local, in fact. Only by careful design can second-channel interference be cut down satisfactorily to a negligible quantity.

We thus have two kinds of selectivity to consider in a super-het—the normal selectivity, which is governed to a considerable extent by the sharpness of tuning of the intermediate circuit, and the selectivity against second-channel interference in which the intermediate circuit or circuits play no direct part whatever, for they magnify everything that comes on to their particular frequency.

One of the best ways of getting rid of second-channel interference is by a well-designed high-frequency stage preceding the first detector. If you have a high gain here then you can afford to loosen the coupling between the aerial and the high-frequency tuned circuit so as to give extreme selectivity without losing too much of the signal.

Recently, when I was discussing matters of design in the AMATEUR WIRELESS Construc-

tional Laboratory, I examined with considerable interest the new super-heterodyne receiver, the Etherdyne Super—in which S. Rutherford Wilkins has evolved an excellent scheme for cutting down second-channel interference by means of a high-gain valve and extremely loose coupling. Thus with second-channel interference reduced to negligibility, with a high-gain

ANOTHER FREE GIFT NEXT WEEK!

THIS week every reader of AMATEUR WIRELESS is presented with a free two-colour photo-chart of the Etherdyne. In addition to this there is a full-size blueprint.

Next week we shall present every reader with an identification chart for use with any radio set—it will be of particular value to Etherdyne constructors, though.

The wiring of the under side of the Etherdyne chassis will be shown in a further full-size blueprint to be found inside the cover of the next issue.

With this week's two-colour photo-chart, the full-size blueprint and the photographs published this week and next week, the construction of the Etherdyne is reduced to the simplest possible terms.

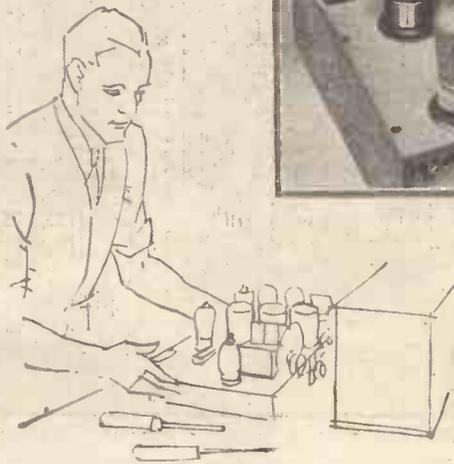
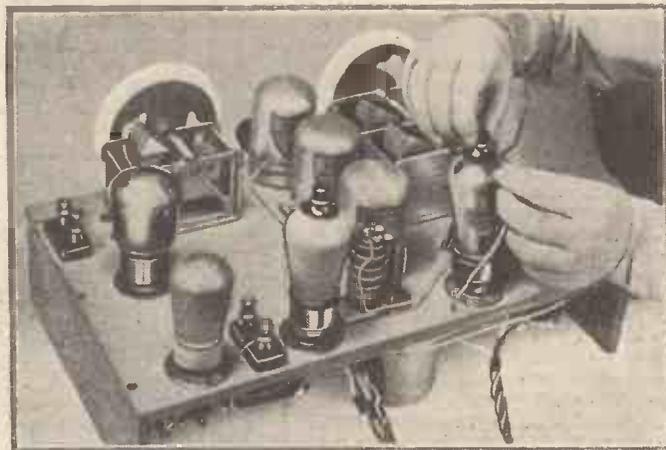
Thousands of listeners will be Etherdying this winter. Will you be one of those with better radio?

well-designed modern circuit using modern valves, and with that attention to quality which comes from a study of modern low-frequency circuits, the latest supers provide really super results.

As to "frills"—automatic volume control complete ganging, and the like—these are attractive in many ways, but, quite frankly, I personally am not too keen on "Robot" sets.

There's no point in having to spend half an hour in tuning to each station and, on the other hand, I do like the benefit of the indi-

Another view of the Etherdyne—connecting the anode lead to the top of one of the screen-grid valves. The receiver is not at all difficult to construct with the aid of the two-colour photo-chart given with this issue



vidual control which is possible when you don't tie every condenser on to one rigid rod.

I never handle a single-control receiver without an itch to lift the lid, get a screwdriver and re-gang on each station, for I know perfectly well that good average results all over the scale mean that with a large number of stations you are definitely not getting all you might.

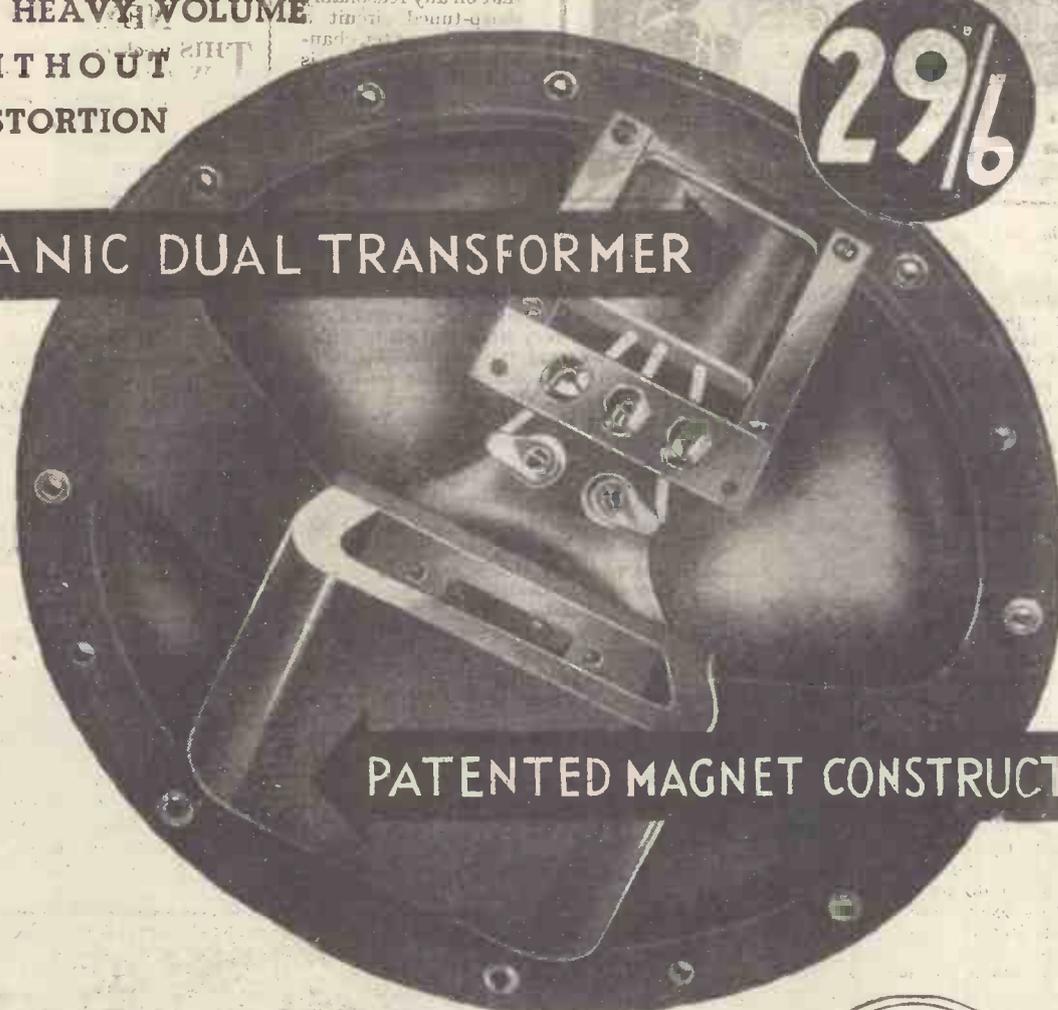
And, anyway, what is the use of having a set which your wife can work as well as you can? Yes, quite—I knew you would agree with me!

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Arrest those Melliush Brothers! A Good Shocker! :: Taking Us Over—Why? Another Music Hall Flop :: Morbid Play About Danger Proms Season Ends

THE B.B.C. is the most aggravating institution I know. It never does what I want it to. Probably, you think the same.

Unfortunately, circumstances over which, etc., prevented me from hearing more than half of *Daylight Robbery*, written by those clever Melliush Brothers. I comforted myself with the prospect of catching it on the Regional a night or so after, but found it was not to be repeated.

Now why must a good show like that go without a second performance when so much unmitigated tripe—oh, what is the use of talking? The B.B.C. is

Emotion prevented me from finishing. Anyhow, I want the Melliush Brothers arrested and locked up!

That is to say, locked up in Broadcasting House and made to write and write and write. They are amongst the very few who can write comedy dialogue.

Taking You Over—and How!

Taking You Over was produced twice. Why? Not for its cleverness. Anybody could make up an hour's broadcast on those lines. Merely a series of disconnected scenes.

The gangster scene was short and not to the point. The inn scene was a mere waste of time because it was filled out with *What shall we do with a drunken sailor?*, *Love's Old Sweet Song*, and *Devon, Glorious Devon*. Who wants to hear those, anyway?

The scene on top of the 'bus was piffle and might just as well have been under a taxi; the cabaret scene suffered by the affected way Margery Wyn delivered her lines; the Scottish scene was filled out with *Comin' Through The Rye* and *Auld Lang Syne*.

Richard Hughes' *Danger* has the distinction of being the first actual radio play. That may be quite a good reason for its revival, but the

play was not good enough for broadcasting in these days.

Evidently it had two objects. One was to thrill us with a scene in a Welsh coal mine where two men and a girl were trapped. The other was to give us an insight into the views of a young man, his fiancée, and an old man on the subject of death.

The thrill failed, to my way of thinking. It was unpleasant and morbid. Each of the three people gave way to hysteria in turn. Each of the three people became amazingly calm in turn. Each of the three people wanted to die in turn. In the end the girl swooned and was saved; her swain did not swoon but was saved; the old man drowned and, therefore, was not saved.

A distinctly unpleasant play, *Morbid*.

The Wrong 'Bus, by Martin Hussingtree, was very different. I heard it when it was originally broadcast, but I managed to get a thrill out of it, even so. A man and a girl get into a 'bus. He falls asleep—at least, you know that at the end—and dreams there is no driver, and that the 'bus is heading for a cliff. The conductor's voice (Philip Wade's) was so eerie that the actual lines he delivered were unusually startling.

An honest-to-goodness shocker, but nothing morbid about it. My shock absorbers had a rough time, but I did not feel the worse for the shaking. The other play left me a bit negative.

Delius' "Idyll" proved to be one of the most intensely beautiful works I have ever heard. Simply an outburst of melody.

It must be dreadful to be blind, but surely there must be compensation in his case?

Another aesthetic treat to me—I hope to everybody—was Albert Sammon's superb playing of the Elgar violin concerto in the Thursday Prom. I wonder whether you listened carefully enough to detect the undercurrent of accompaniment to the cadenza?

I don't know what your opinion about cadenzas may be, but I frequently tire of them when they go on too long, merely because I have to supply the accompaniment in my own mind. That is what everyone does consciously or unconsciously. Elgar supplied the necessary chords in the band; and thus saved everybody a great deal of fatigue.

I think there ought to be an Act of Parliament forcing all composers of violin concertos to do the same.

The Music Hall show this week was another flop. Nobody did anything;

nobody said or sang anything worth hearing, certainly not worth repeating.

Nobody was really bad, but nobody was really good. The sort of show that left you wondering whether Light Entertainment is a workable proposition at all.

Our Director of Light Entertainment will really have to be very terse with some of these beauties who imagine anything will do, and that people in 1933 are made to laugh as easily as they were in 1633.

They tell me at Broadcasting House that two variety programmes not to be missed are



Sir Edward Elgar . . . "saved everybody a great deal of fatigue"



Maurice Cole . . . "delighted the Promsters" at the last concert

on October 25 and 28. Clarice Mayne, Johnson Clark, Charles Hayes, Ben Osborne, and Nellie Perryer appear in the first, and in the second you will hear Jack Hylton's boys, Marie Burke, Charles Heslop, Rupert Hazell and Elsie Day.

Well, it all looks very satisfactory. Let us hope one of them says something funny.

The thirty-ninth season of the Proms has come and gone. The last concert was a huge success. It always is, but this year it went better than ever.

Maurice Cole delighted the Promsters when he played the G Minor piano concerto of Mendelssohn. Perhaps the pace he took the last movement had something to do with it. Personally, I thought he exceeded the speed limit. Still, it was very exciting in places.

Madame Stiles-Allen drove the Promsters nearly frantic with a Verdi aria, but hardly less successful was Samuel Worthington's singing of another aria by the same composer.

Altogether a lively evening. Where else in the whole world can you go and see anything like it? Where else can there be a wireless transmission so vivid? The Queen's Hall Proms are unique.

They have been tried elsewhere—in America notably. The reason they failed is that there is only one Sir Henry Wood. He founded the Proms; he made them what they are. Even if the more critical listeners may favour other conductors' rendering of any given work, it is

Continued on page 730.



Reginald Dixon, the popular organist of the Tower Ballroom, Blackpool, choosing, with the help of his wife, a Ferranti set at the recent Manchester Radio Exhibition



How the Etherdyne Super Brings You Better

Iron-core Coils :: Anti-breakthrough Unit :: Battery Economiser ::

BETTER RADIO! Better than you have ever experienced in all your listening days and nights! That is our claim for the Etherdyne. A claim that everyone can understand, lay listener and technical fan alike.

We all want better radio, of course. We want better all-round radio reception. Better selectivity, mostly. Better range, so that we can bring in any foreigner that takes our fancy—providing it is on the air. Better control—less fiddling with controls, affecting selectivity and range.

What Quality Depends On

Purposely we do not mention better quality, because that depends so much on the individual listener's tastes. Quality that pleases one appalls another, mainly because, no matter what set you use, the quality depends to some extent at least on the loud-speaker used with that set, and on the state of the batteries driving it.

Leaving out quality, then, better radio means to most of us better selectivity, more foreigners within easy range and easy control.

If we can get a set that will give us these things we will see to the quality by the loud-speaker we have on hand or the new one we

buy, stipulating only that the set shall be inherently capable of really good quality if we decide to go in for a high-class loud-speaker.

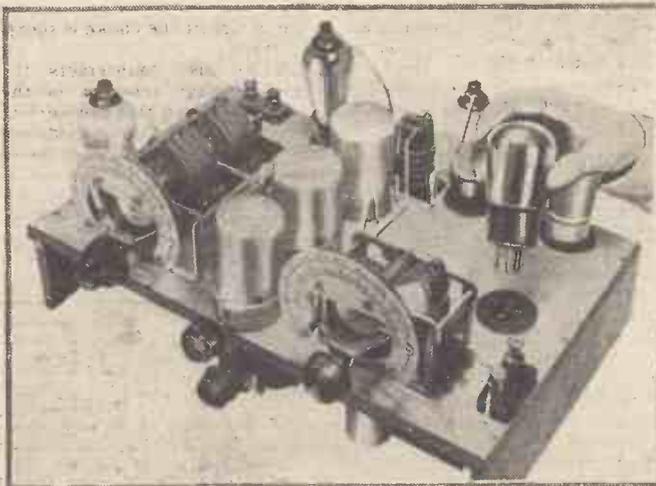
At the outset, then, may we make the claim that the Etherdyne really does bring better radio within the immediate realms of practical politics for the listener of average means? We make that claim knowing full well that we can justify it by the results you will obtain when you build the Etherdyne for yourself.

Our task here, or rather our pleasure, is to explain in simple terms exactly how the Etherdyne brings you better radio, assuming that you are going on our definition.

First, how does the Etherdyne give you better selectivity? Better selectivity than what? By what standard are we judging the Etherdyne when we say that it gives better selectivity? Well, we are quite justifiably taking the average set in use to-day among amateurs as the standard of comparison—the three- or the four-valve straight set.

In spite of all this talk about super-hets, the fact is that at the moment all but a few listeners still rely on a straight set, because designs for the home constructor, though given due prominence in our pages for the past three years, have necessarily been far outweighed

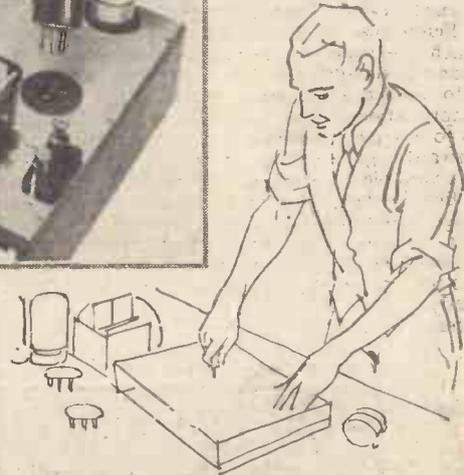
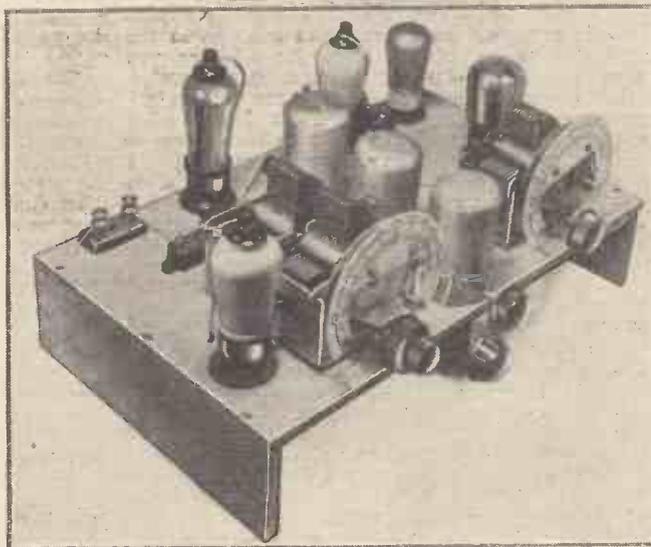
Don't Lose Your Two-colour Photo-chart!



There are only four controls on the Etherdyne Super. On the left and right are the two tuning knobs, while between them are the wave-change switch (top) and combined volume control and on-off switch. Although so amazingly selective the Etherdyne is easy to control.



The completed Etherdyne Super seen from the front. This set makes the best possible use of a metallised-wood chassis. A free two-colour wiring chart is included in this issue and all intending constructors are advised to consult it



through price considerations by the various combinations of the straight circuit.

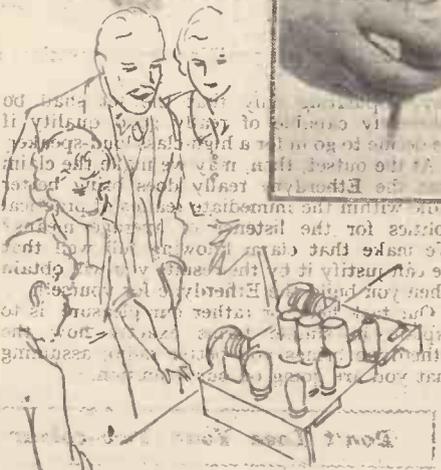
Well, then, we offer in the Etherdyne a measure of selectivity that is certainly far above anything the average listener has ever experienced. We give you, in a phrase, super-het selectivity.

The sort of selectivity that cuts out London Regional and brings in Mühlacker clear of all trace of the home station. The sort of selectivity that clean cuts through the tangled skein of the ether, picking out each strand that represents a programme of entertainment value.

Such selectivity has not been easily achieved. Super-hets do not, just because they are super-

Super Radio

An underneath view of the Etherdyne chassis. The covers have been removed from the intermediate-frequency transformers; one of these has fixed reaction for boosting signals. In wiring up this set, don't forget the photo-chart!



medium waves are in circuit the choke is short-circuited out of action.

This special device also counteracts the tendency for break-through inherent in the iron-core type of coils. Given this precaution, as in this set, iron-core coils do provide an appreciable increase in selectivity, and therefore they have been included.

You will appreciate now that the Etherdyne's selectivity is gained at the expense of nothing—that it is real selectivity devoid of snags. Super-het selectivity at its best!

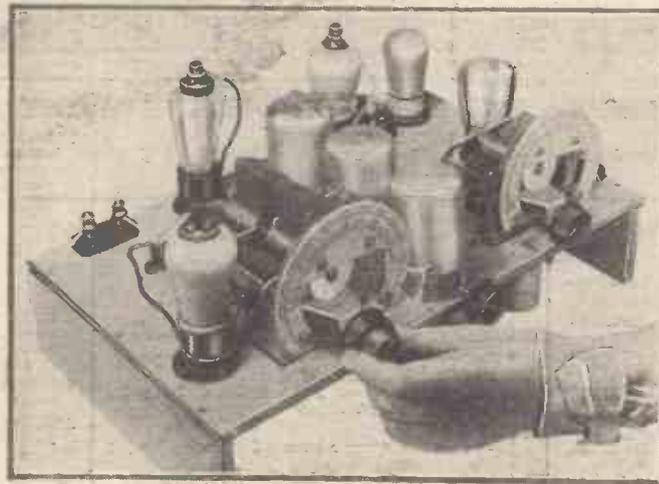
prising (1) first high-frequency stage, (2) mixer, (3) intermediate amplifier, (4) detector, and (5) output.

You have in the Etherdyne plenty of amplifying power. There is the amplification of the first variable-mu, and there is the amplification of the intermediate-frequency stage, both pulling their weight. Because the need for selectivity is so great at the beginning we lose some of the value of the high-frequency amplification on weak signals, and that is why reaction has been introduced into the detector stage. It is fixed reaction because it is feeding back into a circuit of fixed wavelength, the intermediate-amplifier wavelength.

So just bear that in mind: you are getting first-rate sensitivity without any sacrifice of selectivity.

It is not often that one can claim great selectivity and sensitivity at the same time. We can do so in the Etherdyne because it is an exceptional super-het circuit and not a straight type of circuit.

Continued on page 728



Tuning the Etherdyne is so simple that any member of the family can pick up scores of stations—one of the great advantages of a super-het! Remember the Etherdyne is our big Autumn receiver!



That incoming signal passes then from the mixer stage into the intermediate-frequency transformer, thence to the high-frequency amplifying valve of the variable-mu type used for intermediate-frequency amplification, and so to the detector proper—often called the second detector, though actually it is the first and only real detector in the ordinary sense of that term.

Comes a transformer-coupled pentode output valve, the fifth valve of a wonderful team com-

Wood-chassis Construction

hats, automatically give you such wonderful selectivity. Indeed, the design of a super-het that justifies the name is a very pretty problem for the technician.

Yet it is a problem capable of solution—if you go the right way about it. We have gone many ways to find that nth degree of selectivity everyone desires.

In the Etherdyne we have found that selectivity by a careful elimination of all the snags. The snag of the average super-het is whistles—write large.

We Have Conquered Whistles!

We have conquered the snag of the whistle. We have engineered a system that, while depending inherently on the local generation of an oscillation to produce the super-het effect, generates no other oscillation that is audible in the reproduction. Nor is there any latent instability in the set, nothing undermining the essential action of the complete circuit.

That is a most important point to remember in summing up the "how" of the Etherdyne's selectivity. The incoming signal comes first through a pre-set type of capacity, through a special though quite simple and cheap anti-break-through filter, into a simple aerial tuning circuit. Input is fully under control.

Before that incoming signal has a chance to reach the super-het part of the circuit—the part that converts the relatively high frequency into a much lower frequency for intermediate amplification—before that can happen it has to go through the filtering process of a straight-forward high-frequency stage. Actually this is a variable-mu screen-grid valve.

Before, then, our signal reaches the crucial stage of the super-het circuit it is already in a fair way to being clear of adjacent-station interference. Indeed, if we have reduced the pre-set sufficiently it will be quite clear, and ready to be changed to the frequency of the intermediate high-frequency amplifier.

The Mixer Stage

The stage that performs this is called the mixer stage, or sometimes rather inadequately it is referred to as the first detector. Infused into this stage are locally generated oscillations, which combine or mix with the incoming signal to produce a beat frequency. This beat frequency is the difference between the incoming signal's frequency and the locally generated frequency.

In the Etherdyne one valve does both jobs. A screen-grid valve acts at one and the same time as first detector (or mixer) and local oscillator. Naturally, before this great saving can be effected great care must be taken in the engineering of the complete stage.

The Etherdyne circuit includes a device that plays a very important part—an anti-break-through filter taking the form of a choke, so arranged that when the long waves are switched into circuit the choke comes in series with the aerial tuning and when the



Table Model or Radio Gramophone?

Make Up Your Mind Now Which You Will Build!

ASSUMING that you are live enough to decide that you simply must Etherdyne this winter—you will have to choose between a table-cabinet and a radio-gramophone. Fortunately, you are offered the choice right at the beginning of the Etherdyne boom. We have purposely designed the chassis to be



Looking down on the motor-board section of the Etherdyne set built up as a radio-gramophone

equally applicable to the two versions, as we know what a lot of listeners are now going in for the radio-gramophone type of installation. At the same time there are probably more who want a straight set, and so to meet all needs we have planned for both ideas.

On this page you can gain some idea from the photographs just how the table-cabinet and radio-gramophone versions compare. It is a compact table-cabinet set, as you can see. The set chassis is housed in the lower half of

the cabinet, with the moving-coil loud-speaker above.

Behind the loud-speaker there is space for batteries—at least for the accumulator and the two grid-bias batteries. As you will probably be using double- or treble-capacity batteries with the Etherdyne, they will have to be externally connected.

The controls of the table model are quite neatly laid out, as you can see. There are the two tuning controls, on the left the two-gang condenser for the aerial and intervalve tuning, and on the right for the oscillator condenser. Between these controls and their escutcheons come two subsidiary controls, the wave-change switch mounted just above the combined volume and on-off control.

Truly a table set for the family! Quite easy to operate and compact enough to stand in some convenient corner.

No doubt many of you, realising that the Etherdyne is a first-rate chassis and that it has a large pentode power output valve, will be tempted to run it as a radio-gramophone. We can assure you of excellent results if you succumb to that temptation!

From the list of parts below you will see that the extras for the radio-gramophone version are quite few. You need, of course, a radio-gramophone cabinet to begin with. On the top of that you will have your turntable driven by a double-spring

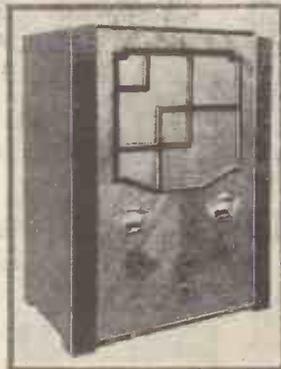
clockwork motor, with a winder on the side.

Associated with the turntable will be the gramophone pick-up and the one we recommend includes a volume control for varying the pick-up's input to the detector, which in the gramophone function of the Etherdyne become the first amplifier valve.

Small additional parts for the radio-gramophone include cups for new and used needles and a small switch for cutting out the gramophone pick-up.



Left, the Etherdyne Super as a table-cabinet set and, above, as a handsome-looking radio-gramophone with the winder shown on the right.



COMPONENTS YOU NEED FOR THE ETHERDYNE SUPER

CHASSIS

- 1—Peto-Scott Metaplex metalised wood to specification

CHOKES, HIGH-FREQUENCY

- 1—British Radiogram, type Super-het (or Bulgin HF10).
- 1—Telsen, type W341 (or Graham Farish, Bulgin HF9).

COILS

- 2—Lissen iron-cored screened aerial.
- 1—Lissen iron-cored screened 126-kilocycle oscillator.

CONDENSERS, FIXED

- 1—Graham Farish .0005-microfarad mica (or Lissen, Telsen).
- 2—Graham Farish .0001-microfarad mica (or Lissen, Telsen).
- 1—Graham Farish .0005-microfarad mica (or Lissen, Telsen).
- 1—Graham Farish .002-microfarad mica (or Lissen, Telsen).
- 1—Graham Farish .01-microfarad mica (or Lissen, Telsen).
- 3—Telsen .25-microfarad, type W229 (or Graham Farish, Lissen).
- 2—Telsen 1-microfarad, type W227 (or Graham Farish, Lissen).
- 1—Telsen 2-microfarad, type W226 (or Graham Farish, Lissen).

CONDENSERS, VARIABLE

- 1—Telsen twin-gang .0005-microfarad, type W306 (or Graham Farish, J.B.).
- 1—Telsen single .0005-microfarad, type W339 (or Graham Farish, J.B.).
- 1—Sovereign .0003-microfarad pre-set (or Lissen, Telsen).

HOLDERS, VALVE

- 4—Clix four-pin chassis-mounting.
- 1—Clix five-pin chassis-mounting.

MISCELLANEOUS

- 1—British Radiogram anti-break-through filter.
- 1—Varley battery economiser, type DP44.

PLUGS, TERMINALS, ETC.

- 10—Belling-Lee wander plugs, marked: H.T.+ , H.T.+1, H.T.+2, H.T.+3, H.T.—, G.B.—1, G.B.—2, G.B.—3, G.B.+ (two) (or Clix, Ealex).
- 2—Belling-Lee spade terminals, marked: L.T.+ , L.T.— (or Clix, Ealex).
- 3—Lissen terminal blocks (or Telsen).
- 1—Belling-Lee wander fuse, marked: H.T.— (or Bulgin S5 fuse holder).

RESISTANCES, FIXED

- 1—Graham Farish 500-ohm (or Telsen, Lissen).
- 1—Graham Farish 5,000-ohm (or Telsen, Lissen).
- 1—Graham Farish 40,000-ohm (or Telsen, Lissen).
- 1—Graham Farish 1-megohm (or Telsen, Lissen).

RESISTANCES, VARIABLE

- 1—Sovereign 50,000-ohm, with combined three-point switch (or Bulgin VS50).

SUNDRIES

- 1—British Radiogram 2-in. metal mounting bracket for potentiometer.
- Connecting wire and sleeving (Lewcos or Goltone).
- 2—Bulgin two-way battery cords.
- 1—Bulgin three-way battery cord.
- 1—Bulgin four-way battery cord.
- 2 vd. thin flex (Lewcos or Goltone).
- 2 ft. shielded sleeving (Lewcos or Goltone).

SUITABLE VALVES

Make	1st H.F. Met.	S.G. Inter. Met.	D.T. Osc.	2nd Det.	Power
Cosmor	220VS*	220VS*	—	210Det.	220PT
Marconi	VS24	VS24	S22*	HL2	PT240
Mullard	PM12M	PM12M	—	PM2DX*	PM22*
Mazda	S215V	S215V	—	HL2	Pen220A
Hivac	—	—	—	L210	Z220
Lissen	—	—	—	HL210	PT240
Osram	VS24	VS24	S22	HL2	PT240
Six Sixty	—	—	—	210D	230PP

*Valves used during "A.W." tests.

TRANSFORMERS, INTERMEDIATE-FREQUENCY

- 1—Lissen 126-kilocycle with reaction.
- 1—Lissen 126-kilocycle without reaction.

TRANSFORMER, LOW-FREQUENCY

- 1—Varley Nicore II (or Lissen Hypermik, R.I. Hypermu).

TABLE-MODEL ACCESSORIES

BATTERIES

- 2—Lissen 60-volt high-tension, type Super Power (or Ever Ready, Pertrix).
- 1—Lissen 16-volt grid bias (or Ever Ready, Pertrix).
- 1—Lissen 9-volt grid-bias (or Ever Ready, Pertrix).
- 1—Lissen 2-volt 40-ampere-hour accumulator, type LN2005 (or Exide Ever Ready).

CABINET

- 1—Peto Scott, type Etherdyne consolette.

LOUD-SPEAKER

- 1—Igranic permanent-magnet, type D9 (or W.B., Ampion, R. & A.).

MAINS UNIT (in place of batteries)

- 1—Atlas, type T23, for A.C. (or Ekco, Regentone CB/20), or 1—Atlas, type DC 25/25B, for D.C. (or Ekco, Regentone CB/DC).

RADIO GRAMPHONE ACCESSORIES

CABINET

- 1—Peto-Scott, type Adaptagram A, with plain front.

GRAMMOPHONE MOTOR

- 1—Garrard, type 11B.

LOUD-SPEAKER

- 1—W.B. permanent-magnet, type PM4A (or Igranic, R. & A.).

- NEEDLE CUP. 1—Bulgin duplex, type NCI.

- PICK-UP. 1—British Radiogram, type 645.

SWITCH

- 1—Bulgin Single-pole rotary, type, S91LB.

It's the LISSEN COILS that count-



INTERMEDIATE FREQUENCY TRANSFORMERS

"Amateur Wireless" have also used two Lissen Intermediate-frequency Transformers in the "Etherdyne," so that the whole coil assembly of the set is matched and balanced in one factory and made to the most exacting standards. When you get your kit of parts for the "Etherdyne," see that LISSEN Intermediate-frequency Transformers are supplied to you.

Lissen Intermediate frequency Transformer with reaction winding .. **8/6**
Without reaction winding **7/6**

The 'A.W.' Boom Set uses them!

"Amateur Wireless" designers to-day disclose the full details of their "set of the year." And once again you will see that it is built around Lissen Coils! In a big band-pass superhet like this "Etherdyne" it is the coils that count—and the "Etherdyne" scores heavily by having the exact matching, the high efficiency, the supreme selectivity of Lissen Iron Cored Coils throughout. These Lissen Iron Cored Coils have lower losses than any previously produced coils. They are particularly efficient in triple-gang, as in this set, being matched to dead accuracy. Shielding is complete, with metal can and metal base supplied; even the terminals are within the screens.

Triple Gang of Lissen Iron Cored Coils, as specified for the "Etherdyne." **12/6** EACH COIL



LISSEN

IRON CORED COILS

THE COILS THAT COUNT

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

The Beginner's How and Why of the New Radio

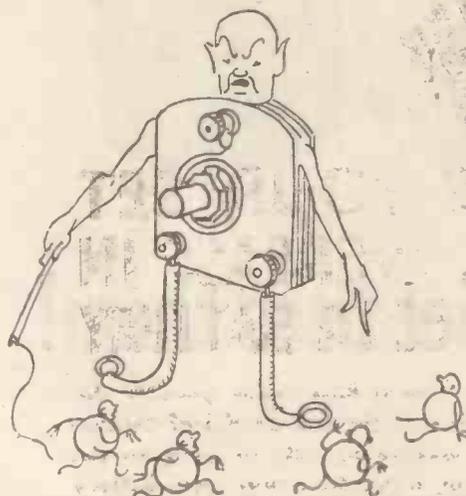
A "Tabloid" Radio Course IN 100 PARAGRAPHS

This is the final instalment of a complete course in radio prepared specially for "Amateur Wireless" by J. H. REYNER, B.Sc., A.M.I.E.E. This week the controls of a modern receiver are explained for the benefit of the beginner

PETER looked at his set. There was the tuning control about which he knew a little, thanks to the previous explanation. What exactly were these other knobs for, he wondered. Well, he could easily find out. He switched on the set and said: "What is this knob marked 'Reaction' for?"

REACTION

"To increase the strength of your signal," replied the set, in its now familiar tones.



"I send some of the currents back to the beginning again," explained Ronnie Reaction

"Let Ronnie Reaction tell you about it himself."

"I make some of the currents work twice over," said a cheerful voice. "I take the currents which have been amplified by the detector valve and send part of them back to the beginning so that they are amplified all over again."

FEEDBACK

"Thus the effective anode current is increased because the currents which I send back add to the currents already there, and if they are in the right direction, the total current will be greater. Of course, if the currents are in the wrong direction the signal strength will be reduced and we say that the feedback is negative or reversed."

SELF-OSCILLATION

"How long can I go on doing this? Well, I have to be careful. You see, the strength of the current has to increase and decrease in accordance with the speech modulations so that I can only feed back a small proportion of the current. If I send back too much the oscillations build up to such a large value that they pay no attention to the speech variations at all. This is called self-oscillation."

WHISTLES

"How do I know when to stop?" asked Peter. "As you rotate the reaction control," answered the set, "the strength of the signal will increase until you find that after a certain point the reproduction gets distorted. This is because the set is on the verge of self-oscillation and the currents are not responding properly to the variations in strength in the modulation. If you go still further the circuit will actually oscillate of itself, and you will hear a whistling noise mixed up with the speech of music."

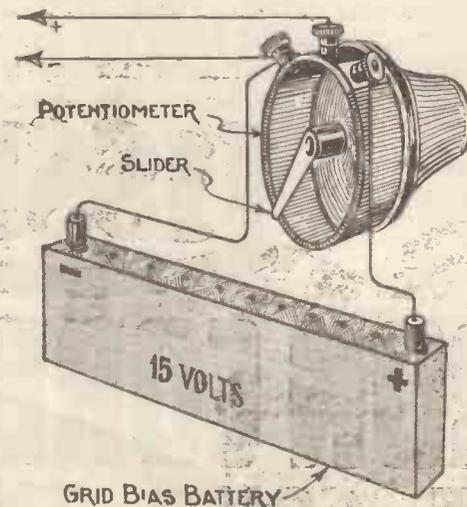
HETERODYNING

"What is that due to? An interference between the self-oscillation in the set and the carrier wave of the broadcasting station. These will interfere with one another and the combined signal will be alternately large and small. It will be large when the two oscillations are both decreasing or increasing together, and it will be small when the currents are flowing in opposite directions at the same instant. This is heterodyning."

BEATS

"Since the oscillations are occurring at slightly different frequencies the currents will fall in and out of step. One moment they will be adding up and the next moment they will be cancelling each other out, so that the strength of the combined oscillation will be rising and falling regularly. This is called the beat between the oscillations, and this is responsible for the whistle you hear."

"According to the difference in frequency between the oscillations you hear a whistle which varies in pitch. As you rotate the tuning knob and alter the frequency of the self-oscillation in the set you can alter the note of the whistle."



GRID BIAS BATTERY
By moving the potentiometer slider round any intermediate potential can be obtained

SUPER-HETERODYNE

"Is this anything to do with super-heterodynes?" asked Peter.

"The idea is the same," was the reply, "but the application differs. In a super-het the beats are made of such a high frequency that they are quite inaudible. The name really is a contraction for super-personic heterodyne, which means above the audible frequency."

INTERMEDIATE FREQUENCY

"The beat frequency is, in fact, so high that it is a radio frequency, and we can build amplifiers in which the circuits are actually tuned to this intermediate frequency, as it is called. The intermediate frequency is fixed and the tuned circuits can be constructed carefully and accurately to give a high amplification and a large measure of selectivity—far more than is practicable if the amplifier has to be tuned to the incoming signal each time."

FREQUENCY CHANGER

"How does one tune in, then? By altering the frequency of the local oscillations, so that the difference between this and the incoming signal is equal to the intermediate frequency. This is accomplished by rotating a tuning condenser so that the process is just the same as with an ordinary tuned set, but instead of having an ordinary tuned circuit and a detector you use a continuously oscillating detector or frequency changer which converts the incoming signals to the intermediate frequency at which the subsequent amplification is carried on."

VOLUME CONTROL

"Well, that's interesting," said Peter. "Why aren't you a super-het?"

"I have only three valves," said the set with a smile, "whereas a super-het usually requires rather more. Surely you are not dissatisfied with me?"

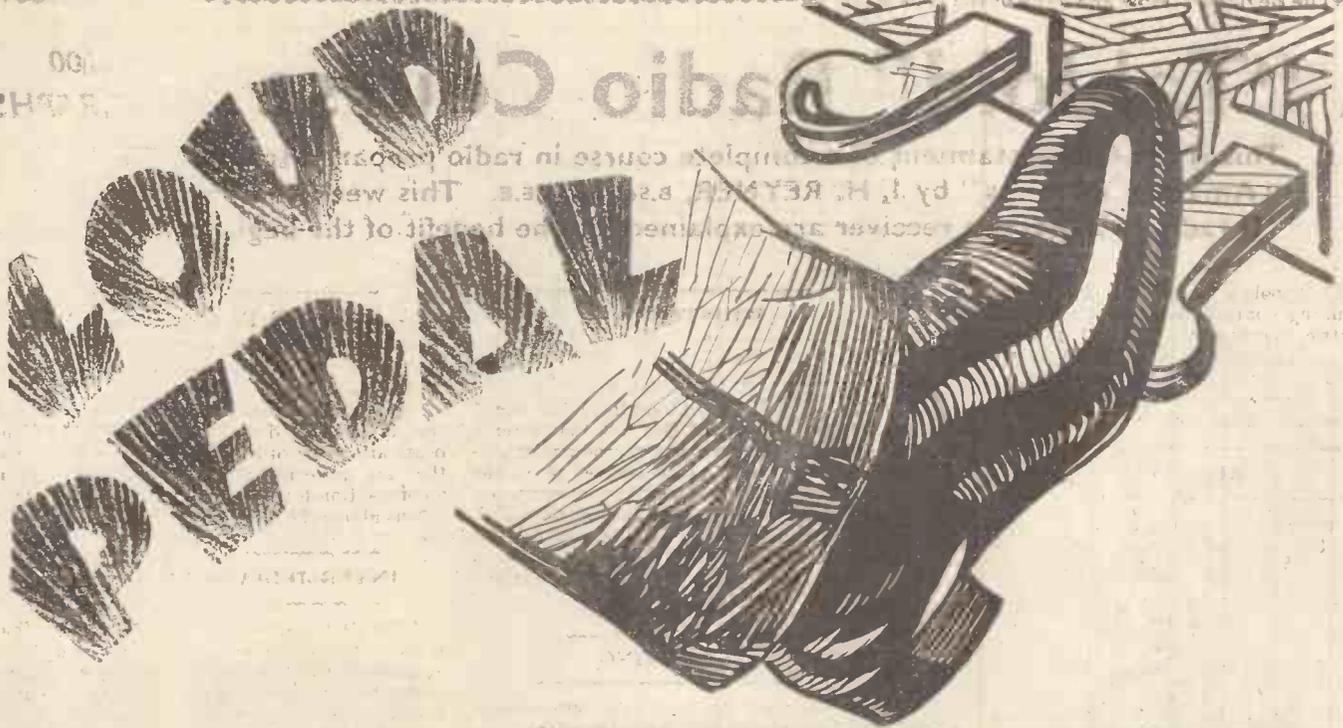
"No, no," said Peter hastily. "Tell me, what is this volume-control knob?"

"That is to adjust the volume of the signals coming from the loud-speaker, so that you may make the noise loud or soft as you want."

PRE-DETECTOR CONTROL

"Does it operate on the loud-speaker? It can do, and in some cases does, but it is more usual to cut down the input to the set by some means. The earlier valves in the receiver are designed to be effective on weak signals and will overload and give distortion if too strong a signal is applied. To avoid this it is much better to control the volume by reducing the amplification of the earlier stages rather than allowing them to develop their full amplification and then cutting down the results at the loud-speaker."

Continued on page 710

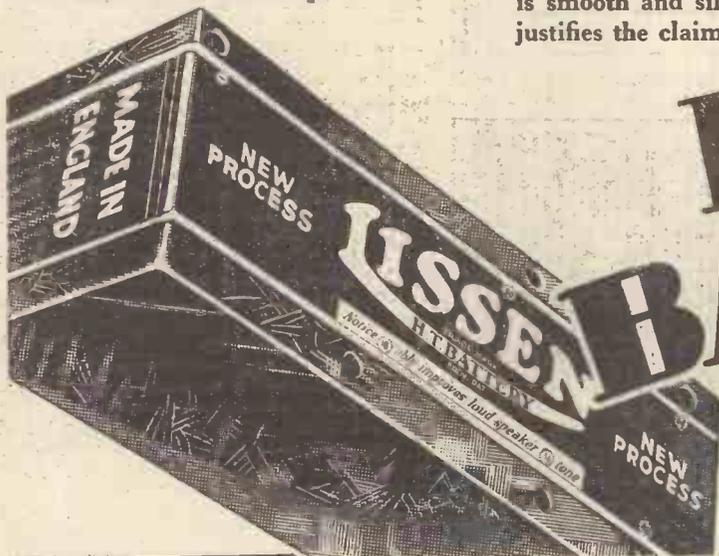


AND AT ONCE YOUR SET DEMANDS A BIG INCREASE IN CURRENT FROM YOUR BATTERY

ONLY the battery with **NEGLIGIBLE INTERNAL RESISTANCE** *can* stand up to the sudden current drains of modern Transient Load Circuits!

In modern Transient Load circuits—which have made possible the claim “Mains Power from Battery Sets”—the amount of high-tension current used depends upon the “noise-value” of the programme. Thus, as the music gets louder and louder, the drain upon your battery gets heavier and heavier. And if beneath this drain the voltage of the battery drops, you get distorted reproduction and lose all the benefits of your modern Class-B or Q.P.P. output.

The cells of a Lissen Battery stand up notably to these sudden drains; they give the required current without volt drop. The big oxygen content of the Lissen cells reduces internal resistance so that the battery can respond *instantly* to any demand. All the time the current flow is smooth and silent, giving distortionless reproduction which really justifies the claim “Mains power from battery sets.”



LISSEN BATTERY

Don't Forget to Say That You Saw it in "A.W."

The Beginners' How and Why of the New Radio—Continued from page 708

VARIABLE-MU VALVES

"There are various ways of doing this, but the most popular is by using a variable-mu valve. Let us ask Hector to tell us about this."
 "I am a screen-grid valve," said Hector "for high-frequency amplification, but I am so made that my amplification factor depends upon the grid bias which you put on me. With a small grid bias I give a large amplification, and with a large grid bias my amplification



A typical receiver, showing how the normal operating controls are arranged

falls off to something quite small. Consequently you can control the amplification in the set quite easily by merely altering the grid bias.

POTENTIOMETER

"How is that done? By a potentiometer, which is a high resistance connected across a battery. Current flows through the resistance so that the voltage at any point on the resistance is dependent on its distance from the end. By having a sliding contact which can be moved over the surface of the resistance you can tap off any voltage you like within the extreme values.

"The volume control in this set is made like that, and as you rotate it you vary the grid bias between 1.5 volts for weak signals and 20 volts for strong signals. I give about one-thousandth times less amplification on a strong signal as on a weak one.

AUTOMATIC VOLUME CONTROL

"This process can be made automatic. The voltage developed at the detector valve by the signal itself can be turned into a grid-bias voltage, which is fed back on to the high-frequency valve. With a strong signal coming in the bias voltage produced is large so that the amplification is cut down.

"On a weak signal the voltage at the detector is small, the bias on the high-frequency valve is small, and the set develops full amplification. Consequently the whole process is automatic."

TONE CONTROL

"I see," said Peter. "Thank you, Hector. Tell me," he continued, addressing the set again, "what is this switch at the back?"

"That is a tone control," answered the set, "to enable you to adjust the quality of the reproduction. It consists of a condenser

connected across the loud-speaker. As you know a condenser will allow alternating or vibrating current to flow through it, and the ease with which it passes them depends upon the frequency of the vibrations.

BY-PASS CONDENSER

"If we have a condenser across the loud-speaker it has no effect at low frequencies, but as the frequency rises some of the current starts to go through the condenser. This cuts down the response of the loud-speaker in the upper frequencies, and produces a mellow effect.

"It must not be overdone or it makes the speech sound 'woofy.' In some cases the condenser is made variable or an equivalent circuit is used so that the amount of top cut may be controlled by the user."

WAVE-CHANGE SWITCH

"It sounds a good idea," agreed Peter, "and now there is only one more knob—this wave-change switch."

"Well, you know what that does," the set replied. "It alters the coils inside the set so that they will tune over the different ranges of wavelengths. All the coils are linked up on the same switch so that they are all changed together. There is also a third position on this switch which changes the connections over for gramophone reproduction."

RADIOGRAM

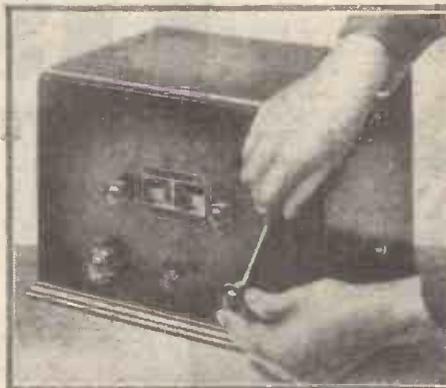
"What do I mean by that? Surely you know that you can play a gramophone through your wireless set? The ordinary gramophone record contains a groove which runs from the outside to the inside of the record, and as it does so it wobbles from side to side. The amount of the wobble is made to correspond exactly to speech waves in the recording studio.

ELECTRICAL PICK-UP

"An electrical pick-up is used, fitted with a needle just like an ordinary soundbox. The motion of the needle in the groove from side to side produces electrical currents which are more or less exact replicas of the original current picked up on the microphone at the recording studio. These currents are introduced into the detector valve of the receiver and are amplified and applied to the loud-speaker, just as the ordinary speech currents in radio reception.

MAINS SETS

"The quality of the music with an electric



Tightening up the grub-screws which hold the control knobs of a set on their spindles

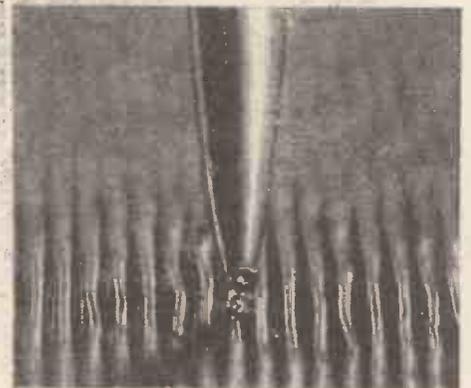
gramophone can be extremely good, especially with a mains receiver. What is that? Just an ordinary set which is arranged to obtain all the necessary high- and low-tension voltages from the electric-lighting mains.

A.C. MAINS

"The most common type of supply known as alternating current, the current flowing first in one direction and then in the other, like an oscillation. This usually takes place fifty times a second—hence the term '50 cycles.' We can use transformers on such a supply just as we can with the speech oscillations in a wireless set, and step the voltage up or down as we require.

A.C. VALVES

"Special valves are made to operate off A.C. mains. These valves have special filaments or heaters which are supplied with current at 4 volts, obtained from a transformer. The filament is made rather massive so that the fluctuations of the current have no effect and the emission of electrons remains steady.



An enlarged photograph of a needle resting in the groove of a gramophone record

RECTIFIERS

"For the high-tension supply the current has first to be made to flow all in one direction, which is done by passing it through a rectifier. This may be a special form of valve or an assembly of specially treated copper discs may be used. The current is then passed through filters, which remove the irregularities, leaving a steady supply just like a battery.

D.C. SUPPLY

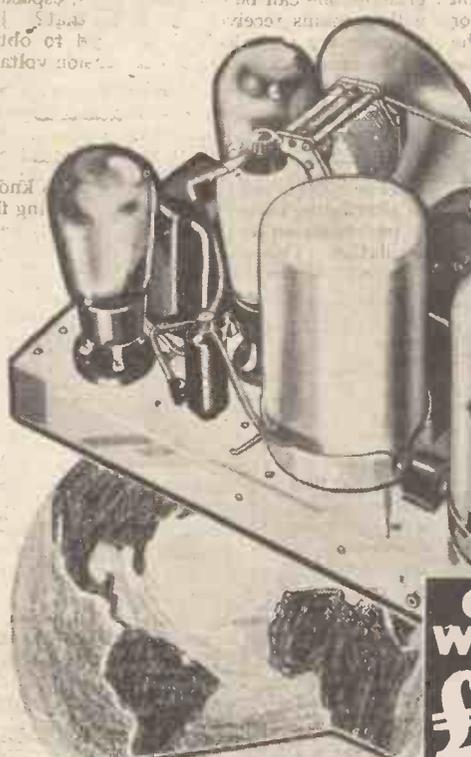
"Some supplies are direct current, meaning that the current always flows in the same direction. Such current does not need to be rectified but it does require to be filtered to remove irregularities.

"These points, however, are all matters of detail. Mains sets are no different in general principles from the better sets which we have been discussing."

Peter lit a cigarette. "Well," he remarked, "this has all been most interesting. I certainly understand much more about you than I ever did before. Thank you."

"You're welcome," answered the set, and all the parts joined in. "You're welcome WELCOME . . . WEEELCOME . . ." until the noise became a continuous shriek.

With a start Peter woke up. "Cuss that alarm," he murmured, "I was having such an interesting dream."



NO OTHER KIT IN ALL THE WORLD CAN GIVE YOU

ENGLAND-EUROPE-AMERICA-AUSTRALIA

as this new All-wave "Skyscraper" does!

COMPLETE WITH FOUR VALVES £5.12.6

WORLD-WIDE NEWS AND ENTERTAINMENT

for Home Constructors ONLY!

At last the day of All-World Radio has arrived, and you can build with your own hands the first receiver to give you not only England and Europe, but America and Australia direct. The Lissen All-Wave All-World "Skyscraper" 4 tunes from 12 to 2,000 metres. It brings two complete new wavelength ranges within reach of the ordinary listener—stations and programmes which before he was never able to receive—Ultra Short and Short-Wave transmissions from the ends of the earth. And remember you get these stations through Double-Balanced Pentode Output, giving brilliant reproduction on a Moving-Coil Speaker—as much power as a Mains Set from ordinary high-tension batteries.

Lissen have made this All-Wave All-World Radio available to Home Constructors first, because it brings back the thrill of conquest to hear America and Australia direct on a set you have built yourself, it makes you an enthusiast to realise what a wonderful thing you have created!

When you see the Great Free Chart of the All-Wave All-World "Skyscraper" 4, which tells you how to build it and how to work it and why it gives such marvellous results, you will agree at once that it will be wise of you to build for yourself rather than buy a factory-assembled receiver which cannot give you these new and intriguing short-wave stations. The FREE CHART simplifies everything; there are pictures of every part, with every wire numbered, every hole lettered, every terminal identified. YOU CAN'T GO WRONG! But get the Chart and see for yourself—then build the Lissen All-Wave All-World "Skyscraper" 4, the SET THAT SPANS THE WORLD!

The Thrill of Distance - the Satisfaction of Pioneer Achievement The Certainty of Success!

DOUBLE BALANCED PENTODE OUTPUT AND MOVING COIL SPEAKER!

WITH WALNUT CABINET and MOVING COIL LOUDSPEAKER £8.2.6



GREAT LISSEN CHART MAKES EVEN THE ULTRA SHORT WAVES SIMPLE!

To LISSEN, LTD., Publicity Dept., ISLEWORTH. Please send me FREE copy of All-Wave All-World "Skyscraper" Chart. Name..... Address..... A.W. 1134



To Ensure Speedy Delivery, Mention "A.W." to Advertisers

Programme Items You Should Hear!

Wednesday, October 18

YOU should hear an outstanding performance of the Beethoven *Emperor* concerto from the Queen's Hall to-night. Josef Hofmann, the great Polish pianist, is the soloist. Hofmann, who has not been heard in England for many years, is now on a world tour.

Thursday, October 19

Emmerich Kalman, the Hungarian composer, is conducting a concert of his own works with the Theatre Orchestra to-night. First time here. Alternatively, you may prefer to hear the first Hallé Concert of the season with Sir Thomas Beecham conducting. Programme rather dull, perhaps; it is purely orchestral and includes three symphonies.

Friday, October 20

Belfast listeners are to hear a performance of that old Ulster story, *The Buried Bride*, to-night. London listeners will be



First steps in radio! A very young listener tunes in the controls of a Marconiphone portable receiver

entertained by the first Chamber Concert from the Concert Hall at Broadcasting House. Haydn, Reger and Beethoven played by the Busch String Quartet at 8.30 p.m.; not very thrilling.

Saturday, October 21

To-night is popular night, as usual. Plenty of real light-hearted entertainment that everyone will enjoy. Dance fans will listen to Ambrose and his boys from the studio at 10.30 p.m. Listen for real good dance tunes with fine vocal choruses by Elsie Carlisle, Sam Browne, and Reilly and Comfort, the famous American duettists. You know that Ambrose's band now plays at the Embassy Club?

North Regional is giving a snappy light programme entitled *Syncopation*. The artists are Thomas Kay, xylophone; James Armstrong, saxophone; John Lewellyn, banjo; and Thomas Johnson, syncopated pianist. Surprising what jolly entertainment can be given by a group of artists like these.

Perhaps you might prefer a concert by the Leeds Symphony Orchestra. It is being conducted to-night by John Barbirolli, who has recently taken over from Julius Harrison. The star item is Myra Hess playing the solo part in Schumann's delightful piano concerto.

Sunday, October 22

A popular band concert by the R.A.F. Band is on the air from London to-day. Tuneful stuff like the *Coronation Bells March*, selections of Wilfred Sanderson's songs and *Pagliacci* are in the programme.

A high spot in the Midland Regional programme to-day is a relay of Sir Hubert Parry's music from Gloucester-Cathedral. The famous Fleet Street Choir is singing six unaccompanied motets and one of Parry's greatest works, *Blest Pair of Sirens*. This work will be accompanied on the organ by W. H. Sumsion.

Belfast is giving Mendelssohn a show in its programmes to-day. Local talent, for the chorus and artists, has been drawn upon for the performance of the *Hymn of Praise*, probably the best known of Mendelssohn's works with the exception of *Elijah*. In this programme will be two popular orchestral pieces, including the famous *Ruy Blas* overture.

Monday, October 23

A great day in the programmes. The Nationals are giving the first of two performances of Roger Quilter's light opera, *The Blue Boar*, in which Amy Augarde, that delightful stage artist, will be making her first broadcast appearance. Ina Souez, Raymond Newell, Appleton Moore and Mark Raphael are in the cast. Stanford Robinson is conducting the B.B.C. Theatre Orchestra and the show will be produced by Gordon McConnell. "The Blue Boar," by the way, is the name of an inn out in the wilds of Hampstead. It should be a good show.

An interesting organ broadcast is being given in the West Regional programme to-day. It comes from the famous Downside Abbey and will be played by Dom Gregory Murray. Downside Abbey organ is very similar to the organ in the Concert Hall at Broadcasting House. It will give listeners an eye-opener regarding the acoustics of organ broadcasting. It will be interesting to compare the acoustics of the Downside organ in open surroundings against the B.B.C. instrument in its comparatively confined space.

North Regional is keen on its brass-band concerts. Every year a contest is held at Belle Vue and to-night the winner of the 1933 contest is giving a broadcast concert. These Northern bands can play!

Tuesday, October 24

If you missed the first broadcast of Roger Quilter's *Blue Boar* yesterday, tune in to the Regional programme to-night; a repeat performance is being broadcast.

The National transmitters are putting out an anniversary programme dealing with the history of the famous Black Watch Regiment. *The Black Watch* has been written by John Gough and is founded on actual fact except, of course, that small liberties have been taken here and there for dramatic effect.

The prologue is written round an incident which is assumed to have taken place in the Great War, when an officer and a soldier are cut off in a shell hole. The war atmosphere will be portrayed and between attempts

when the men try to get away from the shell hole the soldier questions the officer about the Black Watch; four episodes are explained, including the *Birkenhead* episode, when seventy-four men of the regiment went down. The performance will be relayed from Edinburgh.

Midland Regional is relaying a variety programme from the Coventry Hippodrome this evening. The popular orchestra, which frequently broadcasts, will be under the direction of Charles Shadwell and the artists include the Southern Sisters and Herschel Henlere, the comedian.

Wednesday, October 25

You have the choice to-night between a vaudeville show and the second of the B.B.C.'s Winter Season of symphony concerts. In the vaudeville Clarice Mayne, the famous music-hall star; Johnson Clarke, the Sportsman Ventriloquist; Charles Hayes; Ben Osborne; and Gretyl Vernon, the "Viennese Nightingale," are some of the leading lights.

Adrian Boult is conducting the symphony concert. It is a varied programme with items by Bach, Mozart, Beethoven and Strauss. Walter Geisiking is the soloist in the Mozart work, the *Piano Concerto No. 27 in B Flat*. Geisiking, the son of a German doctor, studied at Hanover Conservatoire and is noted as a pianist possessing a perfect execution.

Thursday, October 26

The Concert Hall at Broadcasting House will be packed out to-night with musicians for the performance of Emmerich Kalman's *Circus Princess*. The orchestra will be in its usual place on the ground floor and a military band will occupy the gallery. John Hendrik will be heard in his first "star" part; he has broadcast several times before. Harriet Bennet, the leading lady, is making her first appearance in this country. Miss Bennet has a big following in America and Australia, where she sung in *Rose Marie* for two years.

The band that won the much-coveted Crystal Palace championship this year for the second time in succession—Foden's Motor Works Band, is broadcasting in the North Regional programme to-night. A concert of first-rate interest; it is bound to be good.

Friday, October 27

There are four good things in to-day's programmes. The Royal Marines Band from Chatham in the West Regional programme; another relay from the Birkenhead Argyle from North Regional; European dance tunes played by the Wireless Military Band in the London programme; and, on the National, the first of two repeat performances of Lance Sieveking's famous radio play, *Kaleidoscope*.

Saturday, October 28

"Music Hall" to-night, and a good show it is, too. The leading lights are Jack Hylton and his boys, supported by Marie Burke, Charles Heslop, Rupert Hazell and Elsie Day.

Sir Walford Davies and Joseph Lewis are in Wales to-day helping along a concert that is being given by 375 unemployed men drawn from various clubs in the Rhondda Valley. Sir Walford is playing the piano and Joe Lewis is conducting. Some solos will be given by Arthur Cranmer. The concert is being relayed from the Central Hall, Tonypany, in to-night's West Regional programme. Quite a homely affair, we imagine!

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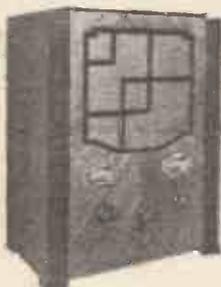
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2 GRAHAM FARISH .0001-mfd. mica fixed condensers	2	0	0
1 GRAHAM FARISH .0005-mfd. mica fixed condenser	1	0	0
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3 TELSEN .25-mfd., type W.229, fixed condensers	4	6	0
2 TELSEN 1-mfd., type W.227, fixed condensers	3	6	0
1 TELSEN 2-mfd., type W.226, fixed condenser	2	6	0
1 GRAHAM FARISH .01-mfd. mica fixed condenser	1	6	0
1 TELSEN, type W.306, twin-gang .0005-mfd variable condenser	12	6	0
1 TELSEN Single .0005-mfd., type W.339, variable condenser	7	6	0
1 SOVEREIGN .0003-mfd. pre-set variable condenser	1	3	0
4 CLIX four-pin chassis-mounting valve holders	4	8	0
1 CLIX five-pin chassis-mounting valve holder	1	3	0
1 BRITISH RADIOGRAM anti-breakthru unit and switch coupler	5	0	0
1 VARLEY battery economiser, type D.P.44	15	6	0
8 BELLING LEE marked wander plugs	1	0	0
2 BELLING LEE spade terminals, marked: L.T., + L.T.	4	0	0
3 LISSEN terminal blocks	3	0	0
1 BELLING LEE wander fuse, marked: H.T.	1	0	0
4 GRAHAM FARISH fixed resistances—500 ohms, 5,000 ohms, 40,000 ohms and 1 megohm	6	0	0
1 SOVEREIGN 50,000-ohm variable resistance with combined 3-point switch	4	6	0
1 BRITISH RADIOGRAM 2-in. metal mounting bracket for potentiometer	6	0	0
Connecting wire and sleeving, screws, 5 yds. thin flex, 2 ft. shielded sleeving	2	6	0
1 VARLEY Nicore II L.F. transformer	11	6	0
1 LISSEN 126-kilocycle intermediate-frequency transformer with reaction, No. 3305	7	6	0
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Broadcasting Stations

Wavelengths are brought up to date week by week. For the purpose of better comparison, the power indicated is that of the carrier wave.

Kilo- metres cycles	Station and Call Sign	Country	Power (Kw.)	Kilo- metres cycles	Station and Call Sign	Country	Power (Kw.)
6.86 17,790	Daventry (GSG) ...	Great Britain	20.0	312.5 960	Genoa	Italy	10.0
16.88 17,775	Eindhoven (PHI) ...	Holland	20.0	312.8 959	Cracow	Poland	2.0
19.56 15,330	Schenectady (W2XAD)	United States	20.0	315 952.5	Marseilles	France	1.6
19.73 15,200	Zeesen (DJB)	Germany	8.0	318.8 941	Sofia (Rodno Radio)	Bulgaria	.5
25.25 11,880	Paris (Coloniale)	France	15.0	318.8 941	Dresden	Germany	.25
25.28 11,865	Daventry (GSE)	Great Britain	20.0	320 939	Naples	Italy	1.5
25.4 11,810	Rome (ZRO)	Italy	15.0	321.9 932	Goteborg	Sweden	10.0
25.51 11,760	Zeesen (DJD)	Germany	8.0	325 923	Breslau	Germany	60.0
25.53 11,750	Daventry (GSD)	Great Britain	20.0	328.2 914	Poste Parisien	France	60.0
25.63 11,705	Paris (Coloniale)	France	15.0	331.5 905	Milan (Siziano)	Italy	50.0
30.0 10,000	Madrid (EAO)	Spain	20.0	335 896	Poznan	Poland	2.0
31.25 9,598	Lisbon (CTIAA)	Portugal	2.0	338.2 887	Brussels (No. 2)	Belgium	15.0
31.3 9,585	Daventry (GSC)	Great Britain	20.0	342.1 877	Brunn (Brno)	Czechoslovakia	32.0
31.38 9,560	Zeesen (DJA)	Germany	8.0	345.2 869	Strasbourg (PTT)	France	11.5
31.55 9,510	Daventry (GSB)	Great Britain	20.0	350 857	Barcelona (EAIJ)	Spain	8.0
31.6 9,490	Poznan (SRI)	Poland	1.0	352.1 852	Graz	Austria	7.0
37.33 8,036	Rabat (CNR)	Morocco	6.0	355.9 843	London Regional	Great Britain	50.0
38.47 7,799	Radio Nations (HBP)	Switzerland	20.0	360.6 832	Muhlacker	Germany	60.0
42.86 7,600	Oslo (Tests)	Norway	0.5	363.6 825	Algiers (PTT)	North Africa	13.0
45.38 6,610	Moscow	U.S.S.R.	10.0	364.1 824	Bergen	Norway	1.0
46.69 6,425	Boundbrook (W3XL)	United States	1.0	368.1 815	Bolzano	Italy	1.0
48.86 6,140	Pittsburgh (W8XK)	United States	40.0	368.1 815	Helsinki	Finland	13.2
48.94 6,130	Mexico (XETE)	Mexico	2.0	368.1 815	Seville (EAJS)	Spain	1.5
49.02 6,120	Wayne (W2XE)	United States	1.0	368.1 815	Santiago (EAJ4)	Spain	.2
49.18 6,110	Chicago (W9XF)	United States	5.0	369.5 812	Radio LL (Paris)	France	.8
49.34 6,080	Chicago (W9XAA)	United States	.5	372.2 806	Hamburg	Germany	1.5
49.4 6,073	Skamlebaek (OXY)	Denmark	.5	376.4 797	Scottish Regional	Great Britain	50.0
49.5 6,060	Nairobi (VO7LO)	Kenya Colony	.5	380.7 788	Lwow	Poland	16.0
49.55 6,055	Vienna (VORZ)	Austria	.5	385.1 779	Radio Toulouse	France	8.0
49.59 6,050	Daventry (GSA)	Great Britain	20.0	389.6 770	Leipzig	Germany	150.0
49.83 6,020	Zeesen (DJC)	Germany	10.0	394.2 761	Bucharest	Roumania	12.0
50.0 6,000	Moscow (RNE)	U.S.S.R.	20.0	398.9 752	Midland Regional	Great Britain	25.0
50.26 5,969	Vatican (HVI)	Italy	10.0	403 743	Sottens	Switzerland	25.0
202.5 1,481.3	Kristinehamn	Sweden	.25	408.7 734	Katowice	Poland	12.0
209.8 1,429	Miskolc	Hungary	1.25	413 725	Athlone	Irish Free State	80.0
209.8 1,429	Magyarovar	Hungary	1.25	416 721	Rabat	Morocco	6.0
209.8 1,429	Pecs	Hungary	1.2	419.9 716	Berlin	Germany	1.5
211.3 1,420	Antwerp	Belgium	.4	424.3 707	Madrid (EAJ7)	Spain	3.0
211.3 1,420	Newcastle	Great Britain	1.0	424.3 707	Moscow (ROZ)	U.S.S.R.	100.0
214.3 1,400	Aberdeen	Great Britain	1.0	429.8 698	Belgrade	Yugoslavia	2.8
215 1,395	Liege (Reg)	Belgium	0.3	441.2 680	Rome (Roma)	Italy	60.0
215.6 1,391	Chatelineau (EL)	Belgium	.25	447.1 671	Paris (PTT)	France	7.0
217.1 1,382	Konigsberg	Germany	.5	447.1 671	Danzig	Poland	.5
217.1 1,382	Dublin	Irish Free State	1.2	452 664	Agaz	France	.2
218.5 1,373	Salzburg	Austria	1.5	452 664	Madona	Latvia	15.05
218.5 1,373	Plymouth	Great Britain	.2	452.8 663	Milan (Vigentino)	Italy	4.0
219.9 1,364.3	Beziere	France	1.0	453.2 662	Odessa (RDH)	U.S.S.R.	15.0
220.3 1,362	Binche	Belgium	.2	453.2 662	Klymfurt	Austria	.5
222.3 1,354	Liege-Pointe	Belgium	0.15	456.6 657	San Sebastian	Spain	5.0
224.4 1,337	Cork (6CK)	Irish Free State	1.2	459.4 653	Beromuenster	Switzerland	60.0
225.9 1,327.3	Fecamp	France	10.0	465.8 644	Lyons (PTT)	France	15.0
227.4 1,319	Flensburg	Germany	.5	472.4 635	Langenberg	Germany	60.0
227.4 1,319	Hanover	Germany	1.5	476.9 629	Lisbon (tests)	Portugal	20.0
231 1,301	Malmo	Sweden	1.25	480 625	North Regional	Great Britain	50.0
231.7 1,294.6	Kiel	Germany	.25	488.6 614	Prague	Czechoslovakia	120.0
233 1,287	Wallonia	Belgium	.3	495.8 605	Tronheim	Norway	1.0
235 1,283	Lodz	Poland	2.2	500.8 599	Florence	Italy	20.0
235.5 1,274	Kristiansand	Norway	.5	509.3 589	Brussels (No. 1)	Belgium	15.0
236 1,271	Bordeaux (S.O.)	France	3.0	518.1 571	Vienna	Austria	100.0
237.2 1,265	Nimes	France	1.0	525.4 571	Riga	Latvia	15.0
238.9 1,256	Nurnberg	Germany	2.0	539.8 563	Munich	Germany	60.0
240.6 1,247	Stavanger	Norway	.5	539.8 563	Palermo	Italy	3.5
242.3 1,238	Belfast	North Ireland	1.0	550.5 545	Budapest (I)	Hungary	18.5
242.7 1,236	Liege	Belgium	.3	559.7 536	Tampere	Finland	1.0
245.9 1,220	Linz	Austria	.5	559.7 536	Kaiserslautern	Germany	1.5
245.9 1,220	Schaerbeek	Belgium	.15	559.7 536	Augsburg	Germany	.25
247.7 1,211	Trieste	Italy	10.0	563 533	Freiburg	Germany	.25
250.1 1,199.5	Juan-les-Pins	France	1.0	565 531	Wilno	Poland	22.0
250.9 1,196	Barcelona (EA15)	Spain	6.0	570.3 526	Grenoble (PTT)	France	15.0
253 1,185	Gleiwitz	Germany	5.0	577.5 519.4	Ljubljana	Jugoslavia	7.5
254.6 1,178	Toulouse (PTT)	France	.7	582 514.2	Tartu	Estonia	.5
257.3 1,166	Horby	Sweden	10.0	690 434.7	Oulu	Finland	1.2
259.3 1,157	Treves (Trier)	Germany	2.3	720 416.7	Moscow (RMO)	U.S.S.R.	20.0
259.3 1,157	Frankfurt A/M	Germany	17.0	743 404	Ostersond	Norway	0.6
259.3 1,157	Cassel	Germany	0.5	760 395	Geneva	Switzerland	1.25
261.6 1,147	London National	Great Britain	50.0	833 360.1	Heston Airport	Great Britain	5.0
261.6 1,147	West National	Great Britain	50.0	840 357	Budapest (2)	Hungary	3.0
263.8 1,137	Moravska-Ostrava	Czechoslovakia	11.0	848.7 353.5	Rostov (RAO)	U.S.S.R.	4.0
265.4 1,130	Lille (PTT)	France	1.3	857.1 350	Leningrad (RHP)	U.S.S.R.	100.0
267.6 1,121	Nyiregyhaza	Hungary	6.3	937.5 320	Kharkov (RMD)	U.S.S.R.	20.0
267.6 1,121	Valencia	Spain	3.0	1,000 300	Moscow (ROZ)	U.S.S.R.	100.0
268 1,119	Bremen	Germany	.15	1,034.5 290	Kiev (RER)	U.S.S.R.	100.0
269.8 1,112	Bari	Italy	20.0	1,071.4 280	Tiflis (RDK)	U.S.S.R.	100.0
271.3 1,105.6	Rennes (PTT)	France	1.3	1,083 277	Oslo	Norway	60.0
273.7 1,096	Turin (Torino)	Italy	7.0	1,105 271.5	Minsk (RMG)	U.S.S.R.	35.0
276.5 1,085	Heilsberg	Germany	75.0	1,126.6 265.75	Monte Ceneri	Switzerland	25.0
279.7 1,072.5	Bratislava	Czechoslovakia	14.0	1,153.8 260	Kalundborg	Denmark	30.0
281.2 1,067	Copenhagen	Denmark	.75	1,170 256.4	Tashkend (RAU)	U.S.S.R.	35.0
282.2 1,063	Lisbon (CTIAA)	Portugal	2.0	1,190.5 252	Luxembourg	Gd. Duchy of Lux.	200.0
283.6 1,058	Innsbruck	Austria	.5	1,200 250	Istanbul	Turkey	5.0
283.6 1,058	Berlin (E)	Germany	.5	1,200 250	Reykjavik	Iceland	21.0
283.6 1,058	Magdeburg	Germany	.5	1,229.5 242	Boden	Sweden	.6
283.6 1,058	Stettin	Germany	.5	1,239.7 242	Kiev (RAG)	U.S.S.R.	10.0
284.7 1,053.6	Radio Lyons	France	1.0	1,255 239	Vienna (Exp.)	Austria	3.0
286 1,049	Montpellier	France	.9	1,304 230	Moscow (RCY)	U.S.S.R.	100.0
288.5 1,040	Bournemouth	Great Britain	1.0	1,348 222.5	Motala	Sweden	30.0
288.5 1,040	Scottish National	Great Britain	50.0	1,411.8 212.5	Warsaw	Poland	120.0
291 1,031	Viipuri	Finland	13.2	1,445.8 207.5	Eiffel Tower	France	13.5
293 1,022	Kosice	Czechoslovakia	2.5	1,481 202.6	Moscow (RTC)	U.S.S.R.	500.0
294.2 1,019.6	Limoges (PTT)	France	.7	1,538 195	Ankara	Turkey	7.0
296.1 1,013	Hilversum	Holland	20.0	1,554.4 193	Norddrecht National	Great Britain	30.0
298.8 1,004	Tallinn	Estonia	11.0	1,620 185	Narentdelch (KVA)	Germany	10.0
301.5 995	North National	Great Britain	50.0	1,634.9 183.5	Zeesen	Germany	60.0
304.3 986	Bordeaux (PTT)	France	13.0	1,725 174	Radio Paris	France	75.0
307 977	Falun	Sweden	.5	1,760 170.45	Moscow (RAX)	U.S.S.R.	30.0
307.1 977	Zagreb	Jugoslavia	0.8	1,796 167	Lahti	Finland	54.0
307.6 975	Vitus (Paris)	France	1.0	1,875 160	Kootwijk	Holland	50.0
309.9 968	West Regional	Great Britain	50.0	1,875 160	Moscow (RCZ)	U.S.S.R.	100.0
				1,910.8 157	Sverdlovsk (RHX)	U.S.S.R.	40.0
				1,935 155	Kaunas	Lithuania	7.0

Pottering Round the Ether

By Jay Coote

THE change back from summer to winter time this year has coincided with a remarkable improvement in atmospheric conditions, and the reception of the more distant or weaker Continental stations is becoming easier nightly. This winter should prove a bumper season for radio, as we are now reaping the benefit of the increased power used by many foreign transmitters.

As a rule, following a preliminary rapid run over the dials in order to ascertain general conditions, and also to find out what is on the air, I make a point of searching on one small portion of the band.

Careful tuning usually brings in some lesser-heard transmission and equally careful logging of the condenser-dial readings facilitates the capture of this broadcast at a later date. Besides, many new transmitters are still seeking more favourable channels, and consequently may be found on slightly varying wavelengths.

Change of Wavelength

As an example, Monte Ceneri (Lugano)-although generally advertised on 1,145 metres-may now be clearly heard on 1,126 metres-to be exact, 1,126.6 metres-and is not spoilt by Kalundborg.

The latter station also, since its increase in power, is well received, providing care is taken to keep Radio Luxembourg out of the background.

A transmitter seldom mentioned is Vienna Experimental, which relays the main Austrian programme from 7 p.m. G.M.T. on 1,255 metres. It is only a 3-kilowatt, but nevertheless a good signal.

As regards Kootwijk taking the Huizen broadcasts, although statements have been made to the effect that the transmissions on 1,875 metres have been spoilt by experimental broadcasts on the same wavelength emanating from Brasov, in Rumania, there is little doubt that the main interference is caused by Moscow, as on several occasions I have heard Russian speech distinctly, and not Rumanian. By the way, it will soon be possible to ascertain, without hearing the call, which programme is broadcast on the lower Dutch channel (296.1 metres) from Hilversum, as the V.A.R.A. are shortly adopting a special musical interval signal. This association is the one which usually closes down its evening programme by playing the *Internationale*, as heard from Moscow and Leningrad.

Excellent Strength of Strasbourg

In the medium waveband, of the French stations I consider that the best is Radio Strasbourg, which, during the last ten days, has been heard at excellent strength. Not only are its local entertainments interesting, but it appears to be the best medium for the P.T.T. programmes, which it regularly relays.

I am informed that early in the New Year steps are to be taken to increase the power of this transmitter, and it may eventually become one of the most important of the stations in the French State network.

If you tune in just below London you cannot fail to separate it from Brno or Graz, and will identify it quickly by its peculiar booming buzzer, used both as opening and interval signal.

Further, similarly to Radio Luxembourg, all announcements are made in both French and German. The main evening programme appears to start at about 8.30 p.m. G.M.T.

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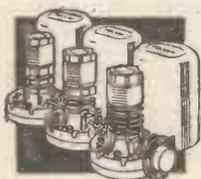


This illustration shows the actual size of the wonderful Telsen Iron Cored Coil.

THE sensational "Iron-Cored" principle has never been so brilliantly applied as in these amazing TELSEN Iron-Cored Coils. Only 2" high—occupying the minimum of valuable base-board space—they are more selective, more convenient and more efficient than any other tuning coils ever produced. They do *not* incorporate switching (since incorporated switching has proved to be much less efficient than a well designed external switch, in addition to considerably increasing the size, and restricting the symmetrical arrangement of controls), and consequently take the fullest advantage of *all* the benefits that the "Iron-Cored" principle provides. Insist on TELSEN Iron-Cored Coils for greater selectivity and amplification.

- Single IRON-CORED COIL 8/6
- Twin Matched IRON-CORED COIL 17/-
- Triple Matched IRON-CORED COIL 25/6

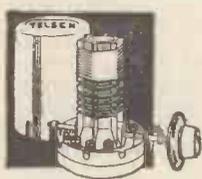
TELSEN COVER EVERY COIL REQUIREMENT



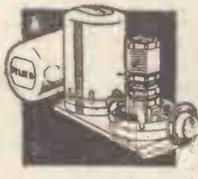
TELSEN SUPERHET COILS
(Type No. S 330) 21/6



TELSEN BAND-PASS & OSCILLATOR COIL
Unit - - - 21/6



TELSEN SCREENED TUNING COILS
Single - - - 7/-
Twin Matched 14/6
Triple Matched 21/6



TELSEN BAND-PASS COIL UNIT 14/6



TELSEN DUAL-RANGE AERIAL COIL 5/6



TELSEN H.F. TRANSFORMER COIL 4/6



TELSEN OSCILLATOR COIL 7/6

TELSEN FOR EVERYTHING IN RADIO

ANNOUNCEMENT OF THE TELSEN ELECTRIC CO., LTD. ASTON, BIRMINGHAM

Advertisers Appreciate Mention of "A.W." with Your Order

Telsen Model 464

Our tests of this new Telsen set have shown that, in spite of its low cost, it gives a fine performance. Telsen always give good value for money. This 464 is an all-electric set with three valves of the indirectly-heated type supplied with high tension by a valve rectifier—four valves in all.

Two things interested us when we first set eyes on the set: its small size and the five control knobs on the front. It is not exactly a midget job though it is almost small enough to stand on the mantelpiece.



These photographs show clearly the attractive appearance of the Telsen model 464 receiver, an efficient three-valve mains set

The size of the cabinet is 11½ in. wide, 8¼ in. deep by 14¼ in. high, finished in a shade of walnut.

Now about those knobs. As we said, there are five of them, not counting the super-imposed trimmer on the main tuning control in the centre. All, except the tuner, have neat ivory discs appropriately engraved.

On the left is the aerial-input control, named selector, above the tone control, and on the right is the reaction knob above the wave-change switch. It is very interesting to note that Telsen have not used a single combination

switch. The on-off switch, a neat toggle type, is on the back of the chassis frame.

There are only two tuned circuits—a loosely coupled aerial coil with a selectivity adjustment and tuned-transformer coupling between the high-frequency stage and detector.

A high-frequency pentode is used in the screen-grid stage and an Osram Catkin for the detector, which is transformer-coupled to the output pentode by the parallel-feed system.

You can see from the back-view photograph that inside the box is crammed full with "works." The set is built up on a two-tier metal chassis. On the top tier are the four valves in line at the back, the Telsen iron-cored coils, two-gang condenser and mains transformer.

Several small parts are underneath this tier. At the bottom is the energised moving-coil loud-speaker surrounded by the smoothing gear, a choke and two 8-microfarad electrolytic condensers.

One thing commendable about this layout is that every part is accessible, even to the eight fixed resistances on the bakelite strip at the bottom. Usual sockets for pick-up, mains for the mains connection, besides the plug for the strip at the bottom.

Now for some practical results of interest, which we noted during our tests in South London on a normal outdoor wire, 35 ft. long. First, we ran over the controls; they all worked smoothly. We compliment the makers on their tone-control system. It is not a mere top-note cutter; it emphasises either top or bottom according to the position of the knob.

Quality, which is, of course, closely related

Brief Specification

Makers: Telsen Electric Co., Ltd.

Model: 464.

Price: £9 9s.

Valve Combination: Screen-grid high-frequency amplifier (Mullard SP4), detector (Osram Catkin MH4), pentode output (Mazda AC/Pen) and valve rectifier (Micromesh R2).

Power Supply and Consumption: A.C. mains, 200-250 volts. Consumption, 48 watts.

Type: A consolette A.C. three-valver needing only aerial and earth.

Remarks: Excellent value for money. Both selectivity and quality are commendable.

to the tone-control setting, was really good. There is plenty of volume; more than most people will need. You can adjust it from a brilliant tone to that mellow note, which is the more popular.

Selectivity is well above the average for a set with only two tuned circuits, no doubt due to the efficient little iron-core coils. You can accomplish really notable feats of station separation by correct handling of the aerial-input and reaction controls.

For instance, we got Brussels No. 2 and Scottish Regional quite clear of London Regional by keeping the reaction control advanced until it was on the verge of oscillation and adjusting volume with the selector control.

Twenty Good Medium-wavers

During a quick run round the medium waveband we easily logged twenty programmes worth hearing. That's very good, you know. Long waves were equally good. The usual eight or nine stations were easily brought in by sacrificing volume. Berlin could be heard clear of neighbourly interference.

Results in daylight more than satisfied us. Ten stations on the medium band is good going! One of the most commendable features we noticed was the entire absence of mains hum.

One final word! We recommend a pick-up; the set is worth it, but you must use an external volume control.

Latest News for the Set Buyer

A REMARKABLY cheap car-radio set will shortly be introduced by Sunbeam Electric, Ltd., of Sunbeam Road, North Acton, N.W.10. The price of £7 7s. will include the valves, but not batteries. The circuit is a straightforward four-valver with screen-grid high-frequency and detector stages, one stage of low-frequency amplification and a pentode output. Four Tungram 4-volt valves are used and the set, which is quite a midget job, is fitted with a moving-coil loud-speaker.

Low-tension supply is obtained from the car battery and high tension from the ordinary dry battery. A converter priced at £6 can be fitted if the user prefers it to dry batteries.

We have frequently received letters from readers asking for details of a reasonably priced A.C. two-valver. These sets are few and far between this year, but we have received details of a 1933-4 set marketed by Standard Telephones & Cables, Ltd., which will suit these people. The set, known as the model S322, is designed to work on A.C. mains between 100 and 250 volts. It is housed in an attractive walnut cabinet with the moving-coil loud-speaker at the top and the tuning knob in the centre underneath.

The set appears to be very simple to operate. A special feature is that a coil enabling the set

to be used on wavelengths between 25 and 70 metres can be had for 6s. 6d. extra. Price, £7 19s. 6d.

Fox Industrial, Ltd., announce an interesting new super-het—a three-stage set with two high-frequency pentodes and a power output pentode. There is a fourth valve for the mains rectification, the set being designed for A.C. supplies.

A high standard of quality has been the aim in designing this set, which has seven tuned circuits, with band-passing to prevent cutting of the high notes.

Automatic volume control is incorporated, as well as the usual manual volume control. Another special feature is a progressive tone control.

The type is No. 401, and the price is £13 13s.

Most set buyers must now be familiar with the attractively designed McMichael Twin Supervox, a table-cabinet set with two moving-coil loud-speakers, one at each end. Now comes news of a useful attachment for this set, a specially-made table in good quality walnut to match the cabinet.

This table costs £2 2s. and conveniently converts the table cabinet set into what is virtually a pedestal model. It solves a prob-

lem of accommodation that often confronts the owner of a table set and should appeal alike to those who have bought the set and to those who are thinking of doing so.

Pressland Products have entered the set market with three receivers, which include an all-electric transportable—the Palmtree—at £12 12s.

A moderately priced set for D.C. mains that gives good results is the Philips model 830C, priced at £12 12s. The set is housed in one of Philips' attractive arbolite cabinets and the circuit uses two high-frequency pentodes and two low-frequency pentodes, the latter in parallel in the output stage. Current consumption is reasonable, being about 50 watts on 220-volt mains.

Two very popular Marconiphone sets, the models 276 and 272, which have only been available for use on A.C. mains, will have their counterparts in D.C. models from October 16. The model 276DC is a seven-valve super-het table model with built-in moving-coil loud-speaker, and the model 278DC, as the D.C. model of the 272 is designated, is a four-valve super-het with a rather fine full-vision scale calibrated in stations and wavelengths.

ETHERDYNE

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GUARANTEED, TESTED and MATCHED COMPONENTS

BUY DIRECT FROM THE FACTORY

Having just acquired a large, modern component Factory, we are able to assist Etherdyne constructors considerably by supplying them direct, eliminating, therefore, the usual middleman's profits. This saves you up to 33% per cent. on the cost of building your Etherdyne. Build with complete confidence an N.T.S. Easibilt Constructor Kit. In addition to these advantageous features, every component part is matched, tested, fully guaranteed, and complete down to the last screw.

THIS LIST OF PARTS SAVES YOU MORE THAN ONE GUINEA

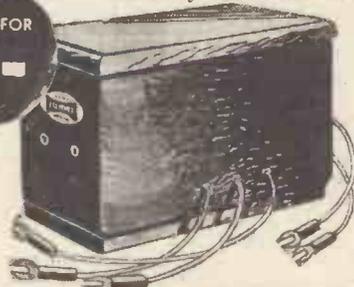
All Manufacturers' Kits, Speakers, Eliminators and Accessories, etc., etc., on our famous EASY WAY TERMS as usual. See our previous advertisements in "Amateur Wireless."

THIS WEEK'S RECOMMENDATION

FERRANTI CLASS 'B' SUPER POWER CONVERTOR

Seven times the power from this ready assembled unit.

YOURS FOR 3/-



SEND FOR IT ON 7 DAYS' TRIAL

This completely assembled Unit with Class "B" Valve enables you to convert your present battery set to Class "B" immediately. Increases power seven times with very little difference in present H.T. Consumption. Connected in a few seconds.

Send 5/- for 7 Days' Trial. If satisfied, pay balance in 11 monthly payments of 6/- (Cash in 7 days) 63/- Carriage Paid.

LISSEN KITS

- NEW LISSEN SKYSCRAPER FOUR ALL-WAVE CHASSIS MODEL, complete kit comprising all components, including set of Lissen Valves. Cash or C.O.D. Carriage Paid, £5/12/6. Balance in 11 monthly payments of 10/3.
- NEW LISSEN SKYSCRAPER FOUR ALL-WAVE CONSOLETTA CABINET MODEL, complete kit, comprising all components, including set of Lissen Valves, Cabinet and Moving Coil Speaker. Cash or C.O.D. Carriage Paid, £8/2/6. Balance in 11 monthly payments of 15/-.
- NEW LISSEN 7-VALVE SUPER-HET, Chassis Model, complete with Lissen Valves in Sealed Carton. Cash or C.O.D. Carriage Paid, £8/17/6. Balance in 11 monthly payments of 16/6.

Any items supplied separately, CASH or C.O.D. Orders over 10/-, C.O.D. Charges Paid. Parcel of Components value £1 or over. EASY WAY TERMS. Send for quotation.

	£	s.	d.
1 PETO-SCOTT "Metaplex" chassis, 16 by 10 by 3 1/2 in.	3	0	
1 N.T.S. standard type H.F. choke	2	6	
1 N.T.S. H.F. choke	1	6	
2 LISSEN iron-cored coils, screened aerial (1) No. 5321; (1) 5392	1	5	0
LISSEN iron-cored coil, 126 kilocycles, oscillator No. 5381	12	6	
1 N.T.S. .00005-mfd. mica fixed condenser	1	0	
2 N.T.S. .0001-mfd. mica fixed condensers	1	0	
1 N.T.S. .0005-mfd. mica fixed condenser	1	0	
1 GRAHAM FARISH .001-mfd. mica fixed condenser	1	0	
3 N.T.S. .25-mfd. fixed condensers	3	9	
2 N.T.S. 1-mfd. fixed condensers	3	0	
1 N.T.S. 2-mfd. fixed condensers	2	0	
1 N.T.S. .01-mfd. mica fixed condenser	1	3	
1 N.T.S. twin-gang .0005-mfd. variable condenser	10	0	
1 N.T.S. single-gang .0005-mfd. variable condenser	5	6	
1 SOVEREIGN .0003-mfd. pre-set variable condenser	1	3	
4 CLIX four-pin chassis-mounting valve holders	4	8	
1 CLIX five-pin chassis-mounting valve holder	1	3	
1 BRITISH RADIOGRAM anti-break-thru unit and switch coupler	5	0	
1 VARLEY battery economiser, type D.P.44	15	6	
8 BELLING-LEE wander plugs, marked: H.T.+1, H.T.+2, H.T.+3, G.B.-1, G.B.-2, G.B.-3, G.B.+(2)	1	0	
2 BELLING-LEE spade terminals, marked L.T.+L.T.	4		
3 TELSEN terminal blocks	1	6	
1 N.T.S. fixed resistance, 500 ohms	1	0	
1 N.T.S. fixed resistance, 5,000 ohms	1	0	
1 N.T.S. fixed resistance, 40,000 ohms	1	0	
1 N.T.S. fixed resistance, 1 megohm	1	0	
1 SOVEREIGN 50,000-ohm variable resistance with combined 3-point switch	4	6	
1 N.T.S. 2-in. metal mounting bracket	3		
Connecting wire and sleeving, screws, 5 yds. thin flex, 2 ft. shielded sleeving	2	0	
1 N.T.S. super L.P. transformer	5	6	
1 LISSEN 126-kilocycle intermediate-frequency transformer with reaction, No. 5395	7	6	
1 LISSEN 126-kilocycle intermediate-frequency transformer without reaction, No. 5391	8	6	

KIT "I" CASH or C.O.D. £6 15 0

SPECIAL EASY TERMS

ETHERDYNE OFFER

LISSEN SET OF COILS OR YOURS FOR

5/-

2 Lissen Iron-cored Coils (5321 and 5392), 1 Lissen Oscillator Coil (5381), 1 Lissen I.F. Transformer (5305), 1 Lissen I.F. Transformer (5391). Cash or C.O.D. Carriage Paid, 53/6.

Balance in 11 monthly payments of 5/-



KIT 1

WITH ORDER

Comprising Tested and Matched Parts, including Metaplex Chassis, but less Valves, Cabinet and Speaker

12/6

Balance in 11 monthly payments of 12/6.

Cash or C.O.D. Carriage Paid, £6 15s. 0d.

KIT 2 As Kit No. 1, but with Valves only, Cash or C.O.D. Carriage Paid, £10 5/0.

KIT 3 As Kit 1, but with Scott Etherdyne Walnut Console Cabinet, less Speaker. Cash or C.O.D. Carriage Paid, £11/18 0.

With order 21/9. Balance in 11 monthly payments of 18/9.

With order 21/9. Balance in 11 monthly payments of 21/9.

KIT 4 As Kit No. 2 with Peto-Scott Model "B" Adapta-gram with fitted Gramo Equipment. £31.10. Cash or C.O.D. Carriage Paid, £16/11/0

With order. Balance in 11 monthly payments of 26/-.

FINISHED INSTRUMENT

COMPLETE ETHERDYNE CONSOLETTA RECEIVER, with 5 B.V.A. Valves and Speaker, factory-built and broadcast tested. Cash or C.O.D. Carriage Paid, £14/17/6. With order £217/6. Balance in 11 monthly payments of 24/-.

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Conducted by J. H. Reyner, B.Sc., A.M.I.E.E.

We Test for You

VARIABLE-CONDENSER LOSSES

MANY people regard a variable condenser as having little to do with the selectivity of a circuit. As long as it will tune to a signal that is all there is to it, they say. Actually a variable condenser contributes very largely to the performance of a receiver.

The selectivity of the ordinary circuit is dependent on its effective resistance measured at a high frequency equivalent to that at which it will be used. A good deal of this effective resistance is contributed by the coil, but a surprisingly large proportion comes from the tuning condenser.

The fixed plates of a modern condenser are held in position by small blocks of insulating material. When the set is working the condenser is subjected to rapid changes of voltage; the electrons in the material have to dance about a million times a second or even

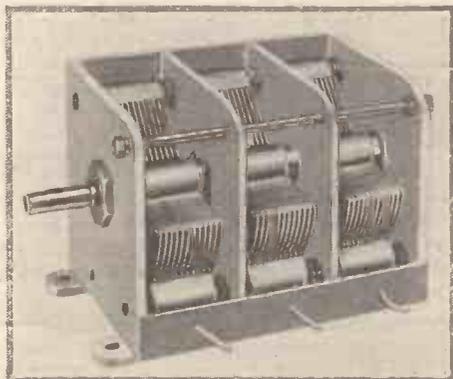
more, and they object to doing so. Consequently they must be forced to move and this requires energy. If we force current through a resistance we also expend energy and so we say that the insulation of a condenser has an effective resistance at high frequencies.

Variable condensers submitted for test have their high-frequency loss measured and this is specified in terms of the effective series resistance introduced into the circuit. A good condenser has an effective resistance at 750 kilocycles (400 metres) of less than 1 ohm. Nowadays it seems that we are not prepared to pay the price or are more easily satisfied. At any rate few condensers reach this standard and the general run of condensers introduce a resistance of between 2 and 4 ohms into the circuit, a loss nearly as great as that introduced by the coil itself.

UTILITY MITE CONDENSER

THE Utility three-gang Mite condenser is a remarkably compact instrument intended primarily for chassis mounting. The three sections of the condenser are built into a die-cast metal chassis $3\frac{3}{4}$ in. long by $2\frac{3}{4}$ in. in height and width. Both fixed and moving plate assemblies are die-cast in position, which keeps them very rigid and enables close spacing to be adopted. Each section is provided with a mica-dielectric trimmer.

The vanes are of a semi-circular type but the fixed plates are cut away to give an approximately logarithmic law. For super-het



The new Utility Mite ganged condenser is particularly compact, being only $2\frac{3}{4}$ in. square

work one section can be obtained with specially shaped plates.

A slow-motion friction drive is available for the condenser, the ivory scale of which is calibrated in degrees and wavelengths, the latter being suitable for use with 157- and 1,900-microhenry coils.

Test Results

The maximum capacity of the condenser was 535 picofarads as against a rating of 500; the minimum figure was approximately 35 picofarads. The maximum capacity of the trimmers was approximately 100 picofarads.

The high-frequency resistance of one section was measured and found to be only 1.3 ohms, a commendably low figure.

The condenser is a thoroughly sound and attractive job.

Makers: Wilkins & Wright, Ltd.
Price: 19s. without dial.

TELSEN MAINS TRANSFORMER

THIS Telsen transformer type No. W360 is of the totally enclosed variety, the end plates being in the form of shields giving complete protection and covering to the windings. The various terminals are mounted on a bakelite panel, at the top of the transformer, in small recesses which are approached by channels in the moulding to facilitate neat and rapid wiring. A neat moulded cover is provided, giving complete protection to all connections.

The transformer is rated for use on 200 to 250 volts at 40 to 100 cycles mains and has three secondary windings. The high-tension winding is rated at 275—0—275 volts, 50 milliamperes, and the low-tension winding 5 amperes at 4 volts, this being centre-tapped. The third winding, for a rectifier, is rated to give 2.3 amperes at 4 volts; this is not centre-tapped.

Test Results

The instrument was tested with an input voltage of 234 on the 230-volt tap. With full load on all the windings the voltages were 260, 3.9 and 3.7 volts respectively. The no-load loss was commendably low, being only 2.3 watts. Regulation (rise in voltage on no-load) was only 12 per cent., again a good figure.

The transformer is a good job and can be recommended.

Makers: Telsen Electric Co., Ltd.
Price: £1 12s. 6d.

VERLOC SAFETY LIGHTNING SWITCH

THIS is a new combination aerial condenser and on-off switch having several interesting

features. The various components are all housed in a neat moulded casing, $2\frac{1}{2}$ in. in diameter, the switching action being obtained by rotating the top half of the casing.

The contacts consist of two long pieces of spring, which move across brass stubs connected to the terminals. With the switch in the "on"

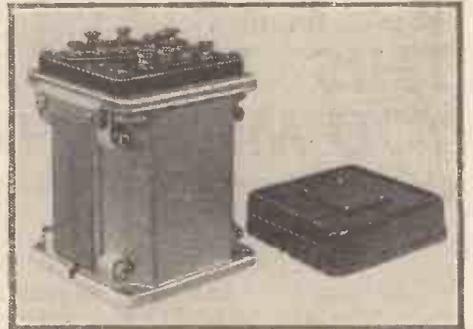


position, the aerial can be picked up direct or via the condenser, while the earth connection goes straight through to the receiver. In the "off" position the leads to the receiver are opened and the aerial shorted direct to earth.

Test Results

The capacity of the pre-set condenser, which is of the familiar compression type, varied from a few picofarads to .00015 microfarad. The action of the switch was quite smooth and a good contact was obtained. The casing is provided with three lugs for fixing the component in some convenient position near to the aerial lead-in.

Makers: Vernon Lockwood Mfg. Co., Ltd.
Price: 3s. 6d.



A bakelite cover for the input and output terminals is fitted to the new Telsen mains transformer

DUBILIER NON-INDUCTIVE CONDENSER

THIS type 9200 condenser is a newcomer to Dubilier's extensive range of condensers. It is of the upright cylindrical type, the housing can be of metal and arranged so that it can be screwed into a small metal cap, which can be fixed to the baseboard or chassis by screws or bolts. Incidentally, the thread of this cap is greased to prevent sticking.

The two terminals are mounted on the slightly conical-shaped moulded top. This, though a small point, is one which should be appreciated as it enables a much easier access to the terminals. The case is $1\frac{1}{2}$ in. diameter, the height depending on the capacity.

Test Results

The condenser received for test was rated at .5 microfarad and the actual value was found to be .53. Insulation was tested at 500 volts but no sign of leakage was obtained. The peak working voltage is 250 volts D.C.

Makers: Dubilier Condenser Co. (1925), Ltd.

Price: 2s.



Left.—The Verloc safety lightning switch, a useful component. Above.—The new Dubilier model 9200 condenser

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1934 Receivers direct from Designers to users



E.M. PLUS 4.

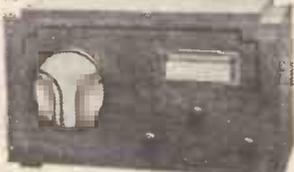
A new straight-four employing the most efficient coils that can possibly be made. These coils cannot be obtained in any other set—they are exclusive to the E.M. Plus 4. Gives super-hot selectivity without any of the usual disadvantages. Amazing range sensitivity with beautiful quality. Very easy to build and operate. Beautiful cabinet of modern design with space for M.C. speaker and batteries.

Build the E.M. Plus 4 and try it for 10 days—if you are not convinced that it is the finest four-valve obtainable, return it and we will refund your money in full.

*The design of this remarkable set is based on the famous Everyman 4.

PRICES

- Kit "A." Complete Kit of Parts, 24/5/0.
- Kit B.—Complete Kit of Parts, with four Valves, 26/6/6.
- Kit C.—Complete Kit of Parts, with Valves and Cabinet, 27/14/0.

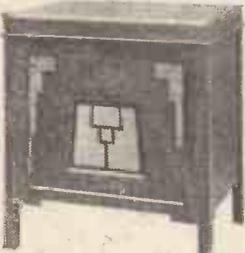


Direct Radio All-Electric (A.C.) Super-Het.

5 valves, (including rectifier). Employs a new circuit possessing many special features. S.G. second detector and pentode output combine to give maximum efficiency obtainable and superior to many sets employing more valves.

Special I.F. circuit eliminates second-channel interference. Amazing range and selectivity with 2 watts speech power in moving-coil speaker. In beautiful cabinet of superb finish and modern design, fitted with high-quality M.C. speaker.

Only 10½ Gns. in oak cabinet. In walnut, mahogany or lined oak cabinet, 10/- extra. Also available as a battery model at same price.



DIRECT RADIO SUPER-HET RADIO-GRAM. ALL-ELECTRIC A.C.

Possesses all the special features described above and fitted with electric gramophone equipment and high-grade pick-up giving most realistic tone. All controls concealed when cabinet is closed.

Only 15 guineas in oak cabinet. In walnut, mahogany or lined oak cabinet, 1 guinea extra.

DIRECT RADIO 3-VALVE MAINS SET

(2 valve plus rectifier). Easy to operate, very selective. Beautiful cabinet. High quality speaker, giving exceptional tone.

All-Electric (A.C.) Model. Only 25/19/6 in oak cabinet. In walnut, mahogany or lined oak cabinet, 28/7/6.

DIRECT RADIO ALL-ELECTRIC RADIO-GRAM.

(3 valves plus rectifier). Will fill a house or a hall with music as loud as the original. Ideal for dance-halls, restaurants and hotels, or for the home.

Only 11½ guineas in oak cabinet. In mahogany, lined oak or walnut cabinet, 1 guinea extra.

Here is the greatest offer ever made to the Radio Public. New Sets of outstanding design and possessing all the latest improvements and many exclusive features at amazingly low prices. Why? Because we offer you the opportunity of buying direct so that you are saved all the usual middleman's profits. Never has such wonderful value been offered; never have such remarkable Sets and Kits been available at such astonishingly low prices.

And you can prove it for yourself with complete safety and confidence. If you are unable to call at our Showrooms at London Bridge to see, hear and test these wonderful sets for yourself, we offer them to you for 10 days' free trial in your own home.

This unique offer is proof of our supreme confidence that you will be delighted with the Set you choose and want to keep it. If for any reason you wish to return it to us, carriage paid, within 10 days, your money will be refunded in full without question.

DEMONSTRATIONS DAILY. If in London, call at our Showrooms at 159 Borough High Street (2 minutes from London Bridge Station) for a demonstration of any of these models or any other Set in which you are interested.

If unable to call, send order at once.

PROMPT DISPATCH There will be a big demand for these Sets. First come—first served. Order at once for prompt delivery.

ETHERDYNE KITS

- Kit A (less valves and cabinet) £7 18 6
- Kit B (with valves less cabinet) £10 13 0
- Kit C (with valves and cabinet) £12 13 0

(Dust Cover for Twin Gang Condenser, 2/- extra.)

- 1 Pertrix 120-volt ultra-capacity H.T. battery 15 6
- 1 Pertrix 120-volt standard H.T. battery 11 0
- 1 Pertrix 9-volt grid-bias battery 1 0

- 1 Baker "Justone" speaker, P.M. type 2 5 0
- 1 Atlas T.25 A.C. mains unit 4 10 0
- 1 Atlas D.C. 15/25 B.D.C. mains unit 1 19 6

PARTS FOR THE ETHERDYNE

- 1 Wooden chassis and foil to specification .. 2 6
 - 1 Ready Radio super-het choke .. 3 0
 - 1 Ready Radio reaction choke .. 1 6
 - 2 Lissen iron-cored aerial coils .. 1 5 0
 - 1 Lissen iron-cored coil, 126 kilocycles .. 12 6
 - 1 Graham Farish .00005-mfd. fixed condenser .. 1 0
 - 2 Graham Farish .001-mfd. fixed condensers .. 2 0
 - 1 Graham Farish .0005-mfd. fixed condensers .. 1 0
 - 1 Graham Farish .001-mfd. fixed condenser .. 1 0
 - 3 T.C.C. 25-mfd. fixed condensers .. 8 9
 - 2 T.C.C. 1-mfd. type 50, fixed condensers .. 5 0
 - 1 T.C.C. 2-mfd., type 50, fixed condenser .. 3 6
 - 1 Graham Farish 01-mfd. fixed condenser .. 1 6
 - 1 Jackson Bros. twin-gang .0005-mfd. variable condenser .. 16 8
 - 1 Jackson Bros. .0005-mfd. variable condenser .. 10 9
 - 1 Sovereign .8003-mfd. pre-set condenser .. 1 3
 - 4 Clix 4-pin chassis mounting valve holders .. 2 8
 - 1 Clix 5-pin chassis mounting valve holder .. 9
 - 1 British Radiogram anti-break unit .. 5 0
 - 1 Varley battery economiser DP44 .. 15 8
 - 8 Wander plugs .. 1 4
 - 2 Belling-Lee spade terminals .. 4
 - 3 Belling-Lee terminal blocks .. 1 6
 - 1 Belling-Lee wander fuse .. 1 0
 - 1 Ready Radio 500-ohm Thermium resistance .. 6
 - 1 Ready Radio 5,000-ohm Thermium resistance .. 6
 - 1 Ready Radio 40,000-ohm Thermium resistance .. 6
 - 1 Ready Radio 1-megohm Thermium resistance .. 6
 - 1 Sovereign 50,000-ohm variable resistance with 3-point switch .. 4 6
 - 1 2-in. metal mounting bracket for potentiometer .. 6
 - Flex, wire and sleeving .. 1 8
 - 2 ft. shielded sleeving .. 6
 - 1 Varley Nicore 2 transformer .. 11 6
 - 1 Lissen 126-kilocycle I.F. transformer with reaction .. 7 6
 - 1 Lissen 126-kilocycle I.F. transformer without reaction .. 7 6
- £7 18 6
- 1 Set of valves as specified .. 2 14 6
 - 1 Cabinet Etherdyne consolette .. 2 0 0

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AMATEUR TELEVISION

SPECIAL SECTION FOR EXPERIMENTERS CONDUCTED BY H COPBISHLEY

First Experiments with the Cathode-ray Tube

This is the fourth of a series of articles explaining in the simplest possible manner the use of the cathode-ray tube for television or other purposes

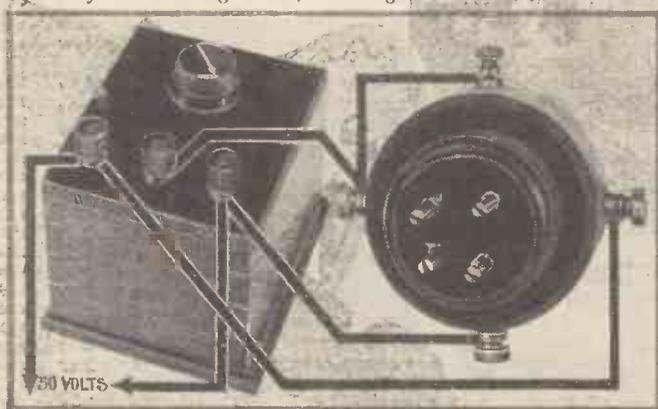
NOW that the exciter unit has been built, it is as well to start by emphasizing the points to be attended to if a long and satisfactory service is to be had from the cathode-ray tube.

(1) Always operate the tube at its rated cathode current. In some cases it may be found that the current may be slightly decreased after the tube has been running for some time. This is all to the good, and provided that loss of focus does not arise, the minimum cathode current should always be aimed at. If for some reason the tube cannot be got to focus at the rated current, and the spot is blurred in spite of adjustment of anode volts and bias, the cathode current may be cautiously increased, but only a very little—5 per cent., say. After running at the higher current for a period it may be possible to reduce

As explained in the first article of this series, if a low A.C. potential is applied to one pair of deflectors, the beam will swing in a straight line, the length of which is

the voltage drop across the condenser will differ in phase from that across the resistance. One potential will be zero at the instant when the other is at maximum.

Accordingly, if one pair of deflector plates is connected across the condenser, and the other pair across the resistance, the potentials applied to the beam will appear as in Fig. 2. At a certain time from the commencement, one wave has the value shown by the dotted line, and the other has a value similarly shown. The combined effect of the two voltages will therefore be to move the beam over as shown. Similar voltage values for different time intervals can be measured, and if their resultant is plotted, it will be seen that the beam will swing round and round in a circle. To make a true circle, the impedance of the condenser must



This photograph shows how the beam deflector is connected to the cathode-ray tube

determined by the A.C. volts applied. Under normal conditions about 30-50v. is sufficient fully to deflect the beam, but no harm will be done if this is exceeded, as the beam will simply hit the deflector plates.

It will be more interesting, however, to produce a figure by applying two potentials

be equal to the value of the resistance, or in symbols:

$$R = \frac{10^6}{2\pi f C} \text{ mfd.}$$

Any value of R and C may be chosen, but since the current taken is negligible, a high-value resistance is usually convenient. The circuit is shown assembled on a panel in the photograph of Fig. 3. The resistance has been made semi-variable so that the voltage drop across it may be varied within limits (Fig. 4). Referring to Fig. 1, if the resistance value is reduced the voltage across the vertical deflector plates will fall and the figure will alter to an ellipse having its long axis in the horizontal plane. Another interesting variation is the inclusion of an L.F. choke in series with the condenser to alter the phase between the two

Continued on page 722

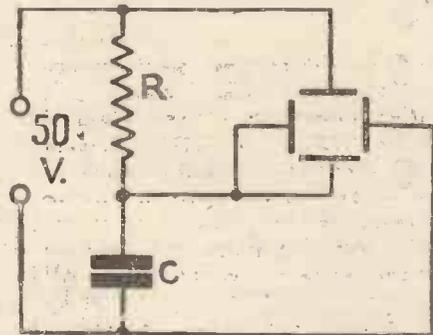


Fig. 1.—A circuit of a simple beam deflector

to normal again, and this should always be tried.

(2) Don't use excessive anode volts. For ordinary observations in a darkened room, 600 volts is usually ample, and good results can be obtained on as low as 400. Keep the 900 for television work when an audience is present. At the end of last week's article it was stated that the spot should not be left too long in one place on the screen. If this is done, there is a possibility of burning the screen material owing to the intense electron bombardment, and a little brown patch will appear where the beam has rested.

So after the tube has been switched on and the preliminary focus obtained, switch it off again and proceed to rig up a simple circuit for deflecting the beam.

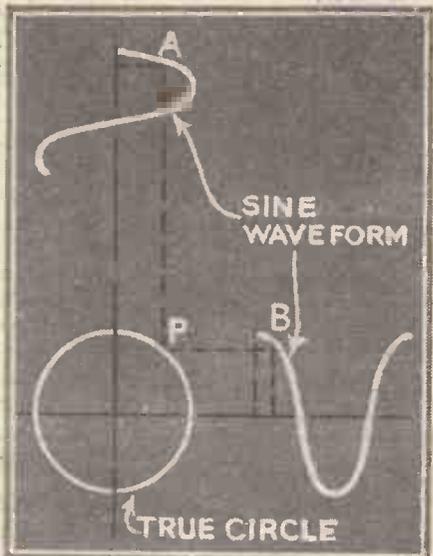


Fig. 2.—How a true circle is formed by the application of two sine waves

to the plates and making them differ in phase. If an A.C. voltage is applied to a condenser and resistance in series (Fig. 1)



Fig. 3.—Here is an under-panel view of a simple beam deflector of which the circuit and values are given by Fig. 4

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specified for the A.W.

"Etherdyme Super"

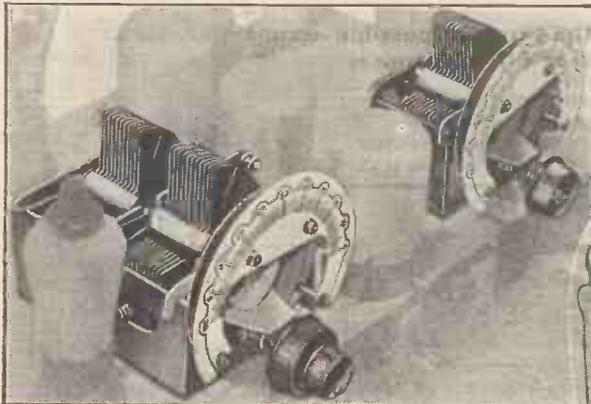
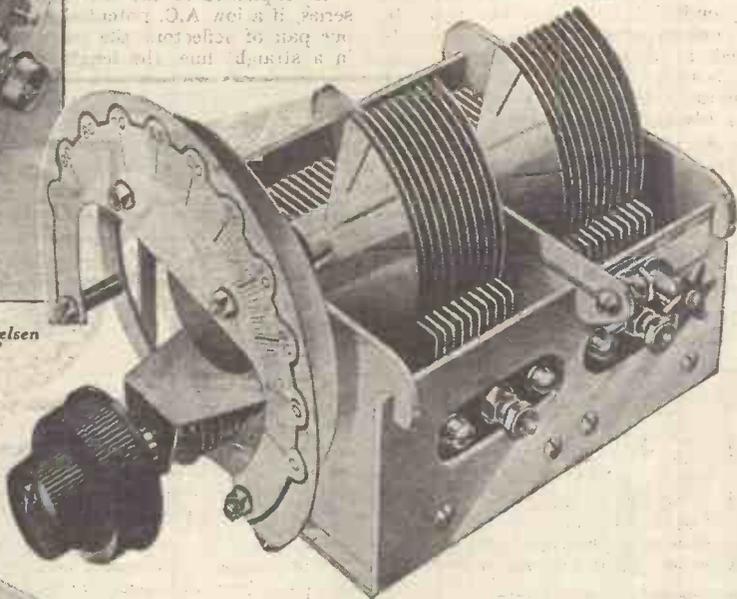
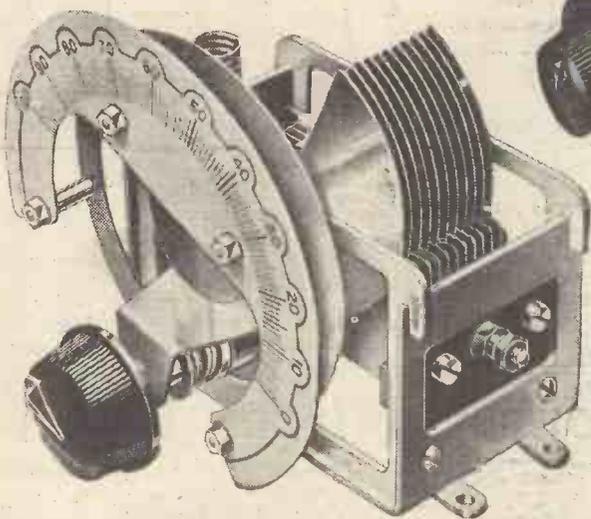


Illustration above shows the position occupied by the Telsen Ganged Condensers in the built-up "Etherdyme Super."

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First Experiments with the Cathode-ray Tube—Continued from page 720

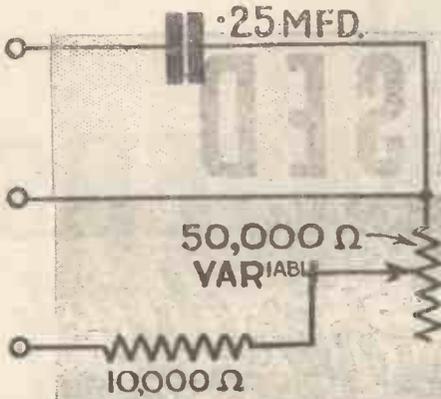


Fig. 4.—The circuit and values of the beam deflector shown by the photographs. This includes a variable resistance

potentials. The ellipse will then lie over at an angle to the vertical which will depend on the amount of inductance in the circuit.

The simple resistance-capacity circuit of Fig. 4 can be used as a time base on which to observe waves of a higher frequency. If a transformer is connected in series with a lead to one of the vertical deflector plates and a small A.C. voltage is applied, it will have the effect of increasing or decreasing the potential producing the elliptical deflection and will thus appear as a ripple on top of the elliptical trace (Fig. 5). A low voltage only is required (about 10 for a trial value) and this could be obtained

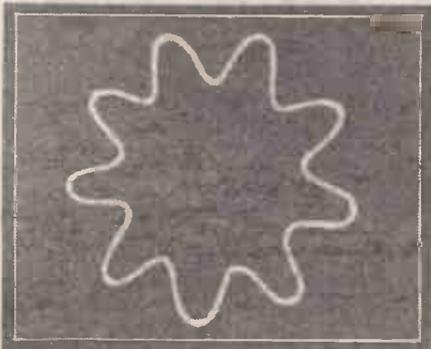


Fig. 7.—A figure produced by superimposing the wave form radially

from the output transformer of an ordinary receiver. The set should be disconnected from the aerial and the reaction increased until a howl sets in. The wave form of the howl in the speaker will then be reproduced on the screen of the tube as in Fig. 6, if the ellipse is widened so that the beam swings well off the screen.

To obtain a stationary wave trace, the frequency of the howl will have to be carefully adjusted to be an exact multiple of 50 cycle. For example, if the howl frequency is 1,000 cycles, twenty little waves will appear round the ellipse. The tube can thus be used as a frequency meter, provided that the waves are not too numerous to cause difficulty in counting.

If the frequency is slightly different from an exact multiple, the waves will crawl

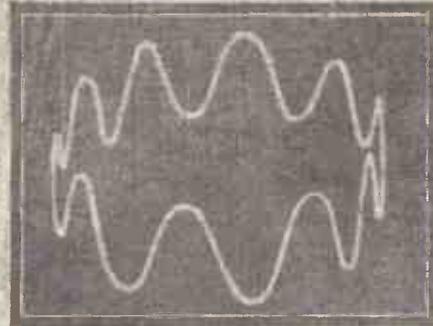


Fig. 5.—The figure produced by connecting a transformer in series with one of the leads to the vertical plates of Fig. 4 and applying an A.C. voltage

round on the ellipse at a speed which depends on the "out-of-step" of the frequencies. This is a very pretty effect, particularly if the direction of rotation is varied by careful adjustment of the howl.

Since the superimposed waves are all in the vertical plane (but try them horizontally by putting the transformer in the other deflector plate circuit!) the end wave forms will be so cramped as to be indistinguishable if the path of the beam is a circle (see Fig. 5 again). To make them all appear uniform, it is better to superimpose them radially on the circle as in Fig. 7. This is done by "injecting" the wave form in the H.T. supply to the anode of the tube as shown in the circuit of Fig. 8. The effect of the A.C. voltage will be to increase or decrease the sensitivity of the tube. The beam on its

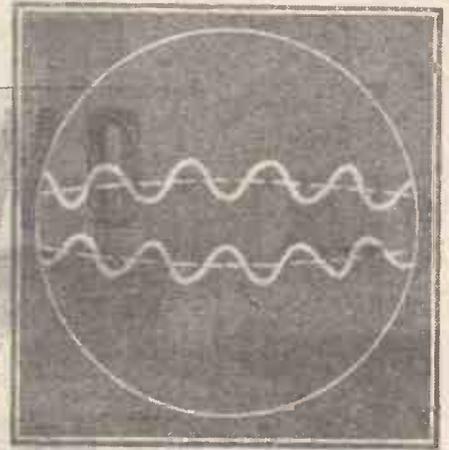


Fig. 6.—The wave form of a howl if the ellipse is widened so that it swings off the screen

way round the circular path will therefore swing in and out as the sensitivity is altered, and the result will be as Fig. 7.

The voltage obtained from the ordinary output transformer of the set should be sufficient to produce a satisfactory deflection; but if not, a 2:1 step-up may be interposed in the cathode-ray H.T. circuit. Remember that the transformer terminals on the tube side will be "live" with 900v., and don't make adjustments when the tube is running!

Next week the construction of a linear time base will be described, which actually is the second step for using the tube for television reception

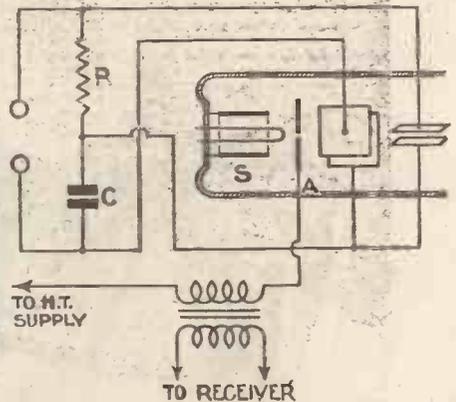


Fig. 8.—How the wave form is injected in the H.T. supply to the anode of the tube

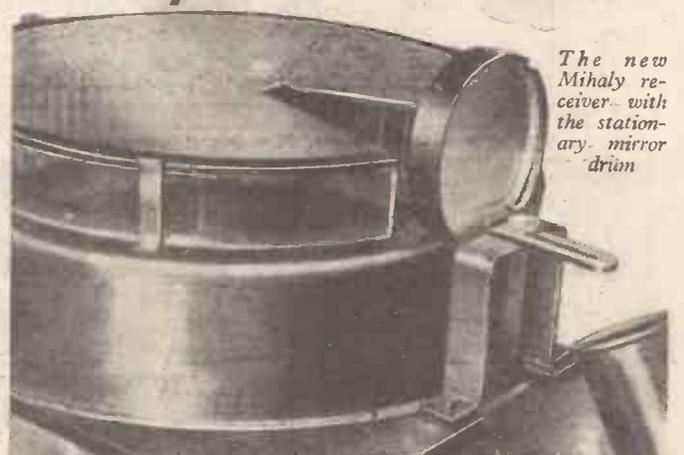
Scanning with a Stationary Mirror Drum

UP to the present the mirror drum has provided the best solution of the problem of mechanical scanning for television receivers, but it is obvious that it has certain limitations. For instance, if a greatly increased number of scanning lines over the present thirty were used it would be inconvenient, if not impracticable, for this would mean increasing the number of the mirrors and therefore the size of the drum, so that more power would be necessary to drive it, and there would be difficulty in synchronising because of the increased weight.

Mihaly has got over these troubles in a very ingenious way. He uses a stationary mirror drum with all the mirrors facing inwards, and the only moving part that is necessary is a small light plane mirror in the centre of these. With this construction it is obvious that any reasonable

number of scanning lines may be employed, and that the power to drive the apparatus and also that required for synchronising are the minimum. Another advantage is that once the mirrors of the reversed drum are set accurately in position there is no likelihood of them getting out of adjustment.

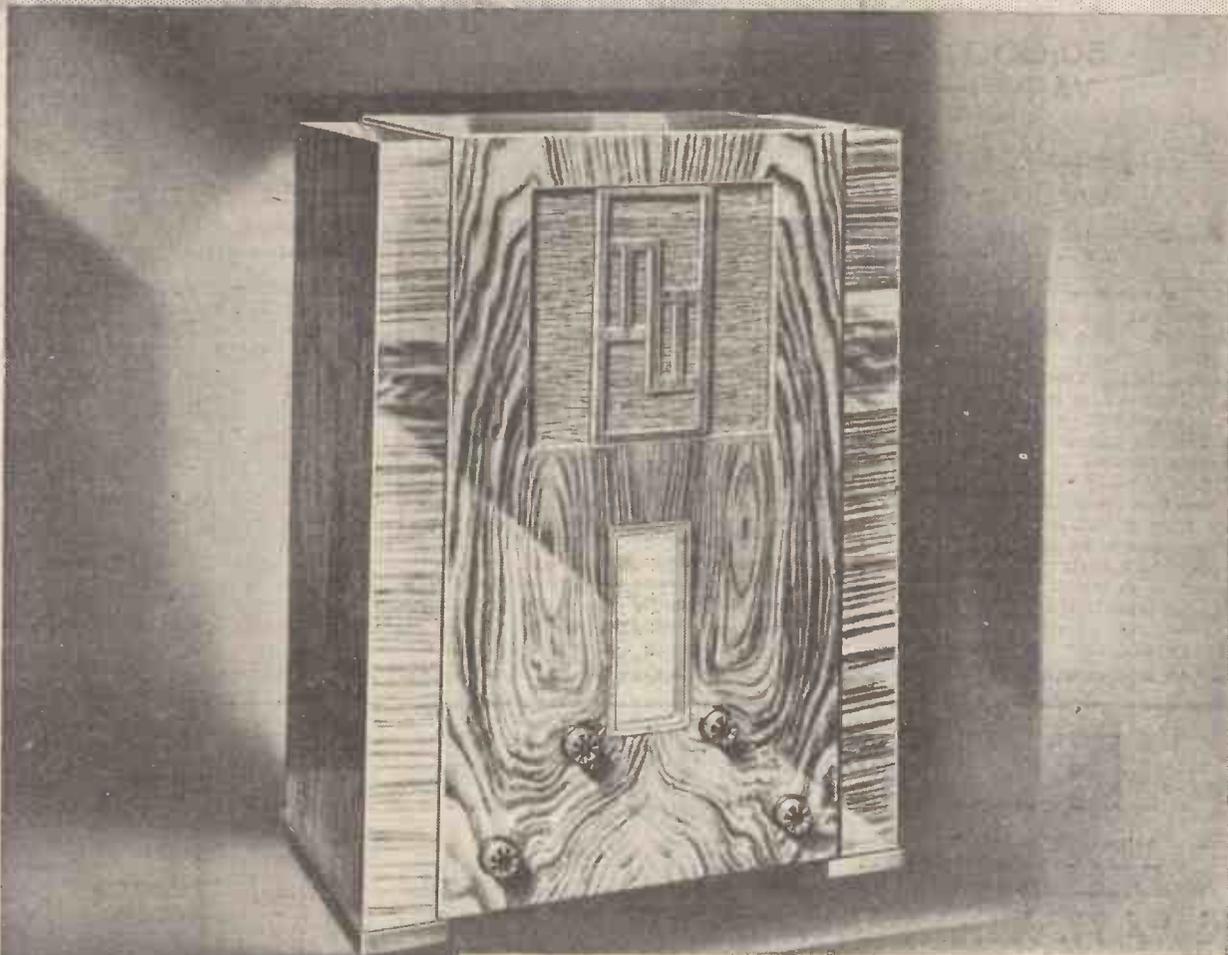
The apparatus as constructed at present is only



The new Mihaly receiver with the stationary mirror drum

(Cont. on page 724)

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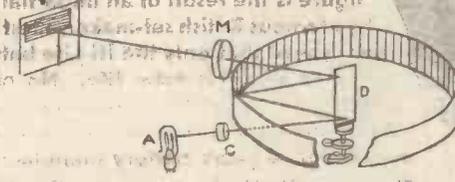
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Scanning with a Stationary Mirror Drum—Continued from page 722

...for horizontal scanning, but it will be clear that it could be adapted for vertical scanning with a little modification in design. In considering how the Mihaly receiver works it is necessary to clear up a point in the first place that the rotating mirror is silvered on both sides

there will be no reflection, but the time is so brief that there is no appreciable loss. Another feature of the Mihaly receiver is that as the rotating mirror is silvered on both sides it need only rotate at half the speed that would be required for a mirror drum projecting the same number of

pictures per second. Its disadvantages are that, owing to the number of reflections there is a certain amount of light loss, and that in some positions of the plane mirror the angle of reflection is very acute with a slight resulting loss of definition at the edges of the picture.



A diagram showing the working principle of the Mihaly receiver

and that whatever is the angle of incidence of the light, the angle of reflection will be the same. The diagram will make the working principle clear. The modulated beam of light B from either a neon lamp A, or a Kerr cell, is in the first place caused to pass under the circle of mirrors, and it is focused by means of a lens C on to the bottom part of the plane mirror in the centre. Owing to the angle at which it strikes this mirror it is reflected back on to the mirrors forming the circular reversed drum which again reflect it on to the centre mirror but this time at the top. From this mirror it passes through a lens M which projects it on to the screen.

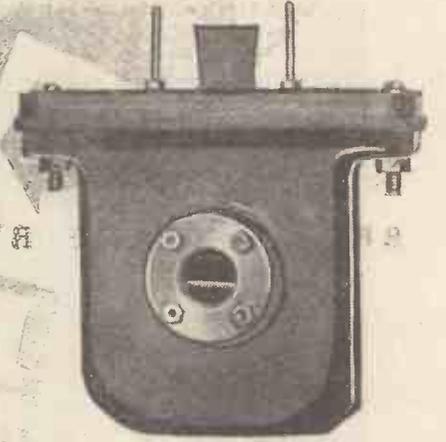
There are, of course, two positions in each revolution of the centre mirror where

A Novel Kerr Cell

TELEVISION components allow of a considerable amount of ingenuity in their construction, and quite a variety of articles can be pressed into service. An example of this is the novel Kerr cell made by a reader of "A.W." Examination of the photograph will show that this has been made out of a bakelite condenser case from which the condenser has been removed. Both sides of the case are drilled through with a circular hole and surrounding this are four small holes in each side of the case to take the small screws which by means of brass washers and nuts clamp the glass windows to the case. Microscope cover glasses, obtainable from any optician, are suitable for the windows, some soft packing material, such as water cork being interposed to make a liquid-tight joint. The cover can be a piece of fibre or ebonite, and the electrode system is supported by this, a hole being provided (and fitted with a cork) so that the nitrobenzole can be introduced.

Manchester. These demonstrations attracted a large amount of attention and proved what excellent results are possible with amateur-constructed apparatus.

This cell gives excellent results, and actually it is the type that was used in the television demonstrations which were given at the recent Wireless Exhibition in



The novel Kerr cell made by Mr. A. Kay of Rochdale

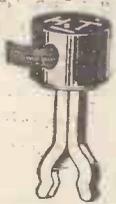
ETHERDYNE

BELLING-LEE AGAIN SPECIFIED IN "AMATEUR WIRELESS" BOOM SET

Belling-Lee Radio Connections have a prominent place in the author's specification of parts required for the Etherdyne.



Midget Wanderplug 1019 ... 2d.

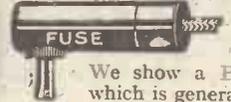


Spring Grip Spade Terminal 1025 ... 2d.

The Midget Wanderplug has three prongs of hard-drawn segmental wire, which are nearly indestructible; they are so resilient that they can adjust themselves to make perfect contact in battery sockets of varying diameters and, once in, they stay put.

The Wanderfuse needs little introduction; it is the most economical means of protecting the valves by fuses and the easiest to fit.

All Belling-Lee Radio Connections mentioned in the article may be loaded with flex without the use of tools, and in such a manner that conductor rubber and fray are securely gripped to ensure an efficient and permanent connection.



No. 1028 - 1/- Spare Fuse 1053 6d.

We show a Belling-Lee Wanderfuse, which is generally fitted to the H.T.—lead and plugs into the H.T. battery. A fuse so fitted is essential for the protection of valves, in event of overload, e.g. as caused by a short.

SPECIAL NOTE
In his description the author of the Etherdyne stresses the importance of fitting an Anode Connector as protection against the possibility of the H.T. lead to the valve becoming loose and earthing on metal, screaming with disastrous results. The illustration shows the most popular Belling-Lee model.



No. 1030 ... 4d.

A SUGGESTION

If you don't mind spending an extra shilling on your Etherdyne, equip it with the most widely specified Terminals in the industry, Belling-Lee R type, at 3d. each. Indications required, A, E, LS+, LS—, and two Belling-Lee Terminal Mounts at 6d. each.

MAN-MADE STATIC SUPPRESSED

Mains Disturbance Suppressor



Will not cut out Atmospherics

90 per cent. of the crackling, buzzing, and sizzling noises in your receiver are H.F. disturbances which are carried by the lighting mains to every room in your home. To suppress these, it is necessary to stop them either at their source or where the mains come into your house, i.e., by the meter-board. The Belling-Lee Suppressor is designed in accordance with Post Office recommendations.

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Listeners' Letters

A ONE-VALVE RECORD?

To the Editor, AMATEUR WIRELESS.
SIR,—May I take a little of your valuable time and space. I am sure the following would be of interest to your readers.

My set is not very selective (London spreads 15 to 20 degrees on the dial). I have logged over thirty-five stations. I have verified reception of two medium-wave American stations, a third being unidentified. WGY was received on June 24 in broad daylight.

All this is not very exceptional, but consider the circumstances. My set is an ordinary straightforward one-valver.

Incidentally, the basic circuit is that of your wonderful B.B.C. One-valver. A leg-up for you! A record for me?

I wonder if any reader can beat this?
Tufnell Park, N.7. H. W. EVANS.

THREE-VALVE SUPER WANTED

SIR,—I have read your "Experimenters" page in AMATEUR WIRELESS with great enjoyment and have noticed that they are easily provoked to settle down and untie the Gordian Knot.

I wonder if I can provoke them into producing a three-valve super-het for A.C. mains? I believe this has been done on the Continent.

Stroud Road, Gloucester. H. EDISON FOX,
[Ed. Note.—We will certainly try to "provoke" those "Experimenters" as requested.]

SIR,—I hope you will soon be able to go forward with the Battery Super 3 set. It seems obvious from the "Experimenters" article in a recent issue of AMATEUR WIRELESS that a new type two-in-one valve is much needed.

Bow, E.3. W. H. MEAD.

THE MASCOT SET

THE MASCOT SET, read in AMATEUR WIRELESS J. Veston's letter re the W. H.'s Mascot, I feel I must write and heartily endorse his statements. As he states, volume and tone are amazing for a detector, two L.F. set. I have been complimented scores of times on the tone and clarity of speech, and I have a log of forty-seven stations, which are receivable at entertainment value.

I also received an American station last Sunday morning at about 3.15 a.m., which, although it was not at London Regional strength, was plainly audible. But in modernising the set, there I do not agree with your correspondent, as I find selectivity much better than on some well-known first-class receivers that I have heard. Well, anyway I

Another Free Gift Next Week!

Included in every copy of next week's AMATEUR WIRELESS there will be a large-size station-identification chart, printed in two colours. This will prove indispensable to every keen listener.

Another point to note about the next issue is that a full-size blueprint of the underside of the Etherdyne chassis will appear on the inside covers.

Tell all your friends about these two special gifts—and order a copy of AMATEUR WIRELESS from your newsagent in advance if you want to make certain of getting one!

am more than satisfied and shall not scrap the Mascot yet in favour of the super-hets. It's a real find.
St. Neots, Hunts. E. G. GREEN.

A READER'S THANKS!

SIR,—I have been a reader since almost the first issue, this is the first letter I have sent you. Apart from the usual technical data, Thermion's stuff is the most interesting and, secondly, the more recently introduced "Experimenters."

Recently Thermion wanted his memory jogged re the name of an obsolete valve. What about the "Myer's"? I think that was the one he had in mind.

By the way, I am in a position most decidedly to support him re backless receivers. Dust does get in—chassis built or not.

May I say I obtain more enjoyment from your paper than any other; and especially read the test reports, which really are "test" as you always give inductance, impedance, and suchlike, very useful indeed when comparing components.
Cathcart, Glasgow. E. WALTER.

AMERICANS IN DAYLIGHT

SIR,—I would like to remark on the reception I have been getting of American broadcasters from when I rise, at 6 a.m., until I leave for work at 7 a.m., and sometimes at 7.30 a.m. they have been leading the loud-speaker.

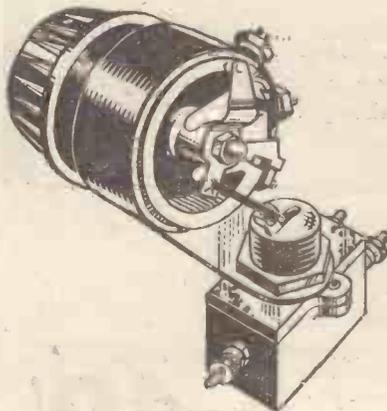
The stations I received were all but one above 250 metres, and one that I had no time to identify about 470 metres. WCAU and WABC came in very loud, and several between London National and Midland Regional.

The receiver I used was a six-valve class-B super-het, using a Westector as a second detector. I would like to know if any others of your readers try for the Americans on medium waves in broad daylight.

Tunstall, Stoke-on-Trent. F. BROAD.

ETHERDYNE

COMBINED VOLUME CONTROL and 3-POINT SWITCH ENTRUSTED TO SOVEREIGN ALONE



In their greatest masterpiece of Radio Construction, the designers of the ETHERDYNE have chosen SOVEREIGN to serve a key position in this wonderful circuit. But if the QUALITY alone is sufficient recommendation for inclusion of the Sovereign Combined Volume Control and 3-Point Switch in this set, how much greater is its value when you consider the price. Here is a soundly constructed component, both electrically and mechanically perfect that you can rely on completely—because it is made by Sovereign and backed by "A.W." Use Sovereign wherever you can when building your ETHERDYNE, there is a wide range of suitable components,

Combined 50,000 ohms, Volume Control and 3-point on-off Toggle Switch as specified for the Etherdyne. Volume Control incorporates patent spring diaphragm contact and accurately set arm to operate switch. Complete with pointer-knob

4/6



also specified

1 SOVEREIGN PRESET CONDENSER (Type J. .0003 mfd.) famous in all important sets. Its inclusion in this set is further guarantee of Sovereign quality. 1/3

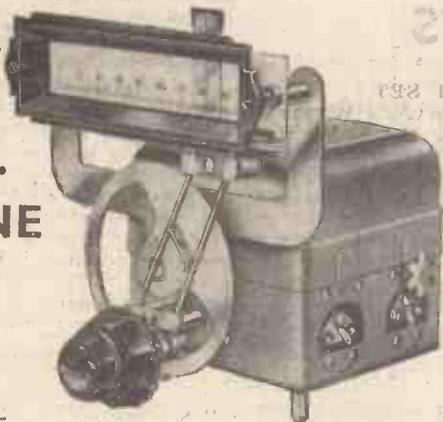
2 Sovereign Terminal Blocks, useful adjuncts to every Set. Each, 6d.



In cases of difficulty, send direct together with your usual Dealer's name and address; also for Free Components Catalogue to—

SOVEREIGN-PRODUCTS, LTD., Sovereign House, 57 James St., Camden Town, London, N.W.1

**THE
NEW J.B.
LINATUNE**



Prices (with cover)—
2-gang, as illustrated, 22/6
3-gang .. 27/6



Whatever the circuit, the experienced constructor will always choose "J.B." For tuning iron-cored coils, in particular, the accurate matching found in J.B. Gangs becomes imperative; and the mechanical rigidity of "J.B." ensures the permanence of this matching. Illustrated is the new J.B. LINATUNE with one trimmer panel—operated by a knob concentric with the main tuning control. It is fitted with the new J.B. Straight-Line Dial, the whole scale being always on view and illuminated by a lamp-holder which travels with the cursor.

PRECISION INSTRUMENTS

Advt. of Jackson Bros. (London) Ltd., 72, St. Thomas' St., London, S.E.1. Telephone: Hop 1837

**CONVERT YOUR SET INTO
AN ALL WAVE SET**

for
9/6



All wavelengths from 14.5 to 2,000 metres covered by this British General All-wave Tuner.

only
9/6

Free wiring diagrams, showing how you can build or convert your set, supplied Free. State circuit when ordering.

From all dealers or direct from the manufacturers—

BRITISH GENERAL

MANUFACTURING CO., LTD., BROCKLEY WORKS, LONDON, S.E.4

**From
every
point
of view**



the 'Alpha' leads

The R. & A. 'Alpha' Reproducer, to quote "The Wireless World," "is a distinct advance in the reliability of M.C. Units."

With ordinary speakers, chassis distortion or damage affects the diaphragm, and may cause the speech coil to foul the gap.

In the 'Alpha,' the unique and patented method of mounting the diaphragm independently of the chassis ensures complete freedom from the effects of chassis distortion.

Diaphragm and speech coil are mounted to a pressed steel member which is secured to the centre pole piece of the magnet by a single nut. Accurate centring of the speech coil in the gap is thus assured, resulting in permanent and trouble-free operation.

Two models are available, viz., STANDARD, with 6-ratio Transformer, and

MODEL "B," with Universal Transformer for Class B operation.

52/6

Ask your dealer to demonstrate, and write us for a copy of new 1934 leaflet.

REPRODUCERS & AMPLIFIERS LTD., WOLVERHAMPTON

R & A 'ALPHA'
P.M. MOVING COIL REPRODUCER DE-LUXE

A Non-directional Loud-speaker

By a Special Correspondent

I SPENT an interesting afternoon at the Patents and Inventions Exhibition at Central Hall, Westminster, inspecting the various radio inventions. One of the most interesting exhibits, from a technical point of view, was the Voigt stand, on which they had some remarkable looking apparatus producing very pleasant music.

One exhibit was a household loud-speaker for use in large rooms and for use in small cinemas where there is little or no room behind the screen.

One of the advantages of this loud-speaker is that you get equal strength in all directions at a given distance. It is also claimed to give, for a given input, four times as much output as a baffle-type moving-coil loud-speaker.

Matching the Furniture

Delving into the inside of the loud-speaker one sees a concrete block in the bend of the horn acting as a reflector plate. A second reflector plate at the top of the cabinet is shaped to reflect the sound waves evenly through the five grilles. This loud-speaker measures approximately 5 ft. high by 4 ft. wide by 2 ft. deep. It can be supplied in any casework to match any furnishing scheme.

Another loud-speaker of the moving-coil horn type was absolutely waterproof. Yet another loud-speaker consisted of four moving-coil units attached to a single horn. This is for use in cinemas, large dance halls or for public-address work, and is capable of handling an undistorted output of 40 watts.

I also noticed two microphones; one was non-directional, being used for general pur-

poses, and the other directional, for the selection of particular sounds.

An adjustable tone corrector for pick-ups was another gadget of interest. On the panel are two knobs; the one on the left-hand side when turned adjusts the amplitude of correction, the one on the right shifts the position of the peak absorption. The price of the standard model is £2 10s.

Further details of any of these exhibits can be obtained from Voigt Patents, Limited, The Courts, Silverdale, London, S.E.26.

How the Etherdyne Super Brings You Better Radio

Continued from page 705

Although selectivity and sensitivity are, of course, paramount attributes of any super-het, there are other things not much less important. For instance, there is the question of running cost. Can a super-het be run economically from batteries? A natural question, and one that we are not afraid to answer in relation to the Etherdyne.

Of course, with five valves you must expect an appreciable milliampere current consumption. But you need not expect an undue drain on a battery of the double-capacity

type, such as we recommend for the Etherdyne. In this set we have taken very full precautions to keep down the anode current of each valve to the lowest possible amount consistent with the results it was desired to achieve.

In the output stage, for example, we have introduced a new economiser scheme already successfully tried out in other sets. This system has the effect of class B or O.P.P., in that it reduces the anode current of the pentode valve to a very low value when the signal is itself low in amplitude. As the signal increases so the system automatically reduces the grid bias and permits a greater current variation.

On an evening's programme the result is an appreciable saving of the battery current. If also the volume control is judiciously reduced when listening to the stronger signals the overall drain is quite surprisingly small, and a double-capacity battery will last a long time.

How and Why of Success

Such, then, is the "how and why" of the Etherdyne's success. In its finished form, as a wooden-chassis set of simple layout, it cannot fail to appeal to you.

We want you to believe that in building the Etherdyne you will be opening up a royal way to reception pleasure. Never since we began designing sets for the constructor have we been so really sure of having produced a "winner."

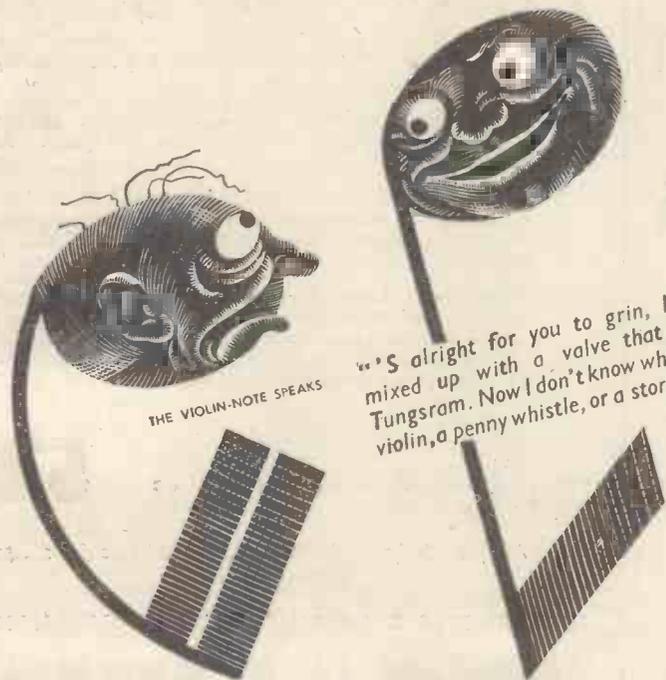
The Etherdyne Super does not depend for its success on ephemeral claims. Its performance is its recommendation.

On that performance, as tested and re-tested by ourselves and entirely unbiased critics, we rest serene—content to let you judge this effort for yourself.

We await your verdict with smiling hearts, for we know beforehand what it is going to be: Guilty—of producing a "super" set among super-hets!

Another Free Gift Next Week!

Included in every copy of next week's AMATEUR WIRELESS there will be a large-size station identification chart, printed in two colours. This will prove indispensable to every listener. Tell your friends about it!

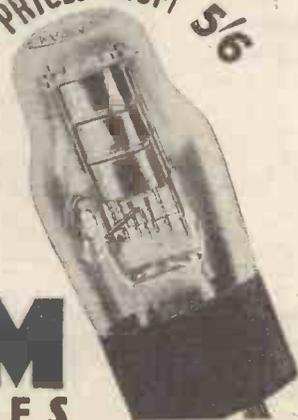


THE VIOLIN-NOTE SPEAKS

"It's alright for you to grin, but I got mixed up with a valve that wasn't a Tungsram. Now I don't know whether I'm a violin, a penny whistle, or a stormy night!"

- THERE'S A TUNGSRAM VALVE FOR EVERY RADIO NEED
- TUNGSRAM'S VIVID TONE PUTS NEW LIFE INTO OLD SETS
- FULL RANGE OF UNIVERSAL A.C./D.C. VALVES
- IF YOU'VE A RADIO PROBLEM, WRITE OUR TECHNICAL DEPARTMENT AND THEY WILL HELP YOU GLADLY

BUT AT PRICES FROM 5/6
THE WORLD'S FINEST



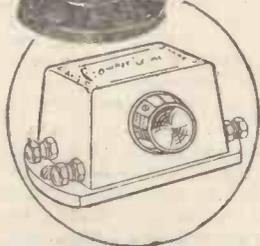
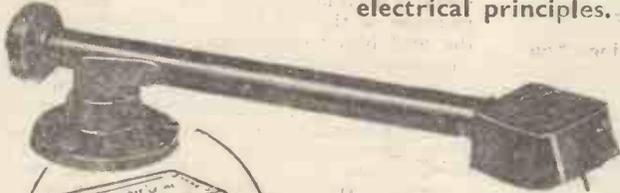
TUNGSRAM

BARIUM VALVES

Advt. of Tungsram Electric Lamp Works (Gt. Britain) Ltd., 72 Oxford St., W.1

CHOSEN
FOR ITS MUSICAL QUALITY
AND EXTREME SENSITIVITY

Everything that a perfect pick-up should be, because it is designed on the best musical as well as the best electrical principles.



FOR THE QUALITY SET
MARK IV PICK-UP

Dearer, perhaps, but the difference in cost is lost in the amazing QUALITY performance of this outstanding pick-up. To ears long accustomed to electrical reproduction it brings a new thrill; to the most critical it brings true satisfaction. Here is a pick-up designed from the very beginning to achieve perfection, and in gaining its object, the BOWYER-LOWE MARK IV PICK-UP has won unstinted praise everywhere. This is the pick-up to use if you value QUALITY.

Matched Response Pick-up (rotating head) with swivel arm on ball bearings, base and support. In Florentine bronze and brown Bakelite to match

COMBINED TONE AND VOLUME CONTROL

affords separate and perfect adjustment of volume and tone. Is indispensable to users of Bowyer-Lowe and all pick-ups. In bakelite case. Connects in an instant.

10/-

Pick-ups from 19/6. Send for Lists.

In cases of difficulty send direct with name of your usual Dealer.

BOWYER-LOWE & A.E.O. LTD., DIAMOND WORKS, BRIGHTON

42/-

NEW DESIGNS
INCREASED OUTPUTS
NO INCREASE IN PRICE



No wonder the Author specifies ATLAS for the ETHERDYNE SUPER

The new "ATLAS" Units, for supplying H.T., or H.T. and L.T. from the Mains, now give you even more and better radio for less than a shilling a year. New designs, increased outputs, improved smoothing and regulation—for "Q.P.P." and "CLASS B"—without any increase in price, make "ATLAS" Units supreme for the "ETHERDYNE SUPER" and every other battery set.

Follow the experts' choice and insist on "ATLAS" or ask your dealer—he knows.

MODEL T.25.
 For A.C. Mains. Tappings 60/80v. (Min. and Max.), 50/90v. (Min., Med. and Max.), 120v. and 150v. Output 25 m/A at 120v. or 150v. Trickle Charger 2v. at 0.5 amps. Westinghouse Rectifiers.
 90/- Cash, or 10/- down.

MODEL D.C.15/25B.
 For D.C. Mains. Tappings 60/80v. (Min. and Max.), 50/90v. (Min., Med. and Max.), and 120/150v. Alternative outputs 15 or 25 m/A at 150v.
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GUARANTEED FOR 12 MONTHS

ATLAS
MAINS UNITS

ASK YOUR DEALER — HE KNOWS

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 London Office: Bush House, W.C.2.

Messrs. H. Clarke & Co. (M/cr), Ltd., Atlas Works, Patricroft, Manchester.
 Please send me full details of the new "ATLAS" Units.

NAME

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(29/4)

SOLDERED CONTACTS FOR BETTER RADIO

Soldered contacts give the best results

Do your Soldering electrically.

ELECTRIC SOLDERING IS SPEEDY. Switch on—ready in four minutes

CLEAN. No flame—hence no dirt

EFFICIENT. Constant heat maintained in the bit

RELIABLE. No jobs spoiled through bit cooling off

ECONOMICAL. 15 hours' use for 1 unit

TRADE SOLON MARK

ELECTRIC SOLDERING IRON

Patent No. 243928

FOR ALL STANDARD VOLTAGES

Obtainable from Leading Stores, Radio Dealers, Electricians, Ironmongers, etc.

Write to makers for FREE BOOKLET

W. T. HENLEY'S TELEGRAPH WORKS CO., LTD.
 DEPT. YB12, HOLBORN VIADUCT, LONDON, E.C.1

76 A HENLEY PRODUCT

Don't Forget to Say That You Saw it in "A.W."



Notes and Jottings

STEPHEN DE LAZLO, B.A., managing director of the High Vacuum Valve Co., Ltd., will lecture on "Technique in Valve Manufacture" at a meeting of the Radio Society of Great Britain to be held at the Institute of Electrical Engineers on October 20. A short film demonstrating the key processes will be shown. Mr. Lazlo will deal with problems of bulb evacuation and also the principles of filament emission.

We have received a copy of the latest edition of *The Handbook of the Wireless League*, the head office of which is at 12 Grosvenor Crescent, S.W.1. In the handbook (price 6d.) are several features that will interest listeners. The aims and benefits derived from the League are explained and there are several interesting articles on topics that affect the listener.

A short-wave station is being erected to provide the new station at Vadsø, in the far north of Norway, with programmes from the Oslo studios. The new Vadsø station has been erected to provide a good radio service to the population scattered in the North Norwegian districts. Its power will be 10 kilowatts.

On Thursday, November 2, the go-ahead Golders Green and Hendon Radio Society are arranging a unique demonstration under the heading of "Music from the Air." The demonstration will include a recital of music played by Martin Taubman on the new valve electronic musical instrument. He will be accompanied by Percy Kahn. A few seats are available to "A.W." readers and early application, enclosing a stamped-addressed envelope, is essential.

In our issue of October 7 we mentioned that a late news bulletin is broadcast every night from Radio Normandie, better known as Fécamp, at 12.15 a.m. We have been informed by the International Broadcasting Co., Ltd., that the bulletin is given at 12.5 a.m.

If you go to Denmark you will learn that young people's dances are given in the studio at Copenhagen once a month from 9 p.m. to 2 a.m. For the first two hours music is provided by the Wireless Orchestra and during the rest of the time music is relayed to the dancers from three restaurants in the city. Why not dances on the same line in the Concert Hall at Broadcasting House?

The opening of the recent Chicago Exhibition was marked by a distinctly ingenious scheme. Thirty years previously an exhibition had been held in the same city to commemorate the four hundredth anniversary of the landing of Columbus, and the idea was to link the two shows together. Some astronomically-inclined person calculated that a ray of light leaving the star Arcturus at the time the first show closed down would reach the earth just as the new show was due to open.

A telescope was accordingly levelled at the star, and at the right second the trapped

A FREE GIFT!

Included in every copy of our next issue of **AMATEUR WIRELESS** there will be a large-size station identification chart, printed in two colours. This will prove indispensable to every listener. Tell all your friends about this special gift.

"ray" was deflected on to a selenium cell, which, in turn, operated a relay to throw open the main doors.

A correspondent informs us that on a recent Sunday he picked up a transmission from Holland on or around 245 metres. This is somewhat remarkable—although not necessarily impossible—as the only station which could be held responsible for the broadcast is that of Bloemendaal on 245.9 metres (1,220 kilocycles).

It is situated in a suburb of Haarlem, roughly four miles from the Dutch coast and about twelve miles west of Amsterdam. It is probably the least worked station in Europe, inasmuch as it limits itself to two transmissions, both on Sundays, namely, at 9.40 a.m. and at 4.40 p.m. B.S.T.; in each instance it relays a sacred service from the local church.

Without Fear or Favour
Continued from page 703

impossible to get past the power of Sir Henry's personality.

The Proms are his, and they are thoroughly English. We can all afford to congratulate him on the great work he has done for London and its music, and to wish him many happy returns of the Last Prom of the Season.

After having made a bad beginning with the Bach Cantatas, it was refreshing to hear one of the best—*Sleepers, Wake!*—done so well.

Dorothy Silk sounded to me as though she stood a foot or so too far back from the microphone. In the duet she was slightly smothered. Otherwise a very good rendering, all the soloists being really good.

America is calling again on November 16 and 17. I guess some of you guys won't know your own language by the time they are through with it.

The ONLY Pick-up Specified for the "A. W." ETHERDYNE is BRITISH RADIOPHONE



PRICE
30/-

THE British Radiophone Pick-up is a worthy representative of a famous range of components and embodies many refinements which are the outcome of careful research. This combined Pick-up, Tone Arm and Volume Control reproduces recorded voice and music with the utmost fidelity—giving clarity to each syllable of speech and bringing out all the rich variations of orchestral and instrumental music. The Radiophone Pick-up enables you to get real music from your records.—As specified for the "A.W." Etherdyne, standard model, mottled brown finish, type 645. Price 30/-.

Obtainable also in the following finishes for an additional charge of 1/-: Old Gold, Oxidised Silver, Oxidised Copper and Bronze.

WRITE FOR FULL DETAILS TO:
THE BRITISH RADIOPHONE LTD., ALDWYCH HOUSE, ALDWYCH, LONDON, W.C.2

Postcard Radio Literature

Here "Observer" reviews the latest booklets and folders issued by well-known manufacturers. If you want copies of any or all of them FREE OF CHARGE, just send a postcard giving the index numbers of the catalogues required (shown at the end of each paragraph) to "Postcard Radio Literature," AMATEUR WIRELESS, 38/61 Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire. Please write your name and address in block letters.

The Lancastria Super-het

I WAS particularly interested to read about the latest range of Ferranti super-hets in their new set catalogue. Of particular interest is the Lancastria, a consolette set. Moderately priced, an attractive burr-walnut cabinet, a well-designed super-het circuit with an output of 2.5 watts, are just some of its fine features. Ferranti make extension loud-speakers for all their sets. **70**

Pots and Switches by Kabi

All kinds and types of potentiometers and switches are described in an eight-page folder I have received about Kabi components. There is a particularly interesting range of midget components that will interest those constructors who may feel inclined to try their hand at the new style of "compressed" sets. **71**

Blue Spot's Latest

When one thinks about loud-speakers, somehow or other the name of Blue Spot always comes to mind. I have just found a copy of the latest catalogue, a comprehensive affair. All types of loud-speaker, moving-coil and balanced-armature, and pick-ups are fully described. A copy of this publication should certainly be amongst your radio books. **72**

An Instrument for Everyone

The new Avonimor is capable of doing nine measuring jobs. In milliamperes 0 to 6, 30 and 120; volts from 0 to 6, 120 and 300; and ohms from 0 to 10,000, 60,000 and 1,200,000. The meter is supplied in a neat case with testing prods and leads. Really I think this ought to go under the heading of radio bargains. **73**

Atlas and Mains Units

Some little time back I commented on Atlas' all-colour catalogue of their range of sets. Now comes a neat little twelve-page colour booklet about their mains units. Here they give full details and nice pictures of their range, which can be obtained for A.C. and D.C. mains with a wide assortment of outputs. There is some useful information on how to use them. **74**

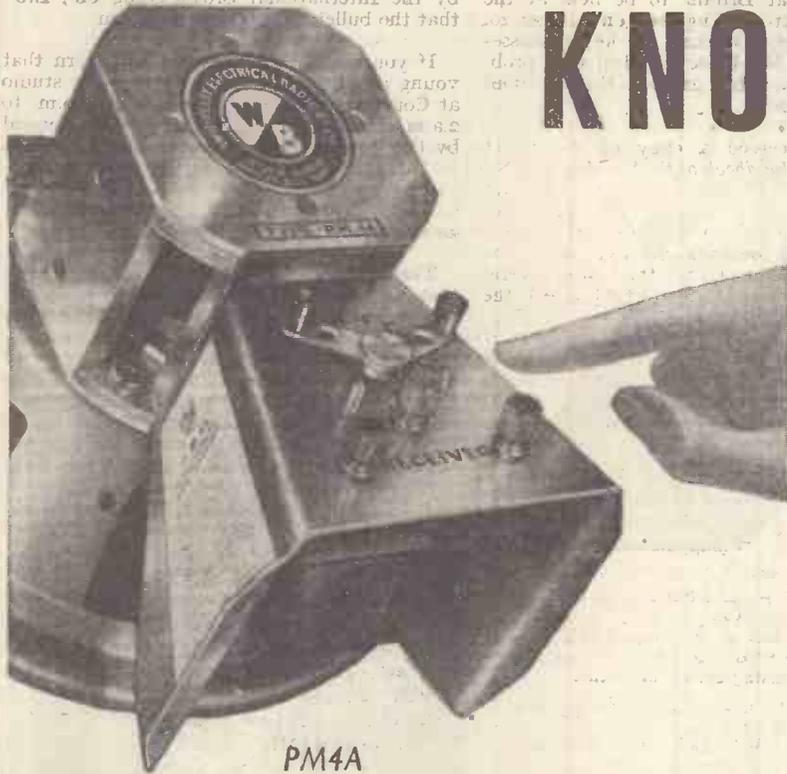
Modern, Distinctive and Elegant

A rather welcome surprise in the form of a Peto-Scott cabinet list arrived on my desk this morning. Until that moment, I did not realise that this famous kit firm made so many types of cabinet. Models for this set and models for that, radiograms, some complete with pick-up and motors and all of them very tastefully designed. I recommend these "boxes" to all constructors. They will give that finishing touch to your outfit. **75**

Belling-Lee's Latest

The new Belling-Lee catalogue is one of the most interesting this firm has produced. There are twenty-four pages really crammed full of interesting information. There are five pages about the range of pick-ups, some very handy and practical news about electrical interference and, of course, pages of news about the famous Belling-Lee range of connections. You should all get a copy of this. **76**

THE DESIGNERS KNOW!



PM4A

A superlative speaker accurately matched to the set is better than a good speaker approximately matched. Brilliance, attack and sensitivity depend largely on magnet, speech coil, and cone design. Even balance of reproduction depends on the matching. • That is why the W.B. "Microloode" is specified for the "Etherdyne Super." • That is why designers of nearly every important constructor set this year have specified the "Microloode." • Hear one at your dealer's and realise the difference. • Meanwhile, write for the new W.B. folder.

'MICROLOODE' TYPE
PM 4a 42/- PM 6 32/6

With the new "Microloode" feature and the famous "Mansfield" Magnetic system.

"MICROLOODE"
Regd. Trade Mark
MOVING-COIL SPEAKERS



Whiteley Electrical Radio Co. Ltd., Dept. A, Radio Works, Mansfield, Notts.

ANNOUNCEMENT

★ to men who want careers in RADIO



In the sign language of the Broadcasting Room this symbol means "Announcement."

The I.C.S. Radio Courses cover every phase of radio work, from the requirements of the youth who wishes to make wireless engineering his career to the man who wants to construct and maintain a broadcasting set for his home.

The Radio industry is progressing with amazing rapidity. Only by knowing thoroughly the basic principles can pace be kept with it. Our instruction includes American broadcasting as well as British wireless practice. It is a modern education, covering every department of the industry.

OUR COURSES

Included in the I.C.S. range are Courses dealing with the Installing of radio sets and, in particular, with their Servicing, which to-day intimately concerns every wireless dealer and his employees. The Operating Course is vital to mastery of operating and transmitting.

There is also a Course for the Wireless Salesman. This, in addition to inculcating the art of salesmanship, provides that knowledge which enables the salesman to hold his own with the most technical of his customers.

We will be pleased to send you details of any or all of these subjects. Just fill in, and post the coupon, or write in any other way, stating which branch of Wireless interests you—the information you require will be forwarded at once.

International Correspondence Schools, Ltd., Dept. 36 International Buildings, Kingsway, London, W.C.2.

Without cost, or obligation, please send me full information about the Course I have marked X

- COMPLETE RADIO
- RADIO SERVICING
- RADIO EQUIPMENT
- RADIO SERVICING AND SALESMANSHIP
- WIRELESS ENGINEERING
- WIRELESS OPERATORS'

Name..... Age.....

Address

Potted Biographies—7

S. P. B. Mais

THE first thing about him you had better get right is the correct pronunciation of his name. It is pronounced *Maze*, not *Mayss*. If you want it all spread out it amounts to Stuart Petre Brodie Mais and according to him, the surname is perfectly good Devonian.

He will tell you his father did him a good turn in choosing such initials, as everyone seems to be able to remember the correct order of them. He is generally known at Broadcasting House as S. P. B.

Mr. Mais says that, in common with many country parsons sons, he devoted most of his time at Oxford to athletics. He hoped to get his Blue for cricket, or else for rugby, but they gave him a half-Blue for running. He seems to have fallen down twice in a run of three miles, but eventually secured a full Blue for a cross-country run.



S. P. B. Mais at the microphone in a B.B.C. talks Studio

The first part of his career was given to schoolmastering. He was at Rossall, Sherborne, and Tonbridge in turn, where he devoted a good deal of his time to taking games. He was later connected with the R.A.F. Cadet Corps.

Mr. Mais is, as you know, a novelist. He says his novels make him shudder now, but he seems to regard his books on the English countryside with warmer feelings. He never tires of trying to discover fresh beauties in England. You will remember his talks on the subject last year.

He has been right through the journalistic mill, and has written on boxing, cinema stars and yachting. He has even essayed to gossip about Society.

Broadcasting is the breath of life to him. He is never happier than when broadcasting to the schools. He loves trying to interest children in sport and in being sportsmanlike.

Mr. Mais has been—poor soul!—a critic in his time. He was literary critic to the *Evening News* in 1918; to the *Daily Express* from 1921 to 1923; to the *Daily Graphic* from 1923 to 1926.

Have you read his *Breaking Cover*, or *Prunello*, or *Perissa*, or *Orange Street*, or *Frolic Lady*? If not, you should.

At all events, Mr. Mais is again in the programmes as the *Modern Columbus*. His series of broadcasts from America began on October 13, but if you missed the first there will be other opportunities every Friday for some time to come, for he will speak across

Continued on page 734

CLIX Specified for the "ETHERDYNE SUPER"

The designer has chosen and you require these CLIX CHASSIS MOUNTING VALVEHOLDERS



STANDARD TYPE 4, Four-Pin 8d. each "AIRSPRUNG" TYPE 1, Five-Pin 1/3

Glix New "Airsprung" Anti-microphonic Valveholder is designed to—

- Damp out actual physical shocks to the valve.
- Insulate the valve from consistent vibration set up by the transformer on the chassis.
- Counteract and absorb the air pulsations set up by the increased acoustic output of modern receivers.

"A MATTER OF CONNECTION"

Glix New Folder "A" gives details of over 30 Components for Perfect Contact. Write for a copy now.



LECTRO LINX LTD., 79a Rochester Row, S.W.1

ELECTRADIX BARGAINS

S. G. BROWN'S BATTERY SUPERSEDER makes H.T. from your L.T. 2-volt battery, rectified and smoothed. 3 tappings. A boon to those who are not on the mains.

Reduced from £3/15/- New and Guaranteed. 37/6

MICROPHONE BUTTONS for all purposes. 1/- Volume Controls, 6d. No. 11 Mikes, 2-in. case, 5/3; Announcers, 11B Mikes, 7/6; Pedestal type, 12/6 and 18/6. Microphone Carbon Granul. MICROPHONE In glass capsule, for four buttons. Grade No. 1, 1/-; No. 2, Medium, 1/-; No. 3, Fine, 1/6; Carbon, solid back, blocks, 3d. Mouthpieces, curved or straight, 10d. Carbon diaphragm, 55 m/m., 4d. Panel Brackets, pivoted, 5/- Reed Receiver Unit for Amplifier making, 3/- Headphones, 2/9 pair.

All grades and types of microphone in stock.

PHOTO CELLS. £5 Photo Cells for Talkies, Light Tests, Timing Controls, etc., at bargain prices. Response to light, 50 microamps. per lumen, 40-watt lamp, 75 c.m. King B.T.P., 15/-; R.C.A., 25/-; Holders, 1/-; Beck Prisms, 5/6; Focus Lens, 3/6.

THE DIX-ONEMETER

The ical of multi-range, moving-coil meters. Built to first-grade British Engineering Standard. 50 ranges on one meter. Measures Microamps to 20 amps, millivolts to 1,000 volts, 50 ohms to megohms. Six Terminals. Two clear scales, mirror, and knife-edge pointer for accurate reading.



Complete in case 60/- D.C. (Multipliers extra.) Test Booklet "P" Free.

THE DIXIMPANTA A small A.C. Test Meter that is really a VEST POCKET TESTER. A wonderfully versa ile moving-iron, multi-range meter for service on A.C. jobs. 19/6

ELECTRADIX RADIOS, 218, UPPER THAMES STREET E.C.4.

At the B.B.C.

The Truth About the B.B.C. Organ

Here is the truth about the B.B.C.'s new organ as seen by Mr. Noel Bonavia-Hunt, M.A. Mr. Bonavia-Hunt is one of the best known organ experts in the country and this contribution of his on the controversy which has arisen over the organ at Broadcasting House will be welcomed by all listeners.

WHEN it was announced that a wonderful new organ was going to be erected in the Concert Hall at Broadcasting House, people were all agog to know what it would sound like.

Extraordinary statements were allowed to find their way in print about the cost of this instrument; even now the general idea is that the builders were paid the sum of £20,000 for it, and more than one man has told me that it really cost as much as £40,000! Well, I understand that the contract price was £10,000. So, in future let us call it the £10,000 organ until someone in authority contradicts us.

A False Impression

Of course, what the purchaser agrees to pay for an article is no business of ours, but there is no reason why a false impression should be allowed to take root in the minds of the public, who contribute their licence money towards the support of the excellent B.B.C.

Now that the organ has materialised and been duly "opened," one hears on all sides complaints that it is far too infrequently used. Various reasons are alleged for this, and I have not read a single one that is correct.

We are told, for instance, that the instrument is so complicated in its various controls and so difficult to manage that only a very few organists are capable of handling it, and that it requires several hours' assiduous practice on the player's part to accustom him to the novel arrangements which he finds displayed before his bewildered eyes.

We are also informed, with some show of authority, that the console—which is that portion of the organ containing the keyboards and controls—is a "cinema console" and can therefore only be properly understood by cinema organists. It is accordingly suggested that cinema organists instead of church organists should be invited to perform on it, since the man who is accustomed to the "cinema console" would be more capable of extracting the real qualities from the B.B.C. organ.

A Unique Console

Let me dispose of this matter first. There is no cinema organ in this country that I know of that possesses a console similar to that of the B.B.C. organ. Cinema consoles have stop-keys or "tabs" for controlling the various stops. The player pushes the tab down lever-fashion when he wants the stop to come into action, and he jerks the tab up again to its original position when he wants to knock it off.

The church organ is usually controlled by means of draw-stops which work like the push in-pull out switch so often found on our wireless panels. But there is a large number of church organs that have the cinema stop-

Continued on next page

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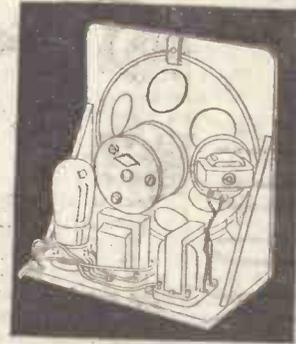
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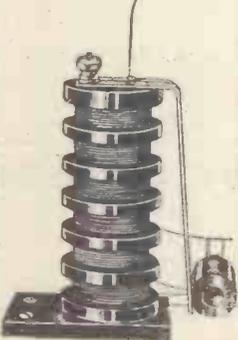
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The Truth About the B.B.C. Organ

Continued from preceding page

keys or tabs, so that a church organ console may be the same as a cinema console.

The console of the organ in Broadcasting House has what is called the piston knob system instead of the usual push-pull knob or lever tablet above described. The organist touches the knob, which brings on the stop required and at the same time lights up a small torch bulb inside the knob-head. A second touch reverses the action and takes the stop and the light off.

Now this method is peculiar to the firm that built the organ, and so far is only to be found in other church organs built by them. The statement, therefore, that the console is of the cinema type is incorrect.

Is the B.B.C. organ the highly complicated affair that we have been led to suppose? I have both seen it and placed my hands on its keys as well as on other organs built on the same principle by the same firm. I have had the pleasure of watching a well-known church organist giving a broadcast recital in Broadcasting House, and I can assure my readers that he had no difficulty whatever in handling the various stops and controls.

This gentleman plays regularly on an old-fashioned pneumatic organ with an obsolete type of console; he told me that the B.B.C. console was delightfully simple to use. In fact, all organists who are worth their salt are prepared to give a recital on any organ anywhere with a reasonable time for practice allowed them.

Another criticism levelled at this B.B.C. organ is the weakness of the deep pedal notes. It is quite true that these pedal notes do not come through so well as those of many outside church and cinema organs. The reason for this is the fact that all the pipes are shut up in a chamber, and it is well known to physicists

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that enclosure damps the lower frequencies much more than the middle. The result is that one does not hear the lowest fundamentals on the loud-speaker, but only the overtones.

In my opinion the whole organ suffers to a considerable extent from this total enclosure of its pipes in a small chamber at the far end of the hall. Not only is there a very noticeable lack of radiation of tone from the pipes, but it was also necessary for the builders to force the pipes to speak with greater intensity than would have been needed under more favourable conditions.

I do not see that any blame attaches to the firm who built the instrument, for they were compelled to make the best of the site provided.

Lastly, there is one good reason why the B.B.C. organ cannot be used as frequently as might be wished. The Concert Hall is supplied with air through specially constructed ventilating shafts. I understand that at present the sounds from the organ radiate up through these ventilating shafts and interfere with performances that may be taking place in another studio.

Until this unforeseen difficulty is overcome it is not possible to arrange organ recitals at frequent intervals. Moreover, the Concert Hall is obviously required for all sorts of other performances, and the organ must take its turn without unduly interfering with the general arrangements.

S. P. B. Mais

Continued from page 732

the Atlantic to listeners in this country and will describe his American experiences. He will have to be careful what he says because the Yanks will be listening as well, and he will be bumped off or something if he goes too far.

Mr. Mais did not go to America as you would expect Mr. Vernon Bartlett to have gone. There is no political significance in his movements; he is just a visitor who records his impressions. He will cover a fair distance; in fact, he will travel from end to end of the American continent—from Jamestown, circling the continent via San Francisco, back to New York. This is, of course, by far the longest journey ever undertaken in the cause of broadcasting.

Only an enthusiast like Mr. Mais would undertake such a journey. That is what I like about him—his enthusiasm. When he broadcast on behalf of the voluntary movement

for Unemployed Men's Clubs some little time ago, I was struck by his keenness for his subject.

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His talks on America promise to be more and more interesting as they go on, for you may be certain that Mr. Mais himself will get more and more enthusiastic.

I believe he would go to the North Pole and broadcast a talk on the necessity for founding a North Polar Regional station if the B.B.C. gave him half a chance, or dash off to the Tropics and write a play called *Sitting on the Equator*.

He displayed daring sentiments when he broadcast a discussion with Holt Marvell on *Living Dangerously*. I recall that those two, between them, very nearly converted me to trying it as an experiment.

W.-W.

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Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of most of these sets can be obtained at 1s. 3d. and 4d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine." Address letters:

Amateur Wireless Blueprints Dept., 58-61 Fetter Lane London, E.C.4

Amateur Wireless FEE 1/-

INFORMATION BUREAU COUPON Available until Saturday, OCTOBER 28, 1933

Printed for the Proprietors and Publishers, BERNARD JONES PUBLICATIONS, LTD., 58-61 Fetter Lane, London, E.C.4, by The Sun Engraving Co., Ltd., London and Watford. Sole Agents for South Africa: CENTRAL NEWS AGENCY, LIMITED, (London Agents for Central News Agency, Ltd., GORDON & GOTCH, LIMITED), Sole Agents for Australasia; GORDON & GOTCH, LIMITED. Saturday, Oct. 21, 1933

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SUPPLEMENT

THE LISTENER'S COMPENDIUM

A Brief Survey of the Leading Features of "A.W.'s"

IRON-CORE COILS :: ANTI-BREAKTHROUGH UNIT :: SCREEN-GRID DETECTOR

SPECIAL FEATURES OF THE SET

How It Leads the Way in Super-het Design

IN a set that teems with special features we must first mention that the Etherdyne is a five-valver for battery operation; a super-het in which each of the five valves pulls its full weight. First, there is a high-frequency valve; secondly, a detector-oscillator stage—one screen-grid valve combining two functions; thirdly, an intermediate-frequency amplifying valve; fourthly, the second detector valve; and lastly, the pentode power output valve.

Perhaps the most important valve is the combined detector-oscillator, the action of which accounts for a good deal of the great success of the Etherdyne.

In a super-het of to-day we have to make sure that all signs of what are known as second-channel interference is eliminated. The Etherdyne has been engineered with this object in view. The special anti-breakthrough unit cuts

out the whistles—definitely. It acts in cutting out interference with long-wave stations caused by medium-wave stations breaking through.

Another highly significant feature of the Etherdyne, and one that accounts for some of the amazing selectivity, is the use of iron-core coils for the tuning of the aerial and the first high-frequency stage.

Naturally, with five valves the anode current would be considerable unless special precautions were taken. That they have been taken is proved by the inclusion in the Etherdyne of the battery economiser, a unit that materially cuts down the anode current of the pentode.

In the practical interpretation of the Etherdyne circuit you will find a thoroughly modern chassis, made of the new metallised wood, easy to work but efficient in action.

OPERATING FOR THE BEST RESULTS

Scores of Programmes Right at Your Finger Tips

IF you make proper use of the pre-set condenser and volume control this set is remarkably free from background noise and from second-channel interference. Especially when listening close to a regional station, the pre-set should be reduced as much as possible, and volume made up to the desired strength by the volume control. You need not fear using the volume control at its maximum—there is no trace of instability. Neglect to reduce the pre-set when you are near a local may produce whistles and other troubles.

Another possible source of whistles is the incorrect setting of the oscillator condenser dial. Study our special list of station readings and you will not go wrong. Sometimes you may possibly find a whistle on a station you want. You may eliminate the background by making a readjustment of the oscillator condenser.

Be sure to tune the oscillator knob very slowly indeed. This is most important.

When adjusting the tuning knob be careful to settle down on the correct tuning point. Bad quality and side-band interference will denote that you are slightly off tune.

We have given you all the possible causes of trouble first, but we must say the Etherdyne is really a very easy set to operate, as you will rapidly see for yourself.

There are four controls, not counting the pre-set at the back. The oscillator and two-gang tuning condensers account for two controls; then there is the combined volume control and on-off switch, leaving us finally with the wave-change switch.

The pre-set should be adjusted to suit your local conditions and then it will not need subsequent attention.

GETTING THE BEST SERVICE FROM BATTERIES

How to Run the Set Economically

AS far as possible the anode-current consumption of the Etherdyne has been kept down. The output valve, for example, is fitted with a Westector unit to reduce the current of that valve when the signal is small. This system works automatically, but there are other ways of economising the anode current.

The two variable-mu valves take about 8 milliamperes when the volume control is at its maximum, but only a fraction of this when the volume is suitably reduced. It is thus important to reduce the volume control whenever the signals are strong. For the locals you can use the volume control practically at minimum. Use the lowest setting compatible with volume requirements.

The tappings of the high-tension battery are important. H.T. +1, controlling the combined detector-oscillator, is rather critical and you

should try voltages between about 60 and 70 volts. H.T. +2 provides voltage for the screening grids of the first high-frequency and intermediate-frequency valves, and should be about 80 volts. H.T. +3 feeds the anodes of all the valves and should be the maximum voltage available. When the battery has been in use for some time it is a good thing to try increasing H.T. +1 a little.

A double- or triple-capacity high-tension battery is desirable, as the set takes between 8 and 16 milliamperes on the locals, and about 13 milliamperes on more distant stations. With this receiver you will need two grid-bias batteries, one of 9 volts for the variable-mu valves (and a pick-up if used), and the other a 16-volt battery for overbiasing the pentode output in the economiser scheme.

A common grid-bias must not be used.

DIAL READINGS

SEVENTY-EIGHT

LONG WAVEBAND

Station	Osc. Dial
Croydon ...	20
Oslo ...	40
Kalundborg ...	45
Luxembourg ...	52
Moscow ...	57
Motala ...	59
Warsaw ...	62
Eiffel Tower ...	65
Moscow ...	66
Daventry... ..	70
Berlin ...	74
Radio Paris ...	81
Kootwijk... ..	90
Kaunas ...	96

MEDIUM WAVEBAND

Aberdeen... ..	10
Plymouth... ..	12
Cork ...	13
Fécamp ...	14
Bordeaux ...	16
Nürnberg ...	17
Belfast ...	18
Trieste ...	19
Gleiwitz ...	19.5
Hörby ...	20.5
Frankfurt ...	21
London National... ..	22
Lille ...	23
Bari ...	25
Turin ...	26
Heilsberg ...	27
Bratislava ...	28
Lyons ...	29.5
Scottish National	30
Huizen ...	31
North National ...	32.5
Bordeaux ...	33.5
West Regional ...	35
Genoa ...	36

M OF THE ETHERDYNE SUPER

' Amazing 1934 Super-het for Battery Operation

OSCILLATOR :: BATTERY ECONOMISER :: WOOD-CHASSIS CONSTRUCTION

STATIONS FOR SHORT STATIONS

Station	Osc. Dial
Naples	37
Goteborg	38
Breslau	39
Poste Parisien	40
Milan	41
Brussels No. 2	43
Strasbourg	44
Graz	45
London Regional... ..	46
Mühlacker	47
Algiers	48
Common Wave	49
Hamburg	50
Scottish Regional	51
Toulouse	53
Leipzig	54
Midland Regional	56
Sottens	57
Katowice... ..	58
Athlone	59
Rabat	60
Berlin	61
Moscow	62
Stockholm	64
Rome	65
Paris	66
Milan	68
Beromuenster	70
Langenberg	72
North Regional	73
Prague	74
Florence	76
Brussels No. 1	78
Vienna	80
Riga	82
Munich	83.5
Palermo	85
Sundsvall	86
Budapest... ..	88
Grenoble... ..	94

VALVES THAT WILL GIVE THE BEST SIGNALS

You Must Use the Right Types

OUR Etherdyne Super has been designed to make the most of modern valves, but it is completely devoid of special types. Variable-mu screen-grids, an ordinary screen-grid, a high-slope triode and a pentode—such are the valves we have used. Very likely you have some of these valves available, and for this reason we give elsewhere a table of alternatives to the makes actually used in the set.

The first valve of the Etherdyne as we built it is a Cossor 220VS, which is a very suitable valve for the job of high-frequency amplification. It is a variable-mu short grid-base valve.

Next in order comes the combined detector and oscillator valve, the choice of which, so far as our experiments can determine, is limited to the Marconi or Osram type S22. This is a screen-grid valve with a high magnification and a moderately low impedance. No other

make or type is recommended for this position.

The third valve is the intermediate-frequency amplifier, and we have chosen another Cossor 220VS as being very suitable. This valve, and the variable-mu in the first stage, has its grid bias controlled by the volume control.

The fourth valve is the second detector, for which function the Mullard PM2DX is recommended. A low-impedance valve, this, with a high slope giving good sensitivity.

Lastly, we have the pentode output valve, which, owing to the economiser scheme, should be one capable of giving a good output—it does not matter if the rated anode current is on the high side as that is cut down by the Westector system. We have used the Mullard PM22 valve for the final stage. An alternative is the Mazda PenzzoA, which has much the same characteristics.

THE ETHERDYNE WITH A MAINS UNIT

How to Connect Up the Proper Tappings

SHOULD you wish to use a mains unit to supply the Etherdyne Super with high-tension current, you must be careful to choose one of the class-B or Q.P.P. types, as the output current is fluctuating quite a lot, due to the battery-economiser arrangement. A maximum output of 120 volts at 20 to 25 milliamperes should be chosen, this representing the highest possible "surge" of current taken by the set.

Tappings on the mains unit should include one giving an output between 60 and 70 volts for the detector-oscillator stage. This tapping is connected to H.T.+1. Another tapping on the unit will be wanted for the two screen-grid valves—70 to 80 volts going to H.T.+2.

There is certainly an advantage in using a mains unit, which will supply constant high-tension current to the Etherdyne and so ensure good results at all times. It is a good plan to

buy a unit with a trickle charger so that the accumulator for the low-tension supply can also be kept well up to the mark.

For preference choose a mains unit that is thoroughly smoothed and decoupled. The Etherdyne is primarily a battery set, of course, but with a good mains unit it will not show any trace of instability. A good mains unit will also ensure that the quality of the reproduction is satisfactory but, if you use such a unit, make sure that the grid-bias batteries are in good order. This point is specially important when we are dealing with the supply mains.

Don't forget, as a final word, about the need for a class-B or Q.P.P. mains unit, will you? This set uses neither of the systems for which such units are designed, but the Westector has the same effect on the output current.

HOW TO SERVICE YOUR ETHERDYNE SUPER

Hints of Value to Every Constructor of the Set

THANKS to the very careful design of the Etherdyne Super, you are not likely to have any trouble with your finished set. Such snags as you may encounter will be those common to all sets. The aerial and earth are as important with this set, as with any other. You should aim at the ideal of a short high outdoor wire, but so powerful is the set that satisfactory reception can easily be obtained on an indoor wire.

At a pinch you can use just a few feet of wire. We have obtained twenty stations on a piece of wire only 4 ft. long.

With such a lot of high-frequency amplification a good earth is essential in the interests of stability. A buried plate or mains water pipe is suggested. Use a thick wire for the earth lead.

If you suffer from crackles from nearby

machinery, try erecting the wire some distance away and leading in with a length of the new screened cable.

Valves should cause no difficulty, but if you do come across a microphonic detector-oscillator you can cure the trouble by covering the bulb with a cardboard tube filled with cotton wool.

Batteries are a frequent source of service trouble. As you will have to do your own servicing on this set, presumably, you should make sure all the plugs and connections are tight.

Crackles will only develop when the batteries are running down—the remedy is obvious.

Any distortion in the reproduction can usually be attributed to the high-tension battery running down, or to unsuitable tappings for the grid-bias plugs.

CONSTRUCTOR'S PHOTO-CHART for the "A.W." ETHERDYNE SUPER

