

HOW ANY BEGINNER CAN BUILD A SUPER-HET

Amateur Wireless

3d
Every
Wednesday

and
Radiovision

**NINETY-TWO
STATIONS ON THE
ETHERDYNE**

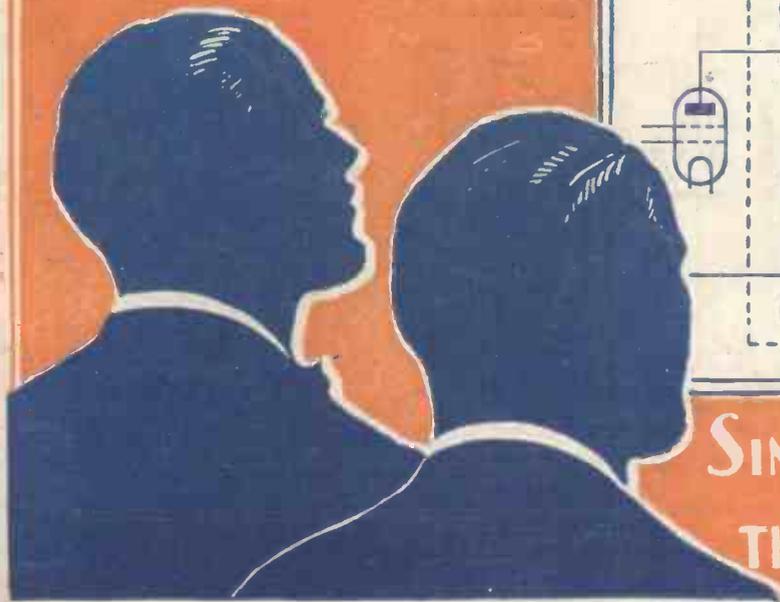
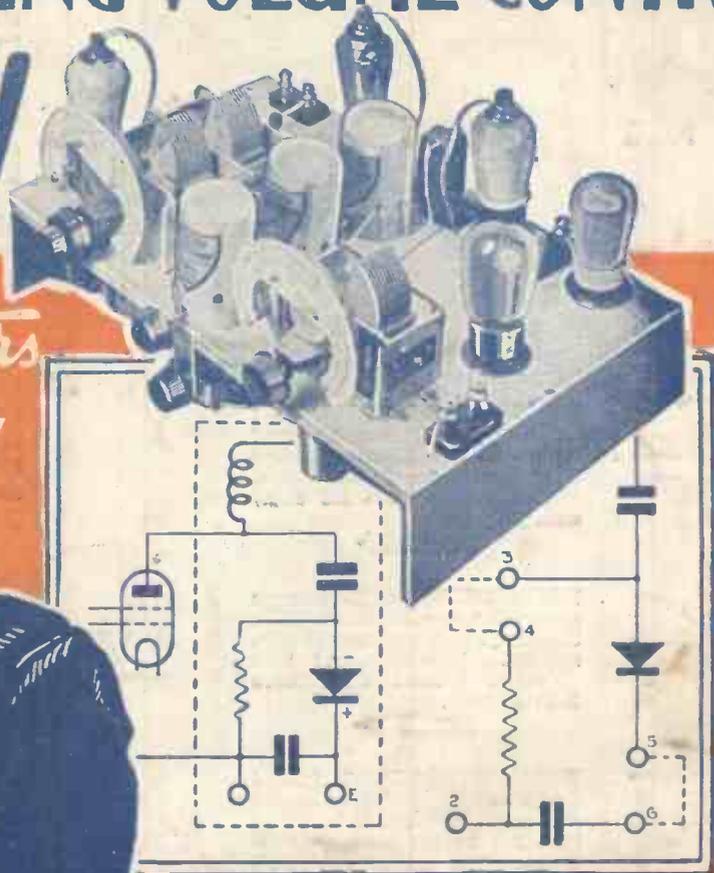
**NEW BATTERY
A.V.C. SYSTEM**

**PRACTICAL MAINS
WORKING**

RECORDS REVIEWED

SELF-ADJUSTING VOLUME CONTROL FOR YOUR SET!

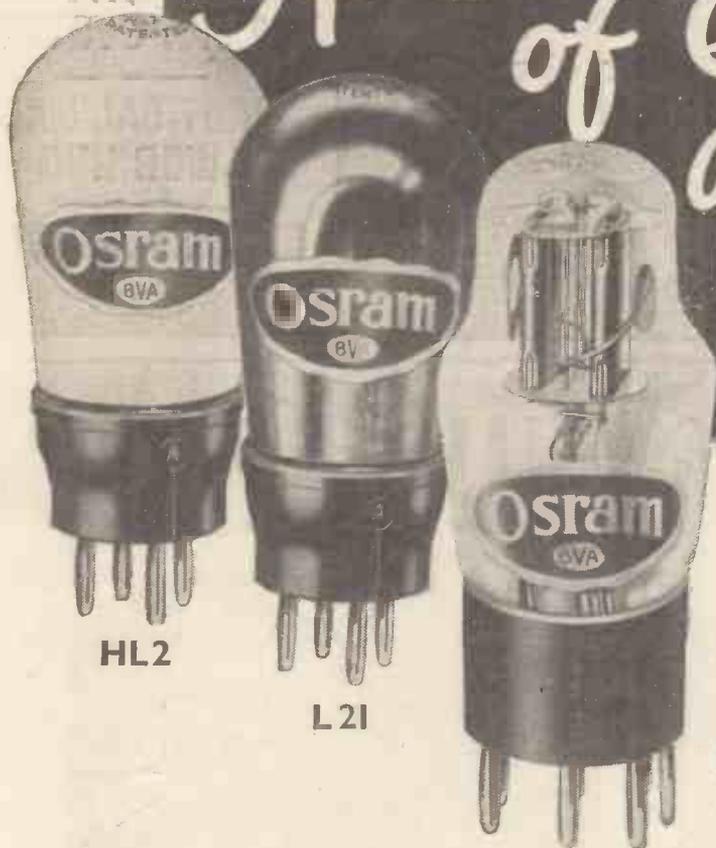
*The Experimenters
GET BUSY AGAIN*



**SIMPLE A.V.C. FOR
THE ETHERDYNE SUPER!**

EVERYTHING **The G.E.C.** ELECTRICAL
your guarantee

A Combination of Quality and Volume



HL2

L21

B21

**NEVER BEFORE
ATTAINED IN
BATTERY RECEIVERS**

A trio of 2 volt Valves which lifts the standard of Battery Set performance to an entirely new level of UN-DISTORTED POWER.

- 1** Complete absence of microphonics—due to the multiple anchored Wembley Filament fitted to the Osram HL2.
- 2** Maximum economy in H.T. current consumption and high sensitivity—due to the efficient characteristics of the Osram L21.
- 3** Great volume with pure tone on all types of broadcast, whether piano music, speech, or full orchestra—due to the unique low impedance design and duplicated grid construction of the Osram B21.

HL2 NON-MICROPHONIC DETECTOR. Filament current 0.1 amp. Amplification Factor 27. Impedance 18000 ohms. Mutual conductance 1.5 m.a./volt.

PRICE 7/-

L21 ECONOMYDRIVER. Filament current 0.1 amp. For 120v. H.T.: Standing anode current 1.7 m.a. approx. Working grid bias $4\frac{1}{2}$ volts. Mutual conductance 1.8 m.a./volt.

PRICE 7/-

B21 DOUBLE TRIODE 'CLASS B' OUTPUT. Total filament current 0.2 amp. For 120v. H.T.: Standing anode current 1.65 m.a. approx. Working grid bias $4\frac{1}{2}$ volts. Average anode current 6.0 m.a. Intervalve transformer ratio 1.25—1.

PRICE 14/-

Osram
2 VOLT BATTERY
Valves

MADE IN ENGLAND

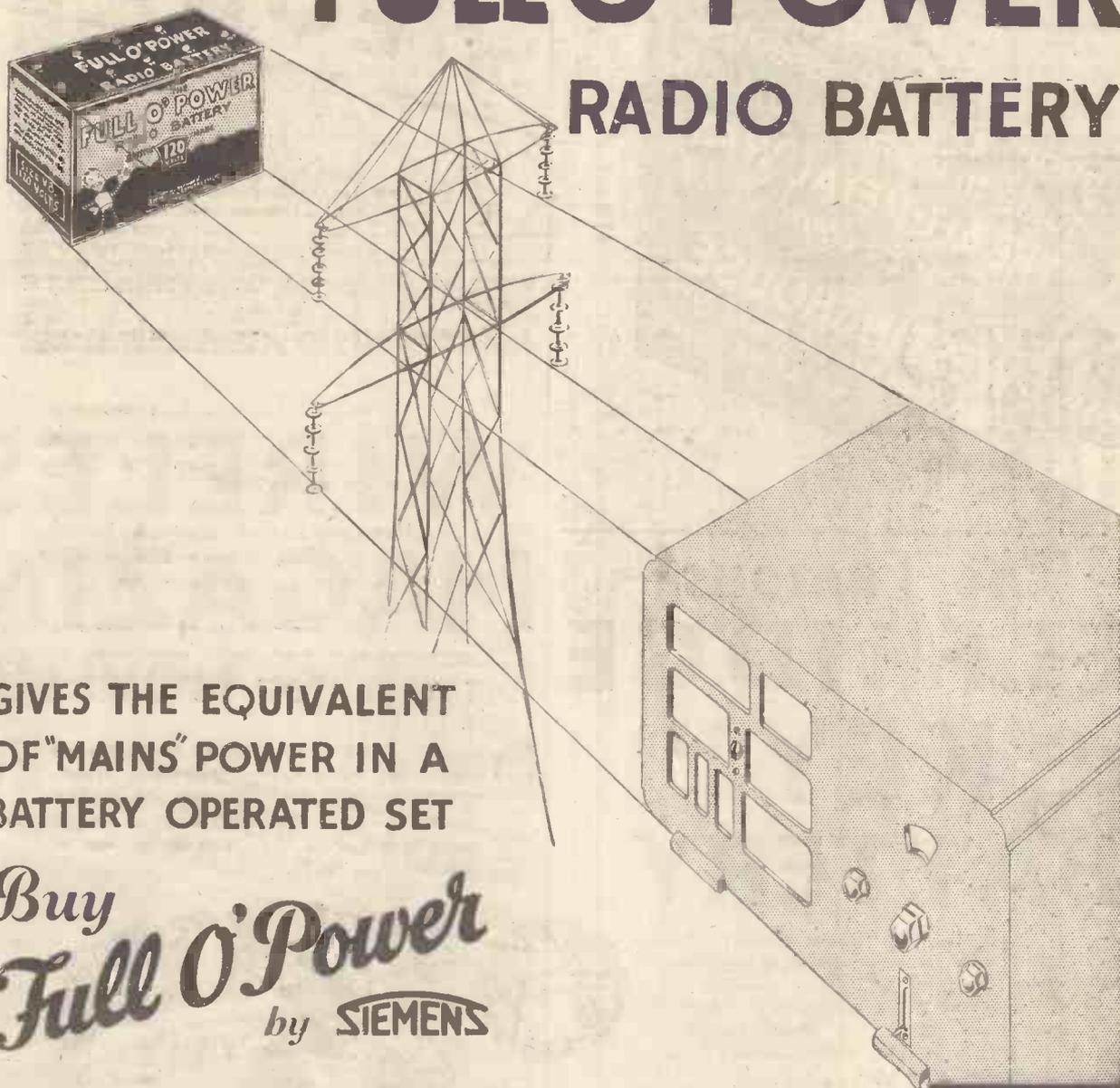
SOLD BY ALL RADIO DEALERS

WRITE for the OSRAM VALVE GUIDE (1933-4 Edition) sent post free.

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

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

THE INCOMPARABLE FULL O' POWER RADIO BATTERY



GIVES THE EQUIVALENT
OF "MAINS" POWER IN A
BATTERY OPERATED SET

Buy
Full O' Power
by **SIEMENS**

THEY COST NO MORE THAN ORDINARY BATTERIES.

WRITE FOR FREE BOOKLET 667 OF UP-TO-DATE BATTERY INFORMATION

Dept. of SIEMENS ELECTRIC LAMPS AND SUPPLIES LIMITED, 38/39 Upper Thames Street, London, E.C-4.

WHEN BUYING
ELECTRIC LAMPS
ASK FOR

SIEMENS

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

The ALL-METAL WAY 1934

3^d

brings you that essential guide to A-C mains working.

"THE ALL-METAL WAY"

Send to Dept. A.W.

The WESTINGHOUSE

BRAKE & SAXBY SIGNAL CO. LTD.

82, YORK ROAD, LONDON, N.1

The Famous

SELFRIDGE

"KEY"

BATTERY

A most economical High Tension Battery. Exceptionally long life. Amateur Wireless Laboratories have tested this and state:—

"That it is a most reliable product, capable of giving a discharge of 9 milliamps and maintaining its general efficiency."

Price each
99 Volts

7/11

Price each
108 Volts

8/9

POSTAGE EXTRA
Selfridge's Radio and Gramophone Department Third Floor
SELFRIDGE & CO., LTD. - OXFORD ST., LONDON, W.12

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

FREE RADIO MAP of EUROPE

Every copy of the November "Wireless Magazine" now on sale, contains a FREE Radio Map of Europe and Broadcast Compendium, which can be used with any home-built or factory constructed receiver. Every place-name on the map is that of a broadcast station that can be heard on the average set. Down each side of the map are identification details of nearly 100 stations in wavelength order. Spelled out phonetically, every listener can easily recognise them. The most complete Broadcast Map of Europe ever presented free!

The recent controversy over car radio 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—an issue that you should not miss. This November Number, price 1s., is now on sale at all news-agents and bookstalls. Get yours TO-DAY.

WIRELESS MAGAZINE

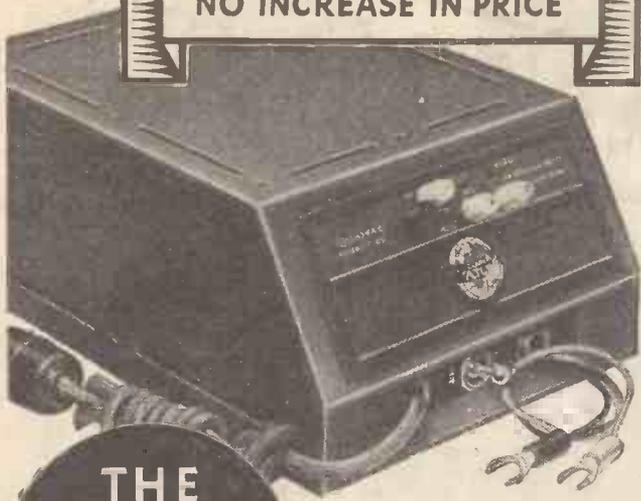
GET YOUR COPY TO-DAY
PRICE 1/-

for NOVEMBER

RADIO MAP OF EUROPE and BROADCAST COMPENDIUM



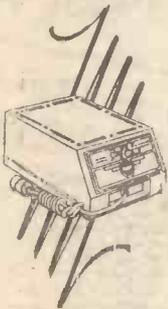
**INCREASED VOLTAGES
INCREASED OUTPUTS
INCREASED SMOOTHING
NO INCREASE IN PRICE**



**THE
WORLD'S
FINEST
UNITS**

IMPORTANT.—Be sure to insist on "ATLAS"—the Units in the handsome green metal cases—when you ask your dealer for a FREE demonstration. No other has such a reputation to maintain.

"ATLAS," the Units that cut running costs to less than one shilling a year, and the only units to win the Olympia Ballots for two years in succession, are now better than ever. Their new designs, increased outputs, increased smoothing—for "Class-B" and "Q.P.P."—without increase in price, make them far and away the most amazingly efficient units ever made. Convert your battery set to mains operation to-day and save 50s. every year on battery replacements. Models for every set from 39s. 6d. cash or 10s. down, fully guaranteed for 12 months. Send coupon to-day to—
H. CLARKE & CO. (M/CR.) LTD.,
PATRICROFT, MANCHESTER.
London: Bush House, W.C.2. Glasgow:
G.E.S. Co., Ltd., 38 Oswald Street.



ATLAS
MAINS UNITS **ATLAS**

H. CLARKE & CO. (M/CR.) LTD., Atlas Works, PATRICROFT, MANCHESTER.

Please send me FREE copy of Booklet 87, telling me how to run my Set from the mains.

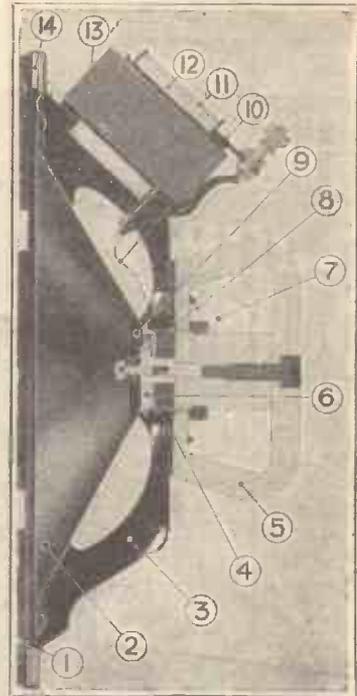
Name

Address

29/5

ASK YOUR DEALER — HE KNOWS

**From
every
point
of view**



Sectional view of the famous "CHALLENGER."
Write for explanatory leaflet.

**R & A
Reproducers**

lead

It is on design and construction that the ultimate performance depends—the dimensions of parts, their correlation; a quality of material, accuracy of machining, skilled workmanship and the employment of precision gauges and testing apparatus at every stage to ensure complete uniformity. Not only upon design, but also on the most scientific production methods, depend the pre-eminence of R. & A. Reproducers.

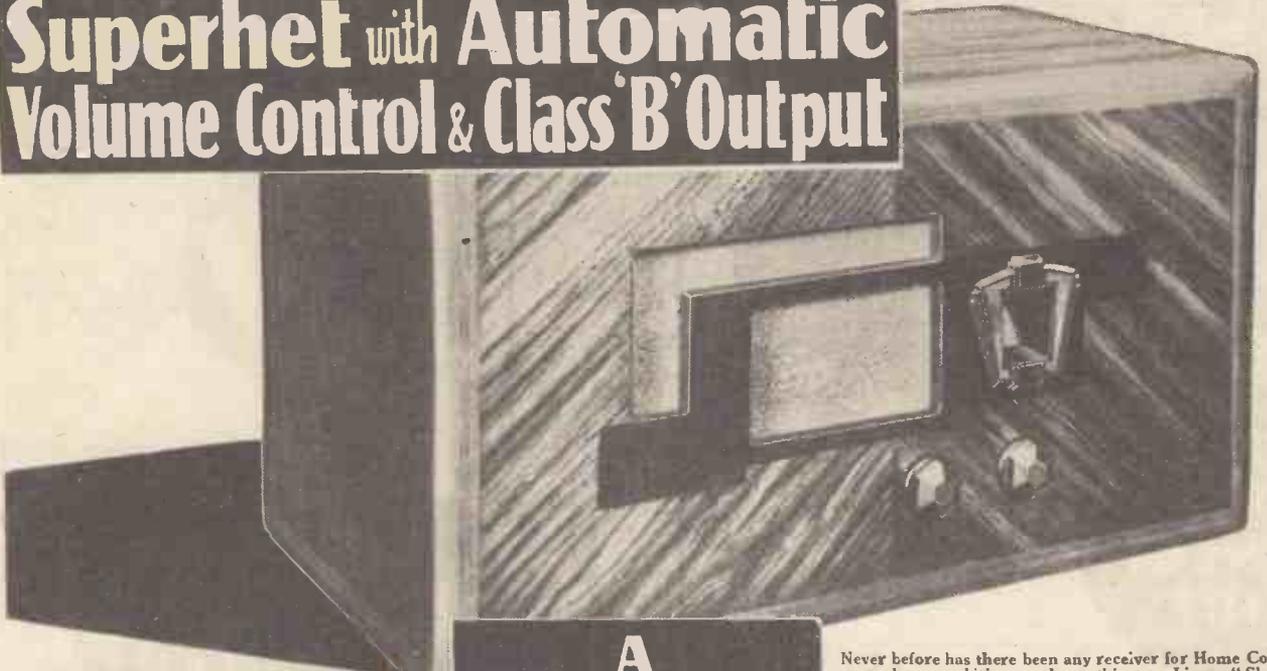
That is why R. & A. performance is the accepted standard by which sound reproduction is judged and why you should purchase an R. & A. Reproducer, because you want this high standard of performance.

*Your dealer will gladly demonstrate.
Prices range from 21/- to 70/-*

R & A
**BRITAIN'S FOREMOST
REPRODUCERS**

REPRODUCERS & AMPLIFIERS, LTD., WOLVERHAMPTON

How to build a 7-Valve Superhet with Automatic Volume Control & Class 'B' Output



A WONDERFUL INSTRUCTION CHART

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 receivers, yet working economically in this Lissen "Skyscraper" from H.T. batteries. 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!

Post Coupon for GREAT FREE CHART



COMPLETE WITH 7-VALVES £8.17.6

To LISSEN, LTD.,
Publicity Dept.,
Isleworth.

Please send me FREE CHART of the "Skyscraper" Seven Valve Superhet.

Name.....
Address.....
..... A.W. 1334

LISSEN

"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
 Radiovision Editor: H. CORBISHLEY
 Editor-in-Chief: BERNARD E. JONES
 Technical Editor: J. H. REYNER, B.Sc.(Hons.), A.M.I.E.E.
 Assistant Editor: ALAN HUNTER
 Research Consultants: W. JAMES and PERCY W. HARRIS, M.Inst.Rad.E.

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

"Experimenters" Again!

MANY readers will welcome back to our pages those inimitable "Experimenters" who this week tell you how to fit a simple form of self-adjusting volume control to the new Etherdyne.

If you are still hazy as to how "A.V.C." works read this bright, informative article. By the way, what do you think of our suggestion—calling A.V.C. self-adjusting volume control?

Post Office Wonders

AS explained in a special article by the Assistant Editor this week, the Post Office has now moved into magnificent new buildings at Dollis Hill, where, among other endeavours, a great deal of radio research work is being done.

Sir Kingsley Wood, the Postmaster-General, reminded everyone present at the opening ceremony—including the Prime Minister—that it was through the work of our Post Office engineers that we were able to claim to be the first country in the world to establish a commercial short-wave beam communication with distant parts of the Empire.

America on Television

FROM America, land of promise—and rosy promises!—comes the suggestion that the only future for really commercial television is through the ultra-short waves.

It is suggested that a wavelength between 9 and 10 metres should be used, as this wavelength band offers reliable contact up to 50 miles.

It certainly looks as though high-definition television, of the order of 120 to 150 lines, will come via the short waves. But which country will be the first to erect a special chain of suitable transmitters?

This Nationalism!

IN many European countries you must watch your step and learn to salute flags when you see them; in others you may not hum, sing or whistle a "late" national anthem. You must keep abreast of the times.

Apparently, at Tarragona (Spain) the station inadvertently played the Royal Anthem—Spain is now a Republic—and was fined accordingly. A censor of gramophone records in the near future will no longer be a sinecure.

Radio Tax on French Listeners

UNTIL recently the French listener only paid one single franc per annum for the registration of his receiver, but the State now requires him to pay a licence fee which, although moderate, has already brought in over thirty-one million francs.

Although the Frenchman has always been averse to paying any kind of direct tax, he is consoled by the thought that the bulk of his

money will go towards musical programmes and fewer advertisements.

Finding Musical Interval Signals

IT is not so easy to find a musical interval signal as you might imagine. If you choose a very old melody—even a fraction of it—listeners may object; if you select something less ancient you may have a copyright fee to pay.

Some of the German studio engineers are

CHIEF CONTENTS

	Page
Radio Wonders of the Post Office	799
Practical Mains Working ...	800
Some of the Special Features of the Etherdyne Super!	801
How Any Beginner Can Build a Super-het ...	805
The Beginner's Guide to the Etherdyne	806
Ninety-two Stations on the Etherdyne Super	808
A New Method of Battery A.V.C.	814
Self-adjusting Volume Control	816
Television Section	822



Post Office engineers demonstrating a few of the many lines of radio research now conducted at the fine new Dollis Hill laboratories recently opened by the Prime Minister (see page 799)

racking their brains to circumvent these little difficulties.

Your Licence, Please!

ON the Continent, where the listener, in some instances, pays his licence in monthly instalments, the authorities do not need Post Office vans to trace radio pirates.

In many countries the postman collects the money and on his rounds by tact and diplomacy soon ascertains the whereabouts of wireless receivers. In Germany, in addition, the information is supplemented by the chimney sweep who spots aerials from the roofs. A blackbird's eye view!

What the B.B.C. is Doing

News from Broadcasting House

By Our Special Commissioner

"J.K." Passes

MANY kiddies—and grown-ups, too—will mourn the death of John Kettelwell, known at Broadcasting House as "J.K." From March, 1932, until a month or two ago he was the Director of the Children's Hour.

Derek McCulloch, who has lately been doing this job, will probably take control. He has certainly done some very good work for the kiddies, and his services are highly valued.



The late John Kettelwell, who directed London's Children's Hour

Christmas is Coming!

AND when it does, look out for Henry Hall in a special feature programme. He tells me that very likely he will play George Posford's "Broadcasting House" suite.

New Children's Hour Ideas

BIRTHDAY greetings, as you probably know, are to come to an end very soon. Ideas for filling up the

time thus saved are being discussed.

Zoo talks will almost certainly be featured. So will talks by specialised broadcasters—to interest the older children.

We may even live to see and hear physical jerks by the B.B.C. This is one of the strongest hints I have had about the much-discussed hour. Breathing exercises for the young, and all that.

Still Studio Hunting!

WANTED: a home for Henry Hall and his dance band. The B.B.C. has its eye on a studio in Bond Street, and there our Henry and his boys may eventually land.

It seems that in the beginning Henry was pushed out of his real studio at "B.H." by the televisionaries; he decamped to the studio allocated to the children and to recitalists.

Now things are getting in a bit of a jam. Hence the search, far and wide, for a permanent home for the dance band. As I say, Bond Street is my each-way tip.

Welcome Charles Brewer

KNOWN as the man responsible for some of the best light entertainment shows on B.B.C. records, Charles Brewer has come to Town—from Birmingham.

His first variety show from London will be broadcast on November 7. For a taste of the real Brewer brew, though, you must wait until November 29, when he will broadcast a show of his own composition.



Charles Brewer has some good shows up his sleeve for London listeners

Where the Bigwigs Sit

SHOULD you worm your way into St. George's Hall during a B.B.C. show in the

future, cast your eye to the box on the circle level on the prompt side of the house. There, in all their majesty, may be sitting senior B.B.C. officials—from the "D.G." downwards.

"Red Ted" Goes Home

MY friend Edward ("Red Ted") Liveing has been nabbed by Manchester after all. For some time now the North Regional Director has been down in London, but the insistent clamour of the North has called him back.

He takes up his former duties again on November 3. I wish him all joy. He will have some Londoners to keep him company, including Archie Harding in Productions, and De Groot, the announcer.

Is 70 Kilowatts the Limit?

GOODNESS only knows what the B.B.C. engineers are up to with our regional stations. First comes the decision to increase the power from 50 to 70 kilowatts, and now on top of that I hear they may even think of adapting the plant for still higher power.

Up to 70 kilowatts can be pumped out without alteration, but for more than that the station would have to be out of action while alterations were made.

The B.B.C. may take advantage of the silencing of the Nationals by Droitwich to do a quick bit of changeover work, using the transition period to increase power all round.

Dan Leno, Jun.

WATCH this youngster! He has all his father's talents—potentially, at any rate. He wrote the book for that amusing Crazy Hour recently. Oh, yes, he has talent—and also his father's gag book!



Henry Hall will do a feature programme at Christmas time

Television: the Latest

SO much confusion reigns in the television world that I am asked to clear up the position. For the moment the B.B.C. is still sending out 30-line signals from London National, four nights a week. This service will go on until the end of March, 1934, when the situation will be reviewed.

Meanwhile, Baird ultra-short-wave film television is being broadcast from the B.B.C. transmitter on a wavelength of 7.75 metres. This is the high-definition stuff, with 120 lines.

Baird gets his look in with this system until the end of the year, when the E.M.I. group take over with their 150-line film transmissions.

Recording Developments

AS I think I hinted some weeks ago, the B.B.C. has been experimenting with a very interesting new system of recording. I find that these experiments have proved very successful.

It is now possible to make very quick disc recordings at the B.B.C. by a new process that is at once highly efficient and very cheap.

At Nightingale Lane, Clapham, B.B.C. research engineers have been improving the Blattnerphone system of metal-tape recording, and several more of these machines are being installed.

All this recording apparatus is rather necessary these days, what with News Reels and Empire broadcasting.

Against Man-made Static

MOST keen fans know by now, I suppose, that the Institution of Electrical Engineers is conducting an investigation into the many problems of electrical interference to broadcast reception.

It is good to hear that the sub-committee's findings have been approved and that the general idea of suppressing or eliminating such interference at its source has been agreed upon. We may expect big developments in the near future.



Malcolm Frost, Empire broadcasting emissary, is off to Canada soon

Tackling Problems Ahead

NOT content with putting present troubles of man-made static on the spot, the Institution has looked ahead to the days when ultra-short waves may be universal.

They have accordingly investigated the peculiar interference caused by the electrical action of wind-screen wipers and petrol lifters on modern cars—the field of exploration being right down to 7 metres.

Lucky Malcolm!

IF there is a young man I envy at Broadcasting House it is Malcolm Frost, who is off to Canada for Christmas. Having done the rest of the British Empire and sold out his bag of records of B.B.C. programmes, he is about to try his luck on the Canadians. He'll knock 'em!

One of the results of his recent tour will be heard on December 13, when the B.B.C. will relay a programme from Bombay. There is also a chance that they will relay something—I cannot imagine what—from the tombs of Egypt.

Tale of an SOS

BECAUSE the name Brunt was inadvertently changed to Grunt during a recent SOS broadcast from London, the announcer repeated the message ten minutes later.

The people concerned in the SOS heard the correction but not the original message. Had the mistake not been made the SOS would probably have failed.

Unwanted Audition at "B.H."

AS I was taking these notes during my weekly "snooping" at Broadcasting House, my ears were assailed by the sweet strains of a violin. Dear me, I thought, can the wonderful Tower have developed a sound leak—for I was in one of the administrative offices on the outside.

But no, it was nothing so calamitous; just a street musician outside the building. Or was he a would-be broadcaster, seeking a novel way of bringing his undoubted talents to the notice of the Entertainments Director? Sort of new-style serenading!

RADIO WONDERS OF THE POST OFFICE

By ALAN HUNTER

TO many people the words "Post Office" often mean no more than the place where one waits a long time for penny stamps or the organisation that seemingly takes a delight in giving one the wrong telephone numbers. May I assure you that our British Post Office has many more important jobs in life?

My visit to Dollis Hill, in north-west London, emphasised how wide is the scope of the Post Office of to-day. However humble its beginnings and however simple its initial object may have been—delivering letters, I suppose—to-day the work of P.O. engineers covers every conceivable form of communication; radio looms significantly large, quite naturally.

Entering the Physics Laboratory, I made for the high-voltage annexe, where an engineer was demonstrating arresstor tests with some very effective "home-made" lightning.

Charging A Copper Sphere

Banks of condensers were connected in parallel to store up potential, for the discharge of which the condensers were then switched in series. One side of the condenser bank was taken to a large copper sphere, about as big as your head, which was suspended a foot or so above a copper plate, connected to the other side of the condenser bank.

On this copper mat were grouped little twigs of trees, standing up about 6 in. high, the whole bunch making a very fair imitation of a forest or wood. We might regard the whole rig-up as a miniature scene on any thundery summer's day in a wood, with the copper mat as the earth, the twigs as the trees in the wood, and the copper sphere as the lowering and highly charged clouds in the sky.

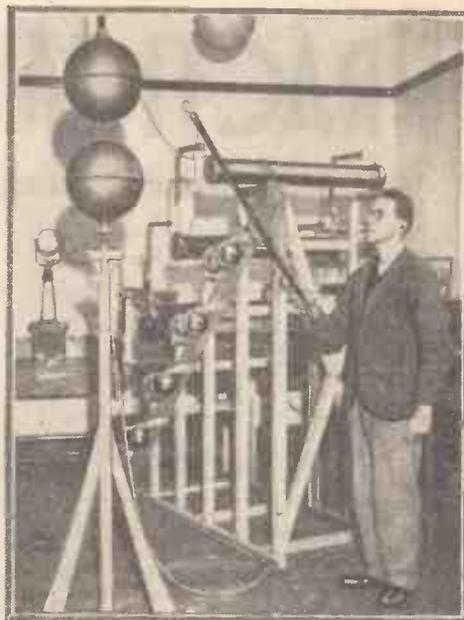
A pretty idea, is it not? I thought so, and went closer to investigate. "I should stand



For critical loud-speaker tests a sound-proof room is essential. This is the Post Office room at Dollis Hill, padded with wool 18 in. thick. A regular padded cell!

back a little, if I were you," cautioned an earnest and bespectacled attendant. "You see," he went on apologetically, "that sphere is charged up to about a quarter of a million volts!" Needless to say, I stood back—very quickly. Disintegration at this relatively early stage in my career is not to be risked.

Came an engineer to tame those volts—to



To test lightning arresstors and lines the Post Office employs artificial lightning apparatus. It can generate 250,000 volts!

make them simulate, with quite amazing realism, lightning on a miniature scale. Nature in the raw is seldom mild, I recalled. Indeed, when the engineer switched on the juice and the condensers had charged up, sparks began to fly with a vengeance. Ugly, jagged streaks of blue began to play around those "trees," striking first one and then another in an almost terrifying fashion.

Life-like Imitation of Lightning

As the air dielectric between the sphere and the plate was broken down again and again, the lightning flashed down on those poor twigs with a vicious sounding noise, just like the crack of a whip.

After it was all over I looked at the twigs, and found half of them were blackened almost to cinder; just as you find the bark of trees damaged after a lightning flash has hit them.

Not far from this laboratory I came upon what is colourfully described as the Robot Operator. Now this is not strictly wireless, but everyone with an automatic telephone will be interested, I am sure.

You know that at the present time if you dial an engaged number you hear a characteristic "busy" tone, repeated *ad nauseum*. That is all very well for people such as you and I. We are so intelligent that we should never mistake a busy tone for anything else. There are thousands of people not so used to the automatic 'phone, including subscribers to public telephone booths, and to these people it is not always clear which tone means what.

So the Post Office has evolved its Robot Operator. Come to think of it, an automatic exchange is a wonderful robot, anyway, getting our numbers without human intervention of any sort. Now this mechanical robot is to take on the essentially human attribute of speech.

Instead of hearing the busy tone when you dial an engaged number you will hear a feminine voice repeating, "Line engaged, line engaged, line engaged." It is no use answering her back because "she" is only a strip of film wound round a revolving disc.

It is just an application of the talking film to the 'phone, that's all. On the film is recorded the speech, in this case "Line engaged," and this is reproduced as speech through a photo-cell and amplifier.

Continued on page 837



Imposing exterior of the new Post Office Engineering Research Station at Dollis Hill, opened by the Prime Minister on October 23, 1933

PRACTICAL MAINS WORKING

Voltage-adjustment Schemes Discussed by PERCY W. HARRIS, M.Inst.Rad.E.

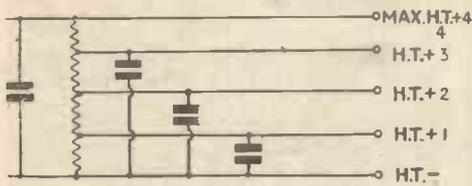


Fig. 1.—Potentiometer with tappings for various voltages

THERE are two main methods of varying the output voltage from a mains unit so as to make it suitable for different tappings in the wireless receiver. One is the potentiometer method, and the other the series resistance.

There are advantages and disadvantages in the potentiometer method of voltage adjustment, one of the important advantages being that the potentiometer imposes a constant "load" on the rectifying and smoothing system, making for better "regulation" (voltage changes with varying loads).

If we have no load on the output side of our mains unit, the voltage applied to the condensers will be quite high, and a small current load may bring about a considerable reduction in voltage.

Strain on Smoothing Condensers

If, too, the sole load is that of the set and we switch off the filament and leave the mains unit on, there may be a sudden voltage surge imposing an undue strain upon the condensers in the filter system. This cannot happen, of course, if we have a potentiometer in position, for although nothing may be taken from the actual tappings, the load of the potentiometer itself is always there.

In Fig. 1 a potentiometer is shown with several tappings. These tappings can either be fixed or variable, the variable type of tapping being more expensive to make. The value of the resistance is important, for if it is too low the "bleed" current, as it is called, taken by this permanent load will be too heavy. If it is too high undue losses and feedback

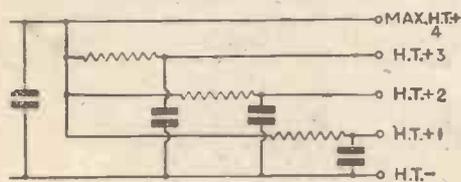


Fig. 2.—Each tapping has a resistance in series with it

troubles may occur, due to the common high resistance in the lead to certain valves.

The wire used must be sufficiently thick to carry not only the current through it when there is no load, but also the maximum load current; 20,000 ohms is quite a general figure for such potentiometers, and if you have 200 volts across it the bleed current will be 10 milliamperes.

The voltage taken from each of these tappings is dependent not only upon the proportionate tapping down of the resistance, but also on the current drawn. Notice that a

low tapping will have to take its current through the majority of the resistance whereas a high tapping takes its current through only a small resistance.

As, however, the current from a low tapping is usually quite small (output valves usually taking high voltage) there is very little trouble in this regard. In any case, if we are using a tapping half-way down the resistance (assuming 200 volts across the lot) then the voltage given on this tapping cannot exceed 100 volts. I shall mention this point later in considering the series resistance method.

Now consider Fig. 2 where each tapping is taken from the highest voltage point, but has in series with it (other than the maximum) a separate resistance shunted on the output side by a condenser. If we know definitely the current load to take on each of these tappings we can calculate the value of resistance necessary to bring the voltage down to the figure we require.

The great advantage of this method is that there is no common resistance for the various tappings (other than the resistance of the rectifier and smoothing unit itself), and therefore it is much less likely to give feedback trouble in a set tending to be unstable. Where the load is known and constant it is the best of all the schemes for every tapping is thoroughly decoupled from the others.

The disadvantage is that the voltage given is dependent upon the load and there are certain places in a set where this form of tapping becomes unsuitable. Take, for example, the supply of the voltage to the screening grid of a screen-grid valve and, particularly, a variable- μ valve.

The actual current varies considerably between different specimens and in different working conditions of the valve, and furthermore there are a number of reasons why this voltage should be kept constant even when other valve conditions alter. The resistance, for example, calculated to give the correct voltage with 2 milliamperes screening current will be entirely wrong for either 1 or 3 milliamperes.

Short-wave Notes By Kenneth Jowers

THERE are a lot of good things that have all arrived together—a number of new stations and quite a lot of interesting components. I have just received one of the new Igranic short-wave coils, iron-cored, by the way. These have internal switching and with a .0002-microfarad condenser tune between 14.5 and 78 metres.

I know they will be very popular because it is so very simple to obtain smooth reaction and, what is more, you don't seem to get that chasing effect which is so prevalent in short-wave receivers. I propose to use one of these coils as an oscillator in a short-wave super-het; with iron-cored intermediates and the new Marconi-Osram high-frequency pentodes; results should be pretty good.

There is a new high-frequency choke just issued by Telsen, which is totally screened. I have tested it down to 14 metres and it was still very efficient, which is saying something for a choke costing only 3s.

The Poznan (SR1) station, which closed

Above, in speaking of the potentiometer method, I pointed out that this particular method gave us an approximately constant voltage with a small current, and for this reason it is usual when the series resistance method of voltage regulation is adopted also to include a potentiometer for that tapping which has to supply the screening grid of a screen-grid valve.

In Fig. 3 we see the circuit of a voltage regulator unit including both the series and the potentiometer method.

The method of calculating the resistances for the series method is to ascertain the current the tapping is to give and the voltage drop required. Say, for example, we have 200 volts as our maximum at the terminals of the smoothing system and the load on a particular tapping is 3 milliamperes—the voltage at 3 milliamperes to be 120 volts.

We therefore want to drop 80 volts at 3 milliamperes. The rule is to divide the voltage by the amperage, and as we are dealing with milliamperes here we multiply the voltage by

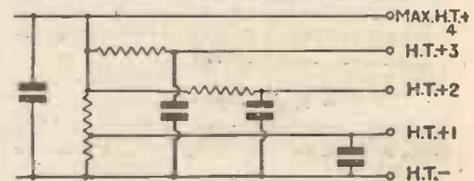


Fig. 3.—Voltage-regulator unit using both the potentiometer and series methods

1,000 before the division takes place. For instance, 80,000 divided by 3 is 26,600 (approximately) and therefore a 25,000-ohm resistance capable of carrying at least 3 milliamperes will be near enough.

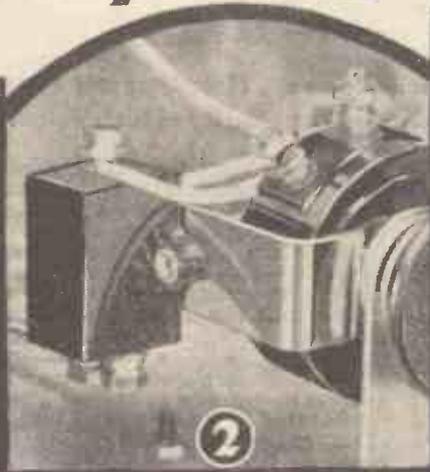
Always remember that the current-carrying capacity must be taken into account, otherwise your resistor will burn out. This is quite an important matter if you are dealing with a heavy-current valve.

down some months ago, is now on the air with some experimental tests, usually on Tuesdays and Thursdays from about 5.30 p.m. on 31.63 metres. I do not feel that this will be very popular because the 31-metre band is already overcrowded. Another newcomer is a Russian—Petrovavlosk-Kamschatka—a little station using only 500 watts on a wavelength of 60 metres (exactly). This station is coming in extremely well, particularly in view of its low power, and is quite easy to find as it is all on its own—well above the 49-metre band.

Ultra short-wave television is causing quite a stir at the moment and a considerable amount of worry to amateur constructors who really don't know what type of receiver to make up. Super-regeneratives are hardly suitable for television—super-hets are rather troublesome and far too expensive, while the straight Reinartz detector is not too efficient.

Personally, I think a super-het is a solution, but I am going to try a straight set with plenty of low-frequency amplification.

Some of the Special Features of the Etherdyne Super!



1. One of the leading features of the Etherdyne Super is the pentode current economiser, for which the Varley Power Puncher is incorporated. It is clearly shown in the foreground.

2. Here you see the combined volume control and the three-point battery switch. Remember to mount the control with the terminals uppermost.

3. When wiring up to this screened high-frequency choke take care to bare the end of the shielding wire so that it can be neatly bound as shown.

4. Connections to the intermediate-frequency transformers are easily made. Note the terminals on the side as well as on the base.

5. A close-up showing how the end of the wave-change switch shorts the two copper wipers connected to the high-frequency choke.

6. The three coils mounted above the chassis have a common wave-change switch. Here you see how to couple up the spindles.

7. View of the underside of the chassis showing the low-frequency transformer with nearby small fixed condensers.



1. One of the leading features of the Etherdyne Super is the pentode current economiser, for which the Varley Power Puncher is incorporated. It is clearly shown in the foreground.

2. Here you see the combined volume control and the three-point battery switch. Remember to mount the control with the terminals uppermost.

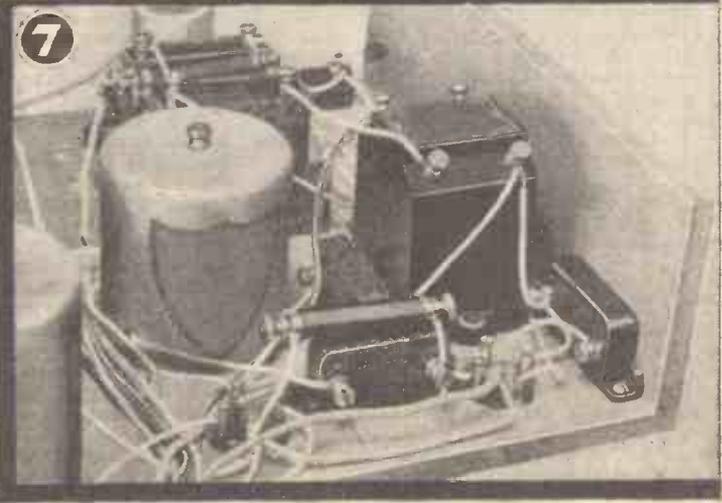
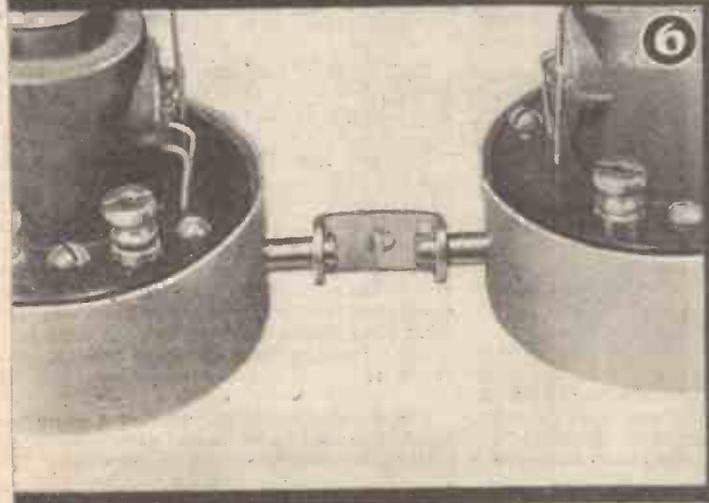
3. When wiring up to this screened high-frequency choke take care to bare the end of the shielding wire so that it can be neatly bound as shown.

4. Connections to the intermediate-frequency transformers are easily made. Note the terminals on the side as well as on the base.

5. A close-up showing how the end of the wave-change switch shorts the two copper wipers connected to the high-frequency choke.

6. The three coils mounted above the chassis have a common wave-change switch. Here you see how to couple up the spindles.

7. View of the underside of the chassis showing the low-frequency transformer with nearby small fixed condensers.



Programme Criticisms by WHITAKER-WILSON

WITHOUT FEAR OR FAVOUR



Success of "London Bells" :: Melodramatic Pursuit :: Give Us the Time!
 "Pepped Up" News Bulletins :: Rarity of Rich Voices :: First or Last Time Here?

I would be untrue to describe Ashley Sterne as two-faced, but he can accurately be described as possessing two distinct minds. Known to us for many years as a humorous writer, until fairly recently he was unsuspected of being a writer of music; of such good music, too.



Doris and Elsie Waters took advantage of the humour in "London Bells"

In *London Bells* Mr. Sterne proved his power as a composer. Mr. A. A. Thomson, his lyricist, produced six exceedingly clever lyrics, which Mr. Sterne set to charming tunes.

Five *Faythings*, *On the top of a 53*, *When I Grow Rich*, *The Satin Shoe*, *London Bells*, and *Here Comes a Candle to Light You to Bed* maintained a level not hitherto approached in a light show of this kind.

Of humour there was enough and to spare. Doris and Elsie Waters took advantage of it.

The description of Mr. Ramsay MacDonald as "the people's wandering boy" sent the studio audience into a roar. Also the *Song of the Muffin-man* (Crumpeter, what are you sounding now?), and the *Mansion House* re-named the *Munchin' House*.

And now, my dear Ashley, please send me tickets for your first comic opera.

It was worth listening to the Bach Cantata this week if only to hear Violet Brough play the *viola d'amore*.

Are you listening to the "Anywhere for a News Story" series? If not, you can do worse than devote half an hour of your Saturday evening to them. Quite thrilling!

Pursuit made interesting broadcasting because it really did take us back to the old Savoy Hill days. It was actually the first dramatic production to make use of the multiple-studio idea.

Good melodrama, too, but the chief interest lay in a comparison between the methods Mr. Cecil Lewis used (in what was patently pioneer work) and those used now.

The Effects Depot produced a noise for everything—even a fog. Now we know what to do to be invisible; simply stand still and make a noise like a fog. We learn a lot by listening.

Josef Hofmann played Beethoven's Emperor concerto so perfectly as to draw attention to the fact that most of the piano part consists of runs and arpeggios. *The concerto ought to be scrapped*. If Beethoven were here he would probably agree.

Dr. Boulton secured an electric performance of Elgar's Second Symphony. Just pure music. Best wishes to Sir Edward for a speedy return to health. *We want to hear his Third*.

Why don't they broadcast the time when they say they will? Time is one of the best things they do, anyway.

The Emmerich Kálmán Hour must have found a deep response with many listeners. Deservedly popular music. To the success of that hour John Hendrik and Thea Philips contributed in no mean degree.

Why must Henry Hall's lady singer sing about her forgotten mannnnnnn?

Henry is a much-criticised "mannnn," by the way. Judging from a programme of his this week there is nothing to grumble about. Definitely varied and artistic. *The Wedding of the Dragonflies* is worth repeating.

Funny Men "Do their Stuff"

What Next? proved again that it is unwise to write lines for people like Jay Laurier, Tommy Handley and Leonard Henry.

For the first twenty minutes it seemed as though we were in for another ghastly show like *The Fire Station*. The lines were very poor. The last half, however, was really good simply because each comedian was allowed to "do his stuff."

One definition is worth recalling. A quartet is four times worse than a solo.

Also a conundrum. What is it that does 5,000 miles without a puncture? The roller-towel in the cloak room at the B.B.C.

Jay Laurier, with his *Let's have a jolly good cry*; Tommy Handley in a monologue, and Leonard Henry as an attendant at a Turkish bath were what we expected them to be.



Josef Hofmann played Beethoven's Emperor concerto perfectly

Moral: leave them free to give their own shows. Nothing is to be gained by unduly cramping these funny men.

The news programme on Saturday evenings proved one of the most interesting broadcasts we have had in this department. Most of us have longed for a Brighter News scheme. We certainly had it on Saturday.

Opinions from Berlin and Paris on the disarmament question, a description of the Post Office research laboratory at Dollis Hill, and of the work of *Discovery II* in the Antarctic seas, all made a good beginning to what promises to be a fascinating series.

Some odd pronunciations came through. Is laboratory to be sounded *laboratory*? Authority says *labra-try*.

The announcer spoke of Steevenage. The inhabitants call it Steevenage, surely?

Mr. Lloyd James! Forward, please!

S. P. B. Mais, Modern Columbus, indefatigable globe-trotter, and enthusiastic re-producer of experiences, seems to have been enjoying himself amongst the alligators in Florida.

A fascinating series, but it will be nice when transmissions from America become a trifle clearer. "S. P. B." sounded like an asthmatic ventriloquist half the time.

A word to Alice Moxon's accompanist. Don't improvise between songs. We are not going to switch off; you needn't keep on keeping on like that. Miss Moxon's singing was good enough to keep us listening.

Rich voices are rare nowadays. Clara Serena has one, though. Her singing of *Ponchilli* and *Verdi*, the other night, proved it.

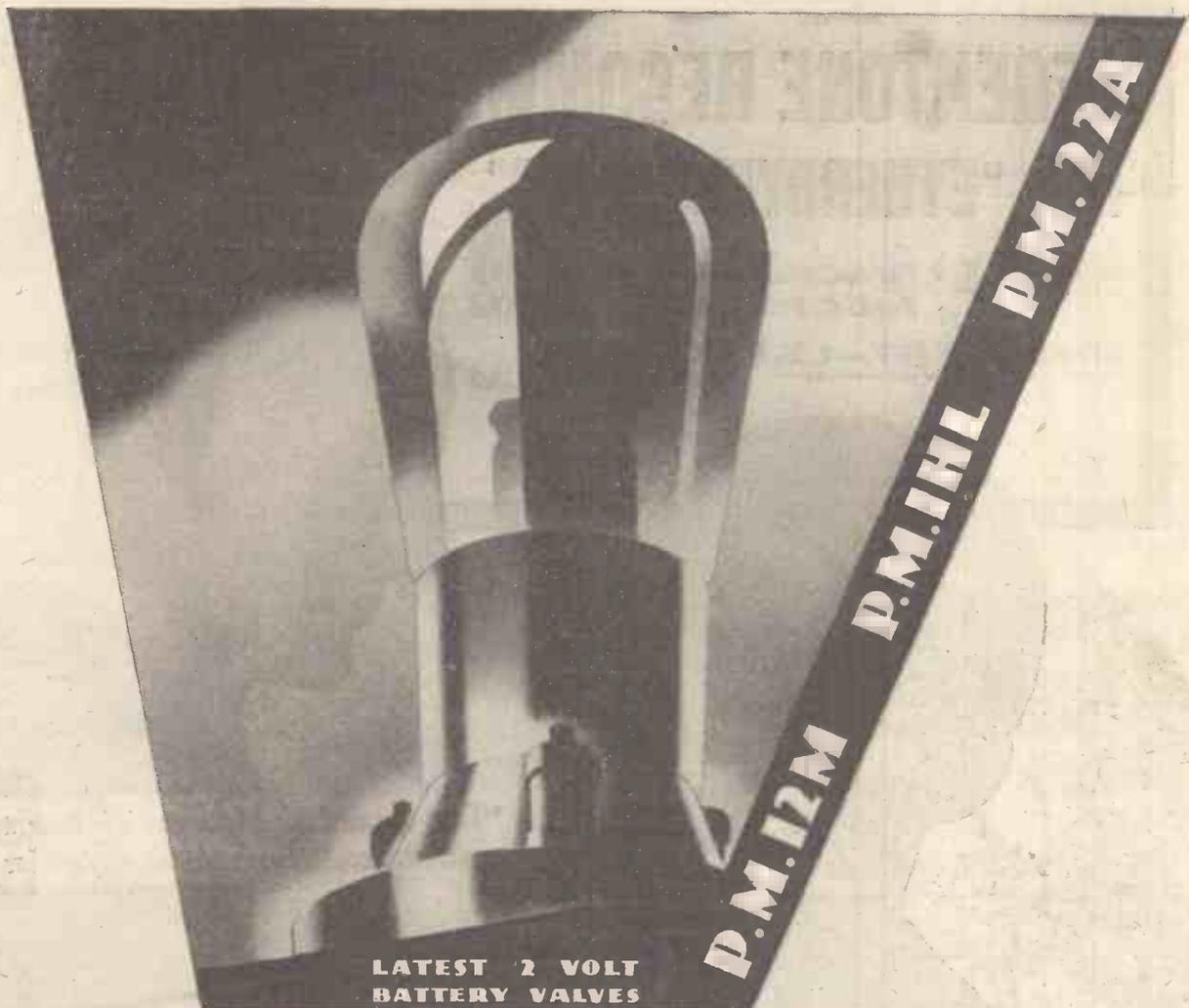
Did you hear *Trafalgar* right through, or was it too much for you? The opening must have killed it for a good many. Much too long. The text made the going rather heavy in places.

These tea-time entertainments by artists new to the microphone have not quite justified themselves yet. Some will have to be told that *First Time Here* may mean the last time anywhere. Perhaps there are some brilliant ones to come?

The Busch Quartet proved that a quartet is not *always* four times as bad as a solo. Their playing of a Beethoven quartet must have been four times as good as anything Beethoven heard.



Tommy Handley was allowed to "do his stuff" in "What Next?"



Because ten years' unceasing research and consequent experience has gone towards perfecting the mechanical construction of the Mullard Master Valve, three million aerials today lead down to Mullard 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., Ref. B.G.S.

JOIN THE BETTER RADIO BRIGADE

Mullard

THE MASTER VALVE

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

Arks

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

**REGENTONE RECOMMENDED
FOR "ETHERDYNE SUPER"**

H.T. ONLY • For A.C. Mains, Model W.I.C., £2.15.0
For D.C. Mains, Model D.C.I., £1.17.6

COMBINED H.T.—L.T. • A.C. Mains,
Model W.5.A. £3.15.0



"Take my advice. Make sure it is Regentone, the exclusive control makes it the only one for the job."

**ONLY REGENTONE MAINS UNITS
HAVE A LINE VOLTAGE REGULATOR!**

You would not buy a car without a gear box. The Regentone Mains Unit has a "gear-box" and a pre-selective one too! It is essential when choosing a Mains Unit to ensure that the controls are such as to allow selection of just the right voltage value suitable to the set, and the circumstances under which it is operated. With seven high-tension tappings to choose from, and the Line Voltage Regulator controlling mains voltage fluctuation, a "Regentone" Mains Unit allows the operator to adjust H.T. voltage to exactly the value required to maintain full efficiency.

To REGENTONE LTD., REGENTONE WORKS,
WORTON ROAD, ISLEWORTH, MIDDY.

Please send me, free of charge, illustrated list of
Regentone Mains Units

Name..... Address.....

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

How Any Beginner Can Build a Super-het

By the AMATEUR WIRELESS Technical Staff



ARE you what is known as a handyman? Are you fond of doing things for yourself? Are you capable of handling a screwdriver, a pair of pliers, a footrule?

Maybe you are *not* a handyman, and *don't* take delight in hanging pictures, mending leaky taps, or anything else that goes wrong in the domestic arrangements. But you *must* be interested in radio, or you would not be reading this article now.

You Don't Need Experience!

That is all you need to be, really. Just interested! Granted that, and you can meet on level terms the most experienced handyman in this set-building business.

Why not capitalise this interest of yours? Do you realise what you are sacrificing by remaining just passively keen on radio? Probably you do, but stay your hand from attempting to build one of our sets because you think the work is beyond you.

Please take our word for it. *No home-constructor set of to-day is beyond amateur scope.* No set we turn out, certainly, is at all difficult to build. Long before our sets reach the publication stage they are ruthlessly put through the mill to eliminate snags.

When we turn out a design we are not just content at having produced a good set. We have also to bear in mind the necessity of making the construction end of the process essentially easy. We pride ourselves that no one need be debarred from tackling our designs—however small their knowledge of wireless theory may be, or however limited their mechanical ability.

For, with every home-constructor set we produce there is always our invaluable guide to assembly and wiring—the full-size blueprint. So impressed are we with the value of these blueprints that we, alone of all the wireless periodicals, have for years issued blueprints with *every one* of our designs.

Latterly, we have sought to enlarge the scope and utility of these unique blueprints by printing them on the inside of the cover. In this way you obtain what is equivalent to a shilling or one-and-sixpenny blueprint free. Or, looking at it another way, you get a great deal for the threepence you pay for a copy of AMATEUR WIRELESS.

Foolproof Aid to Building

We want to impress upon every new reader, and everyone new to home construction, that a full-size blueprint, such as we are in the habit of giving with our designs, is a really foolproof aid. Not only does it indicate exactly where the component parts are screwed on the base-board and panel; it gives in addition the point-to-point route of every wire in the set.

So that there shall be no mistake in the wiring we take the trouble to number every wire, from No. 1 up to the last wire in the circuit. If you follow this sequence, and cross out each wire on the blueprint as it is actually made in your own set, you will know at the end of the job that no wire has been left out, no extra wire put in.

With a blueprint you can go ahead with the confident knowledge that when the last wire

is made you have a set that will work—straight away and without hours of anxious searching for elusive faults.

Every reader of AMATEUR WIRELESS is a potential if not an actual builder of wireless sets. We want all those who normally pass over the blueprints to give them a moment's thought. To ponder on their real value. Which will inevitably lead to a consideration of the facilities needed to take advantage of their guidance.

Long ago, this home-construction pastime was discovered, not by handicraftsmen or experts with tools, but by ordinary listeners, by non-technical amateurs. And they found, as you can prove for yourself, if you have not already done so, that with the very simplest tools, such as screwdrivers, wire cutters, and pliers, it was the easiest thing in the world to make a wireless set.

We are not trying to belittle the undoubted fascination of making things. We are trying to show that making a wireless set is not a job that needs any sort of expert knowledge, or any particular experience in handling tools. As we said before, if you are interested, that is enough. To that interest you must add just a little commonsense—and then there is absolutely no reason why you should not materialise even the most ambitious types of set.

Indeed, a super-het is well within the capabilities of the novice. It is no more difficult to build a modern super-het than it is to build a simple straight three. We have proved this by the production of our Etherdyne Super, a five-valve super-het set for battery operation.

Why not make a start on home-construction with this Etherdyne Super? It is not a fantastic idea. We think that with all the information we have given about the set the veriest

novice can easily assemble an Etherdyne.

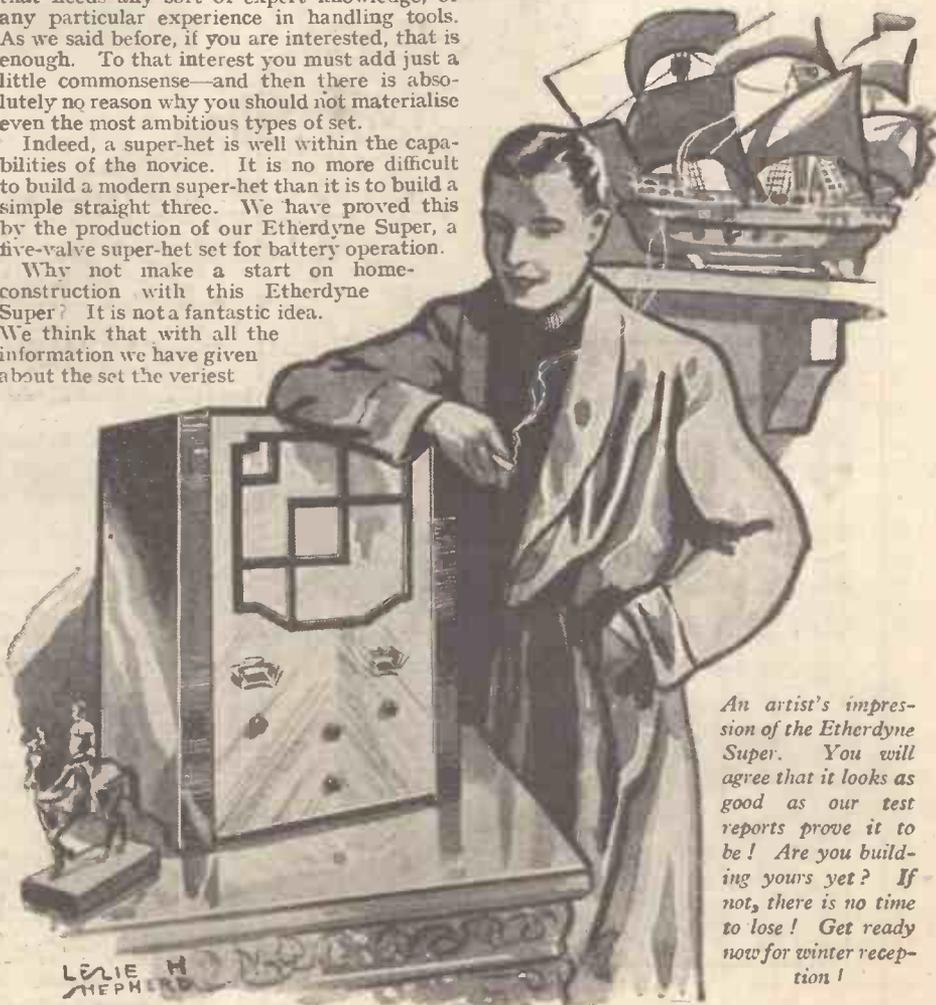
Just look back a little. In the October 21 issue we introduced the Etherdyne with pages of lavishly illustrated text on every phase of the set's design and construction. We included a special photo-chart, showing the top and underside layouts of the wooden chassis.

Help from Our Blueprints

In that issue we also gave a full-size blueprint on the inside covers of the top part of the chassis, accurately indicating the positions of the components and their wiring.

In the October 28 issue we continued the story of the Etherdyne, and on the inside covers gave you the full-size blueprint of the underside of the chassis, as a companion to the blueprint the week before.

This, then, is our contention. That you can build the Etherdyne no matter if you have never built a set before. Take the plunge now—and be in the swim with all other discerning amateur constructors.



An artist's impression of the Etherdyne Super. You will agree that it looks as good as our test reports prove it to be! Are you building yours yet? If not, there is no time to lose! Get ready now for winter reception!

LESLIE H. M. PHEP



To take advantage of the constructional hints given in this article the reader should be in possession of the Etherdyne photo-chart given free with the October 21 issue and the full-size blueprints to be found on the inside covers of the October 21 and October 28 issues. Copies can be obtained from the Publisher for 4d. each, post paid.

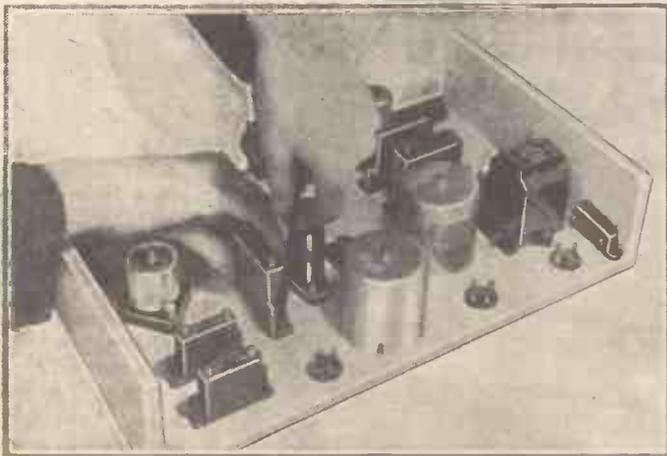
WE are now taking you step by step through the assembly of our "ace" super-het, the set with a pedigree, the set about which all the radio trade is talking, in a word—the Etherdyne.

However little you may know about set construction, you can still tackle the job of making up the Etherdyne. We have smoothed out all the snags. Our special photo-chart given free with the October 21 issue provides you with a real-life view of the layout and wiring.

Being a chassis set, the Etherdyne's wiring is divided up into two sections, above and below the main baseboard. The photo-chart clearly shows the wiring of these two sections, and what is more it shows by a simple letter code how the wires are taken through from one section to another.

As an additional aid to construction we ought to mention the free full-size blueprints that have been given in the preceding two issues, one of the top part of the baseboard and the other of the underside. Remember that these full-size prints, which were given on the inside of the covers, can be used as drilling templates, and to check up the wiring.

As in the photo-chart, all the wires are numbered in sequence, and where wires go through the baseboard the holes are lettered. With so much explicit instruction



Screwing down parts for the Etherdyne Super, the first main stage before wiring together according to the photo-chart and blueprints

The Beginner's Guide to the

Here the "A.W." Technical Staff Goes through the

the Etherdyne almost falls together. It is certainly not a difficult set to build in any case, and with the chart and blueprints even the novice ought to be able to go ahead.

The first job is to get together the components specified in our list, or suitable alternatives. The basis of the design, as you probably realise already, is a chassis, but instead of being made of the usual metal, such as aluminium, it is a special wood.

Metaplex, as this wood is called, is really a great boon to the home constructor. It retains all the workability of wood with the added advantage of complete metallisation. The wood is metallised by a special process on both sides. Of course, the impregnation does not penetrate right through, and it is necessary to arrange to connect the upper and lower surfaces together.

Our chassis is really quite a simple affair, consisting of a flat piece of board and two side pieces to hold the main part about 3 in. above the bottom of the cabinet.

No panel for the controls is needed, because the components with variable control knobs are mounted directly on the baseboard, and the knobs of the various spindles simply project through the holes drilled in the front part of the cabinet.

transformers, the low-frequency transformer, screened and unscreened high-frequency chokes and coupling resistances and condensers.

Leads for the batteries come out from underneath the chassis, these leads being connected directly to the components involved, by means of one four-way, one three-way and two two-way cords.

Tighten Up Nuts and Bolts

Before you attempt to start work on the actual assembly of the chassis we strongly advise you to look over your components and see that the nuts and bolts are properly tightened. Not for a moment are we suggesting that the makers send out their parts improperly finished, but it is a fact that in transit the nuts and bolts tend to loosen.

Another thing; make sure there are no protruding terminal bolts underneath the components. The pre-set condenser in the aerial circuit, for example, might easily short the aerial to earth if one of the terminal bolts were a little "proud."

We will assume you are buying your chassis ready drilled. If not this is the point to do it. The full-size blueprints we give away in our covers will help you locate the holes, not only for fixing the parts but for leading wires from one side of the chassis to the other.

Don't fix the side-pieces yet, otherwise you will find it awkward to screw down the parts.

We advise you to make a start by fixing the parts to the underside of the baseboard. No special order in fixing is essential, but for convenience you ought to fit the smaller parts first, so that you won't have to try your temper with fiddling screws in inaccessible places.

All the parts you see in the chart can be fixed, but note that the resistances are not brought in at this stage, because they are held in position by their wiring, and that, of course, is not started until the assembly of all the parts, top and bottom, is completed.

Volume-control Fixing

About that volume control: first mount the bracket itself without the control—you will have to do this otherwise you will not be able to get at the screw holes. Two screws make a firm fixing, but make sure they are tight, because they hold a variable control with a lot of wear and tear ahead of it.

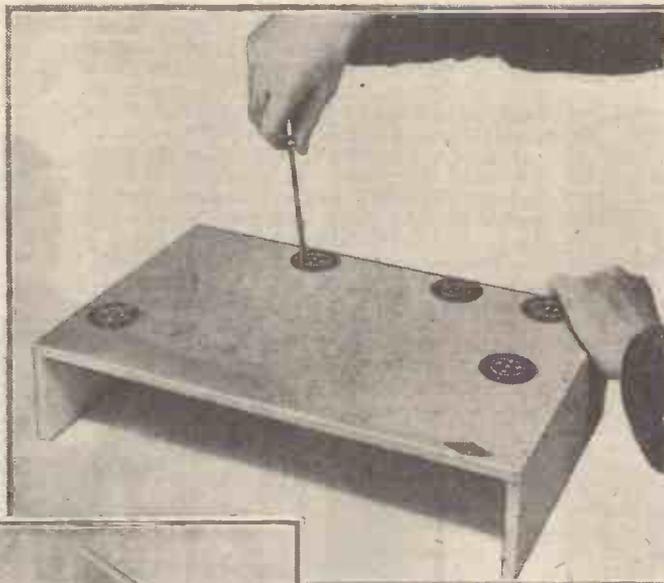
Make very sure of fixing the insulating bushes on each side of the spindle, as the volume control

must be insulated from earth. See that the three terminals come uppermost in relation to the metal bracket screwed to the baseboard.

Remember that if you are using a ready-drilled chassis some of the holes are for leading through wires. Don't cover them up by fixing parts in the wrong places, will you?

The screened high-frequency choke needs a word or two. Make sure the terminal to which the wires marked No. 24 and 25 are connected is the one with the metal strip connected to the screen of the choke. *This is most important.*

Mounting the few components above the chassis is a very easy stage in the business. Fix those five valve holders, making sure the



Fixing the valve holders to the baseboard. This is a simple job, but be sure the terminals underneath are clear for connections

Very few of the components are mounted on the top part of the chassis, only the two-gang condenser, single tuning condenser, three-coil unit, aerial pre-set condenser, anti-break-through unit, terminal strips, and the valves.

All the rest of the components are fixed underneath the baseboard, including the intermediate-frequency

ETHERDYNE SUPER

Points of Construction Step by Step

grid and anode pins are the right way round, and that the pins underneath do not foul the holes in the baseboard.

Next fit the coil assembly. The two outer coils should be fitted first, leaving the middle coil to be centred by the spindles. You will appreciate the value of this tip when you come to do the job. If you make a good fixing of the two outers, having of course assured yourself that they are in line, you will find the spindles and bushes or couplings will automatically centre your middle coil in the correct position. It is essential to make a good and true fit here, otherwise the wave-change switch will not turn easily.

Care is needed in fitting the anti-break-through unit. This, as you will realise, is really a high-frequency choke, with two copper wipers, which are short-circuited by a metal bush on the end of the wave-change switch spindle arrangement.

Shorting the Choke

As the medium waves are brought in by moving the wave-change switch to the right, the metal bush on the end of the spindle comes in contact with both wipers, and as these are connected to the two ends of the choke this shorts the choke out of action.

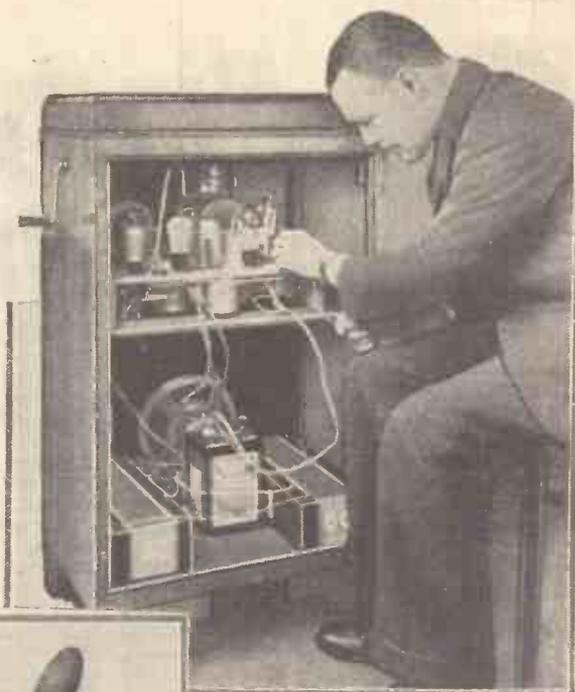
This is what is wanted, of course, because the medium wave break-through only applies on the long waves, and there is no point in the series aerial choke on the medium waves. In fixing the choke just take care that the desired shorting is effected, as you can easily do by moving the wave-

condensers, that is the two-gang condenser and the single tuning condenser. The two-gang condenser is easily fixed with three bolts screwed up from the underside. These are supplied with the condenser.

Four bolts are needed to fix the single tuning condenser, and these are screwed from the top, with nuts underneath the chassis making a really firm fixing. By the way, these bolts do more than hold the condenser in position. They connect the metallised top surface with the similar surface below the baseboard—a point of



Only the simplest of tools, such as every schoolboy can handle, are needed to build the Etherdyne Super



Now is the time to build your Etherdyne Super—and sort out those foreign stations!

be quite rigid. What is more to the point, it will then be easy to thread through the insulating sleeving, which is a consideration, as you will rapidly discover.

The wiring sequence can be followed either from our free photo-chart already in your possession, or from the blueprints, which have been given on the inside covers in the preceding two issues. The wires are numbered and the holes through which some of them have to go are lettered to avoid any confusion.

Wiring starts from the aerial terminal on the terminal strip on top of the baseboard and goes to the pre-set condenser, but for convenience the sequence does not continue strictly in circuit order. Some of the underside wiring has to be done before all the top part is completed. Most of the top wiring is done in the early stages, and you can then settle down to the completion of the underside wiring, still keeping to our chart or blueprint sequence, of course.

Anode Connectors

Note that for the anode connections for the three screen-grid valves special shielded wire is used. As an added precaution we recommend you to Belling-Lee anode connectors. You should bind up the frayed ends of the shielding wire covering the flexible leads to prevent any possibility of shorts on to the other parts. Remember the shielding is earthed, but *not* the flexible wires inside them.

Carry on with the wiring, taking note that some leads are earthed by bolts to the metal surfacing, and that the resistances are wired in sequence, held in position by their leads.

For a really detailed description of the wiring, with instructions for the wire by wire connection of every part of the set, you ought to refer to the article on pages 757 to 759 of last week's issue.

From this article we hope every beginner at constructional wireless work will realise how essentially simple is the work involved. Very few tools are needed, very little experience either. Just a little common sense—and faith in the set. We stake our reputation on the Etherdyne—it's a winner!



Even if you have never built a set before, there is not a single reason why you should not start on the Etherdyne Super—there are dozens of reasons why you should!

change switch backwards and forwards. It is quite a simple idea, and does the trick without complicated switching.

Now you can mount the two variable

but firmly with the pliers held in the other hand, gripping the free end of the wire, which should be uncoiled a couple of feet or so. Then you will find the wire will "give" a little, and

importance and one you might overlook. So make sure the bolts are really well screwed down, otherwise the surfaces will not be connected.

To complete the components assembly you have now only to fix the aerial pre-set condenser and the terminal strips for the aerial and earth, loud-speaker and pick-up, the last named only being used if you know you are going in for gramophone record reproduction.

We suggest the best wiring for connecting together the various components is No. 20 gauge, tinned-copper. To insulate each wire you should use 1 mm. sleeving. A good tip is to stretch the wire on the reel before cutting it into small lengths.

Hold the reel in one hand and pull gently with the pliers held in the other



Ninety-two Stations on the Etherdyne Super

By Capt. E. H. ROBINSON

THE Etherdyne is a very remarkable receiver for a specific reason which is easily stated. There are two possible ways of judging any new set. One is by the number of stations which it will bring in and the other by the quality of loud-speaker reproduction on the local and more powerful stations. Very, very seldom is it possible to give good marks to a set in both tests. The Etherdyne is one of those rare birds which flaps its wings over tremendous distances and at the same time sings very sweetly.

Having read the preliminary announcements, I guessed that quite possibly I had a treat in store when I was asked to test the set; and when the Etherdyne chassis came to hand I connected it up to my standard 100-ft. outdoor aerial and to my Celestion Reetone dual-compensated loud-speakers, which, when properly fed, give very good quality. Just a word in passing about quality. Despite anything that may be said to the contrary, there is only one criterion. Does received speech and music approximate closely to the original?

Terrific Roar of Sound

The first station received was London National. Having set the volume control to "full on" there was a terrific roar of sound with every indication of tremendous overloading and consequent distortion. Quickly reducing the volume control to very nearly the minimum, I was delighted to find that the quality at ample volume for an ordinary room was very good indeed. London Regional, West Regional, Scottish Regional, with Fécamp

and Breslau and Poste Parisien—all received in full daylight—have confirmed this impression.

This first test was made on a Saturday afternoon, but being very busy I could not do much that evening, but in an hour convinced myself that the claim made for seventy-eight stations was a modest one. On Sunday I really set to work and tuned in and identified every one of the seventy-eight stations claimed, but I heard a very considerable number more. As all the big stations had already been bagged I was not able to identify all these additional small fry; but I have little doubt that they are the stations I am about to name.

If I have not made any mistakes, they bring the total list up to ninety-two. Don't misunderstand me. I am not claiming that these little fellows were all of programme value. Most of them were only interesting in showing the extreme selectivity and sensitivity of this receiver; and, of course, in favourable conditions any one of them might be useful to students of foreign languages. In any case, logging them is an exciting adventure.

Starting at the very bottom of the scale, about a degree under Newcastle there was a station, speaking no language I could recognise, which must, I think, have been one of the Hungarians on 209.8 metres. Newcastle, a degree under Aberdeen, gave quite a strong signal. Between Aberdeen and Plymouth I heard German easily understood, which I don't doubt was Königsberg, a 5-kilowatt station on 217 metres. It was faint, but absolutely clear.

Another 5-kilowatt station, Flensburg, a degree above Fécamp, was also quite clear, though occasionally there was a bit of side-splash from the big Normandy station.

After that I heard French just below Nurnberg, and quite clear from Bordeaux, which I think must have been Nimes. The next stranger on the wavelength scale I captured, late in the evening, was Valentia between Lille and Bari. It was not very good, but the announcement sounded like Spanish.

By now I had nearly reached the end of the new stations. I found Lvov less than a degree above Scottish Regional and managed to get Lyons quite clear of Langenberg and Beromunster. The only station on the long waves not claimed in the already published list was a Russian almost exactly half way between Motala and Warsaw. I see I have forgotten to say anything about Heston Aerodrome, which is receivable about 8 degrees below Croydon.

Capturing Small Fry

Interested readers will naturally want to know whether there was any difficulty in capturing these small fry, most of them sandwiched in between powerful stations. With my hand on my heart I can truthfully say there was no difficulty at all. All I did was to move the oscillator dial very slowly between the neighbouring stations until I heard something. A little juggling with the gang-condenser dial was sometimes necessary to clear things up, but otherwise it was dead easy.

There is no doubt at all that the Etherdyne is a very remarkable achievement.

COMPONENTS YOU NEED FOR BUILDING THE ETHERDYNE SUPER

CHASSIS

- 1—Peto-Scott/Metaplex/metallised wood to specification

CHOKES, HIGH-FREQUENCY

- 1—British Radiogram, type Super-het (or Bulgin).
- 1—Lissen, 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 .00005-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 Power Puncher.

PLUGS, TERMINALS, ETC.

- 10—Belling-Lee wander plugs, marked: 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, Eelex).
- 2—Belling-Lee spade terminals, marked: L.T.+1, L.T.— (or Clix, Eelex).
- 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 yd. thin flex (Lewcos or Goltone).
- 2 ft. shielded sleeving (Lewcos or Goltone).

SUITABLE VALVES

Make	1st H.F. Met.	S.G. Inter. Met.	Det. Osc.	2nd Det.	Power
Cossor ...	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 Hypernik, 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, Drydex, Pertrix).
- 1—Lissen 9-volt grid-bias (or Ever Ready, Drydex, 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., Amplion, R. & A., Blue Spot 45 PM).

MAINS UNIT (in place of batteries)

- 1—Atlas, type T25, for A.C. (or Ekco AC 20/3, Regentone CB.20, or 1—Atlas, type DC 15/25B, for D.C. or (Ekco DC 1525/3, Regentone CB/DC).

RADIO-GRAMOPHONE ACCESSORIES

CABINET

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

GRAMOPHONE MOTOR

- 1—Garrard, type 11B.

LOUD-SPEAKER

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

NEEDLE CUP. 1—Bulgin duplex, type NC7.

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

SWITCH

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

TELSEN IRON-CORED COILS

the smallest, most convenient and most **efficient** coils ever designed

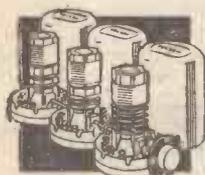


This illustration shows the actual size of the wonderful Telsen Iron Cored Coil.

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

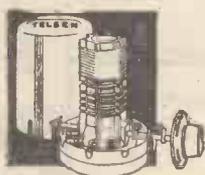
TELSEN COVER EVERY COIL REQUIREMENT



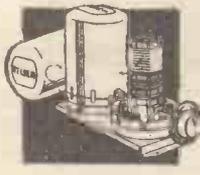
TELSEN SUPERHET COILS
(Type No. S 330) 21/6



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

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

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.
- Greater overall magnification, because it is possible to use driver transformers having a higher ratio than those allowable with the zero bias type of valve.
- Shaped bulb and rigidly interlocked electrode system with top support means greater accuracy of matching —important in push-pull.

B21



MARCONI VALVES FOR USE WITH B 21

Marconi VP21 — The first Variable-Mu battery H.F. pentode, for all up-to-date circuits	15/6
Marconi S24 — High Efficiency straight screen grid	15/6
Marconi VS24 — High slope Variable-Mu screen grid	15/6
Marconi HL2 — Non-microphonic triode detector ...	7/-
Marconi L21 — High Efficiency Class B driver for normal use	7/-
Marconi LP2 — Power valve and Class B driver for sets where full output is needed ...	8/9

PRICE

14/6

For full details and lists send this coupon to The Valve Department, The Marconiphone Company, Ltd., 210-212 Tottenham Court Road, London. W.1.

Name

Address

A.W. 4/11/33

MARCONI VALVES

the choice of the experts

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

On Your Wavelength!

By Thermion

Trouble Coming on Long Waves?

THE emergency meeting of the International Broadcasting Union at Amsterdam was unhappily unable to get any forrader with regard to the Lucerne Plan. Since Holland and Luxembourg have now definitely refused to stand in, this means that the whole of the long-wave arrangements are upset. A reshuffle will have to be made.

This is possible because certain stations to which channels were assigned have not yet come into operation and their wavelengths can be used temporarily by others; but what is going to happen as these stations are completed and start transmitting?

The only ray of hope about the business is that it has been stated that the long waves only are affected and that on the medium waveband all is sweetness and light.

Russian Broadcasting Menace

BUT is it? You may or may not have noticed that the Russian delegates announced that since the original meeting their wavelength system had been entirely re-planned and that they could not now agree to come in under the Lucerne scheme.

If this is really so matters are very far from being "all right" on the medium waves. The Russians have at least thirty stations built or building for medium-wave operation with output ratings up to 150 kilowatts or more.

If they are going to obtain wavelengths by the simple but effective process of taking those which suit them best and then using power enough to shout down opposition I am afraid that the position is not so good.

Still Plenty of Foreigners!

THAT may seem a gloomy prospect but these things invariably turn out rather better than might be expected. What I anticipate is that whether the Lucerne Plan is or is not torpedoed we shall continue to have at least a score of good Continental programmes receivable in this country throughout the year.

The number may be a very great deal bigger, but I don't think that it will be any less. After all, with a couple of home alternative programmes and a score or more from the Continent we shall not be badly off. It is just as well to remember this fact when you read about Lucerne plans and all that!

'Phoning Other Worlds?

CANON BARNES, I notice, has been suggesting that in time to come we may establish wireless communication with the inhabitants of worlds outside our own little solar system.

Every star, he reminds us, is a sun and it is probable that many of them have families of planets, which may be inhabited by races of "super" beings.

So far as we can see, the only planet in our own solar system that could be inhabited is Mars, for all the others are either too hot or too cold to support life. But there may be thousands or even millions of inhabited worlds away out in the depths of space.

The idea of communicating by wireless with very distant worlds is very attractive, but there seems little possibility that it will ever be done, no matter what wonderful

developments may be made in the future.

Wireless waves, as you know, travel with the speed of light and that is the highest speed that can possibly be realised by anything. Light from the very nearest of the stars takes more than four years to reach us so that supposing that it had inhabited planets and you got into touch with one of them by wireless, it would be over eight years before the answer came back to your original "hullo."

Very few stars are anything like as near as this. The vast majority are so distant that it would take hundreds, thousands or millions of years for an answer to be received. One feels somehow that a conversation in which even eight years elapsed between each question and answer would not lead very far. Of course, there is always the possibility of inter-stellar communication but it does seem a little far-fetched just now.

"A.W." Leads Again!

ONCE more "A.W." has given the constructor a first-rate and thoroughly up-to-date super-het that he can build for himself with the certainty of obtaining fine results. I had nothing to do with the design and I haven't even seen the finished set yet.

Any opinions, therefore, that I express about the Etherdyne are entirely my own and they are based so far upon an examination of the circuit diagram and the layout.

I think the designers have been very wise in not trying to provide one-knob tuning. I have used scores of super-hets and I am quite definite on two points. The first is that ganging the oscillator with the signal-frequency circuits may be a terrible task for the home-constructor unless he has a large outfit of instruments and almost infinite patience.

The second is that you certainly obtain better all-round results from a modest number of valves by having separate tuning for the oscillator and the signal-frequency circuits.

What's Wrong with Two Knobs?

AND, after all, why shouldn't a super-heterodyne have two tuning knobs? You must have at least two—main tuning and reaction—on any straight set.

The oscillator control in a super-het is much easier to operate satisfactorily than the

reaction knob of a "straight." Nature has provided us with two hands and I cannot see any good reason why we shouldn't use them.

Difficulties of Matching

IT isn't always realised that you pay a pretty heavy price for the alleged advantages that the one-knob tuning set gives. For perfect matching of all circuits over both wavebands you would require both coils and variable condensers of absolute laboratory precision, the cost of which would run to something stupendous.

With commercial coils and condensers even of the best quality, ganging can only be a compromise; that is, circuits are probably not all precisely in tune at any point in the wavebands covered.

This means that you are not getting the best out of your valves; you are, in fact suffering pretty heavy losses.

The only way to make these losses good is to use more valves. It follows that with single-knob tuning there are only two alternatives: either you must be content with fewer stations and less volume or you must use more valves, which entails greater expense both in construction and in upkeep.

Etherdyne's Interesting Circuit

THE circuit of the Etherdyne appeals to me because it has all the marks of simplicity, originality and efficiency. It is also devoid of "stunts"—all very well in their way, but they are not good lasters.

A set like the Etherdyne is designed not merely for to-day but also for to-morrow. It will give you all the selectivity that you are likely to require both now and in the immediate future and the volume should be adequate for all ordinary purposes.

The "economised" output stage means that running costs are going to be very low. Yes, the circuit and the layout are both most attractive and, what is more, they lend themselves to the addition of any improvements that are likely to come along.

The Expanding B.B.C.

THE universe has been likened by eminent astronomers to a soap bubble which is ever being blown larger and larger. The

Broadcasters You Should Hear By Slade



B.B.C. seems to be working on the same lines.

Originally, the whole concern—lock, stock and barrel—was accommodated in a few rooms at Marconi House.

Next, whilst the studio (there was only one) remained where it was, a gigantic single room in a Kingsway building was taken for office purposes. Then came the move to Savoy Hill, which for some little time was big enough.

Broadcasting House was built when the transmitting plants were erected at Brookman's Park. Now Broadcasting House is much too small.

The B.B.C. is taking St. George's Hall and it is also negotiating for a huge skating rink in the Maida Vale district. In years to come Broadcasting House may be regarded as a quaint little annexe to the real B.B.C. building!

Man-made Static Increasing

RECENT inquiries show that man-made interference is steadily increasing in many parts of the country. Often—far too often—listeners just grin and bear it without taking the proper steps.

Mr. Mugglesworth's new electric sausage machine is known as the probable cause of the trouble. But nobody likes to say anything or do anything for fear of offending Mr. Mugglesworth.

He is probably quite unaware that he is causing interference and would gladly set matters right if only he knew. Often a word in season is all that is required and no one need hesitate to give it.

Don't Grin and Bear It!

IF you cannot trace the source of the trouble, or if you have tracked it down and the disturber of the ether won't set matters right, then let me beg of you to report it forthwith to the B.B.C.

If people just sit down under interference



The ubiquitous portable! Good use being made of the new H.M.V. Super-het A.V.C. Portable Grand

and take no steps to have matters set right it will become worse and worse until wireless becomes impossible in many places.

A Disturbance Suppressor

IN some cases machinery cannot be rendered non-radiating for one reason or another, and the listener must do what he can to make the best of things.

Post Office investigations have shown that a very large proportion of interference is carried by the mains and this can be eliminated in most instances by the fitting of an appliance of G.P.O. design known as a disturbance suppressor. The cost is very small and the results are often miraculous.

For battery sets and for mains sets where

the disturbance suppressor does not effect a complete cure the best thing is a screened aerial down-lead. Where the earth wire is long this may also be metal screened with advantage.

Radio in a Scottish Village

RECENTLY I mentioned that in both Westmoreland and Devonshire villages I had found wireless installed in almost every house and that the inhabitants regarded it as one of the greatest boons that had ever come their way.

A Scottish friend tells me that he has just been up to a small village in the very north of his own country. There he found only three wireless sets in existence, one of which was completely out of use whilst the other two were brought into action only on rare occasions.

When he asked the reason he was told that "they just couldn't be bothered with it." A queer business, what?

Stations, Wavelengths and Degrees

WHEN I asked one important maker of wireless sets whether he could supply a certain model without the station-name tuning dial but with a scale marked off simply in degrees, he told me that he couldn't and that I was the only person he had ever heard ask such a thing.

All the same, I don't believe that the station-name dial is really as popular as he and other makers believe. I would very much like to know what readers think about it.

A NOVEL SET

Considerable interest was taken in a single-valve set built into a cigar box that was described in the September 23 issue of AMATEUR WIRELESS. An even greater novelty will be described next week—a simple two-valver built into a cigar box. The set gives remarkable loud-speaker results and can be built at low cost. This is a feature that should appeal particularly to the beginner.

My own objections to this kind of dial are three. The first is that I have never yet come across one that was accurate and I cannot see the slightest use of a thing that points to Leipzig when you are really receiving Sottens. The second is that stations frequently change their wavelengths so that

as time passes the dial becomes even less accurate than it was originally.

The third objection is that there is room on the scale for only about half the stations that a modern super-heterodyne will bring in. Terrific calculations are necessary to identify the unknowns. If "Hilversum" on the scale really means "Bordeaux," what is the station that comes in between the "London National" and "Bari"?

Encouragement to Inventors

IN the form in which Edison left it, his famous "effect" had no practical application, and it was only twenty years later than Fleming and de Forest developed the "Edison effect" into the thermionic valve.

Now we have double-diode triodes, pentagrid converters, catkins, and a score of other modern descendants of that fifty-year-old inspiration.

They all serve to point the moral that competition in ideas is far more vital than, say, competition in price-cutting. So pull up your socks, all you inventor chaps, and let us have another jolt forward!

More Headphones?

I BELIEVE we are going to see a revival of the headphone cult—not so much for the humble crystal set as in the form of a standard accessory to the valve receiver. In the first place, it so often happens that one member of the family wants to listen in to something or other, just when everybody else wants to talk or play bridge.

A headphone unit which can be plugged in—and at the same time shut out the loud-speaker—comes in very handy on these occasions.

Then, of course, there is the bedside set, where the loud-speaker is absolutely barred by the sleepy side of the family. Naturally, it goes without saying that the "standard" headphone fitting—if it does "take on"—will have to be a very different contraption from the original hair-pulling and ear-pinching variety.

Another Two-in-one Valve

A MOST ingenious output-stage valve has recently been developed in America. Its bulb contains a twin assembly, though the two parts work not side by side as a pair, but one before the other after the manner of a tandem. It is really a driver and an output power valve in one.

The grid of the power valve is allowed to go positive when a big impulse comes along and the driver portion supplies the necessary power to make good the losses that would otherwise be occasioned.

It is a very clever idea and I shouldn't be at all surprised to see the development of other two-stage valves on similar lines for different purposes in the receiving set. It is wonderful, nowadays, what can be packed in a bulb.

Trimming Made Easy

SHOULD you ever construct a big super-het with intermediate-frequency transformers of the type tuned by small pre-set condensers, you will find the task of trimming made a great deal easier if you can borrow an accurate wavemeter that ranges up to 3,000 metres. One of the biggest difficulties in the ordinary way is to set the intermediate-frequency transformers at exactly 110 kilocycles.

With a wavemeter it is quite simple. Disconnect the first I.F. transformer from the oscillator and first detector, connect one of its primary terminals to earth and provide the other with a miniature aerial made from a few inches of stiff wire.

Now set the wavemeter to 110 kilocycles (2,737 metres) and it won't take you long to do the tuning.

For Ganging, Too

THE adjustments of the ganged condenser which tunes either a super-het or a "straight" are also considerably simplified if a wavemeter covering the range 200-550 metres is available. With it you adjust the trimmers of the ganged condenser for the best response on about 250 metres and then go up to 500 metres or so.

Having made these preliminary adjustments you can move the wavemeter slowly over the whole band between 200 and 550 metres, following with the tuning controls of the set. In this way you soon arrive at the adjustments which give you the best average results over the whole waveband.

Programme Items You Should Hear

Wednesday, November 1

DR. BOULT is conducting the Symphony Concert that is being relayed from the Queen's Hall to-night.

North Regional listeners will hear a relay of variety from the Palace Theatre at Huddersfield.

Thursday, November 2

Leslie Holmes and the Eight Step Sisters are taking part in the Leslie Sarony Hour to-night. Snappy entertainment!

A good alternative is the Hallé Concert from the Free Trade Hall at Manchester. Robert Heger, the eminent German composer, is conducting a concert, chiefly of orchestral works.

Friday, November 3

Lionel Tertis, the famous viola player, and Solomon, the pianist, are the artists in the B.B.C.'s Chamber Music Concert to-night. Good entertainment, for the works are by Mozart, Bliss, Delius and Chopin.

The television studio is being invaded by the Ballets Russes de Monte Carlo at 11 p.m. Many of the dancers are still in their 'teens.

Saturday, November 4

We are having quite a deal of Hungarian music of sorts in the programmes lately. To-night we are having the real stuff. London Regional listeners will hear two broadcasts from Budapest. Firstly, a concert by the Royal Opera House Orchestra under Ernest Dohnanyi, the famous composer, pianist and conductor. The second will be a relay of popular Hungarian music by the Tzigane Orchestra under Imre Magyari and Arpad Toll.

Don't forget that North Regional is broadcasting a play by Ian Priestly-Mitchell called *Yorkshire Relish*.

A relay from the Welsh Rugby Trial game will be heard by West Regional listeners in the afternoon programmes.

Sunday, November 5

The two chief features in the day's programmes are an organ recital from Broadcasting House, in the London programmes, and a symphony concert by the Merseyside Symphony Orchestra from North Regional. The organ recital is interesting because it will be given by J. C. Taylor, from Compton's, the people who built the instrument.

The Merseyside Symphony Orchestra is making its first appearance as a broadcasting orchestra in the concert, which will be relayed from St. George's Hall, Liverpool. The chief item in the programme will be that little-heard work of Rimsky-Korsakov, *Concerto in C Sharp Minor* for piano and orchestra. The soloist will be Douglas Miller.

Monday, November 6

West Regional have a delightful concert booked for to-day. It is a typical homely affair and will be relayed from Marston Court, Somerset. Marston Court is the home of Mr.

H. Ashworth Hope and the relay will be taken from the Tudor Music Room, which has a raised balcony, oak beams and panelling and a three-manual organ. The artists in this concert will be Hilda Blake, Gladys Jones, Glyn Eastman and A. J. Baker.

West Regional is also giving another rather unusual concert to-day; one by children. The chief soloist is Winnie Jones, aged sixteen, who won first prize for singing at the Wrexham National Eisteddfod.

North Regional are featuring an operetta in one act by Yorke Gooden called *The Sailor's Return*.

London's high spots are a show by the Fol-de-Rols concert party and a band concert.

Tuesday, November 7

Shrewsbury, the county town of Shropshire, is in the news. Midland Regional is giving three broadcasts to-day from this centre. The first is an industrial relay from a steam-wagon works together with noises of various processes and power tests; the second, the Shrewsbury Orchestral Society's Concert. The orchestra will be conducted by Frederic Morris, Dennis Noble as vocalist, and the chief orchestral item will be Brahms' third symphony. The third relay is a talk on the Roman city of Uriconium by Francis Jackson, curator there.

National programmes appear to have a good vaudeville programme for to-night. Davy Burnaby, who excels at the job of compère, will be in charge. Harry Tate and company are talking about fortifying a home; then there is Mario de Pietro, the wizard of the mandoline and banjo; with Phyllis Scott and John Rorke, Maurice Elwin, Ernest Sefton and Betty le Brock to round off the hour.

The National transmitters are broadcasting Strauss' Viennese operetta, *The Waltz Dream*. This is good, tuneful light music.

Wednesday, November 8

The Symphony Concert from Queen's Hall is particularly interesting. Arthur Bliss' great work, *Morning Heroes*, will be the main work of the evening. This was composed as a remembrance of Armistice Day, 1918. It will be conducted to-night by Dr. Adrian Boult; the artists will be the B.B.C. Symphony Orchestra the B.B.C. Chorus and Howard Marshall. Howard Marshall has become one of the most proficient all-rounders at the "mike." Marshall is a rugby expert and has given talks on football and cricket, descriptions of life in England's slums, and now to-night he is acting as narrator in Bliss' choral symphony.

Dr. H. Lowery is giving an organ recital from the College of Technology, Manchester, in the

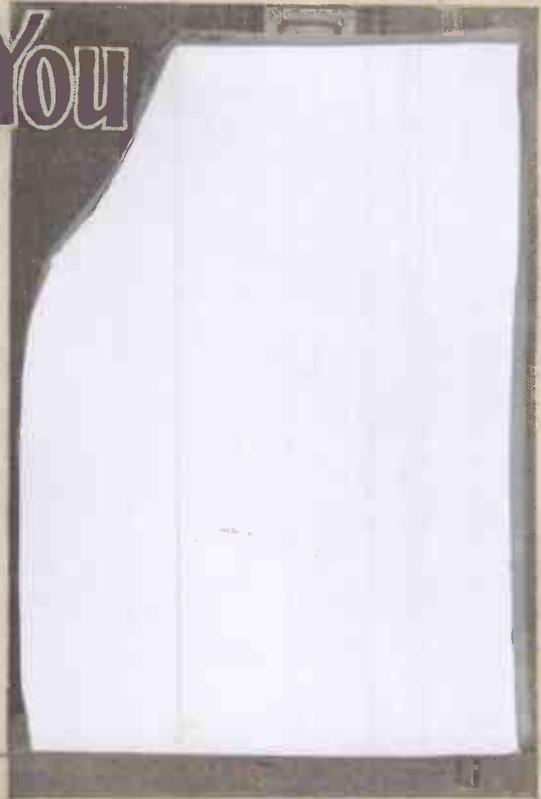


Photo: Marconiphone

North Regional programmes. It will consist of works by Northern composers.

Storm in Shropshire, a genuine village play, written and produced by the wife of the village doctor at Clunbury, and acted by the Clunbury Village Players, is Midland Regional's star turn for the day. The plot concerns the revolt of a farmer's son against the quietness of rural life.

London Regional is giving a repeat performance of Strauss' operetta, *The Waltz Dream*.

Thursday, November 9

The annual relay of the Lord Mayor's banquet from the Mansion House this evening. The Prime Minister is one of the guests; his speech will be relayed by all the National transmitters.

Another civic ceremony, the swearing-in of Sir Montague Butler as Lieutenant-Governor of the Isle of Man, is being relayed by North Regional.

Also in the day's programmes: *The Flowers are Not for You to Pick*, Tyrone Guthrie's fine radio play in the Regional programmes; the second of the Old Music Halls series, this time the old Tivoli; a song recital of modern German and Italian songs by John Morel. Quite a varied assortment. We are likely to hear more of John Morel in song-recital programmes. He has been sent a fine collection of Scandinavian songs by leading music publishers in Norway, Denmark and Sweden. Morel, who has already broadcast in five languages, is now studying Danish so that he can cope properly with this new collection.

Friday, November 10

Dances and songs from the Land of the Midnight Sun are to be included in a light programme by the Walford Hyden Magyar Orchestra. For his programme, which he has called "Northern Lights," Walford Hyden has chosen examples of light music from Norway, Sweden and Finland.

Continued on next page

METHOD OF BATTERY A.V.C.

R. B.Sc., A.M.I.E.E., Explains an Improved System

U
rec
but
usu
ind

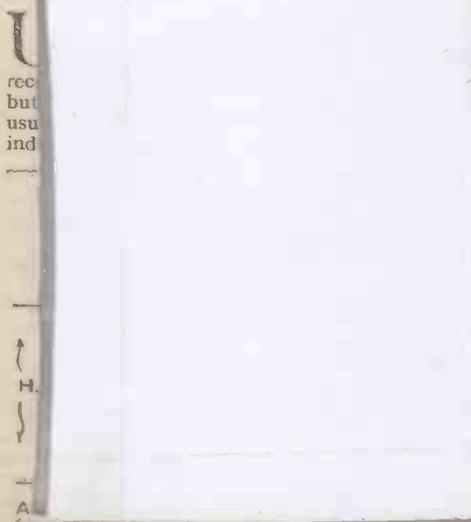


Fig. 1.— Circuit for amplified automatic volume control

In a battery set all the filaments are connected to the common low-tension battery, which makes the problem of the designer more difficult.

A new scheme brought out at the Radio Exhibition by Lissen's and featured in their seven-valve super-het kit puts a different complexion on the situation. With this scheme it is possible to obtain full control with as little as .5 volt on the detector. Let us review for the moment the way in which automatic volume control works.

At the Detector Grid

We pick up the signal on the aerial and amplify it through high-frequency valves (and in this category we must include the intermediate-frequency stages of the super-het). As a result of this amplification we arrive at the detector with a carrier wave which may range from perhaps .1 volt on small signals up to several volts for strong signals.

If we adjust the detector to be really sensitive to weak signals we find that the strong signals of several volts produce unpleasant overloading. The quality becomes nasty and the volume from the loud-speaker is far too great.

Carrier-wave Control

Without automatic volume control we have to adjust the amplification of the set by hand. While this is satisfactory on a local signal it is quite hopeless on a station like Radio Normandie, in which the strength is varying from time to time due to fading. With the new arrangement the strength of the carrier wave itself operates the volume control.

We make the voltage at the detector produce a steady bias (in addition to doing its ordinary job) and we apply this bias to the grids of the high-frequency valves. If these are of the variable-mu type, the greater the grid bias the less the amplification from the valve, so that we can cut down the amplification of the receiver almost to nothing by applying something like 9 volts bias.

The difficulty is that with the normal methods, the bias voltage which we produce

the detector is approximately equal to the voltage developed by the carrier.

For strong signals only produce one or two volts then we cannot run back the high-frequency valves sufficiently and the system becomes ineffective. Various attempts have been made to produce amplified A.V.C. so that the bias voltage developed is several times greater than the actual carrier voltage. This can be done reasonably easily with battery valves, it is not at all an easy proposition with vacuum tubes.

Lissen circuit overcomes the trouble in an ingenious manner. A pentode valve is used for the detector and it is connected in the ordinary way to operate as a grid detector, but is sensitive to weak signals. Now the circuit of a detector valve contains two paths of current. First of all we have the high-frequency modulations which have been rectified from the carrier wave by the process of detection. These signals are passed on to the output valve and loud-speaker. They also have high-frequency currents which have been amplified by the valve during the process of detection but which are no longer required. In the ordinary way we waste these currents by passing them through a condenser from the anode to filament.

With this new system we use these currents to produce the bias for automatic volume control. We start off in the ordinary way by by-passing the current through a condenser. The other end of this condenser, however, goes on to a diode, which is merely a small anode mounted inside the valve near to the filament. This rectifies the by-passed high-frequency current and if we now connect a high resistance of the order of .5 megohm from the diode to the filament, we produce across this resistance a D.C. voltage which is proportional to the strength of the current.

Now the point is that these currents in the anode circuit have already been amplified by the valve in the ordinary process of rectification. Consequently a voltage of perhaps .5 volt on the grid of the valve will produce 9 or 10 volts D.C. across the diode resistance.

This is quite sufficient to operate the modern battery variable-mu valve which runs back completely on 9 or 10 volts bias and gives an amplification of less than one-thousandth of its normal value.

Here, then, is the solution of our problem. The high-frequency currents in the anode circuit of the detector which are normally useless and have to be drained away to avoid

doing any harm, are now turned to account and made to produce a bias for us which in turn keeps the receiver in leash, as we might say.

On a weak signal where the voltage at the detector is .1 volt or less, the high-frequency currents in the anode are quite small and only produce a small bias.

As the strength of the signal increases, the bias developed at the detector rises and cuts down the amplification of the high-frequency valve. This process continues until when we have a really strong signal at the detector the full bias of 9 or 10 volts is developed and the amplification of the receiver becomes quite small.

A.V.C. Units Available

The scheme as originally put forward required a special valve. The latest development uses an ordinary valve and a Westector which is a more flexible arrangement. In fact there are on the market one or two special a.v.c. units which are simply added after the detector valve in a set.

With an arrangement of this sort the detector never receives as much as 2 volts. Before the signal has time to rise anything like as high as this, the amplification of the high-frequency stages has been cut right down and therefore there is no danger of overloading the detector.

An even more important point is that there is no overloading on the high-frequency valve.

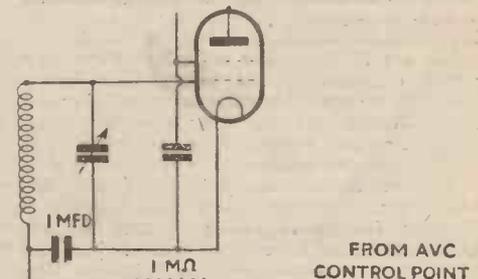


Fig. 2.— Method of applying control bias to high-frequency (or low-frequency) valves

Cross-modulation troubles disappear in a surprising manner when automatic volume control is used, and this circuit which makes it possible to use the system on battery receivers is therefore a distinct step forward in receiver design.

Programme Items You Should Hear—Continued from page 813

A repeat performance of Tyrone Guthrie's play, broadcast yesterday in the Regional programmes, is being given on the National to-night.

A spot of opera is being relayed from the Old Vic. The second act of *Figaro*, by Mozart, should delight many listeners.

North Regional, as usual, is giving something of the cheerful type; this time it is a relay of vaudeville from the Palace Theatre, Halifax.

Saturday, November 11

Armistice Day. The service at the Cenotaph in the morning will be broadcast for the first

time to all parts of the Empire, via the short-wave transmitters at Daventry. Starting at 10.30 a.m., the broadcast will consist of band music by the massed bands of the Coldstream, Welsh, Grenadier and Irish Guards, followed by a short service. During the evening the Festival of Remembrance, organised by the British Legion and held at the Albert Hall, will be broadcast. There will be an orchestral alternative to the Albert Hall broadcast.

Scotland is celebrating the evening of Armistice Day in a homely way. There will be some short readings and some popular songs. The programme has been designed to appeal to simple Scottish folk sitting round their fire-side hearths.

A Review of the Month's Records

Here "Recorder" reviews a selection of the best of the recent issues. It will be noted that criticism is chiefly devoted to the treatment of the music and quality of recording rather than the actual composition

ORCHESTRAL

Symphony No. 5 in C Minor (Beethoven), 16s.

COLUMBIA DX516-9

This recording, by the London Philharmonic Orchestra under Weingartner, is quite the big event of the month. It is, I think, the most popular of the Beethoven Symphonies. If this is so, the reason is easy to understand. The music is so essentially tuneful and straightforward as to captivate one from the first hearing. Utterly devoid of artifice, it appeals to a public with almost every kind of musical taste. If you would begin an acquaintance with the great works of the masters, you may hear this magnificent performance with the certainty of a treat in store.

Wood Violets and Cornflowers, 2s. 6d. PARLO R1608

Petras and Waldteufel are the composers of these two very delightful "afternoon" pieces played by the Dajos Bela Orchestra—newly reconstructed. A "modern" performance, but one in which the tuneful melodies remain intact. You'll like this.

I Love You and To You, 2s. 6d. PARLO R1610

Two more by Waldteufel of similar kind. Here the Orchestra Mascotte bring a different treatment to bear, but the result is none the less attractive.

Hail Vienna; potpourri, 4s. H.M.V. C2589

If it is at all possible to add another to the Viennese Medley shelf, this one, by Marek Weber's Orchestra, certainly ought to go in. I think it is the pick of the bunch, tuneful, yet "peppy"—familiar, yet not hackneyed in most of its airs.

Pussy Cats' Parade and 'The Gnomes' Guard, 2s. 6d. PARLO R1628

Here are two of those pleasant pick-me-ups one occasionally hears as intermission music. Cheeky and tuneful, and admirably played by a new (to me, anyway) orchestra—Eric Harden's.

Melodie Caprice and Pirouette, 2s. 6d. PARLO R1627

Rather more orthodox, these two, but in the same class. In this case the Novelty Players are the performers who put any number of tricks into their presentation.

Russia—Symphonic Poem (Balakirew), 5s. COL DB1236-7

These are the two records which created a sensation as another of the many Columbia successful efforts to make records better. The vastly improved recording lies in the correction of acoustic properties of the studio, which allows the orchestra, as Sir Hamilton Harty (who here conducts the London Philharmonic) said, to be heard as "the real performance." The piece itself is unmistakably Russian and is founded on three old folk songs. Its structure lent itself admirably to the occasion, for almost every instrument has a show, and it is in these passages where the improvement is so marked. Two historic records, from every angle.

The Forge in the Forest and Turkish Patrol, 2s. 6d. H.M.V. B8000

Atmosphere and rhythm by that very fine orchestra—the London Palladium. The latter performance is splendidly taken and the "Forge"—a bit of everything—will make a very pleasant interlude at any time.

Maldens of Baden and Dream Waltz, 4s. H.M.V. C2559

Two very delightful waltzes of the "Viennese" School played ever so well by Marek Weber's Orchestra. Quite another for the lighter hours.

Rhapsody in Blue, 4s. BRUNS 423

Here is a very fine performance of this classic by Frank Black and his Orchestra.

The piece is not, of course, to everybody's taste; but, all the same, I think everybody should hear it for the sake of its latter half. The piano solo, its *pièce de résistance*, is beautifully played by Oscar Lavant. I believe this record to be the best of the piece yet; there are no undue extravagances and yet the spirit of the composition is brilliantly revealed in all its detail.

Ballet Egyptien, 1s. 6d. STERNO 5004

A very pleasant performance by Joseph Lewis's Orchestra. This is a long-playing record, so they manage to get what seems like the whole suite on it.

Symphonic Rhapsody, 1s. 6d. STERNO 5005

Reginald King's Orchestra are strong wireless favourites. They cope splendidly with this piece of Eric Coates's. My own opinion

is that this sort of stuff is neither "flesh, fowl, nor good red herring," but I do know people who like it. You must hear it for yourself and judge.

INSTRUMENTAL

Polonaise in A flat Major (Chopin), 4s. H.M.V. DA1316

This piano solo by Mischa Levitzky contains some well played passages, but the performer seems too anxious to create a terrific tonal effect, with the result that blurring occurs rather often. I think most people will prefer less weight.

Nymph Errant (Selection) and Nice Goings On (Selection), 2s. 6d. PARLO R1624

Piano again, but how different. Here Patricia Rossborough, that very expert performer, gives a most sparkling potpourri of some catchy airs. And—she doesn't spoil the tunes, as many of these syncopated pianists do.

Sevilla (Albeniz), 2s. 6d. DECCA-POLYDOR P05076

This is a brilliant performance of a showy piece by Lily Dymont. She has a sure touch throughout, her *legato* playing—what little there is of it—being especially delightful. There is no very great message in this composition, but it is wholly pleasant, the playing is quite distinguished.

VOCAL

Una Voce Poço Fa (Barber of Seville) and Caro Nome (Rigoletto), 6s. H.M.V. DB1979

Tetrazzini recorded these twenty-five years ago and now they have been rejuvenated with new orchestral accompaniment, as the Caruso records were. The result is interesting in that a wonderful voice has been preserved for future generations to hear. Each air is ideal in showing the clarity and flexibility of her voice—always remarkable.

Ball at the Savoy. (Miscellaneous discs)

There is a spate of records of tunes from Paul Abraham's New Drury Lane success, Oscar Denes and Rosy Barsony are, of course the stars, and are recorded by Columbia. The big hit, a laughing song in which Denes does some weird cackininations is *Oh, Why! Oh, Why!* (Columbia DB 1211). In German, Parlophone R1596. Then Gitta Alpar, that wonderful soprano, who played in the German production, has two records in Parlophone RO20224-5. Altogether, though, I do not think the music up to the standard of "Viktoria and her Hussar."

Te Quiero Dijiste and Cancione, Florecita, 2s. 6d. H.M.V. B4497

Here is a record quite unusual. You have a Spanish tenor—Tirado—who has not only a beautifully flexible voice, but a real knack of making these slender little songs sound like something much more important. Excellent!

Captain Harry Morgan and Chorus, Gentlemen, 2s. 6d. H.M.V. B4494

Peter Dawson in fine voice, but the first is the more successful. There is room for a little more bucolic warmth in the other old gem, but the chorus is finely sung—by a chorus.

Aboard the Windjammer, 4s. H.M.V. C2592

This collection of well-known sea chanties, with Stuart Robertson in the lead, is fairly well done, but Mr. "Effects" puts over a great show. Personally, I would have preferred not quite so much "re-aimment" here and there; this is really he-man stuff in the main.

Chanson Indoue and Triste Maggio, 4s. H.M.V. DA1307

Here is Gigli in two songs which show his power in the smooth mellifluous piece of Rimsky-Korsakov and the contrasting full-flooded de Crescenzo composition. These might almost be by two singers. Truly Gigli provides something fresh to marvel at every time he makes a record. Hear this, please.

Too Late To-morrow and Whisper in your Dreams, 1s. 6d. DECCA F3646

Leo Mussi's first record. The songs are quite competently sung, but he has, in my opinion, never reached the very high standard of his first broadcast.

Dicitencello Vive and Luna d'estate, 2s. 6d. DECCA M443

A new baritone, I think—Fernando Gusso. He has plenty of "body" in his voice and handles it well, but his style is a trifle stodgy in the first. The second, by Tosti, is much better.



Prince George pressing one of the Prince of Wales's records at the H.M.V. factory at Hayes

Self-adjusting



so coldly received our idea because he didn't like the phrase "A.V.C.," he made the really excellent suggestion that henceforth we should refer to the system as *self-adjusting volume control*. Anyone ought to be able to understand that, as we agreed.

Keeping Output Constant

And so here we are, telling you how to fit self-adjusting volume control to your Etherdyne—or to any good set, for that matter. How to fit, in other words, a control that will adjust itself to the varying conditions of a waxing and waning signal, to keep the output volume constant.

Right now we ought to emphasise a very important point about all systems of self-adjusting volume control. If there is only a limited amount of high-frequency amplification the high-frequency current you can handle will be small, and to develop any sort of voltage for control purposes you will therefore need a very high resistance.

On the other hand, if we have a super-het, or any set with more than one stage of high-frequency amplification, we shall have to use a smaller resistance, otherwise the voltage developed across it will be too great.

As you probably know by now, the basic idea of self-adjusting volume control is quite simple. The idea is to control the amount of amplification of the high-frequency stages. There is only one good way of doing this, by using the variable- μ type of screen-grid valve. With such a valve you can vary the amplification simply by varying the grid bias.

So the real object of self-adjusting volume control is to arrange for the incoming signal to control the bias on the high-frequency stages. How on earth can this be done? That is a question many readers are still asking.

It is amazingly simple—when you know. We insert a resistance in a certain way, and a voltage develops across it. This voltage depends on the strength of the incoming signal. A big signal causes a big voltage, and a small signal a small voltage.

We make use of this voltage as bias for the high-frequency valves. You already know that as you increase the negative bias on a variable- μ screen-grid the amplification drops; so that our control voltage, when it increases, as it will with a big signal, automatically reduces the high-frequency amplification.

Many Systems To Try

In attempting to put this essentially simple idea into practice we are up against the fact that there are now many alternative arrangements, all claiming to be jolly good. We've tried them all—and, believe us, they are not all so hot as they are made out to be.

Let us look into the very simplest arrangement for this self-adjusting volume control. You can see how it is done from Fig. 1. At the grid of the detector valve, which we shall assume is preceded by one or more stages of high-frequency, there is a signal voltage, which is passed back through the resistance R_1 . At the end of R_1 is a fixed condenser C_1 . This

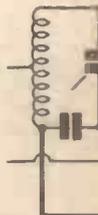


Fig. 2—used in

WE are with you all once more. For two weeks we have been moving into our new lab., which is now practically ready for work. Aerials for receiving and transmitting are up, measuring instruments are wired—and we have even managed to rig up television equipment.

Talking of work, though. Just as we were breathing freely again, Rutherford Wilkins blew in, had a look at the gear, and then burst

ness of the Heaviside and other layers. For a long time we have been tackling this wretched trouble of fading; we have done, perhaps, more than most people on various automatic volume control systems. On short waves, where our automatic volume controlling began, and where it was pursued relentlessly for many moons, we certainly have achieved quite a success.

Why not, we thought, try the same idea on this Etherdyne? So impressed with the idea did we become that we phoned up Mr. Wilkins to get permission to "muck about" with his new baby. In fact, we asked him why he had not put some form of automatic volume control into the original set.

Spelling Complication!

He had a perfectly good reason. The words "Automatic Volume Control," he said, tend to spell complication to the average amateur. He wanted his set to have a wide appeal and so he did without A.V.C., but nevertheless he was most interested in our suggestion. In fact, he told us to go to it—and to let him in on the result.

At this point the Editor had something to say. We had called on him to suggest this article, but immediately we mentioned "A.V.C." he turned up his editorial nose. "Rather meaningless, isn't it?" he asked. "Everything seems to be automatic, these days."

Which rather stumped us. Anyway, our Editor is nothing if not constructive. Having

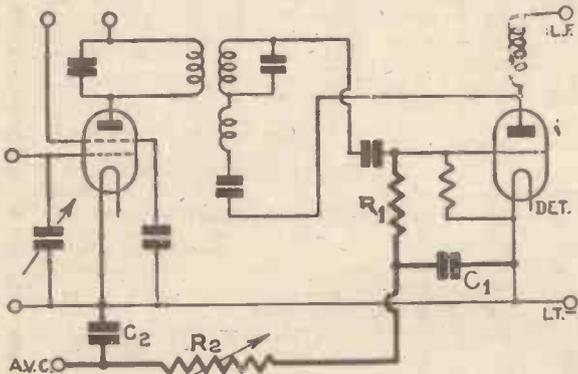


Fig. 1—Simplest self-adjusting volume-control circuit, suitable only for sets with plenty of high-frequency amplification

his little surprise upon us. "Look here, chaps, I want you to try out my Etherdyne Super. Now don't make excuses—it's a good set and you'll like it."

With which he left us. So we undid the brown paper parcel and beheld for the first time the latest "A.W." masterpiece. We liked the look of it. A clean sort of a job, we thought.

Best "A.W." Super Yet!

We won't bother you with all our experiences. We got practically every station in the ether, and most of them clear of interference. In fact, we came to the conclusion that this was by far the best super "A.W." had ever turned out.

Late at night we were listening to Fécamp, which came in, as you might imagine, with a bang. What a pity, we thought, that this station fades so badly. Everyone knows how it fades. Not the fault of the Etherdyne, of course—just the general cussed-



Wearite self-adjusting volume control, which has the advantage of flexibility of application

Volume Control

for Most Sets and in Particular for the Etherdyne Super

By

The Experimenters

condenser side-tracks or bypasses any high-frequency accompanying the signal voltage.

As you know, a condenser, however small, offers very little impedance or opposition to high-frequency, and that is why any high frequency at the junction of C_1 and R_1 automatically goes to earth.

You might for a moment wonder why the rest of the signal does not do the same. The reason is that the rest of the signal is direct current, and this cannot get through the condenser, however large it may be. So it goes along to R_2 and passes through that stance.

From Ohm's Law you should know that when a current is passed through a resistance a voltage is developed across its ends, the potential difference depending on the amount of current and the value of the resistance. Either of these two factors, current or resis-

the voltage. With this variable resistance we have a ready means of obtaining any desired voltage, within certain limits, of course.

Now, C_2 is connected between the end of the variable resistance and earth, for exactly the same reason as the condenser C_1 , to bypass any high frequency that may have trickled through.

Elementary!

This Fig. 1 arrangement is one of the most elementary self-adjusting volume controls, as the only alteration to an existing set is to one wire. You disconnect the "earthy" end of the tuning coil and take it to the point marked "A.V.C." The effect then is for the voltage developed across R_2 to be applied as bias to the high-frequency valves through the tuning coil.

Just a brief word or two on the action. You first decide on what average volume level you want. If then you tune in a station of exceptional strength it will cause the signal voltage on the grid of the detector valve to increase, and so the current flowing through R_1 is increased, so is the current through R_2 , and so is the voltage across R_2 .

As this voltage is applied to the grids of the variable-mu screen-grid valves it follows that the amplification factor for a strong signal will be decreased—which gives us the see-saw action we want—self-adjusting volume control.

As usual in these very simple systems, there are snags. In the Fig. 1 system there is only one real snag. Unless the high-frequency stages are ultra-efficient there is not enough voltage developed across R_2 to reduce the volume on the very loud stations.

To overcome this Westinghouse have



Varley self-adjusting volume-control unit, which is entirely self-contained, suitable for sets with one high-frequency stage.

brought out a modification. Let us take a look at Fig. 2, which shows the Westinghouse circuit. As before, the action is that the signal voltage varies the grid bias of the variable-mu valves. But as the signal voltage is tapped off after the detector valve, the amount of voltage we have to play with must obviously be much greater—due to the amplification of the valve.

A fundamental difference in this idea is that it is the high-frequency current that is used for the control. So this time there is no question of the high-frequency being bypassed. What we have to do is to rectify this current. In the anode circuit of the high-frequency valve is a high-frequency choke, which prevents the high-frequency current going anywhere except through C_1 , which, as we have already said, offers no resistance to high frequency.

Now w_1 is a half-wave Westector, which rectifies this oscillating high-frequency current. At the junction between C_1 and the w_1 rectifier we tap off the control voltage, which is applied across R_1 , which is again variable to give us just the amount of bias we want for our normal output level.

Preventing Instability

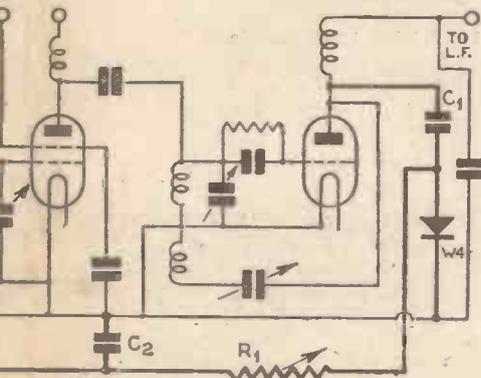
Condenser C_2 is used to bypass any high-frequency current that may have leaked through the rectifier. On no account must high frequency be allowed to trickle into the grid circuit—the whole high-frequency stage would become unstable and probably howl like the deuce.

We come now to the main object of this article—the inclusion of self-adjusting volume control to the Etherdyne. If you look at Fig. 3 you may be somewhat alarmed at the seemingly complicated arrangement. You must remember, though, that all the components inside the dotted lines are in a unit and all you have to do is to wire up the terminals on the unit to three points in the existing Etherdyne set.

When Signals Are Weak

Before telling you what it all means, let us harp on a very important aspect of self-adjusting volume controls—an aspect that is rarely thought about, even by quite experienced amateurs. This is the point: no matter how weak the incoming signal may be, you always seem to get a slight feedback of control voltage, which has the effect of decreasing slightly the amplification of the variable-mu valves. Obviously, you don't want any reduction of amplification when the signal is weak. On the contrary, that is just when you want all the punch you can get.

So what we have to do is to arrange the circuit so that the self-adjustment of volume



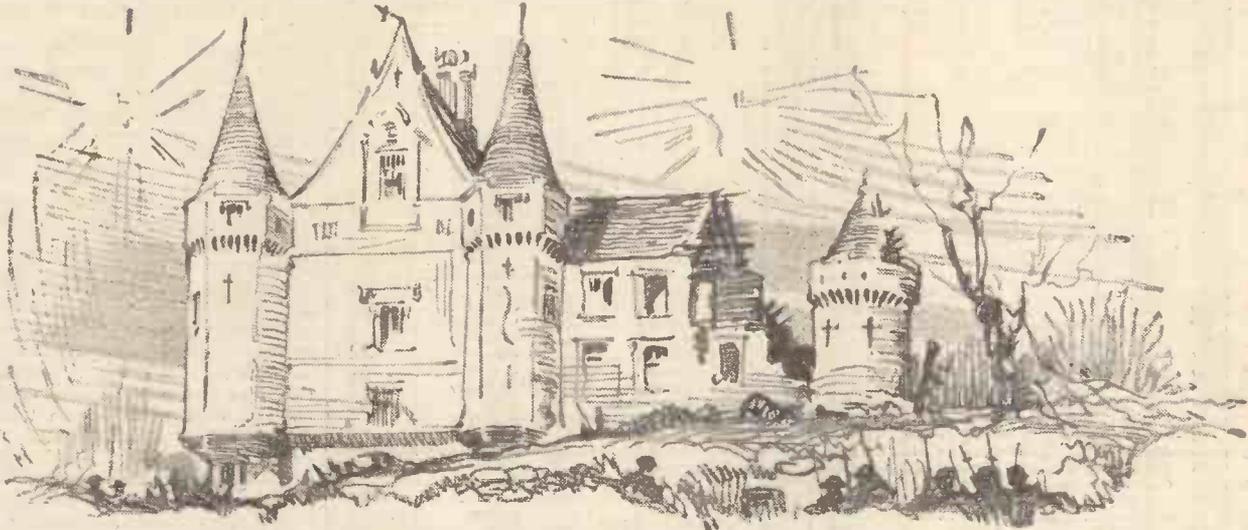
How a Westinghouse half-wave rectifier can be a circuit with only a moderately efficient high-frequency amplification

tance, can be altered to give a desired voltage difference.

So R_2 is made variable, as we cannot vary the current easily, and as we do want to vary



The B.B.C. have dared to broadcast NOISE!



AN AMAZING EFFORT BY THE EFFECTS STUDIO BUT AN IMMENSE DRAIN UPON YOUR HIGH TENSION BATTERY!

Hoarse voices rising against a background of sheer noise; the stark terror of the trenches under a barrage; a wonderful interpretation of war's reality by the Effects Studio; you could almost see the crumpled ruins of "White Chateau" standing against the menacing skyline! Seldom has such intensity of sound been broadcast; seldom have high-tension batteries been called upon to bear such heavy current drain. Because in modern Transient Load Receivers, the high-tension current consumption depends upon "noise-value" of the programme and when sheer noise such as you hear in these war plays is broadcast, the demand upon your battery may rise to 40 milliamps or more! An ordinary high-tension battery simply cannot stand up to such a drain—the voltage drops off alarmingly and immediately you lose all the advantages 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. And all the time the current flow is smooth and silent, giving distortionless reproduction at a volume which really justifies the claim "Mains power from battery sets."



The Voltage of a
LISSEN · BATTERY
is steady as a rock **ALL THE TIME!**

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

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.)
16.86	17,790 Davenport (GSG) ...	Great Britain	20.0	309.9	968 West Regional	Great Britain	50.0
16.88	17,775 Eindhoven (PHI) ...	Holland	20.0	312.5	960 Genoa	Italy	10.0
19.56	15,330 Schenectady (W2XAD)	United States	20.0	312.8	959 Cracow	Poland	2.0
19.73	15,200 Zeesen (DJB) ...	Germany	8.0	315	952.5 Marseilles	France	1.6
25.25	11,880 Paris (Coloniale) ...	France	15.0	318.8	941 Sofia (Rodno Radio)	Bulgaria	.5
25.28	11,865 Davenport (GSE) ...	Great Britain	20.0	318.8	941 Dresden	Germany	25
25.4	11,810 Rome (ZRO) ...	Italy	15.0	320	939 Naples	Italy	1.5
25.51	11,760 Zeesen (DJD) ...	Germany	8.0	321.9	932 Goteborg	Sweden	10.0
25.53	11,750 Davenport (GSD) ...	Great Britain	20.0	325	923 Breslau	Germany	60.0
25.63	11,705 Paris (Coloniale) ...	France	15.0	328.2	914 Poste Parisien	France	60.0
30.0	10,000 Madrid (EAO) ...	Spain	20.0	331.5	905 Milan (Siziano)	Italy	50.0
31.25	9,598 Lisbon (CTIAA) ...	Portugal	2.0	335	896 Poznan	Poland	2.0
31.3	9,585 Davenport (GSC) ...	Great Britain	20.0	338.2	887 Brussels (No. 2)	Belgium	15.0
31.38	9,560 Zeesen (DJA) ...	Germany	8.0	342.1	877 Brunn (Brno)	Czechoslovakia	32.0
31.55	9,510 Davenport (GSB) ...	Great Britain	20.0	345.2	869 Strasbourg (PTT)	France	11.5
31.6	9,490 Poznan (SRI) ...	Poland	1.0	350	857 Barcelona (EAI)	Spain	8.0
37.33	8,036 Rabat (CNR) ...	Morocco	6.0	352.1	852 Graz	Austria	7.0
38.47	7,799 Radio Nations (HBP)	Switzerland	20.0	355.9	843 London Regional	Great Britain	50.0
42.92	6,990 Oslo (LCL) ...	Norway	0.5	360.6	832 Stuttgart (temp)	Germany	1.5
45.38	6,610 Moscow	U.S.S.R.	10.0	363.6	825 Algiers (PTT)	North Africa	13.0
46.69	6,425 Poundbrook (W3XL)	United States	1.0	364.1	824 Bergen	Norway	1.0
48.86	6,140 Bournemouth (W8XX)	United States	40.0	368.1	815 Bolzano	Italy	1.0
48.94	6,130 Mexico (XETE)	Mexico	2.0	368.1	815 Helsinki	Finland	13.2
49.02	6,120 Wayne (W2XE) ...	United States	1.0	368.1	815 Seville (EAS)	Spain	1.5
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 Davenport (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	396	758 Vladikavkaz	U.S.S.R.	10.0
50.26	5,969 Vatican (HVJ)	Italy	10.0	398.9	752 Midland Regional	Great Britain	25.0
50.26	1,483 Tarragona (EAJ33)	Spain	.25	403	743 Sottens	Switzerland	25.0
202.5	1,481.3 Kristinehamn	Sweden	.25	408.7	734 Katowice	Poland	12.0
203	1,477 Bilbao	Spain	.25	413	725 Athlone	Irish Free State	80.0
209.8	1,429 Miskolcz	Hungary	1.25	416	721.1 Rabat	Morocco	6.0
209.8	1,429 Magyarovar	Hungary	1.25	419.9	716 Berlin	Germany	1.5
209.8	1,429 Pecs	Hungary	1.2	424.3	707 Madrid (EAI7)	Spain	3.0
211.3	1,420 Antwerp	Belgium	.4	424.3	707 Moscow (ROZ)	U.S.S.R.	100.0
211.3	1,420 Newcastle	Great Britain	1.0	429.8	698 Belgrade	Yugoslavia	2.8
214.3	1,400 Aberdeen	Great Britain	1.0	441.2	680 Rome (Roma)	Italy	60.0
215	1,395 Liege (Reg)	Belgium	0.3	447.1	671 Paris (PTT)	France	7.0
215.6	1,391 Chatelineau (EL)	Belgium	.25	447.1	671 Danzig	Dantzig	.5
217.1	1,382 Konigsberg	Germany	.5	451.8	664.1 Madona	Latvia	15.0
217.1	1,382 Dublin	Irish Free State	1.2	452	664 Agen	France	.2
218.5	1,373 Salzburg	Austria	1.5	452.8	663 Milan (Vigentino)	Italy	4.0
218.5	1,373 Plymouth	Great Britain	.2	453.2	662 Odessa (RDH)	U.S.S.R.	15.0
219.9	1,364.3 Beziers	France	1.0	453.2	662 Klagenfurt	Austria	.5
220.3	1,362 Binche	Belgium	.2	456.6	657 San Sebastian	Spain	5.0
222.3	1,354 Liege-Colnkte	Belgium	0.15	459.4	653 Beromunster	Switzerland	60.0
224.4	1,337 Cork (6CK)	Irish Free State	1.2	465.8	644 Lyons (PTT)	France	15.0
225.9	1,327.3 Fecamp	France	10.0	472.4	635 Langenberg	Germany	60.0
227.4	1,319 Bremen	Germany	1.5	476.9	629 Lisbon (tests)	Portugal	20.0
227.4	1,319 Flensburg	Germany	.5	480	625 North Regional	Great Britain	50.0
227.4	1,319 Hanover	Germany	1.5	488.6	614 Prague	Czechoslovakia	120.0
231	1,301 Malmo	Sweden	1.25	495.8	605 Thronheim	Norway	1.0
231.7	1,294.6 Kiel	Germany	.25	500.8	599 Florence	Italy	20.0
233	1,287 Wallonia	Belgium	.3	509.3	589 Brussels (No. 1)	Belgium	15.0
235	1,283 Lodz	Poland	2.2	518.1	571 Vienna	Austria	100.0
235.5	1,274 Kristiansand	Norway	.5	527	569.5 Riga	Latvia	15.0
236	1,271 Bordeaux (S.O.)	France	3.0	532.9	563 Munich	Germany	60.0
238.9	1,260.6 Nimes	France	1.0	550.5	555.7 Palermo	Italy	3.5
238.9	1,256 Nurnberg	Germany	.5	559.7	545 Budapest (I)	Hungary	18.5
240.6	1,247 Stavanger	Norway	.5	559.7	536 Tampere	Finland	1.0
242.3	1,238 Belfast	North Ireland	1.0	559.7	536 Kaiserslautern	Germany	1.5
242.7	1,236 Liege	Belgium	.3	559.7	536 Augsburg	Germany	25
245.9	1,220 Dornbirn	Austria	.5	565.2	530.8 Freiburg	Germany	25
245.9	1,220 Linz	Austria	.5	565.6	530.3 Wilno	Poland	22.0
245.9	1,220 Schaarbeek	Belgium	.15	569.5	526.8 Grenoble (PTT)	France	15.0
247.7	1,211 Trieste	Italy	10.0	577.5	519.4 Ljubljana	Jugoslavia	7.5
249.4	1,202.9 Juan-les-Pins	France	1.0	582	515.4 Tartu	Estonia	.5
250.9	1,196 Barcelona (EAI15)	Spain	6.0	590	434.7 Oulu	Finland	1.2
253	1,185 Gielwitz (PTT)	Germany	5.0	620	416.7 Moscow (RMO)	U.S.S.R.	20.0
254.6	1,178 Toulouse	France	.7	743	404.0 Ostersund	Norway	0.6
257.3	1,166 Horby	Sweden	10.0	760	395 Geneva	Switzerland	125
259.3	1,157 Treves (Trier)	Germany	2.3	733	360.1 Heston Airport	Great Britain	5.0
259.3	1,157 Frankfurt-A-M	Germany	17.0	840	357 Budapest (2)	Hungary	3.0
259.3	1,157 Cassel	Germany	0.5	848.7	353.5 Rostov (RAO)	U.S.S.R.	4.0
261.6	1,147 London National	Great Britain	50.0	857.1	350 Leningrad (RHF)	U.S.S.R.	100.0
261.6	1,147 West National	Great Britain	50.0	837.5	320 Kharkov (RMD)	U.S.S.R.	20.0
263.8	1,137 Moravska-Ostrava	Czechoslovakia	11.0	9,000	300 Moscow (ROZ)	U.S.S.R.	100.0
265.4	1,130 Lille (PTT)	France	1.3	1,034.5	290 Kiev (RER)	U.S.S.R.	100.0
267.6	1,121 Nyiregyhaza	Hungary	6.3	1,071.4	280 Tiflis (RDK)	U.S.S.R.	35.0
267.6	1,121 Valencia	Spain	3.0	1,083	277 Oslo	Norway	60.0
269.8	1,112 Bari	Italy	20.0	1,105	271.5 Minsk (RMG)	U.S.S.R.	35.0
271.3	1,105.6 Rennes (PTT)	France	1.5	1,131	265.2 Monte Ceneri	Switzerland	25.0
273.7	1,096 Turin (Torino)	Italy	7.0	1,153.8	260 Kalundborg	Denmark	30.0
276.5	1,085 Heilsberg	Germany	75.0	1,170	256.4 Tashkend (RAU)	U.S.S.R.	35.0
279.7	1,072.1 Bratislava	Czechoslovakia	14.0	1,190.5	252 Luxembourg	Gd. Duchy of Lux.	200.0
281.2	1,067 Copenhagen	Denmark	.75	1,200	250 Istanbul	Turkey	5.0
283.6	1,058 Innsbruck	Austria	.5	1,200	250 Reykjavik	Iceland	21.0
283.6	1,058 Berlin (E)	Germany	.5	1,229.5	244 Boden	Sweden	.6
283.6	1,058 Magdeburg	Germany	.5	1,239.7	242 Kiev (RAG)	U.S.S.R.	10.0
283.6	1,058 Stettin	Germany	.5	1,255	239 Vienna (Exp.)	Austria	3.0
284.9	1,053.8 Radio Lyons	France	1.0	1,304	230.1 Moscow (RCY)	U.S.S.R.	100.0
286	1,049 Montpellier	France	.9	1,355	221.5 Motala	Sweden	30.0
288.5	1,040 Bournemouth	Great Britain	1.0	1,411.8	212.5 Warsaw	Poland	120.0
288.5	1,040 Scottish National	Great Britain	50.0	1,445.8	207.5 Eiffel Tower	France	13.5
291	1,031 Lisbon (tests)	Portugal	20.0	1,481	202.6 Moscow (RTC)	U.S.S.R.	500.0
291	1,031 Viipuri	Finland	13.2	1,538	195 Ankara	Turkey	7.0
293	1,022 Kosice	Czechoslovakia	2.5	1,554.4	193 Davenport National	Great Britain	30.0
294.2	1,019.6 Limoges (PTT)	France	.7	1,620	185 Norddeich (KVA)	Germany	10.0
296.1	1,013 Hilversum	Holland	20.0	1,634.9	183.5 Zeesen	Germany	60.0
298.8	1,004 Tallinn	Estonia	11.0	1,725	174 Radio Paris	France	75.0
301.5	995 North National	Great Britain	50.0	1,760	170.45 Moscow (RAX)	U.S.S.R.	30.0
304.3	986 Bordeaux (PTT)	France	13.0	1,796	167 Lahti	Finland	54.0
307	977 Falun	Sweden	.5	1,875	160 Kootwijk	Holland	50.0
307.1	977 Zagreb	Jugoslavia	0.8	1,875	160 Moscow (RCZ)	U.S.S.R.	100.0
307.7	974.8 Vitus (Par)	France	1.0	1,910.8	157 Sverdlovsk (RHX)	U.S.S.R.	40.0
309.9	968 Tcherulgov	U.S.S.R.	10.0	1,935	155 Kaunas	Lithuania	70.0

How the Foreigners Are Coming In

By Jay Coote

WITH signals pouring in as they have been doing during the past week, I have been compelled to return to my old love the super-het, a circuit which appears to be the only one able to cope with the present situation in the ether.

It was a pleasure to handle "extra controls" again, which permit a separation of stations working on dangerously neighbouring wavelengths and, incidentally, it allowed me to capture some of the more elusive transmissions.

One of these was Monte Ceneri, the Swiss broadcaster for the Italian area, and which, following a complete overhaul prior to its official launch on October 28, has resumed its concerts. So far, although generally advertised on 1,153.8 metres, it is working on 1,126 metres and is now clear of Kalundborg.

I think you will find it will maintain this channel for some time to come. If you wish to log this newcomer do so early in the evening; it does not work late but usually closes down towards 9 p.m., and long before Beromunster or Sottens.

As there is no other Italian-speaking studio on any neighbouring frequency, you cannot mistake it. The last half hour is often devoted to dance music from the Lugano Kursaal, so far the only relay of an outside broadcast carried out by this station.

Vienna, over the week-end, although not yet operating at the power it will radiate eventually, proved a revelation; undoubtedly, with Beromunster, it must lay claim to the most interesting programmes broadcast from German-speaking districts. It has Germany itself beaten to a frazzle. Austria has always made a speciality of light music and tuneful operettas. On most evenings if you turn to Vienna you will not be disappointed.

It is a curious point that so little is heard of the Spanish stations now, whereas in the earlier days of broadcasting Madrid, Barcelona and San Sebastian regularly appeared on our logs.

During the past two nights in London I have picked up Barcelona EAJ1, but at no great strength. Listeners have been promised much from Spain in the near future and, personally, I shall look forward to hearing transmissions from Madrid, but so far little has taken place to improve the power of the stations.

Two new transmitters have been recently installed at Bilbao and Tarragona, but they are only 250-watters and I very much doubt whether, even after a long search, we shall pick up much more than a whisper from them.

The former works on 202.2 metres, the latter on 203 metres. They are included in the list for those who wish to try their luck. (Tarragona is on the western coast of Spain, about fifty miles south-west of Barcelona).

The Germans will carry out in December—probably on the first day of that month—certain changes of wavelength at the Berlin, Munich, and Muhlacker stations, which will again take up different positions in the wave-band on January 15.

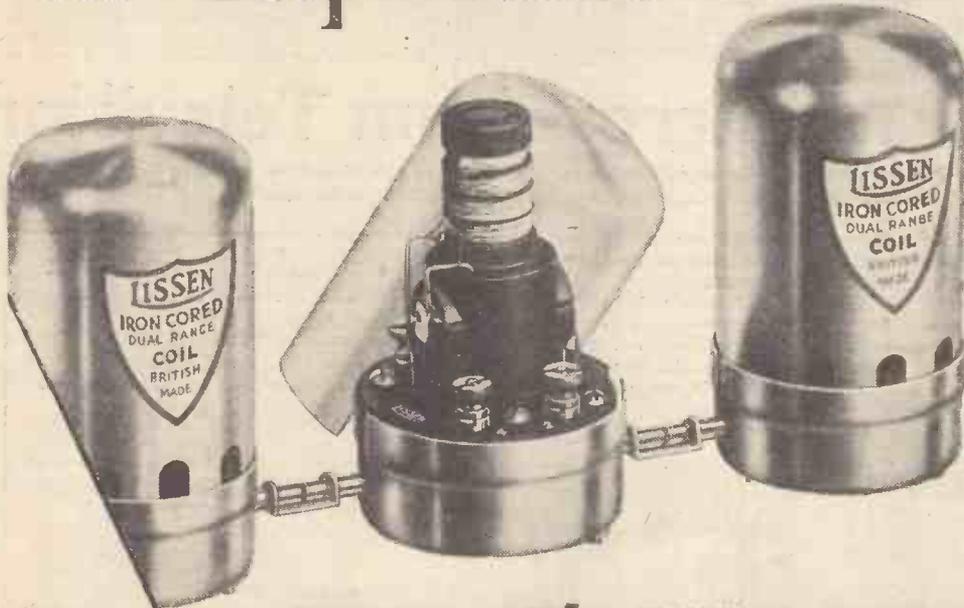
The high-power transmitter at Tegel destined to replace Witzleben is nearing completion and will test towards the middle of November on 360.6 metres, compelling Munich to work from that date on 419 metres.

Muhlacker will then operate on 532.9 metres. When the Lucerne Plan comes into action, their respective channels will be Berlin (355.7 metres), Munich (405.3 metres), and Muhlacker (522.6 metres).

"..... a definite advance in Superhet technique"

says

"A.W."



AND IT'S THE LISSEN COILS THAT MAKE IT POSSIBLE!

"Amateur Wireless" designers claim for the "Etherdyne" that it is "the set of the year," and a "definite advance in super-het technique." And, once again, you will see that it is built around Lissen Coils! In a big super-het 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. The complete set for the "Etherdyne" consists of two Lissen Iron-cored Dual-range Aerial Coils and one Lissen Iron-cored Combined Detector and Oscillator Coil.

Triple Gang of Lissen Iron-cored Coils, as specified for the "Etherdyne" 12/6 EACH COIL

LISSEN

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

LISSEN

IRON CORED COILS

THE COILS THAT COUNT



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



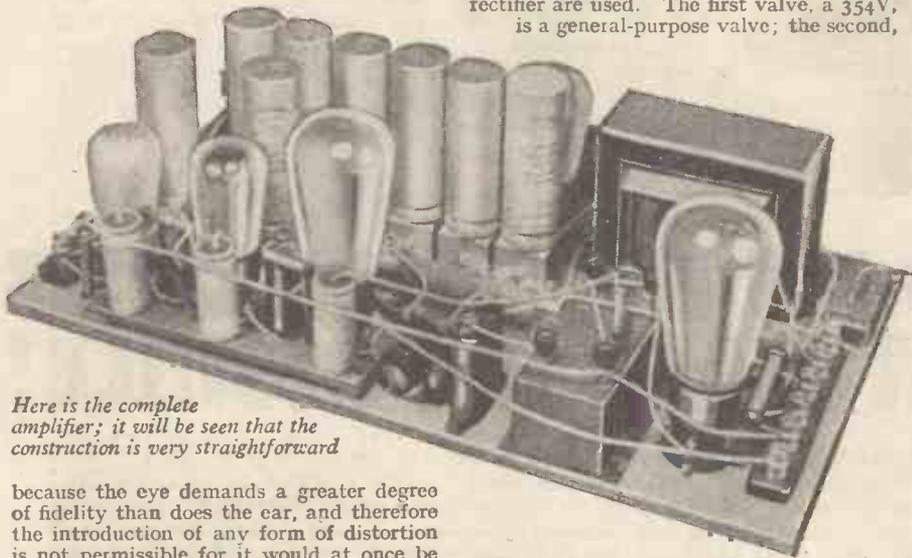
An Amplifier for Mirror-drum Television

Here is an amplifier suitable for use with a mirror-drum television receiver such as the Simpico, which was described in "A.W." Nos. 586—589. Additionally it is ideal for gramophone and public address.

AN amplifier which is to be used in conjunction with a television receiver must have certain characteristics which are not so necessary when sound only has to be dealt with. This is

for public address work; or it will enable the builder to receive the television programmes.

The amplifier is intended to be operated from A.C. mains and reference to the circuit will show that four valves and a rectifier are used. The first valve, a 354V, is a general-purpose valve; the second,



Here is the complete amplifier; it will be seen that the construction is very straightforward

because the eye demands a greater degree of fidelity than does the ear, and therefore the introduction of any form of distortion is not permissible for it would at once be painfully noticeable. Then if the picture is to be bright the output which is available must be much larger than we are accustomed to use with sound receivers.

Specially for Television

These matters were dealt with at length in "A.W." No. 590, and it will suffice to say here that the amplifier about to be described has been designed specifically for television purposes and has an output of approximately four and a half watts.

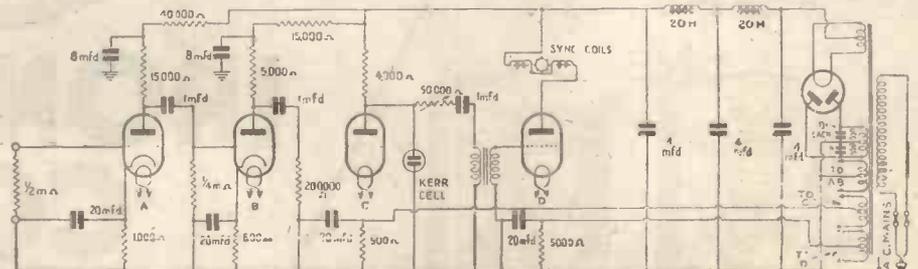
Resistance-capacity coupling has been used throughout with the exception of the coupling of the last valve which is for synchronising; this is coupled by means of a special transformer and the output from this valve is fed to the synchronising coils of the motor driving the drum.

It may be mentioned here that this amplifier minus the last valve and its coupling arrangements will be ideal as a gramophone amplifier or for public-address work. It is capable of filling a fair sized hall and the quality will leave nothing to be desired. This is an important matter for it means that the amplifier can be used in conjunction with a wireless set and produce enormous undistorted volume; it can be used with a pick-up and will provide music suitable for dancing; with a microphone it will do

104V, a small power type and the last two DO24 super-power output valves. The rectifier is a DW4.

Extensive decoupling has been employed throughout in order to avoid any possibility of instability. It will be observed that automatic bias resistances have been provided between the cathode and H.T., but each of the last two valves, which have no cathode but are directly heated, the bias resistance has been

Continued on page 824



The circuit of the television amplifier. Special attention has been paid to ensure that there is adequate high-note response, resistance-capacity coupling being used. Note the inclusion of a 375 peaked transformer for the synchronising valve

COMPONENTS NEEDED FOR TELEVISION AMPLIFIER

BASEBOARD

1—Peto-Scott 20-in. by 11-in.

CHOKES, LOW-FREQUENCY

2—Sound Sales 20-henry, 120-milliamper.

CONDENSERS, FIXED

- 1—Dubilier .02-microfarad, type BE328.
- 3—Dubilier 1-microfarad mica, type BB775.
- 8—Dubilier 8-microfarad dry electrolytic (or Telsen, T.C.C.).
- 4—Dubilier 20 microfarad dry electrolytic, type 402.

HOLDERS, VALVE

5—Benjamin five-pin midget (or Lissen, Telsen).

HOLDER, FUSE

1—Belling-Lee twin, complete with fuses (or Bulgin).

RESISTANCES, FIXED

- 1—Erie 750-ohm, type 2-watt (or Telsen).
- 1—Erie 600-ohm (or Lissen, Telsen).
- 1—Erie 1,000-ohm (or Lissen, Telsen).
- 2—Erie 5,000-ohm (or Lissen, Telsen).
- 2—Erie 15,000-ohm (or Lissen, Telsen).
- 1—Erie 40,000-ohm (or Lissen, Telsen).
- 1—Erie 200,000-ohm (or Lissen, Telsen).
- 1—Erie 1/2-megohm (or Lissen, Telsen).
- 1—Zenith 4,000 ohms.

RESISTANCE, VARIABLE

1—Lewcos 50,000-ohm (or Bulgin, Lissen).

TERMINALS

4—Lissen terminal blocks.

SUNDRIES

- 1—British Radiogram 2-in. metal mounting bracket.
- 8—British Radiogram aluminium mounting brackets for electrolytic condensers.
- Strip of wood 12 in. by 1 in.
- Connecting wire and sleeving (Lewcos or Goltone).
- 4 ft. thin flex (Lewcos).

TRANSFORMER, LOW-FREQUENCY

1—Mervyn 375-cycle peak.

TRANSFORMER, MAINS

1—Partridge type A.W. E30 (or Sound Sales).

VALVES

Mullard one 351V, one 104V, two DO24, one DW4.

All-Wave All-World "SKYSCRAPER"



COMPLETE WITH FOUR VALVES
£5.12.6

MAKES IT POSSIBLE FOR YOU TO STUDY THE INTERNATIONAL SITUATION DIRECT AND AT FIRST HAND

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 Europe and England, but America and Australia direct. The Lissen All-Wave All-World "Skyscraper" 4 tunes from 12 to 2100 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.



CABINET COMPLETE WITH 4 VALVES
£8.2.6

ULTRA SHORT

SHORT

MEDIUM

LONG WAVES

England, Europe, Africa, America Australia, all on one set at last!

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!



4-WAVELENGTH RANGES INSTEAD OF TWO!

LISSEN



"SKYSCRAPER"

FREE CHART
POST COUPON BELOW

THE THRILL OF DISTANCE
•THE SATISFACTION OF PIONEER ACHIEVEMENT
•A NEWS & ENTERTAINMENT SERVICE WORLD-WIDE IN ITS SCOPE!

To LISSEN LTD., Publicity Dept., ISLEWORTH.
Please send me FREE copy of All-Wave All-World "Skyscraper" Chart.
Name.....
Address.....
A.W.1334.

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

An Amplifier for Mirror-drum Television
Continued from page 822

taken from a centre tap of the separate filament winding to H.T. —

Another feature is the use of low-voltage electrolytic condensers for the bias decoupling. The reservoir and main H.T. smoothing condensers each consist of two 500-volt electrolytics connected in series in order to give a larger margin of safety.

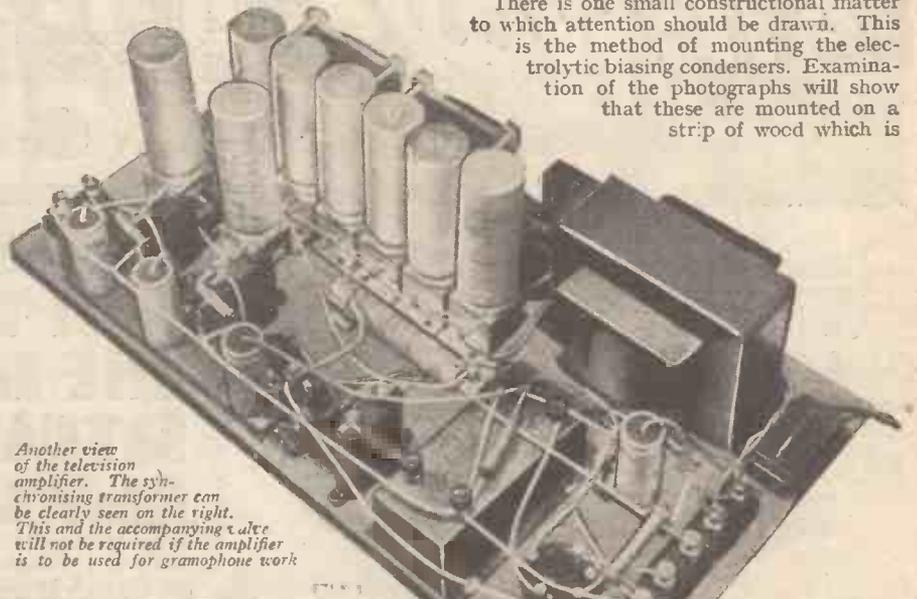
As it is desirable that there should be a constant impedance in the anode circuit of the modulating DO24 with the object of avoiding any possibility of distortion, a 4,000-ohm anode resistance replaces the usual output choke. The Kerr cell is connected to terminals between the anode of this valve and earth; it thus receives the same polarising voltage as the anode of the DO24 (about 500 volts) and is modulated by the output voltages.

The construction of the amplifier calls for little comment for all the components are merely screwed down on to the baseboard and the layout will be clear from the reduced copy of the blueprint reproduced here. The use of a full-size blueprint, which can be obtained from these offices price 1s. 6d. post free, will facilitate the wiring which is quite simple.

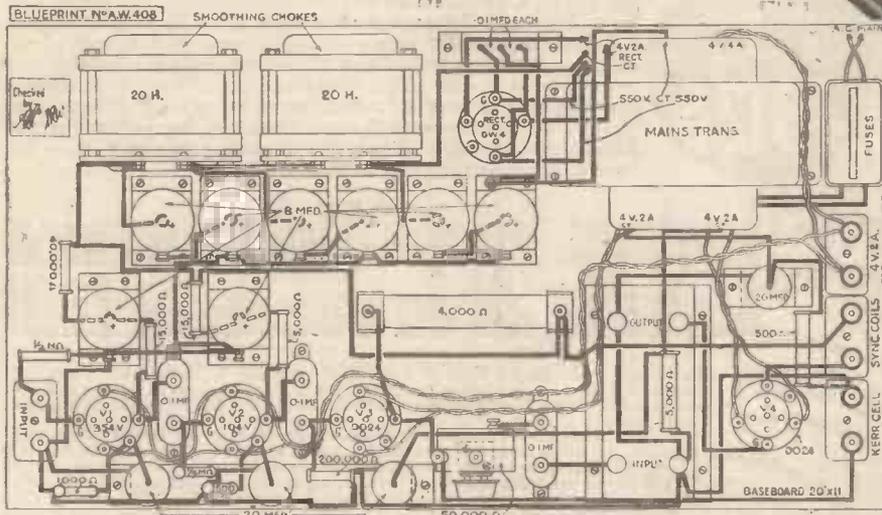
A list of components required to build the amplifier is given in the accompanying panel and it will be advisable to adhere to

the ones specified as these have been selected with regard to the somewhat exacting duties they have to perform.

There is one small constructional matter to which attention should be drawn. This is the method of mounting the electrolytic biasing condensers. Examination of the photographs will show that these are mounted on a strip of wood which is



Another view of the television amplifier. The synchronising transformer can be clearly seen on the right. This and the accompanying plate will not be required if the amplifier is to be used for gramophone work



The layout and wiring diagram of the television amplifier. The full-size blueprint which can be obtained for 1/6 post free will simplify the wiring

raised from the baseboard by means of small blocks at each end, the blocks being of sufficient depth to give clearance for the condenser terminals.

Checking the Wiring

We have not followed our usual practice of numbering the wires in this amplifier as the sequence in which the wiring is carried out is of no consequence. When the wiring is completed, however, it should be carefully checked and the best way to do this is to mark each wire on the blueprint with a pencil when assurance has been made that it has been put in and is in the correct place.

As no doubt many readers will desire to use this amplifier for other purposes than television, next week we propose showing how the last valve and its coupling can be omitted, thus converting it into a straightforward, high-power, good quality instrument suitable for a variety of uses.

Experimenting with a Time Base

WITH the construction of the time base, described in last week's issue, one half of the television scanning circuit is complete. Actually, twin time-base units will be required—one to swing the beam horizontally, and one for the vertical movement, but before proceeding with the second unit it is worth while experimenting with the one already made in order to get the "feel" of the adjustments.

The time base should work satisfactorily as soon as it is connected up. Although 200 volts H.T. may be required to produce a full swing of the beam from the time base, 120 volts will be sufficient for a preliminary run, together with 2 volts for the diode filament and 4 volts for the thyatron heater. It is important that these cells should be kept separated, particularly when the circuit is used in television, as they are at different potentials, and a leakage between them may upset the travel of the beam.

With a low value of bias (say 4½) on the thyatron, the diode filament resistance should be decreased until the thyatron starts to flash, indicating that the condenser is charging and discharging regularly. If

the diode filament is low, the time of the flashes will be so slow that they can easily be counted. As the diode resistance is turned up to brighten the filament the flashes will increase in frequency until the thyatron is glowing blue with no perceptible flicker. The frequency of charge and discharge will then be probably some hundreds per second.

The following are the points to be looked for if the time base is not behaving nicely:—

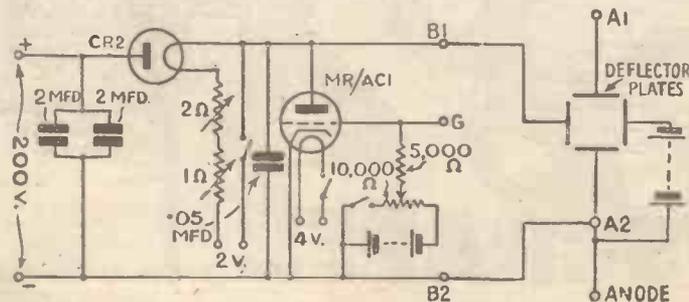


Fig. 1. Time base circuit shown connected to the deflector plates with a biasing battery to centralise the movement of the beam

Continued on page 826



ETHERDYNE PILOT AUTHOR KIT



SPEAKERS

NEW BLUE SPOT 29 P.M. PERMANENT MAGNET MOVING-COIL SPEAKER. With input transformer. Cash or C.O.D. Carriage Paid, £1/12/6. Send **5/-** only

Balance in 6 monthly payments of 5/-.

NEW BLUE SPOT 99 P.M. PERMANENT MAGNET MOVING-COIL SPEAKER. Complete with tapped input transformer. Cash or C.O.D. Carriage Paid, £2/19/6. Send **6/-** only

Balance in 10 monthly payments of 6/-.

NEW LISSEN P.M. MOVING-COIL SPEAKER with input transformer. Cash or C.O.D. Carriage Paid, £1/5/0. Send **5/6** only

Balance in 4 monthly payments of 5/6.

NEW W.B. P.M. 4A. MICROLODE PERMANENT MAGNET SPEAKER complete with switch-controlled multi-ratio input transformer. Cash or C.O.D. Carriage paid, £2/2/0. Send **5/9** only

Balance in 7 monthly payments of 5/9.

ROLA 6P.M. PERMANENT MAGNET MOVING-COIL SPEAKER, with input transformer, Cash or C.O.D. Carriage Paid, £2/9/6. Send **6/-** only

Balance in 8 monthly payments of 6/-.

PETO-SCOTT PERMANENT MAGNET MOVING-COIL SPEAKER with tapped input transformer for power or pentode. Cash or C.O.D. Carriage Paid, 15/-.. Send **5/6** only

Balance in 2 monthly payments of 5/6.

Class "B" Type, 22 G. Cash or C.O.D., or 4 monthly payments of 6/3.

NEW R. & A. "ALPHA" P.M. MOVING-COIL SPEAKER DE-LUXE, with tapped input transformer. Cash or C.O.D. Carriage Paid, £2/12/6. Send **6/6** only

Balance in 8 monthly payments of 6/6.

NEW BLUE SPOT "CLASS B" OUTPUT STAGE. As advertised. Complete with Osram B21 "Class B" Valve. Cash or C.O.D. Carriage Paid, 43/6. Send **4/-** only

Balance in 11 monthly payments of 4/-.

If Blue Spot 29 P.M. Moving-coil Speaker required, add 3/- to deposit and each monthly payment.

NEW FERRANTI CLASS "B" SUPER-POWER CONVERTER. Instantly converts your set to Class "B." Complete with Valves. Ready assembled. Cash or C.O.D. Carriage Paid, £3/3/0. Send **5/9** only

Balance in 11 monthly payments of 5/9.

ELIMINATORS

ATLAS C.A.25, for Mains, "Class B" and Q.P.P. Four tappings: 60,80, 50/90, 120, 150, 25 m/A. Cash or C.O.D. Carriage Paid, £2/19/6. Send **6/-** only

Balance in 10 monthly payments of 6/-.

NEW REGENTONE A.C. ELIMINATOR, Type W.I.F. 7 voltage tappings. 120 150 volts at 12 m/A. Cash or C.O.D. Carriage Paid, £2/10/0. Send **6/-** only

Balance in 8 monthly payments of 6/-.

TELSEN H.T. AND L.T. A.C. MAINS UNIT W.346. H.T. Portion: Max. Det. and S.G. tappings, each adjustable for high, med. or low voltages. Maximum 25 m/A. at 150 volts. L.T. trickle charges, 2, 4, or 6 volts at 1 amp. Cash or C.O.D. Carriage Paid, £4/17/6. Send **9/-** only

Balance in 11 monthly payments of 9/-.

TELSEN D.C. MAINS H.T. UNIT W.348, with 3 tappings, each adjustable for high, med. and low voltages. Output, 24 m/A. at 150 volts. Cash or C.O.D. Carriage Paid, £1/15/0. Send **5/6** only

Balance in 6 monthly payments of 5/6.

KIT "A" YOURS FOR 14/6

Author's Kit of FIRST SPECIFIED Parts, including Peto-Scott META-PLEX Chassis, but less valves, cabinet and speaker. Cash or C.O.D. Carriage Paid, £7/17/6. Balance in 11 monthly payments of 14/6

KIT "B." As Kit "A" but with Valves only. Cash or C.O.D. Carriage Paid, £11/7/6. Send **20/9** only

Balance in 11 monthly payments of 20/9.

KIT "CC." As Kit "A" but with Valves and Peto-Scott Etherdyne Walnut Console Cabinet, with Baffle Assembly, without Speaker. Cash or C.O.D. Carriage Paid, £13/0/6. Send **24/-** only

Balance in 11 monthly payments of 24/-.

KIT "CR." As Kit "A" but with Valves and Peto-Scott Etherdyne Radiogram Cabinet, including full Gramo Equipment, less speaker. Cash or C.O.D. Carriage Paid, or Deposit, £2/13/8. **£17:13:6**

Balance in 11 monthly payments of 30/-.

FINISHED INSTRUMENT
ETHERDYNE, completely assembled from Specified Parts with Valves and Speaker and Console Cabinet. Aerial tested. Cash or C.O.D. Carriage paid. £16:15:0. OR SEND ONLY **£3 15 0**

Balance in 11 monthly payments of 26/-.

EXCLUSIVELY SPECIFIED
PETO-SCOTT ETHERDYNE CONSOLE WALNUT CABINET **29/6**

Cash or C.O.D. Carriage Paid

Yours for 5/- deposit and 5 monthly payments of 6/-.

Baffle Baseboard Assembly 3/6 extra.

Exact to Specification
Detailed List of Parts for TELEVISION AMPLIFIER SENT UPON REQUEST

ALL THE RAGE PILOT CLASS 'B' SPEAKER-AMPLIFIER KIT

Assemble this amazing Unit yourself in less than half an hour. Gives seven times the volume with mains quality from your existing battery set. Complete Kit comprises R.V.A. Class "B" Valve, Peto-Scott Permanent Magnet Moving Coil Speaker, B.R.G. Driver Transformer and Input Choke, seven-pin Valveholder, Peto-Scott Baffle and Baseboard Assembly, all necessary Wires, Screws and plug-in Valve Adapter, with full-size Diagrams and Assembly Instructions.



Complete with Speaker. Cash or C.O.D. Carriage Paid **55/-** Or Send only 6/-

Balance in 11 monthly payments of 5/-.

SUITABLE FOR ANY BATTERY SET

LISSEN

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. Send **10/3** only

Balance in 11 monthly payments of 10/3.

NEW LISSEN SKYSCRAPER FOUR ALL-WAVE CONSOLE 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. Send **15/-** only

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. Send **15/-** only

Balance in 11 monthly payments of 16/6.

NEW LISSEN 7-VALVE SUPER-HET CONSOLE CABINET MODEL complete with Valves and Permanent Magnet Moving-coil Speaker. Cash or C.O.D. Carriage Paid, £11/10/0. Send **21/-** only

Balance in 11 monthly payments of 21/-.

LISSEN "SKYSCRAPER 3." Chassis model with (Lissen) S.G., Detector and Pentode Valves. Cash Price, £4,9/6. Carriage Paid. Balance in 11 monthly payments of 8/3. Send **8/3** only

TELSEN CLASS "B" 4 CHASSIS KIT in sealed carton, less Valves, Cabinet and Speaker. Cash or C.O.D. Carriage Paid, £3,17/6. Send **7/-** only

Balance in 11 monthly payments of 7/-.

TELSEN 325 STAR KIT, less Valves and Cabinet. Cash or C.O.D. Carriage Paid, £1/19/6. Send **5/3** only

Balance in 7 monthly payments of 5/3.

NEW COSSOR MODEL 341. S.G., Detector and Pentode, and balanced-Armature Speaker, complete with Cabinet. Cash or C.O.D. Carriage Paid, £6/7/6. Send **10/-** only

Balance in 11 monthly payments of 11/9.

NEW STATION MASTER MODEL 34 M.C. Complete Kit, with Valves, Cabinet, and Permanent Magnet Moving-coil Speaker. Cash or C.O.D. Carriage Paid, £7/2/6. Send **13/-** only

Balance in 11 monthly payments of 13/-.

NEW MARGONIPHONE MODEL 19 PICK-UP. Cash or C.O.D. Carriage Paid, £1/12/6. Send **5/-** only

Balance in 8 monthly payments of 5/-.

B.T.H. MINOR PICK-UP AND TONE-ARM. Cash or C.O.D. Carriage Paid, £1/1/0. Send **4/6** only

Balance in 4 monthly payments of 4/6.

B.T.H. SENIOR PICK-UP AND TONE-ARM. Cash or C.O.D. Carriage Paid, £1/17/6. Send **5/-** only

Balance in 7 monthly payments of 5/-.

NEW GARRARD MODEL 202A. 12-in. Turntable. Electric Motor for A.C. mains. Cash or C.O.D. Carriage Paid, £2/10/0. Send **6/-** only

Balance in 8 monthly payments of 6/-.

GARRARD AUTOMATIC RECORD CHANGER for A.C. mains. Mounted on unit plate complete, ready for fitting in position, including Garrard Pick-up and Tone-arm. Cash Price, £10,10/0. Carriage Paid. Send **18/6** only

Balance in 11 monthly payments of 18/6.

IMPORTANT—Parts, Kits, Miscellaneous Components. Finished Receivers or Accessories for Cash, C.O.D. or H.P. on our own System of Easy Payments. Send us a list of your wants. We will quote you by return. C.O.D. orders value over 10/- sent Carriage and Post Charges Paid.

PETO-SCOTT CO. LTD., 77 City Road, London, E.C.1
Telephone: Clerkenwell 3406/7.
West End Showrooms: 62 High Holborn, London, W.C.1.
Telephone: Holborn 3248.

Dear Sirs,
Please send me CASH/C.O.D./H.P.
.....
for which I enclose £.....
CASH/H.P./DEPOSIT.....

NAME.....
ADDRESS.....
A.W. 4/11/33.

SEND DIRECT to AVOID DELAY — CASH, C.O.D. or EASIWAY

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

Experimenting with a Time Base
Continued from page 824

- (1) The thyatron may require a little time to warm up to its work, so allow a minute or so before proceeding to examine the circuit for faults.
- (2) An open circuit condenser will cause the thyatron to glow permanently, and controlling the diode temperature will not affect it.
- (3) Insufficient H.T. will prevent the thyatron flashing—but this can be checked by reducing the bias on the grid.
- (4) Similarly, too high a grid bias will prevent the discharge. For the Ediswan thyatron (MR/ACr) the grid bias should be approximately one-twentieth of the anode voltage. Other thyatrons may require a different ratio.
- (5) If the thyatron obstinately refuses to flash, examine the circuit to see if it has been accidentally short-circuited.

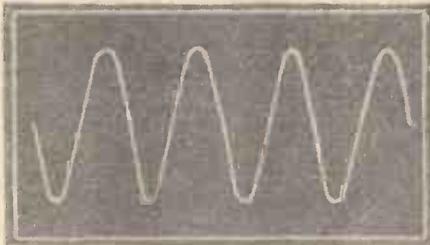


Fig. 3.—The beam here is travelling at one quarter the speed of the supply, giving four waves at once

- (6) Finally, is the H.T. battery connected the right way round.
- Assuming that everything goes well and that the time base is flashing regularly, it can be connected to the tube as shown in Fig. 1.

For the time being, the deflector plate marked A.1 and the one marked A.2 should

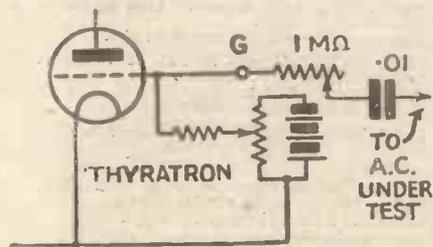


Fig. 5.—Locking circuit for steadying the waveform on the screen

be joined together, and to the anode of the tube (see last week's article). If the tube is focused and the time base switched on, the beam will be seen flickering slowly across the screen in time with the flashes of the thyatron.

As the flashes increase in rapidity (by increasing the diode current) the travel of the beam will appear smoother, and a thin line will be drawn across the screen.

Now investigate the action of the time-base circuit by making a few alterations and seeing their effect. The beam may be travelling off the scale at one side and only one end of its travel be visible. It can be brought into centre by adjusting taps on the bias battery shown connected to the other horizontal deflector plate. This bias battery is acting as a permanent charge on one deflector plate, pushing the beam to any desired point on the screen. Alter both its value and polarity (if necessary) until the beam is swinging symmetrically across the

screen. Now reduce the thyatron bias—the travel of the beam will be shortened. Increasing the bias, on the other hand, will lengthen it.

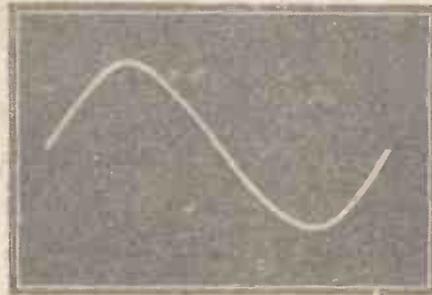


Fig. 2.—Sine wave shown when beam travels at 50 cycles per second

Reduce the speed of the flashing until the beam is "ticking over," and connect a small condenser across the one in the time base. The beam will move more slowly still if the time-base capacity is decreased (by connecting a condenser in series with the existing one) the beam will move faster.

Producing Wave Forms

Now proceed to draw a wave form on the screen by applying about 50 volts A.C. across the plates marked A.C. and A in Fig. 1. If the time-base speed happens to be exactly 50 swings per second, you will see a single complete sine wave shown as Fig. 2. If the speed is slower than 50 cycles, more than one wave will be seen (Fig. 3), and if the speeds of the time base and the A.C. supply are not exact multiples of one another, the waves will slowly walk across the screen. They can be pulled up and held stationary by a cautious adjustment of the time base. The number of complete waves divided into 50 (for a 50-supply) will give the speed of traverse of the beam.

If the beam is travelling faster than 50 times per second innumerable parts of waves will appear, drawn out across the screen and forming a curious lattice-work, like Fig. 4. These are really "close-ups" of different portions of the sine wave, and it is sometimes useful to spread the wave out in this fashion to examine part in greater detail,

"Locking" the Time Base

If the time base is adjusted approximately to 50 "sweeps" to give a single wave on the screen, difficulty is usually experienced in keeping the wave stationary and preventing it moving slowly across, as the time base gets out of step with the supply frequency.

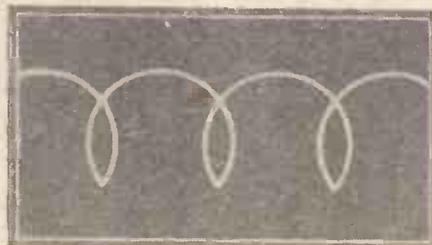


Fig. 7.—Loops produced by combination of time base and circular deflections

This difficulty can be overcome in a very ingenious way by "locking" the time base to the supply frequency. The grid of the thyatron was deliberately led out to a separate terminal for this purpose, and it

can now be connected to the supply through a variable megostat and a condenser of, say, .01 microfarad (Fig. 5). The effect of this connection will be to supply the grid of the thyatron with a small voltage of the frequency of the supply. As the voltage across the thyatron is rising, the grid bias will suddenly be reduced by the timing impulse from the supply frequency, and the thyatron will flash over. Provided the adjustment of the time base is not too far removed from the frequency of the supply, these timing impulses will be sufficient to pull the time base into synchronism, and the wave form will remain stationary on the screen.

Be careful that the "locking" voltage applied to the thyatron grid is not too strong, or the "tail will wag the dog" and the linear movement of the beam will be upset.

An indication of excessive locking voltage is the closing-up of the wave-forms at one end of the time scale, and the variable high

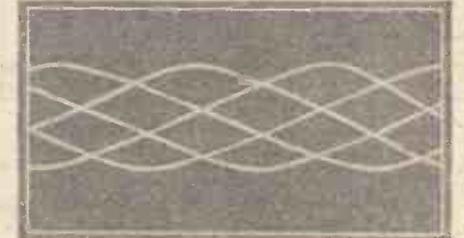


Fig. 4.—Effect of making the beam travel faster than the supply frequency. The sine wave is spread out into various portions which interlace

resistance should be altered until the wave is just held stationary without flicker.

As a change from the recording of wave forms, the time base may be connected in series with the resistance-condenser circuit described in the issue of October 21. The arrangement is shown in Fig. 6, and if the speed of the time base is made higher than

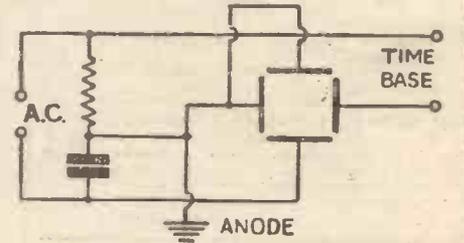


Fig. 6.—Time base in series with split-phase circuit

50 cycles the beam will trace a series of loops across the screen (Fig. 7), which can be varied in style by altering the speed of the time base. No "lock" will be required for this experiment as the travelling of the loops across the screen gives a very pretty and novel effect.

THE GRAFTON TELEVISION RECEIVER

A RECENT demonstration by Grafton Radio, Ltd., of their latest television receiver showed what remarkable progress has been made. The picture was perfectly steady and, except for one small adjustment of the control, the machine ran without any attention for a full half-hour.

The Grafton receiver is a complete equipment built into a fine cabinet with the receivers in the base. Control is as simple as a wireless set. The address is 79 Lots Road, Chelsea, London, S.W. 10.



WHEN you try one of these handsome **Cossor Receivers** in your own home (your Dealer will gladly arrange it) you will realise that you can have up-to-date Radio for a surprisingly modest outlay. In performance, appearance and ease of operation these **Cossor Console Models** are equal to much more expensive Receivers. Send the coupon for full particulars.

SCREENED GRID CIRCUIT

MOVING COIL SPEAKER

SINGLE-DIAL TUNING

COSSOR CLASS "B" BATTERY CONSOLE Model 3456

Complete Receiver, as illustrated, with **Cossor 220VS Variable-Mu Screened Grid, Cossor 210 HL Detector, Cossor 215 P Driver and Cossor 220 Class "B" Output Valves**. Single-dial tuning, selectivity control and combined volume control and "on-off" switch. Wavechange switch for 200-530 and 900-2000 metres. Handsome walnut finished Console Cabinet, 2 ft. 11 in. high, 1 ft. 2 in. wide, 11 in. deep, giving ample accommodation for batteries. Permanent Magnet Moving Coil Loud Speaker of the latest type. Gramophone Pick-up Plug and Socket. **PRICE £9.19.0**

Price does not include Batteries or Accumulator. Hire Purchase Terms: 20/- deposit and 10 monthly payments of 20/-.

COSSOR ALL-ELECTRIC CONSOLE (for A.C. Mains) Model 3468

Specification similar to Battery Model 3456, but operating from Electric Light Supply. Complete with four **Cossor A.C. Mains Valves** viz: M.V.S.G. (Met.) Variable-Mu S.G., 41 M.H. (Met.) Detector, 41 M.P. Output and 412 B.U. Rectifier. Mains Energised Moving Coil Speaker. Illuminated tuning-dial (Model 3468 only.) For A.C. Mains only, 200/250 volts adjustable. **PRICE £10.15.0**

Hire Purchase Terms: 25/- deposit and 10 monthly payments of 21/-.

COSSOR ALL-ELECTRIC CONSOLE (for D.C. Mains) Model 3469

As Model 3468, but for operation on D.C. Mains. Supplied complete with three **Cossor D.C. Mains Valves** viz: D.V.S.G. (Met.) Variable-Mu S.G., D.H.L. (Met.) Detector and D.P. Power Output. For D.C. Mains only, 200/250 volts (adjustable). **PRICE £10.15.0**

Hire Purchase Terms: 25/- deposit and 10 monthly payments of 21/-.

Legs are detachable on all Console Models and the receivers can be used as table models with legs detached.

COSSOR

BATTERY & ALL-ELECTRIC RADIO

Prices do not apply in I.F.S.

A. C. COSSOR LTD., Highbury Grove, London, N.5. Depots at Birmingham, Bristol, Glasgow, Leeds, Liverpool, Manchester, Newcastle, Sheffield, Belfast, Cardiff and Dublin.



COSSOR
Console Receivers

To A. C. COSSOR LTD., Melody Dept., Highbury Grove, London, N.5.

Please send me free of charge, Folder No. 199 which gives full particulars of Cossor Console Receivers.

Name

Address

A.W. 4/11/33

♥ 385U

Readers' Views on This and That

Listeners' Letters

AMERICANS IN DAYLIGHT

To the Editor, "Amateur Wireless."

SIR,—Having read in AMATEUR WIRELESS S. F. Broad's letter re "Americans in Daylight," I take this opportunity of describing my experiences.

My searching hours are almost identical; from the time I rise, at 6 a.m., until I leave for work at 6.45 a.m., I have heard on the loud-speaker WCAU, WPG, and presumably WGY on 379.5 metres at good strength in daylight.

Using headphones several more have been heard, but not identified through call-sign.

During the early hours of the morning when darkness prevails on both sides of the "Herring Pond," WCAU and WPG are star performers. Many others have been heard, including several South Americans.

The receiver I used was a battery-operated three-valver (screen-grid, detector, and power) with outdoor aerial.

Treherbert, Glamorgan. R. C. CASSAM.

BRITISH TALKIES

SIR,—I read your very interesting paper each week, and especially those notes by "Thermion."

While in general I enjoy his comments, I should like now to offer a comment on the accuracy of his statement in the October 21 issue that "only the cinema loud-speakers now prevent us from hearing 'canned' music which is indistinguishable from the real thing."

It might interest "Thermion" to know that the amplifiers also require some improvements before they will deliver the extended

range of frequencies (30-10,000 cycles) to the aforesaid loud-speakers.

The British Thomson-Houston Co., Ltd. (an entirely British firm manufacturing their gear in this country) have now in operation in several cinemas "extended frequency" type amplifiers with special output circuits and high-frequency bugles.

In the interests of fair play I think this might be mentioned also.

Fagley, Bradford.

J. C. HALL.

SUPERS v. STRAIGHTS

SIR,—I have read with considerable interest a statement by "Thermion" in the October 21 issue of AMATEUR WIRELESS on the subject of super-hets v. straight sets.

In my opinion super-hets are out of the question for the majority of users because of the too noisy background. I have found that in nine cases out of ten a super-het cannot be used to its fullest extent because of this trouble.

Then, again, second-channel interference does not by any means seem to be overcome yet, except in very large sets.

Now in a straight set none of the above apply—a great point in its favour. Although a super-het should give greater selectivity straight sets can equal it.

"Thermion" states that reaction is necessary; well, if straight sets were made with the number of valves of a super-het, reaction would become unnecessary. This also removes the question of tone-control.

With regard to anti-fading, no doubt there is an advantage in the case of a super-het but it is applied and works well when fitted

to sets with two or more high-frequency stages.

My contention is, therefore, that if attention is given to the design and construction of a straight set and with sufficient number of valves, it can do as much and more than a super-het.

Bournemouth.

S. GREATOREX.

Universal Mains Kits

THE first two universal mains kits are now available for the home constructor. These are to be marketed by Ostar-Ganz and will use the well-known Ostar-Ganz high-voltage mains valves. There will be a two-valver (excluding rectifier) for £5 15s., or £8 8s. completely assembled. A three-valver (excluding rectifier) will cost £8 15s. in kit form, or £11 11s. assembled.

A five-valve super-het will be available in about three weeks, costing £15 15s., to be followed by a super-het which will cost £25 4s. The seven-valve super-het will be suitable for all-wave working (from 14 to 2,000 metres) and will include full automatic volume control.

New Class-B Valve

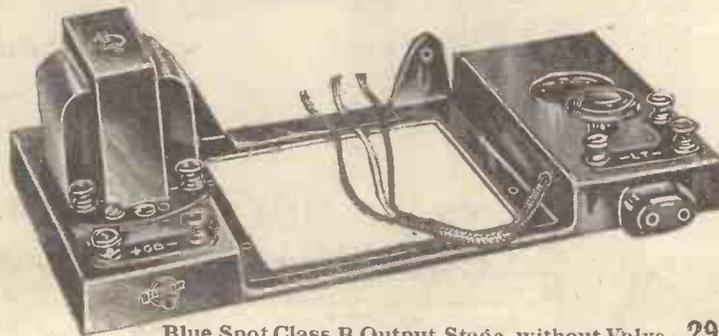
A NEW positive-drive class-B valve just released by Mazda is designated the PD220A. This valve has been designed to overcome the slight distortion that is always present with zero-bias class-B valves. It consumes more anode current than the usual type of class-B valve, but it is ideal when reproduction is of primary importance.

This valve requires a slight negative grid bias, sufficient to reduce the quiescent anode current to 1.2 milliamperes with 150 volts high tension. The maximum power output under these conditions is 2,900 milliwatts, which is far higher than that of any other valve on the market at the present time.

New Blue Spot

CLASS B OUTPUT STAGE

The most Efficient and ADAPTABLE
Class B Unit available



Blue Spot Class B Output Stage, without Valve	29/6
Blue Spot Class B Output Stage, with Osram B.21 Valve	43/6
66R Output Choke and Base Plate	7/6

THE BRITISH BLUE SPOT COMPANY LTD.,
Blue Spot House, 94/96 Rosoman Street, Rosebery Avenue, London,
E.C.1. Telephone: Clerkenwell 3570. Telegrams: "Bluspot, Isting,
London." Distributors for Northern England, Scotland and Wales:
H. C. RAWSON (Sheffield and London), Ltd., 100 London Road,
Sheffield; 22 St. Mary's Parsonage, Manchester; 177 Westgate Road,
Newcastle-upon-Tyne; 37, 38, 39 Clyde Place, Glasgow.

WRITE TO-DAY FOR
FULLY ILLUSTRATED
LEAFLET No. A.W. 84.B

SUITABLE for all constructors and all Battery Sets. Particularly suited for all owners of Blue Spot Speakers, both existing and recent types. Special adaptor for all 66R units and R cabinet models.

Thousands of listeners will welcome the introduction of this new unit which enables any Battery Set owner to enjoy Class B Output at little expense.

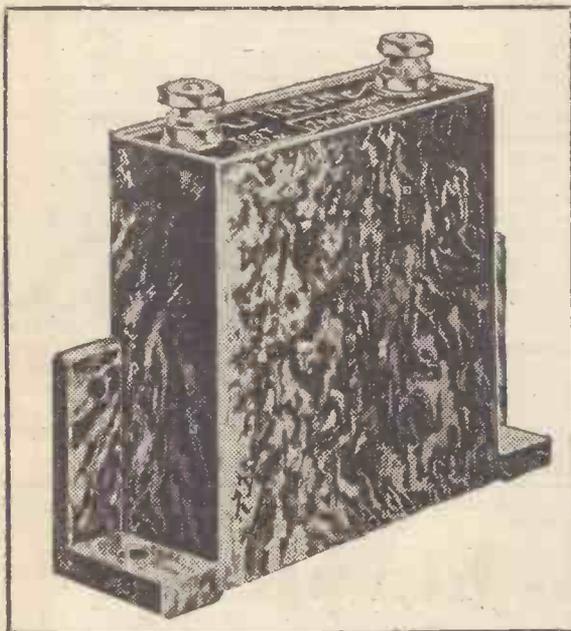
Tone Control to match Unit with Set and minimise high-frequency disturbance such as heterodyne whistles or background noises. Provision for Grid Bias for Class B Valve where required. Existing Blue Spot Moving-coil Speakers fixed in a few seconds, the whole bolting together and forming a complete, rigid unit. The complete assembly may be fitted direct to the Speaker Baffle, screwed to the Baseboard or fitted inside any Blue Spot Speaker Cabinet.



TELSEN PAPER CONDENSERS

Specified for the A.W.

“Etherdyne Super”



THE designer's choice of six Telsens Paper Condensers for use in the Etherdyne 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.

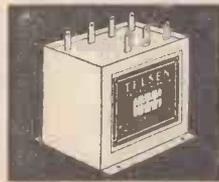
The illustration below shows the position occupied by Telsens Paper Condensers in the built-up Etherdyne Super.



TELSEN PAPER CONDENSERS.

Cap.	500 Volt Test.	1000 Volt Test.
.01	1/3	1/9
.04	1/3	1/9
.1	1/6	2/-
.25	1/6	2/-
.5	1/6	2/-
1.	1/9	2/6
2.	2/6	3/6

TELSEN COVER EVERY CONDENSER REQUIREMENT



TELSEN PAPER
BLOCK CONDENSERS
from 4.9



TELSEN
GRID LEAKS
6d.



TELSEN LOW
VOLTAGE ELECTRO-
LYTIC CONDENSERS
from 2.6



TELSEN
FIXED MICA
CONDENSER 3
from 6d.



TELSEN
TAG CONDENSERS
from 4 1/2d.



TELSEN
PRESET
CONDENSERS
1.3

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

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

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

WE TEST FOR YOU



The Cosmocord Universe pick-up is housed in a moulded bakelite casing

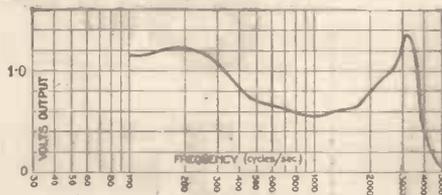
COSMOCORD UNIVERSE PICK-UP

BOTH the arm and base of this pick-up are made entirely of moulded bakelite, finished a pleasing shade of brown. The head is set at an angle to the arm to provide good tracking and is also arranged to swivel so that needle changing is a simple matter.

The weight of the pick-up head on the record is adjustable by means of varying the position of a lead counter-balance weight located at the pivot end of the arm. This weight is simply adjusted for position by means of a knurled knob. In the base is fitted a carbon-track type variable resistance operating as a volume control.

Test Results.—The pick-up was tested for

a response over the whole audio range and the result can be seen by the curve reproduced on this page. This curve shows that the pick-up is reasonably sensitive and that the response is well maintained in both upper and lower frequencies. When tested with various types of record we were pleased with its overall performance. This pick-up is recommended. Makers: Cosmocord, Ltd. Price: £1 2s. 6d.



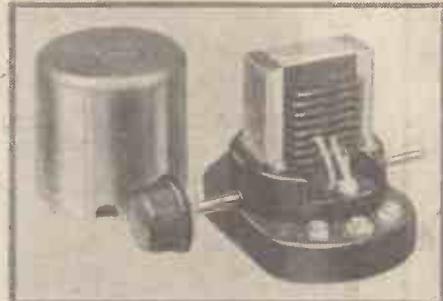
A curve showing the performance of the Cosmocord pick-up on test

IGRANICOR SHORT-WAVE COIL

THE Igranic coil is of the dual-range type and is one of the first short-wave coils to use an iron core. In appearance it is similar to the standard medium-wave iron-cored coils made by Igranic. The iron core is laminated

and a complete iron circuit is employed. The coil assembly is mounted on a moulded bakelite base, which carries the terminals and also houses the wave-change switch, which is of a very simple but apparently satisfactory character.

A metal can which is automatically earthed when in position is supplied with the coil. The operating spindle of the wave-change switch protrudes on both sides of the base and the length can be simply adjusted. This is a useful feature when constructing an all-wave receiver and allows the short-wave coil to be ganged with the medium- and long-wave coils.



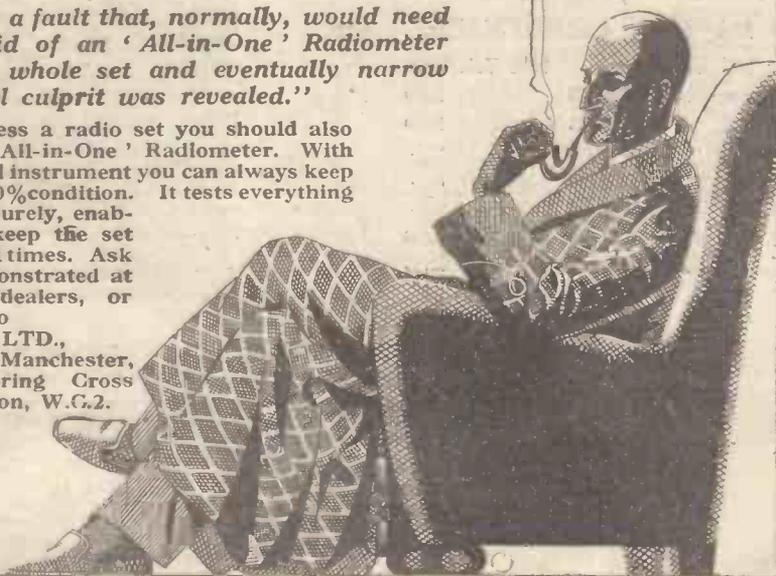
The new Igranic short-wave coil uses an iron core
Continued on page 832

"Intricate deduction, Watson, BUT THE 'ALL-IN-ONE' CONFIRMED IT."

"A broken down grid bias resistance is a fault that, normally, would need some locating, Doctor, but with the aid of an 'All-in-One' Radiometer it took me very little time to test the whole set and eventually narrow down the field until the real culprit was revealed."



IF YOU possess a radio set you should also possess an 'All-in-One' Radiometer. With this wonderful instrument you can always keep your set in 100% condition. It tests everything quickly and surely, enabling you to keep the set up to par at all times. Ask to see it demonstrated at your radio dealers, or write direct to PIFCO, LTD., High Street, Manchester, or 150 Charing Cross Road, London, W.C.2.



PIFCO
ALL IN ONE
RADIOMETER

Standard Model "All-in-One" Radiometer, for Battery Sets only, as shown here

De Luxe Model, for Battery Sets, Electric Receivers and Mains Units.

Price **12/6**

Price **£2 : 2**

LINACORE

The J.B. LINACORE an exceptionally selective band-pass tuning unit employing the latest type of iron-cored coils. LINACORE takes all the worry out of set-building. Far more efficient than if home-assembled and far more compact. Obviates all ganging difficulties. Makes the most of its super selective coils by very accurate matching of the condenser sections. Tunes from 200-550 and 800-2,000 metres. LINACORE gives a 3-valve set a performance comparable to a superhet. Complete with volume and reaction controls and all switching. Fitted with the latest pattern J.B. Straight Line Dial.



Price **69/6**

For Mains Receivers type B.P.M.
For Battery Receivers type B.P.B.

Write for complete catalogue.

**PRECISION
INSTRUMENTS**



Advertisement of Jackson, Bros. (London), Ltd., 72, St. Thomas Street, London, S.E.1

Telephone Hop. 1837

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

WHAT MAKES A GOOD DRIVER TRANSFORMER

IN a class-B amplifier the output valve requires a certain amount of power to drive the grid positive and this power has to be supplied by the driver valve through its associated transformer. Thus, not only has the driver transformer to give a uniform performance over the whole working range of audio frequencies, but it must also be designed to handle power without excessive loss.

Losses in the driver transformer are due to two causes. Firstly, there is the copper loss which depends on the resistance of the windings, which must therefore be kept low. Secondly, there is the iron loss caused by the continually varying magnetisation of the

coil. This can be kept low by the use of a good primary inductance. The primary inductance must be well maintained in order that the response of the transformer to the bass frequencies shall be good.

Apart from individual tests of primary inductance and secondary resistance, a driver transformer is tested for overall efficiency by supplying to the primary winding 100 milliwatts and noting the power output obtained from a class-B valve connected in the usual way across the secondary. In this way all the variable factors are automatically taken into account and a good idea of the performance of the transformer can be obtained.

We Test for You
Continued from page 830

Test Results.—The coil is rated to cover a wavelength range from some 15 to 78 metres, but, on test, the actual range was found to be 19 to 76 metres. This range is, of course, obtained in two steps, the first being 19 to 35 and the second 35 to 76 metres.

When connected in a 2-valve detector and low-frequency receiver, the coil behaved exceedingly well, the reaction being fairly smooth and constant over both ranges.

Makers: Igranic Electric Co., Ltd.
Price: 12s. 6d.

GOLSTONE AERIAL INSULATOR

HERE is a small component which should prove useful in many circumstances. It is actually a conical-shaped porcelain insulator with a single bolt at the apex. A porcelain flange is formed round the base of the cone and this contains two holes to facilitate fixing in position.

The insulator is intended for use as a support to a long lead of any description where the

lead has to run in close proximity to a wall or other support. The diameter of the base and the overall height are each 2 in.

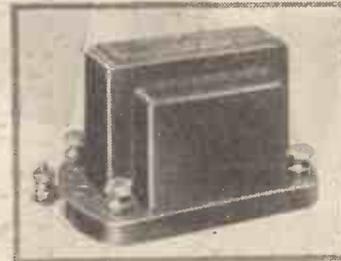
Makers: Ward & Goldstone, Ltd.
Price: 9d.



A useful gadget for insulating aerials made by Ward & Goldstone, Ltd.

GRAHAM FARISH DRIVER TRANSFORMER

HOUSED in a neat moulded bakelite case, this driver transformer is interesting in that the four terminals for the two grids, anode and high tension are moulded into the



Graham Farish's new driver transformer is an interesting component

casing, so ensuring that they shall always remain tight. The fifth terminal is connected to one of the fixing lugs by means of a small bracket which is also in contact with the core and so automatically earthed. The transformer has a rated turns ratio of 1:1 overall.

Test Results.—The inductance of the primary winding varied between 11 and 7 henries as the direct current in the winding was increased from 0 to 4.5 milliamperes. This value is somewhat low and may result in a loss of bass, while the iron loss would also tend to be high. The D.C. resistance of the secondary winding was only 60 ohms per side, which is a good point. With 100 milliwatts in the primary winding, adequate voltage was developed across the secondary to produce the rated output, without distortion, from a class-B valve connected in the usual way.

Makers: Graham Farish, Ltd.
Price: 8s. 6d.

IMPROVE YOUR SHORT WAVE RESULTS

SHORT-WAVE ENTHUSIASTS will welcome this "EDDYSTONE" high efficiency lead-in device. It makes sure that weak short-wave signals from thousands of miles away are carried safely to the set without loss at the point of lead-in—usually the weakest link of any aerial system.



The special outside insulator of the lead-in is of vitreous glazed porcelain, made to withstand weather and to give long leakage path to earth—it will not hold wet or moisture. The insulating tube itself is high tensile strength glass of electrical quality. All metal parts are polished and nickel plated. Also available for use with transmitters.

STRATTON & CO., LTD., Bromsgrove St., BIRMINGHAM
LONDON SERVICE DEPOT—WEBB'S RADIO STORES, 164, Charing Cross Rd., W.C.2

"EDDYSTONE" LOW LOSS LEAD IN
CAT. No. 946,
Price 2/6.

Latest list of "EDDYSTONE" short wave parts now ready, free on request.

EDDYSTONE
LOW LOSS LEAD IN

STANDARD SAC LEGLANGHE BATTERY



Please note before buying your next H.T. Battery that the Standard Wet H.T. Battery will give you greater satisfaction, also costing less. The life of the Standard Battery being 6 to 12 times that of an ordinary H.T. Battery. Replacements of Refills is simple and interesting. Battery of 120 volts comprised of 80 No. 3 Cells, 12,500 milliamps. Price, complete, £2, carriage paid. Send for interesting particulars.

ALL SPARES for STANDARD BATTERIES SUPPLIED

THE WET H.T. BATTERY CO.,
28 Lisle Street, London, W.C.2. GERRARD, 6121

RADIO SUPPLIES

Send your list of Radio needs for our quotation. Kits, Parts, Sets, etc. Everything in Radio stocked. Prompt delivery: seven days' approval. Catalogue free. Taylor and Standard Wet H.T. replacements stocked.
A. TAYLOR, 9 GROVE ROAD, BALHAM, S.W.12.



The "POPULAR" Radiogram Cabinet

An attractive but inexpensive Radiogram Cabinet that will house most sets with ample room for speaker, batteries, and gramophone motor.

Automatic stop, baffleboard, baseboard, and shelf. Finished shaded walnut ... 75/-

Send coupon for Free Camco Cabinet Catalogue or see complete range in our Showrooms.

CARRINGTON MFG. CO., LTD.
Showrooms: 24, Hatton Garden, London, E.C.1. Holborn 8202
Works: S. Croydon



Post in 1d. envelope

Name

Address

32 A.W

British Made



YOU WANT PERFECTION? FOR SHORT WAVES

Then use the original BECOL EBONITE LOW-LOSS FORMER, tested before despatch and reliable. Prices Low. Look for Trade Mark. Efficiency Tells.

INTERESTING.—Send 6d. (post free) for 3rd Edition of UP-TO-DATE HANDBOOK of Tuning Coils for Circuits, Dual Range, Band Pass and Super-het, fully illustrated with data.

THE BRITISH EBONITE CO. LTD. MANWELL LONDON, W.7

HOW MANY LISTENERS REALISE?



"I wonder how many listeners realise (as I did when trying out the 'Microlode' pointer) how much volume is wasted when the speaker is not correctly matched to the output valve" —writes a user.

The designers of the 'Etherdyne Super' know the unique merits of the 'Microlode' and the perfect matching it provides. W.B. Microlode speakers have received first or sole specification on nearly every important set this year.

A revelation similar to this user's awaits you. Hear a W.B. Microlode speaker on YOUR set today or write for folder.



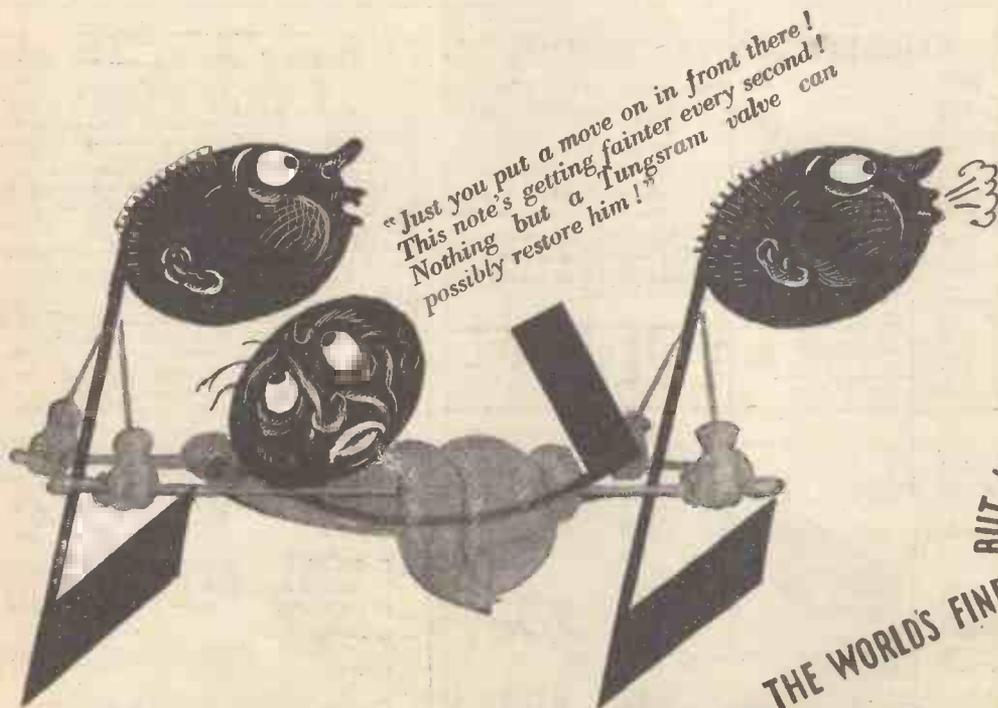
17 Ratios for power or pentode: 4 for Class B. Perfect matching and the Mansfield magnet gives greater sensitivity.

'Microlode' Model PM4A 42/-

'Microlode' Model PM6 32/6



Whiteley Electrical Radio Co. Ltd., Dept. A., Radio Works, Mansfield, Notts.



There's a Tungram valve for every radio need. Their vivid tone turns old sets into new. Ask our Technical Dept. about your radio problems.

BUT AT PRICES FROM 5/6

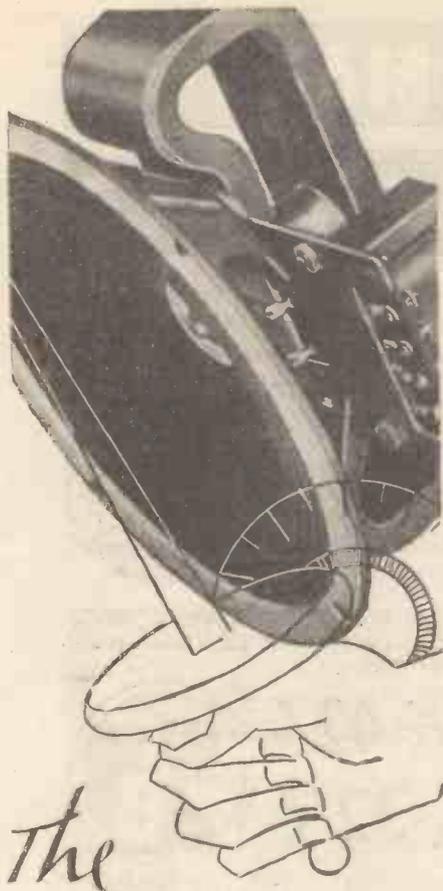
THE WORLD'S FINEST

TUNGSRAM

BARIUM VALVES

Advt. of Tungram Electric Lamp works (Gt. Britain) Ltd., 72 Oxford St., W.1

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



The
M.C.22

The Amplion M.C.22 is particularly suited to super-het requirements and, as such, is the specially recommended speaker for the "Etherdyne Super."

A super-size Magnet and rigid cone-housing are special features of the M.C.22, while great power handling capacity and sensitivity to distant signals are added advantages with all Amplion speakers.

The universal transformer provided enables suitable connection to be made with every type of set; Power, super-power, Pentode, Class "B," Q.P.P. and Push-pull

- The M.C.22 (7 in. cone) 39/6
- "AUDIOLA" (9 in. cone) 49/6
- "SONETTE" (5½ in. cone) 27/6



AMPLION (1932) Ltd., 82/84, Rosoman Street, E.C.1.

Notes and Jottings

LICENCES are still increasing in this country. At the end of September 5,720,500 licences were in force, an increase of 66,100 for the month. Figures for the same period last year show a total of 4,855,505 listeners. When will the 6,000,000 mark be reached?

Many listeners will remember Leslie Baily's recent radio play, *The Fantastic Battle*, which was a great success. Sweden thought so, too, for it is arranging to broadcast the play shortly. Negotiations are also proceeding for the broadcast of the play in Ceylon.

Oxford has passed a new by-law dealing with noisy loud-speakers. The official jargon of the by-law prohibits the use of any wireless loud-speaker or gramophone in places likely to cause annoyance to the general public.

A huge floodlight beacon for airmen is being erected at the huge Post Office transmitting station at Hillmorton, near Rugby. Only one of the twelve huge masts is lit at the present time; there is a small red light on top and another about half-way down. The foundations for a huge steel tower to carry the new beacon was finished some time ago, but work on the tower was held up by national economy considerations. We understand that the Royal Air Force, who are responsible for the work, are resuming work on the tower.

Those who are troubled with electrical interference from trams, lifts, violet-ray apparatus, and barbers' implements, etc., will be pleased to learn that a special committee has been set up by the Institute of Electrical Engineers and our sub-committees appointed to inquire into the means and cost of rendering future gear free from this defect. Special investigation is necessary on some of the larger plant, and this is being carried out by the British Electrical and Allied Industries Research Association. Efforts are being centred in the direction of co-operation with manufacturers and the other interests. Consideration has also been given to the setting up of a British national committee to deal with the idea of international action on the question of electrical equipment embodying suppression devices.

"M. P. R." DEPENDABLE ELIMINATORS with

the renewable safety fuse



A Renewable Safety Fuse is fitted as standard to all 'M.P.R.' Models. In your own interest see that the Eliminator you buy includes a safety fuse.

D.C. Models 22 m/a from 21/-
A.C. Models 15 m/a from 39/6
Or on hire purchase

Ask your dealer to show you the Eliminator which caused a sensation at this year's Radio Exhibition.

Full details and illustrations from

MAINS' POWER RADIO LTD., EASTERN RD., ROMFORD
Romford 338

★ to men who want careers in **RADIO**

ANNOUNCEMENT

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

.....

ETHERDYNE

**COMBINED VOLUME CONTROL and 3 Pt. SWITCH
ENTRUSTED TO SOVEREIGN ALONE**

IF 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 price. Electrically and mechanically perfect, you can rely on this component completely—because it is made by Sovereign and backed by "A.W." Use Sovereign wherever you can in building the ETHERDYNE; there is a wide range of suitable components at prices to save you money.

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.



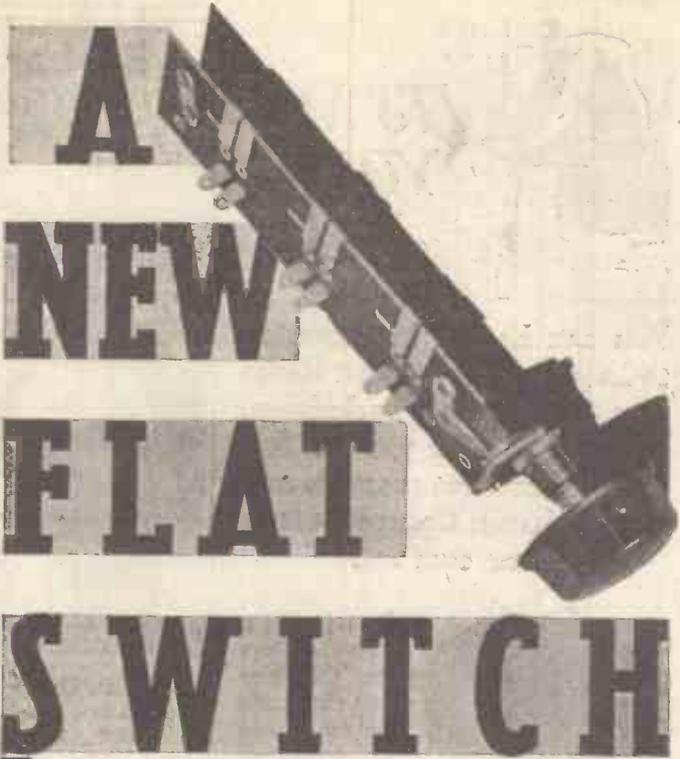
4/6

also specified

- 1 SOVEREIGN PRESET CONDENSER (Type J, .0003 mfd.), famous in all important sets. Its inclusion in this set is further **1/3** guarantee of Sovereign quality.
- 3 Sovereign Terminal Blocks. Useful **6d.** adjuncts to every set. Each

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, N.W.1



This is the most compact switch we have yet produced, and as efficient as any made. It is the ideal switch for matched coil units or any other components requiring a combined change-over or make-and-break.

Nickel silver contacts engage on silver points, avoiding all risks of corrosion, and the sliding action ensures at all times a perfectly clean contact. There is virtually no inter-capacity between the points, thus avoiding the use of elaborate screening.

Any number of circuits can be controlled by this new switch, from a single make-and-break or change-over upwards.

Prices

- 342/1 3 Pole Single Throw ... **1/6**
- 342/2 2 Pole Change Over ... **1/6**
- 342/3 3 Pole Change Over ... **2/-**

From your dealer or post free from the makers.

WILKINS & WRIGHT LTD.,
UTILITY WORKS, HOLYHEAD, BIRMINGHAM

London Agents: E.R. MORTON Ltd., 11 Newman St., Oxford St., W.1.

Write for a copy of our new catalogue; it contains full details of our complete range of switches, condensers, and dials.



THE AERIAL ELIMINATOR OF PROVED EFFICIENCY

- INCREASES SELECTIVITY
- REDUCES MAINS HUM AND STATICS
- FIXED IN A MOMENT—LASTS FOR EVER

THOUSANDS ALREADY BRINGING BETTER RECEPTION TO LISTENERS ALL OVER THE COUNTRY

Here's the Aerial Eliminator of proved value... the VEGA. Just connect it to your Set and there's a perfect aerial without any of the trouble of erecting masts. It is a definite safeguard against lightning, too. There's nothing in the VEGA to wear out or need replacement. 2/- spent on a VEGA to-day means goodbye to aerial trouble for a lifetime.

Your dealer stocks the VEGA Aerial Eliminator, or send direct to:—

CRAFTS (A.W.) LTD.
7 DUKE STREET, ADELPHI,
LONDON, W.C.2.
Telephone: Temple Bar 1693.



VEGA
AERIAL ELIMINATOR **2/-**

Satisfaction Guaranteed... Or money returned

Buckingham

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

Edmont



IT'S NOT YOUR JOB!

You can hardly be expected to know as much about Radio Construction as a Technician, it's his job. But you can follow his excellent example and use Benjamin Components in your own set.



7-PIN

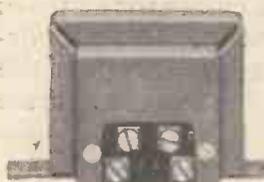
Benjamin Valveholders are the very best obtainable and can be used with confidence in every set you build.

New type 5-pin and 7-pin holders with self-cleaning contacts. Fitted with easy wiring reversible terminals.

Benjamin 7-pin .. 2s.
Benjamin 5-pin .. 10d.



VIBROLDER



OUTPUT CHOKE

Benjamin 4-pin valve holders with self-aligning, positive-grip sockets and solder tags integral with springs. Indexed terminals provided.

Clearertone .. 1s. 6d.
Vibrollder 19d.

Benjamin Transformers and chokes used in a circuit ensure the highest degree of quality and performance.

Class "B" Output choke (above) for matching all Class "B" valves to existing loudspeakers. Price 11s.

The Transfeeda (right) for use wherever an L.F. transformer is specified. Price 11s. 6d.

Benjamin Class "B" Driver Transformer, tapped to give choice of ratios. Price 10s. 6d.



TRANSFEEDA

BENJAMIN
THE
BENJAMIN ELECTRIC LTD.
TARIFF ROAD, TOTTENHAM

Potted Biographies—9

Barbara Couper

BARBARA COUPER was born in the year—no, she wasn't, or at least she may have been, but wild horses would not drag the information from me, even though details of that sort really should be given in biographies, potted or otherwise.

I spent an hour with her the other afternoon, and learned that she worried her family to death in order to be allowed to go on the stage. She studied at the Guildhall School of Music and also at the Academy of Dramatic Art, where she won a special medal for French drama. Pity she did not try for another for Americanised speech; she is very good at it.



Barbara Couper

Miss Couper has probably played in more radio dramatic productions than any other actress. You may remember that she played the name part in *Deirdre of the Sorrows*; she was Katherine in *The Taming of the Shrew*, Gloria in *R.U.R.*, Madge in *Galsworthy's Strife*, Amina in *The Forest*, Flavia in *The Prisoner of Zenda*, Hermione in *A Winter's Tale*. She also played in *Kismet*, *The Cherry Orchard*, *Obsession*, and other plays far too numerous to mention.

In private life Miss Couper is Mrs. Howard Rose, but that is not the reason she has broadcast so many times in plays, although her husband is one of the producers at the B.B.C. In fact, she assures me to the contrary.

"When did you marry Howard?" I asked.
"Five years ago."
"Does it seem longer?"
"No. Do you know, the strange part of it is that we are still happy."

Their First Meeting

"So you ought to be," said I, knowing Howard. "Tell me, where did you first meet him?"

"I didn't. I heard his voice."
All my journalistic instincts came to the fore. "Look here," I said, "is this a romance or something?"

"You've said it."
"Come on, then. Let's have the whole story, but don't let your coffee get cold."

"It was like this." (They all begin that way when they are nervous or under strain of emotion).

"I went up to Savoy Hill for an audition. I was simply terrified, but managed to summon up enough courage to say my piece. Then a very solemn voice said: 'It might be nice if you gave me something humorous, Miss Couper.' I said I was sorry, I had nothing suitable. Then the voice said: 'Well, say something funny for me to hear.'"

Engaged—for a Radio Play

Evidently Miss Couper obliged, for she was engaged later on—I mean engaged to take part in a play.

"Were you married after that?"
"Hardly. We don't do things at that speed at the B.B.C. We went through the customary 'walking-out' stage first."

Mr. and Mrs. Howard Rose live near Woking. Judging from pictures Mr. Rose showed me one day over lunch in the canteen at Broadcasting House, their home is charming.

I'll have a shot at biographing him one day—just to see if he "produces" the story the same way. I expect he does. W.-W.

(Next week: LEONARD HENRY.)

EVERY TIME—IT'S
ERIES for CERTAINTY

Designer of the—
AMATEUR WIRELESS

'TELEVISION
AMPLIFIER'

Recommends 17

ERIE IMPREGNATED
RESISTORS

Noisy Resistors in your radio may be drowned by music, but in a Television Amplifier this same noise means visual distortion.

That's why ERIES are recommended for this Television Amplifier, and it's just as desirable to use ERIES in your radio.

1/4 PER WATT IN ALL VALUES
Eries are now colour coded and also clearly labelled. Look for the Erie Kits on your dealer's counter.

Write for new descriptive leaflet and Colour Code Chart

The RADIO RESISTOR Co.

1 Golden Square, Piccadilly Circus, London, W.1

ELECTRADIX BARGAINS

THE DIX-ONEMETER

The ideal of multi-range, moving-coil meters. Built to first-grade British Engineering Standard. 50 ranges in 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/-

(Multipliers extra)

Test Booklet "A" Free



**THE DIX-MIPANTA
VEST POCKET TESTER**

A wonderfully versatile moving iron multi-range meter for service on A.C. jobs. No projecting terminals. THREE ranges of volts: 0-7.5, 0-150, 0-300. Used for MILLIAMPS reads: 0-12½ m/A., and 0-75 m/A. In black bakelite case. Measures only 2½ in. by 2½ in.

Complete with pair of test leads 19/6 A.C. & D.C. and plugs

Leaflet "A" gives full information

MICROPHONES. All prices, all purposes.

We are makers and carry the biggest and most varied stock in London. Our famous Button insets for detectaphone experiments are only 1/-.
MICROPHONE L.R. Volume Controls, 6d. For making your own Mike. Carbon Granules in glass capsule, Grade 1, 8d.; No. 2, 1/-; No. 3, fine, 1/6; No. 4, extra fine, 2/-; Back Blocks, 3d. Diaphragms, 4d. Button, with 2-in. mica diaph., 1/6. Mounted on pedestal, 2/-; Hand Mikes in 2-in. case, No. 11 at 5/6; Superior Type, No. 11B, 7/6. Fay Mikes, factory throwouts, 8/-; Lesdix No. 10B Pedestal 10-in. high, 12/6. Lesdix Superior No. 12BB Ring 14-in. Pedestal, 18/6; Lafone-Reisz Hand Mike, 52/6. Genuine Eilsed Reisz Table Model, 55/-; W.E. Table Model Semi-Reisz, 5 in. dia., for lectures, 35/-; First-class Studio Recording Mikes, as new, ex a talkie studio, Edison Bell, Goodson Grams, etc., B.T.H. Moving Coil P.M., £5; Amplion, £5; Browns, D., £12; Voigt Electrostatic, £10; Igranic Transverse, £13/10/-; Western Electric P.A., £14; Siemens H. Ribbon, £50 Moving Coil for £20; famous Marconi-Reisz B.B.C. Model, £25.

ELECTRADIX RADIOS,
218, UPPER THAMES STREET, E.C.4

Radio Wonders of the Post Office

Continued from page 799

I listened to a standard 'phone, which I dialled to the Robot, and I must say I was completely "fooled." Had I not known how it was done I should certainly have thought it was a real voice and not synthetic film. So will unsuspecting subscribers, I imagine. Even if you cannot answer it back it is rather a jolly idea. Humanising the 'phone system, in fact.

Talking of telephone improvements having a touch of radio in them, I must tell you about the loud-speaking telephones. You can now have quite a miniature broadcasting station fitted up instead of a simple combined receiver and transmitter instrument.

As an extension of the receiver portion you normally clap on your ear there is now a Post Office loud-speaker, with a volume control on the base of the hand 'phone to regulate the extent of the loud-speaking. If, that is to say, your remote subscriber gets very excited you can tone down him—or her—to a bearable volume of sound.

Phoning from Your Armchair

All this is really encouraging you to be lazy. For, quite apart from the loud-speaker extension, which has its own little amplifier, there is a microphone extension for the mouth-piece, also with integral amplifier. So that once you have got a number, or someone has got you, it is the easiest thing in the world to sit back in your armchair and talk into the microphone some feet away from you and to hear the replies through the loud-speaker.

It is a wireless telephone as a luxury of to-day. But who would like to say that to-morrow it will still be a luxury? More than likely a standard fitting.

So, my head whirling with the wonders of Post Office research, I crossed from the main building to the radio engineering building a hundred yards or so distant. Here I was more at home, with beam transmitters, amplifiers and the like.

A smiling engineer beckoned. "Come in here a moment," he begged and before I knew what was happening I was inside one of the most amazing rooms that has ever been built. It is an all-steel room, of which the walls, floor, ceiling and even the door are made of plates of steel 1/8 in. thick.

On a small table was a familiar object—a Pye portable, reproducing the London Regional programme. Well, I thought, this steel room cannot be necessary just to house a Pye. And I waited for the explanation. It came rather suddenly. For the engineer closed the door. As he did so the Pye stopped dead, as though it had been switched off.

What was Happening?

I asked the engineer to open that door again. Which he did. And up started the Pye again. Can you guess what was happening?

The room was so completely screened that a wireless set inside it, even tuned to the very nearby Brookmans Park, received absolutely no trace of a signal. As the door was opened the signals literally came through it to the set. Rather extraordinary, all the same.

Next I came upon something much more serious. Nothing less than ultra-short-wave telephony in action. I saw, and heard, super-regenerative receivers of amazing simplicity bringing in speech from a transmitter about 100 yards away. As the engineers pointed out, this same gear will give reliable telephone links up to 20 miles.

I saw the sort of equipment that is now in experimental use for spanning the Bristol Channel. So successful has this proved that in the near future the experimental apparatus will give way to fully commercialised ultra-short-wave transmitters and receivers.

ETHERDYNE

SAVE MONEY WITH THIS EASIBILT

COMPLETE KIT—
DIRECT FROM FACTORY

YOURS FOR

12/6

This saves you up to 33½ 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 KIT SAVES YOU MORE THAN ONE GUINEA

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. With order, 18/9.

Balance in 11 monthly payments of 18/9.

KIT 3

As Kit 1, but with Valves and Peto-Scott Etherdyne Walnut Consolette Cabinet, less Speaker. Cash or C.O.D. Carriage Paid, £11/18/0. With order, £19/9.

Balance in 11 monthly payments of £19/9.

KIT 4

Adaptagram with fitted Gramo Equipment. Cash or C.O.D. Carriage Paid, £18/11/0. With order, £23 11/0.

Balance in 11 monthly payments of 28/-.

If Dynamic D.9 P.M. Speaker required, add 20/- to Cash Price, or 2/9 to each monthly payment.

FINISHED INSTRUMENT

COMPLETE ETHERDYNE CONSOLETTA

Receiver, with 5 B.V.A. Valves and Speaker, factory-built and broadcast tested.

WITH

£2:17:6

Cash or C.O.D. Carriage Paid £14/17/6.

ORDER

Balance in 11 monthly payments of 24/-.

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/-.

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.

With

10/3

order

Balance in 11 monthly payments of 10/3.

NEW LISSEN 7-VALVE SUPER-NET CHASSIS MODEL, complete with Lissen Valves in Sealed Carton. Cash or C.O.D. Carriage Paid, £8/17/6.

With

15/-

order

Balance in 11 monthly payments of 16/6.

TELSEN CLASS "B" 4 CONSOLETTA KIT, including Telsen Class "B" Moving-coil Speaker and Consolette Cabinet, less Valves. Cash or C.O.D. Carriage Paid, £5/17/6.

With

10/9

order

Balance in 11 monthly payments of 10/9.

NEW BLUE SPOT CLASS "B" OUTPUT STAGE. As advertised. Complete with Osram B21 Class "B" Valve. Cash or C.O.D. Carriage Paid, 43/6.

With

4/-

order

Balance in 11 monthly payments of 4/-.

If Blue Spot 20 P.M. Moving-coil Speaker required, add 3/- to deposit and each monthly payment.

Miscellaneous Components, Accessories, etc., etc., supplied CASH, C.O.D., or H.P. on our own Private System of Easy Payments. Any items advertised in this journal sent C.O.D. Orders over 10/- sent all C.O.D. charges paid.

NEW BLUE SPOT 99 P.M. PERMANENT MAGNET MOVING-COIL SPEAKER. Complete with tapped input Transformer. Cash or C.O.D. Carriage Paid, £2/19/6.

Balance in 10 monthly payments of 6/-.

NEW BLUE SPOT PERMANENT MAGNET MOVING-COIL SPEAKER 45P.M., with input Transformer. Cash or C.O.D. Carriage Paid, £2/5/0.

Balance in 11 monthly payments of 4/2.

With

6/-

order

With

4/2

order

CLASS 'B' SPEAKER AND AMPLIFIER

Seven Times the Volume

Without Class "B" amplification your present Battery Set is obsolete. Realising this, we have produced this marvellous self-contained Unit, comprising guaranteed Peto-Scott Class "B" Moving-Coil Speaker, Class "B" Transformer and Output Choke, B.V.A. Class "B" Valve. Gives 7 times the volume . . . with mains quality and power. Low H.T. consumption. SIMPLE TO CONNECT. JUST PLUG IN the amazing 5-WAY Automatic Connector and get better Radio NOW. We have made it easy for you to buy.



Already Mounted on acoustic Baffle Board, as illustrated. Complete with B.V.A. Class "B" Output Valve & Speaker.

5/- ORDER

balance payable in 11 monthly payments of 5/9. Carriage Paid to your door.

Cash or C.O.D. Carriage Paid. 59/6

In Walnut Cabinet: 6/- with order and 11 monthly payments of 6/6. Cash or C.O.D. carr. paid 69/6.

New Times Sales Co.

56, Ludgate Hill, London, E.C.4.

Please send me N.T.S. Easibilt Etherdyne Kit.....for which I enclose £.....d.

Cash/Deposit.....

NAME.....

ADDRESS.....

A.W. 4/11/33

Sets of the Season Tested

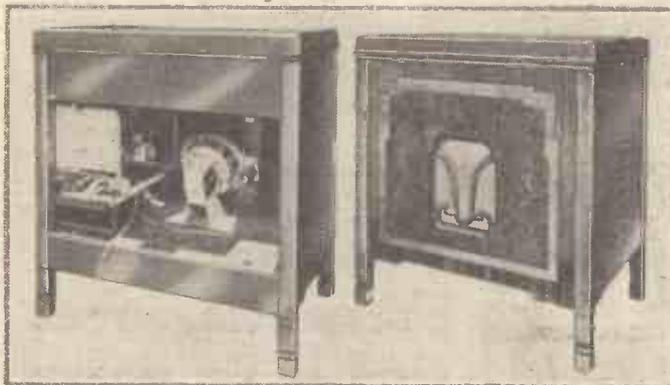
Marconiphone Model 290

LET us introduce to you one of the finest of this season's radio gramophones, the Marconiphone Model 290. Rather expensive and an outfit for the connoisseur; no string of superlatives can do justice to this instrument. With it you can range through queer noises called music from North African stations to operas from Italy and London's sedate programmes—simply by turning a single knob. The tone and volume you can vary to suit your own tastes.

Six Valves and Two Westectors

Briefly the model 290 is a super-het radiogram using six valves and two Westectors in the radio circuit and a valve for mains rectification. Automatic volume control, which adjusts the strength of nearly all stations received to the same level, is one of the big points about this set.

The photographs give you an idea of the set's appearance. One of its greatest attractions is the handsome cabinet. Like all the best Marconiphone cabinets, it is finished in a dark shade of walnut with inlays of contrasted walnut and ebony.



These photographs show the massive cabinet of the Marconiphone model 290 super-het radio gramophone—a set for the connoisseur

Again the appearance is enhanced by the Marconiphone practice of having only one knob, the volume control, on the front. The rest of the controls are neatly arranged on the motor-board. These are simple to operate; anyone can master them in a couple of minutes.

All About the Controls

The layout of these motor-board controls is simple and very convenient. On the side of the moulded escutcheon plate is the tuning knob; it operates the two tuning scales, back for long waves and front for medium, both calibrated in wavelengths and stations. These markings we found very accurate.

The knob in the front is the tone control, and at the back is the combination switch, which adjusts the set for either long- or medium-wave reception, gramophone reproduction, or off. Four jobs in one! Every control is marked, so you can't go wrong.

In any case the dial illumination scheme would prevent mistakes. Only the wavelength scale in use is illuminated when the set is switched for radio reception; only the word

"Gramophone" in the centre is lit when the pick-up is in circuit, and, of course, all is dark when the set is switched off.

At the other end of the motor-board are the gramophone accessories. An auto-brake is fitted which automatically stops the motor after a standard-type record has been played. A manual stop control is provided for use when non-standard discs are used.

There is quite an unusual layout inside the cabinet. The massive set chassis is fixed on the side in a vertical position; the loud-speaker, a big affair, is in the usual place in the centre. The huge set is extremely compact considering its specification; a "tight squeeze" is the best description.

The voltage-adjustment panel is right inside; it is very easily adjusted to suit any mains supply between 200 and 250 volts. On this panel are the usual fuses and also a hum adjuster. We found that this was correctly set before the set left the factory. Mains hum very slight.

Features: the set is full of them. There are the usual sockets for aerial and earth; a mains aerial is provided; a static suppressor control is fitted on the back in case the user is troubled with electrical interference; and a switch is provided for bringing into circuit one or more external loud-speakers.

So much for the set. Now for the results.

First tests were made in South London using a piece of twin flex about 7 ft. long, curled up underneath the set as an aerial. On this piece of wire we easily logged all the worth-while stations at good strength and quality. Long waves brought Luxembourg, Radio Paris, Daventry, and two others at listening strength.

Brief Specification.

Makers: Marconiphone Co., Ltd.

Model: 290.

Type: Seven-valve super-het radio gramophone in large walnut cabinet.

Price: £44 2s.

Valve Combination: Six valves in super-het sequence with seventh valve as rectifier. High-frequency amplifier (Marconi VMS4B), mixer (Marconi VMS4B), oscillator (Marconi MH4), I.F. amplifier (Marconi MSB4), low-frequency amplifier (Marconi MH4), and triode output (Marconi PX4). Rectifier (Marconi U12). A Westector is used as second detector and another for providing automatic volume control.

Power Supply: A.C. mains, 200-250 volts.

Remarks: An outstanding radiogram of the season. Gets as many stations as you want with delightful quality.

Then we tried the outdoor aerial of 35 ft. This showed the real station-getting performance of the model 290. No fewer than eighty-five stations were recorded during the evening. All the small stations—Aberdeen, Juan-les-Pins, Copenhagen, Rabat (in Morocco), and Algiers—simply rolled in, though background noise was a little strong in some cases.

It was a real treat to tune in Graz, then London Regional and Mühlacker at all about the same strength, and clear of each other. All adjacent high-powered foreigners, in fact, were easily separated, including Berlin and its neighbours on the long waves.

Quality both on radio and records was splendid. The PX4 output valve with its output of a little over 2 watts gave enough volume to fill a small hall. Tone you can adjust to suit. Either top or bottom notes can be accentuated. Marconiphone have adopted a neat scheme with this control. One can hear and feel a "click" about half-way during its turn; this is the position recommended by the makers for well-balanced tone.

Altogether a really first-rate instrument fully competent of effectively dealing with the present ether chaos.

News for the Set Buyer

HAVE you ever considered the advantages of having a spare set in case your "big noise" suddenly gives up the ghost?

A neat inexpensive two-valver that might have been designed as a standby is the Columbia Battery Two, model 353, priced at £4 4s. That price includes everything except pieces of wire for the aerial and an earth.

The job is housed in a neat oak cabinet with the set at the top and loud-speaker and batteries at the bottom in the conventional manner. A balanced-armature loud-speaker is fitted with the adjusting screw in the middle of the loud-speaker fret. It is quite cheap to run, the total anode consumption of the two valves, a detector and small power, being only 5 milliamperes.

With the great increase in interest in fading compensating devices comes news of a very

useful portable from the Marconiphone Co., Ltd. Model 269 is a six-valve super-het in portable form, with fully developed A.V.C. It incorporates a metal rectifier for the second detector and makes use of the Q.P.P. output system to provide $\frac{1}{4}$ watts undistorted power. The price is very reasonable, being only £15 15s. Another Marconiphone introduction is a radio gramophone for A.C. or D.C. This is a three-valver for D.C., but a four for A.C. The model is 271 and the price is again very reasonable—23 guineas. The cabinets of both models are in walnut.

Kolster Brandes are now making special receivers for use on 25-cycle mains. In all cases the prices are slightly higher, and models must be ordered specially. K.B. will also make to order special receivers for use on 260-volt mains; the normal range of their A.C. sets being from 200-250 volts.

DON'T START BUILDING ANY SET UNTIL YOU HAVE THE

QUALITY
COMPONENTS
OF EVERY TYPE

BULGIN
CATALOGUE No 153A

Enclose 2d. Postage

A.F. BULGIN & CO LTD
ABBAY ROAD
BARKING ESSEX

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, 58/61 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.

Dubilier 1933-4

Dubilier has just sent me a revised copy of their popular booklet, "Choosing Your Condensers and Resistances." You probably know what to expect in here. In brief it is a profusely illustrated catalogue of all Dubilier's condensers and metallised resistances together with some very useful information on how and why they are made. The condensers for ordinary use are not expensive, the popular "three O's one" can be obtained for 6d. Every serious constructor should make a point of getting the Dubilier Guide. **83**

Lissen's Skyscrapers

I did not realise that Lissen made such a varied assortment of sets until I received their latest set folder. There are four Skyscrapers, including the all-wave set for tuning from 12 to 2,000 metres, and fifteen others. The "others" include super-hets for A.C. and D.C. mains, battery portables and several three's for all kinds of power supply. The Skyscrapers are all kits sets, by the way. **84**

All-metal Loud-speakers

Midgely Harmer, Ltd., has just brought out a range of loud-speakers with aluminium diaphragms and have sent along their brochure on the subject. Midgely Harmer make several bold claims for these reproducers. They say that it is suitable for use in the tropics; it is more sensitive than the average cone loud-speaker and that it gives really fine reproduction of transients. I am very keen to try one of these loud-speakers; the descriptions given in the brochure point to something really startling in reproduction possibilities. **85**

Scientific Coil Design

I have been very interested in an article on coil design in Colvern's book on Ferrocarr components. There are pages of material of technical and general interest. At the end of the book are details of Ferrocarr iron-core coils with circuit diagrams and some useful hints on using them. Particularly interesting are Colvern's tuning units, available for "straight" or super-het sets. There are two dozen pages crammed full with information here. **86**

Cabinets by Camco

Have you seen the new 1933-34 Camco "boxes"; they are fine-looking jobs. Besides the "Daventry," a modern horizontal type, the "Oxford" pedestal job is the model that takes my fancy. It is one of the neatest pedestal cabinets on the market to-day. It is made of selected walnut veneer with a particularly attractive loud-speaker fret, which takes up more than half of the cabinet front. Camco's booklet is worth getting. **87**

Karadio Battery Charger

I have been looking at a folder from the Lancashire Dynamo and Crypto people dealing with a useful and cheap battery charger. Briefly the Karadio charger will charge 2-, 4-, 6- or 12-volt accumulators, irrespective of size. The job operates from A.C. mains and is useful for charging radio accumulators, car batteries, in fact it could be used as a small charging station for charging your friend's batteries. **88**



OHMITE RESISTANCES

(1 watt type)

The most popular and efficient type of fixed resistance for all general purposes. "Better than wire wound." All values, 50 ohms to **1/6** 5 megohms.

HEAVY DUTY TYPE 2/3
(3 watt type)

Advertisement of Graham Farish, Ltd. Bromley, Kent.



The Designer of the

"TELEVISION AMPLIFIER"

naturally chose

SOUND SALES

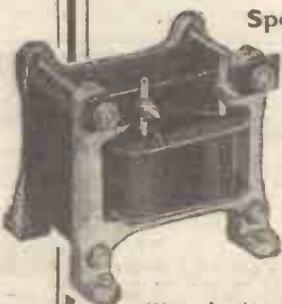
exclusively

20 hy. CHOKE **15/6**

Type C.1.

Special Tapped
OUTPUT
CHOKE

P.50. **15/6**



Sound Sales products also used by leading TELEVISION companies and well-known experimenters.

Write for Lists "A" etc.—Mains Transformers—Chokes—Sound Speakers—Sound Unit (Class B), etc.

SOUND SALES LTD.,

Tramlett Grove Works, Junction Road, N.19.

Phone: Archway 1661.

Every component gives up its secrets to an EMICOL Test Meter.

No component can hold anything back from an EMICOL Test Meter. In a twinkling you can test the efficiency of every part of your set.

Why waste time and money looking for faults when the regular use of an EMICOL Test Meter will enable you to prevent them?

Write for free descriptive literature giving full details of the range of EMICOL-Testing Meters.

"EMICOL" Double Reading Voltmeter Range 0-6 v., 0-150 v. Price 6/-.
"EMICOL" 3-in-1 TEST METER (Wates Patent) Range: 0-6 v., 0-150 v., 0-30 m.a. Price 9/6.
"EMICOL" 4-in-1 TEST METER (Wates Patent) Range: 0-6 v., 0-15 v., 0-150 v., 0-30 m.a. Price 9/6.
"EMICOL" Universal Meter. Range: 0-6 v., 0-150 v., 0-30 m.a., 0-2,000 ohms. Price 12/6.



EMICOL

BRITISH MADE

Manufactured solely by—

Electrical Measuring Instruments Co., Ltd.,
55, Cardington Street LONDON N.1.

PREPAID ADVERTISEMENTS

Advertisements under this head are charged THREEPENCE PER WORD, minimum charge THREE SHILLINGS. DEPOSIT SYSTEM.

As the publishers cannot accept responsibility for the bona fides of advertisers in this publication, they have introduced a system of deposit which it is recommended should be adopted by readers when dealing with persons with whom they are unacquainted.

The amount of the Deposit and Fee must be remitted by Postal Order or Registered Letter (Cheques cannot be accepted), addressed to "Amateur Wireless," Advertisement Department, 58/61 Fetter Lane, London, E.C.4.

CHARGE YOUR H.T. FROM YOUR L.T. AT HOME.—Combination trickle. Charges efficiently 1 to 12 H.T. 10-volt accumulators, 8/6. Postage 6d. Diagram only, 1/6.—R. Fox, 188 Camberwell Grove, S.E.5.

PATENTS—Trade Marks, "Advice Handbook" free.—B. T. King, Regd. Patent Agent, 140a Queen Victoria Street, London.

REPAIRS to Loud-speakers, Transformers, and Head-phones, 4/- each; Blue Spots, 5/-. Moving Coils a speciality. Cones fitted, Eliminators and Sets quoted for. Satisfaction guaranteed. Prompt service. Inquiries invited. Terms to trade.—Loud-speaker Repair Service, 5 Balham Grove, London, S.W.12. Batterssea 1321.

CHARGING WITHOUT MAINS 1—Thousands are charging their own accumulators, why don't you? "Tonio" trickle-charger kits keep 2-volt accumulators fully charged. Ideal for remote districts. From 7/-. postage 6d. Full particulars, stamp.—Williams, Netherend, Cradley, Nr. Birmingham.

GRAMOPHONES, Radiograms, Motors, Arms, Pick-ups, Loud-speaker, Horns, Springs, Needles, Repairs, cheapest.—Catalogue, Regentem, 120 Old Street, London, E.C.1.

USED AND NEW RADIO COMPONENTS AND SETS ON EASY TERMS.—Dual-wave Coil, 5/6. L.F. Transformers, 4/9.—Arlin, 44 Runelagh Road, Westminster, S.W.1.

BRUCE PRODUCTS.—Unbroken public service. Mains transformers and chokes to specification within 48 hours. Patent transformers and patent aerial system to eliminate interaction and man-made static. Send now for lists.—W. Andrew Bryce & Co., Woodfield Works, Bury, Lancs. Phone 1251.

A.W. TELEVISION AMPLIFIER.—Complete specified kit, supplied from stock. Lowest price. S.T.500 kit, 70/-; Alternative kit, 50/-. Lists free (trade supplied).—Melford Radio, 5 Queens Place, Hove.

WANTED.—Bankrupt and Clearance Stocks of Proprietary Sets, Kits, Components, Speakers, for cash.—"Corite," 44 Haweside Street, Southport.

TELEVISION APPARATUS.—We specialise in all components. Illustrated list free.—Sanders, 4 Grays Inn Road, London, W.C.1.

INSTRUMENT AND RESISTANCE WIRES. Transformer and Choke Stampings. Insulation. Lists free.—Lumen Electric Co., Scarisbrick Avenue, Litherland, Liverpool, 21.

LET US QUOTE FOR "A.W." SPECIFIED COMPONENTS, Speakers, Eliminators, Valves. Keenest prices; quality counts. "Skyscraper" kits.—Childs', 20 Moray Road, London, N.4.

INFORMATION BUREAU

Will every querist please observe the following revised rules.

Please write concisely, giving essential particulars. A fee of one shilling postal order (not stamps), a stamped, addressed envelope and the coupon on the last page must accompany all queries.

Not more than two questions should be sent at any time.

The designing of apparatus or receivers cannot be undertaken.

Slight modifications of a straightforward nature only can be made to blueprints. For more serious alterations the minimum charge is 2/6.

Blueprints supplied by us will be charged for in addition, but of course, readers may send their own blueprints for alteration.

Modifications to proprietary receivers and designs published by contemporary journals cannot be undertaken. Readers sets and components cannot be tested by us. Queries cannot be answered by telephone or personally. Readers ordering blueprints and requiring technical information in addition should address a separate letter to the Query Department and should see that their remittance covers the price of the Blueprint and the amount of the Query fee.

We do not answer queries in cases where the fee is omitted.

Queries should be addressed to the Query Department, "Amateur Wireless," 58/61, Fetter Lane, London, E.C.4.

180 ACCUMULATOR CHARGERS, 1 amp., 2-6 volt., in ventilated metal case with mains flex (Westinghouse rectifiers), 7 days' trial, 10/6, postage 6d. 1 amp., 21/-.—W. Arden Agency, Wollington, Wellingborough.

ETHERDYNE SUPER KITS, £6/5/-: S.T.500, £3/16/-; Class-B 4-valve Kits, £3/2/6. S.T.500 Coils, 5/6 pair. Class-B Transformers and Chokes, 5/6. All latest components in stock. Old sets taken in part exchange. Keenest prices quoted for anything wireless.—Servwell Wireless Supplies, 64 Prestbury Road, London, E.7.

H.D. RADIO ELECTRICAL SERVICE.—New Boxed Set Manufacturers' Surplus Rola Speakers, all fitted hum buckers, state for power or pentode: F8, 2,000 ohms, 2,500 ohms, 4,700 ohms, 6,500 ohms, list 35/-, at 18/- each. F9, voltages as above, list 47/6, at 25/-.

"UNIVERSAL" RADIO BARGAINS.—Lotus .00085 reaction condensers, 1/-. Lotus transformers, 2/11. Lotus disc drives, 2/6. Blue Spot 100U speakers, 14/11. Ready Radio Meteor S.G. 3 kits, 27/6. D.X. screened coils, 2/11. Valves from 3/3. Lewcos 5-way leads, 1/-; 7-way, 1/3. 6-pin coil formers, with cans, 1/-. Amplion speaker units, 1/11. Dario super transformers, 3/6. S.T.500 coils, 5/11. Class-B drivers and chokes, 5/11 each. S.T.500 kits, in sealed cartons, complete with blueprint, 67/6. Air-spaced condensers, 1/11. Diffs., 1/8. H.M.V. screened chokes, 10d. Eliminators, D.C., 15/6; A.C., 32/6. Leaks, condensers, 5d. each. Pick-ups, 5/11. Double-reading meters, 2/11. Valve-holders, 4d. P.M. M.C. speakers, 15/11. £10,000 worth of other radio bargains. Stamp for our huge bargain list and prints of our Super 3 kits.—"Universal", 20 Victoria Road, Peckham, S.E.15. New Cross 4933. Pre, Marconiphone, Lissen, Cossor kits and sets supplied on easy terms. Local agents for Milnes units and spares.

QUALIFIED RADIO ENGINEERS are always in demand, and our Home Study Course enables you to qualify for a good post. Many students already placed this season. Prospectus free.—Northern Counties Wireless School, Preston.

J. A. PIERCE CALLING all Brighton enthusiasts. A.W. television amplifier. Complete kit now on view.—6 Victoria Road.

ETHERDYNE KIT.—Completely assembled, aerial tested. Complete with valves, permanent-magnet moving-coil speaker, and handsome walnut console cabinet, £12/12/-. Carriage paid.—Mains Radio Development Co., 4-6 Muswell Hill Road, London, N.6.

PARTRIDGE TRANSFORMERS.—Model A.W.530, selected by "Amateur Wireless" for the television amplifier. Price, 42/-, carriage free.

PARTRIDGE TRANSFORMERS.—Supplied to any specification for television or radio. Write for quotation.

PARTRIDGE POPULAR MODELS.—250-0-250 v., 60 m.a., 4 v. 1a., 4 v. 2-4 a., 12/-; 350-0-350 v., 120 m.a., 4 v. 2-2 1/2 a., 4 v. 3-5 a., 4 v. 1 a., 17/3; 500-0-500 v., 100 m.a., 4 v. 2-2 1/2 a., 4 v. 3-5 a., 4 v. 2 a., 21/-.

TRADE NOTICE.—Service, P.A., and relay requirements a speciality. Competitive prices, quick delivery. Trade list available.—N. Partridge, B.Sc. (Eng.), A.M.I.E.E., A.I.Rad.E., Kings Buildings, Smiths Square, London, S.W.1. Telephone: Vic. 5035.

BANKRUPT BARGAINS.—List free with 3-valve diagram. S.T.500 kit, 52/6. S.T.400, 45/-. S.T.300, 35/-; 3-valve kit, 17/6. S.T. kits are practically specified or alternative specified parts. A.C. eliminators, 28/6. D.C. from 12/6. Ready Radio 303 kits, with cabinet and M.C., 35/-. Celestion Soundex P.M., in cabinets, 20/-. Screened dual coils, 2/6. Transformers, Stal, 2/9. Stal Class-B drivers, 6/-. Chokes, 6/-. Triotron valves, 3/6. Power, 4/6. Class B, 9/-; M.C. speakers from 12/6. S.T. coils, 5/6 pair. Every S.T. part in stock. Burgoyne 3-valve transportables, complete, Cossor batteries, 50/-. Any parts or kits supplied. I will take your old set or parts for any new parts, kit, or set up to 50 per cent. of the value of the new order. Let me know what you have for disposal. Positively the keenest prices.—Butlin, 143b Preston Road, Brighton.

SUPER "DIRECTOTONE" KITS OF QUALITY.—Comprised of guaranteed components. Straight 2-valve, 14/6. Straight 3-valve, 17/6. S.G.3, employing 2 H.F. stages, 24/6. Also the new S.T.500, 66/6. All carriage paid, cash or C.O.D. These amazing bargains can only be obtained from The Direct Trading Co., 65-66 York Terrace, Baker Street, N.W.1.

RADIO GRAM CABINETS advertisement featuring illustrations of cabinets and text: '65/- Polished 35/- Cabinet for No. Middle Profits! Famous maker offers finest Radio Furniture. As supplied to B.B.C. A quality and value impossible to better. Beautifully hand polished! GUARANTEED Piano-Tone Acoustically. Trial! Will Delight You! (Cash or 10/- Monthly.) LIST FREE! From Makers—PICKETT'S Piano Tone Cabinet (AM.) Works, Albion Rd., Bexleyheath, Nr. London'

FULL - SIZE BLUEPRINTS

When ordering, please send Postal Order, NOT STAMPS. Quote the Blueprint number shown below; Lot the number of this issue.

CRYSTAL SET (6d.)

1531 Crystal Set AW308

ONE-VALVE SETS (1s. each)

B.B.C. One-valver AW387
Portable Short-wave One AW354

TWO-VALVE SETS (1s. each)

Clarion-voice 2 (SG Det, Pen) AW371
Home Station A.C. 2 (D, Pen) AW374
B.B.C. National Two (D, Trans) AW377
Melody Ranger Two (D, Trans) AW388
Full-volume 2 (SG Det, Pen) AW392
"A.W." Iron-core Two (D, Trans) AW395
"A.W." Iron-core Two with Q.P.P. Consolectric Two (D, Pen) AW403
Screen-grid Two (SG Det, Trans) WM289
A Two for 7 Metres (D, Trans) WM295
New-style Radiogram (D, Trans) WM299
A.C. Quality Gem (D, Trans) WM312

THREE-VALVE SETS (1s. each)

James Push-push Three (SG, D, Q.P.P.) (1/6) AW378
Everybody's Home Radiogram (SG, D, Trans) AW381
Home-lover's New All-electric 3 for A.C. mains (SG, D, Trans) AW383
Our Up-to-the-minute Three (SG, Westector, LF, Trans) AW384
Class-B Three (D, Trans, Class B) AW386
S.S.3 (A.C.) (SG, SCDet, Pen) AW390
"Up-to-the-minute Three" with Class B, 1/6. AW384B
New Britain's Favourite Three (D, LF, Class B) AW394
A.C. Triodyne (SG, D, Pen) AW399
1933 Economy S.G. Three (SG, D, Trans) WM306
Harris Ethergram (SG, D, Pen) WM308
A.C. Calibrator (SG, D, Pen) WM309
Narrow-pass Three (SG, SG Det, Pen) WM314
£6 6s. Radiogram (D, RC, Trans) WM318
Simple-tune Three (SG, SG Det, Pen) WM327
Tyers Iron-core Three (SG, SG Det, Pen) WM330
I.C.B. Three (D, LF, Class B) WM333
Economy Pentode Three (SG, D, Pen) WM337
Three-range Three (SG, D, Pen) WM336
Simplicity A.C. Radiogram (SG, D, Pen) WM338

FOUR-VALVE SETS (1s. 6d. each)

Melody Ranger (SG, D, RC, Trans) with copy of "A.W." 4d. postage AW375
"A.C. Melody Ranger" (SG, D, RC, Trans) AW380
Signpost Four (SG, D, LF, Class B) AW398
"A.W." Ideal Four (2SG, D, Pen) AW402
Table Quad (SG, D, RC, Trans) WM303
"Words and Music" Radiogram (2SG, D, Trans) WM307
Home Short-waver (SG, D, RC, Trans) WM311
"Words and Music" Radiogram de Luxe (SG, D, RC, Q.P.P.) WM307a
Empire Short-waver (SG, D, RC, Trans) WM313
Calibrator de Luxe (SG, D, RC, Trans) WM316
D.C. Calibrator (SG, D, Push-pull Pen) WM328
All-metal A.C. Four (2 SG, D, Pen) WM329
All-progress Four (Battery Super-het) WM335

FIVE-VALVE SETS (1s. 6d. each)

James Short-wave Super (Super-het) AW328
Simple Super (Super-het) AW340
Super-quality Five (2 HF, D, RC, Trans) WM320
Ideal Home Super (Super-het) WM280
Easytune 60 (Super-het) WM284

SIX-VALVE SETS (1s. 6d. each)

New Century Super (Super-het) with copy of "A.W." 4d., post free AW363
New A.C. Century Super (A.C. Super-het) AW365
1932 Super 60 (Super-het) WM269
1932 A.C. Super 60 (A.C. Super-het) WM272
James Class-B Super (Super-het) WM326
Connoisseur's Super (A.C. Super-het) WM334

SEVEN-VALVE SETS (1s. 6d. each)

Super Senior (Super-het) WM256
Seventy-seven Super (A.C. Super-het) WM305
Q.P.P. Super 60 (Super-het) WM319

PORTABLES (1s. 6d. each)

General-purpose Portable (SG, D, RC, Trans) AW351
Midget Class-B Portable (SG, D, LF, Class B) AW389
Holiday Portable (SG, D, LF, Class B) AW393

AMPLIFIERS (1s. each)

A.W.'s Push-push Amplifier AW376
Universal Push-pull Amplifier AW300
"A.W." Record Player (LF, Push-pull) AW319
Battery-operated Amplifier AW362
Class-B Gramophone Amplifier AW391
Five Q.P.P. Output Circuits WM315

MISCELLANEOUS (1s. each)

"A.W." Trickle Charger AW352
Add-on Band-pass Unit AW359
Short-wave Adaptor for New Century Super AW367
Plug-in Short-wave Adaptor AW382
Three Class-B Units AW400
Voltage Regulator WM287
"A.W." Television Receiver, (1s.) AW401

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

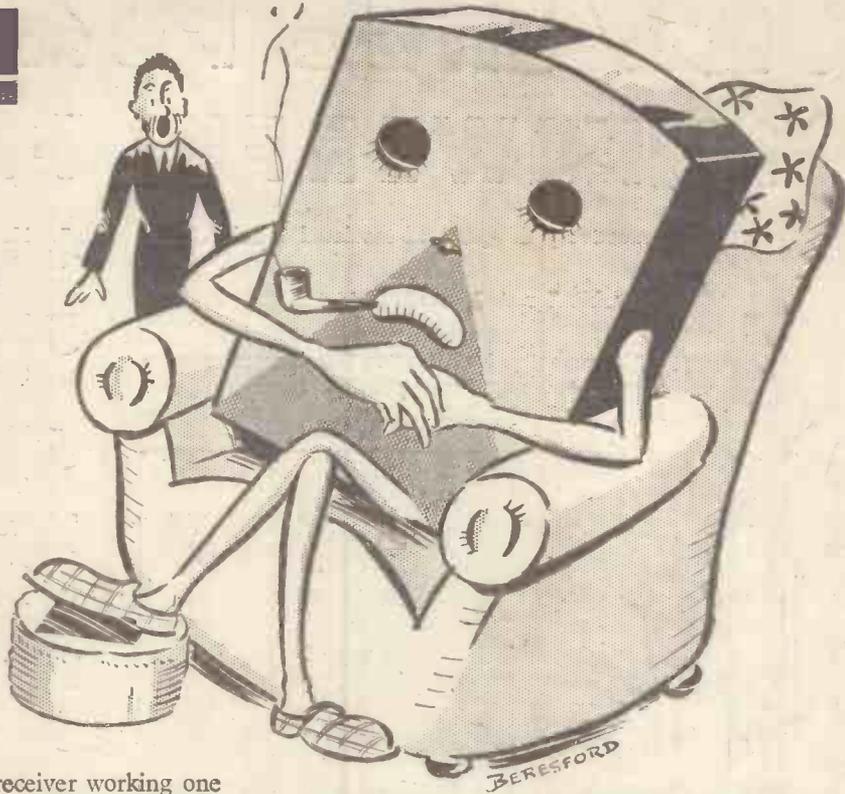
Amateur Wireless FEE 1/-

INFORMATION BUREAU COUPON Available until Saturday, NOVEMBER 11, 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, Nov. 4, 1933

DON'T ENCOURAGE LAZINESS!

Make your Set
give you
MUSIC
throughout
THE HOUSE



IT'S sheer waste to keep a modern receiver working one speaker only, when it can operate two or three extra ones without any difficulty at all.

Instal Blue Spot Speakers in your Dining Room, Kitchen, Nursery, Bedroom, etc., and have music "on tap" whenever and wherever you want it. There are Blue Spot Speakers for Extension use—easy to instal and a type for every class of set. Be sure you get Blue Spot Speakers. When more than one speaker is being used from a single receiver you MUST get the best to be sure of perfect results. There is nothing better than Blue Spot. It will emerge triumphant from any test you make—appearance, construction or performance.

MOVING COIL SPEAKERS 32/6 - 87/6
(also obtainable without transformers)
MOVING IRON SPEAKERS 12/6 - 42/-
PICK-UP MODEL 33 with wire wound
volume control and rotating head 35/-

99 PM 59/6



TO BATTERY SET CONSTRUCTORS

BLUE SPOT
CLASS B
OUTPUT
STAGE

The addition of this unit to your present set gives you the benefit of Class B output. You can use a modern or recent type Blue Spot Moving Coil Speaker or a Blue Spot 66R Class B Moving Iron Unit with your old set. Special adaptor for the thousands of owners using our famous 66R speakers. Unit Stage without valve 29/6, with valve 43/6. 66R Output Choke and base plate 7/6.

Cabinet Model
32 P.M Walnut
87/6



THE BRITISH BLUE SPOT COMPANY LTD.
Blue Spot House, 94-95 Rosoman St., Rosebery Avenue,
London, E.C.1.

Phone: Clerkenwell 3570. Grams: "Bluespot, Isling, London."
Distributors for Northern England, Scotland and Wales: H. C. RAWSON (Sheffield and London), Ltd., 100 London Road, Sheffield; 22 St. Mary's Parsonage, Manchester; 177 Westgate Road, Newcastle-on-Tyne; 37, 38, 39 Clyde Place, Glasgow.



CUT OUT
COUPON FOR
A.W.
S.S.A.
Catalogue No.

Cut this out,
write your name and
address in the margin and
post in open envelope (3d. stamp) to
obtain full particulars of 99 PM, Class
B Output Stage and other Blue Spot lines.

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

New EKCO POWER UNITS

10 POWERFUL FEATURES

- 1 Attractively designed all-insulated Bakelite Case,
- 2 Available for A.C. or D.C. Mains,
- 3 High capacity Electrolytic Condensers ensure absence of hum and provide reserve power for Class B operation.
- 4 New design Power Transformer completely screened by a thick steel case eliminates all outside interference.
- 5 H.T. voltage to intermediate tapings (S.C. and Detector) in three steps enables variable voltage to screened grid detector etc., to be adjusted to correct value.
- 6 Whole output of each Unit can be reduced to approximately three-quarters of the rated value for receivers built for low voltage H.T. batteries.
- 7 Westinghouse Metal Rectification.
- 8 Charging current on new combined units is now .5 amp to fulfil filament current requirements of Class B valves.
- 9 All metal parts are cadmium plated.



10 PRICES FROM **37'6**
or by Easy Payments

Behind these new EKCO Units lies a wealth of experience unrivalled in British Radio. The leading constructors and designers for over eight years have used and specified EKCO Units. They are more enthusiastic than ever about this new range. Follow their lead and insist upon EKCO.

EKCO RADIO

To: E. K. Cole Ltd., Dept. K12, EKCO Works, Southend-on-Sea.

Please send me details of the new Ekco Power Units.

NAME.....

ADDRESS.....