

Amateur Wireless,
December 13, 1930

TWO FINE "TWOS"—

—AND HOW TO BUILD THEM

Amateur Wireless

Every
Thursday 3^d

and
Radiovision

Vol. XVII. No. 444

Saturday, December 13, 1930



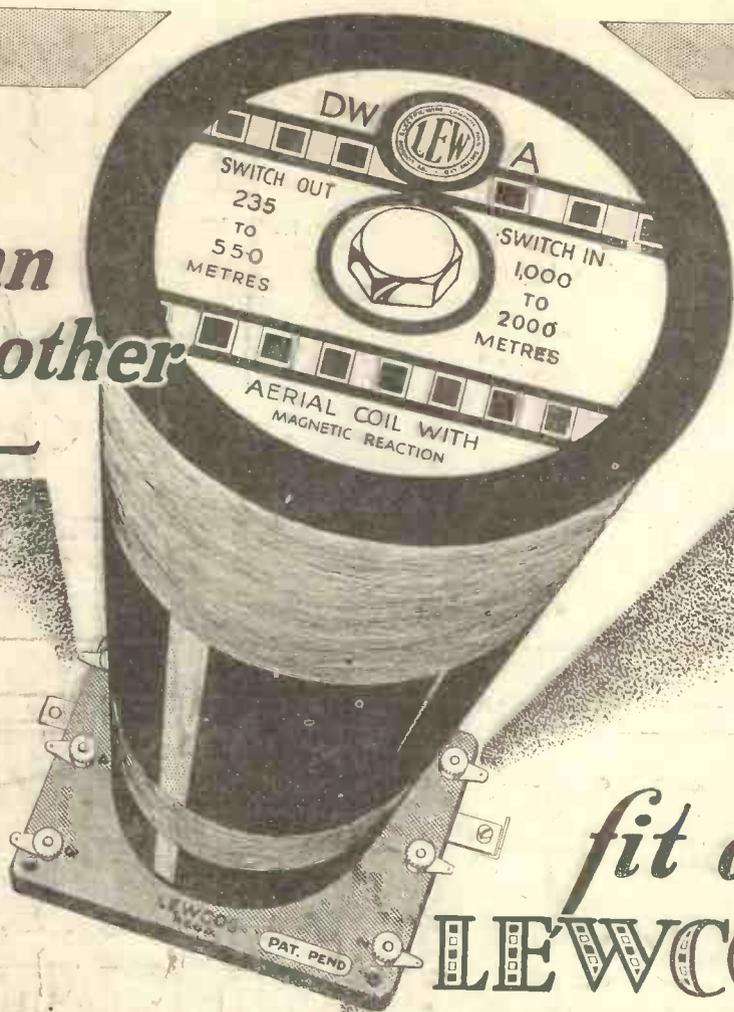
The LOFTIN-
WHITE
2

A NOVEL
MAINS SET

The illustration shows a detailed view of a radio receiver with various tubes, coils, and a speaker. To the right, a hand is shown plugging a two-prong electrical cord into a standard wall outlet. The entire scene is framed by a decorative border with a repeating pattern of small figures.

Registered at the G.P.O. as a Newspaper

*Better than
having another
Valve —*



Because new conditions demanded it, "Lewcos" made this new Dual-Wave Coil to supply the need for a highly efficient, though selective, coil, covering both the medium, 235-550 m., and long, 1,000-2,000 m., wavebands. The waveband required is selected by a single operation of a push-pull rod arranged to protrude through the panel of the receiver. The remarkable range of sterling qualities of this new Lewcos component, which is the product of the factory where the keynote is "Perfection In Every Detail," cannot be given in this small space, but we invite you to write for a fully descriptive leaflet, Ref. R.65.

fit a
LEWCOS
DUAL WAVE
COIL

PRICE 15/- EACH.

LARGE STOCKS OF
LEWCOS RADIO
PRODUCTS CARRIED
AT ALL BRANCHES.

WRITE FOR LEWCOS
FREE SHEET OF BLUE
PRINTS OF FOUR
SUGGESTED CIRCUITS
UTILISING LEWCOS
COMPONENTS, REF. R.70.

THE LEWCOS DUAL
WAVE COIL IS SPECIFIED
FOR THE "LOFTIN-
WHITE" TWO RECEIVER
DESCRIBED IN THIS
ISSUE.



LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION
THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED, CHURCH ROAD, LEYTON, LONDON, E.10

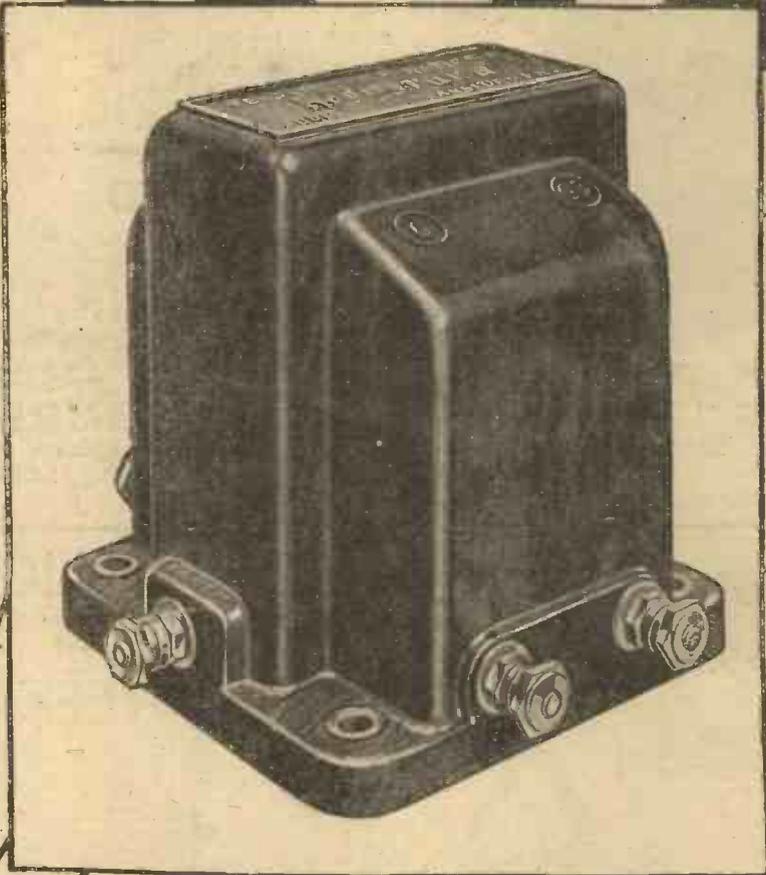
To Ensure Speedy Delivery, Mention "A.W." to Advertisers

Built to LAST

"ACE," made in Ratios 3-1 and 5-1, Price 8/6

"RADIOGRAND," made in Ratios 3-1 and 5-1 - Price 12/6

"RADIOGRAND" Super Ratio, 7-1 Price 17/6



FOR LASTING EFFICIENCY

TELSEN

TRANSFORMERS

The extraordinary popularity which Telsens Transformers enjoy has been gained by their wonderful reproduction, which records deep bass or highest treble with equal purity of tone, and by their maximum efficiency over a very long life. This unmatched performance is the result of SOUND AND PROVED DESIGN, a fact which is endorsed by technical designers and radio public alike.

If you want transformers which give maximum amplification, faithful reproduction and are BUILT TO LAST—fit TELSEN, RADIO'S CHOICE FOR BETTER RADIO RECEPTION!

Advt. of The Telsens Electric Co., Ltd., Birmingham.

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

Convert your set for Mains operation



IGRANIC "UNIVERSAL" MAINS TRANSFORMER

by using an IGRANIC "UNIVERSAL" MAINS TRANSFORMER

This new Igranic Mains Transformer provides for the supply of the following:—

- High tension current.
- Filament heating current for valve rectifier.
- Heater current for indirectly heated cathode valves.
- Filament heating current for output power valves of either 4 or 6 volt type.

Supplied in two types:

- | | |
|--|---|
| <p>TYPE A</p> <ol style="list-style-type: none"> 1. H.T. for full-wave rectifying valve or Igranic-Elkon Metal Rectifier, 180-0-180 volts, 25 M/A. 2. Filament of rectifying valve, 4 volts, 1 amp. 3. Filaments of valves, 4 volts, 3 amp. 4. Filament of output power valve, 4 or 6 volts, 1 amp. | <p>TYPE B</p> <ol style="list-style-type: none"> 1. H.T. for full-wave rectifying valve or Igranic-Elkon Metal Rectifier 225-0-225 volts, 40 M/A. 2. Filament of rectifying valve, 4 volts, 1 amp. 3. Filaments of valves, 4 volts, 5 amp. 4. Filament of output power valve, 4 or 6 volts, 1 amp. |
|--|---|

Price 37/6

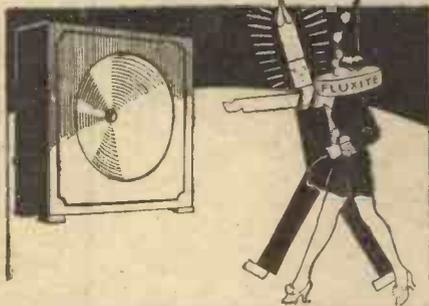
Price 39/6



IGRANIC ELECTRIC CO. LTD.
149 Queen Victoria Street
LONDON

May we send you a copy of our booklet, "The Link Between," dealing with mains components? Write to Dept. D.153.

Branches:
Birmingham, Bristol,
Glasgow, Leeds,
Newcastle, Manchester.



"We've Fluxite and Solder—The reliable pair, Famous for Soldering, Known everywhere! If there's trouble with Wireless, Loud-Speaker—or Set, just call US to help you—You'll be glad that we met."

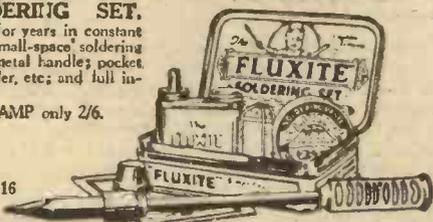
See that Fluxite and Solder are always by you—in the house, garage, workshop—anywhere where simple, speedy soldering is needed. They cost so little but will make scores of everyday articles last years longer! For Pots, Pans, Silver and Brassware; RADIO; odd jobs in the garage—there's always something useful for Fluxite and Solder to do.

ANOTHER USE FOR FLUXITE. All Hardware and Ironmongery Stores sell Fluxite in tins, 3d., 1/4 and 2/8.

FLUXITE SOLDERING SET. Simple to use and lasts for years in constant use. Contains special 'small-space' soldering iron with non-heating metal handle; pocket blow-lamp, Fluxite, Solder, etc; and full instructions.

COMPLETE 7/6, or LAMP only 2/6.

FLUXITE LTD.,
(Dept. 328)
ROTHERHITHE, S.E.16



ALL MECHANICS WILL HAVE
FLUXITE
IT SIMPLIFIES ALL SOLDERING

ANNOUNCED LAST WEEK

TO an already famous range of reliable Components come two more to make further triumphs for Sovereign. The Sovereign Fixed Condenser and the Sovereign Grid Leak have all the high quality features of every Sovereign component, yet by specialised manufacturing processes they are remarkably inexpensive, costing even less than others. Any circuit is improved by them.

OTHER NOTABLE SOVEREIGN PRODUCTS:—
Volume Controls, Wire-wound Resistances, Potentiometers, Rheostats, Wave Traps, Dual-range and Screen-grid Coils, H.F. Chokes, Compression-type Condensers, etc. — Components upon which experts rely.

SOVEREIGN FIXED CONDENSERS



THESE patented components are GUARANTEED within 5% of their stated values. In Bakelite case with nickelled fittings (clips where necessary for all Grid Leaks), they are made in the following values:

.0001	10d.	.001	1/3
.0002 with clips		.002	
.0003	each	.004	each

SOVEREIGN GRID LEAKS
THESE components, too, are of Sovereign quality and value. To fit on to Sovereign Fixed Condensers, they are far better and more reliable in service

All Resistances 10d. each, standard fittings.

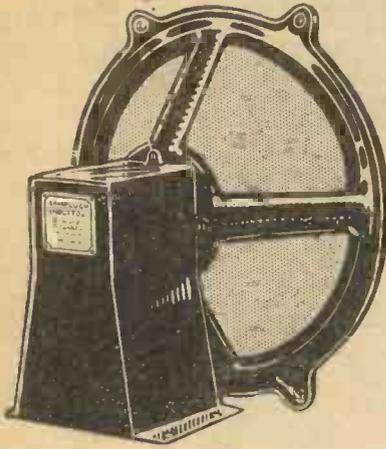
Tell us if your dealer does not stock these or any other Sovereign lines you may want. We will gladly give you the name and address of the nearest stockist.

SOVEREIGN PRODUCTS, LTD.
52/54 Rosebery Avenue,
London, E.C.1



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

THIS IS THE SPEAKER THAT HAS SUPERSEDED THE MOVING COIL



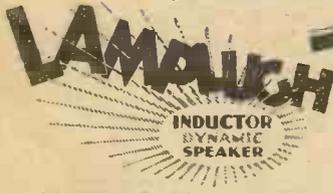
The Speaker which will abolish all balanced armature speakers . . . which brings home the truth . . . which gives reproduction that is "Realism" . . . which meets the demand of the discriminating "Radio" user who is determined to get the best . . . It is extremely sensitive, and will give adequate volume even when used on a 2 Valve Set if fitted with a "Power" or "Pentode" Valve.

It is all British and is guaranteed for 12 months.

Chassis complete £1:10:0. Standard Cabinet £5:10:0. De Luxe Cabinet £8:10:0. Futurist Cabinet £7:0:0. Ask your dealer for a demonstration.

Manufactured under FARRAND AND LECTOPHONE STAND: ARD HOPKINS PATENTS and Patent Applications.

GUARANTEED 12 MONTHS



To: Messrs. S. A. Lamplugh Ltd., Kings Road, Tyseley, Birmingham.
Please send particulars of your Inductor Dynamic Speaker.

Name _____
Address _____

Scottish Distributor: Mr. Michael Black, 181 West Gairloch St., Glasgow.

TANNOY PRODUCTS

"ALL-ELECTRIC" RADIO-GRAMS



Not massed produced, but individually built—

—A matched transformer-coupled moving-coil speaker is incorporated in this set—slow speed induction motor, high stage gain screen-grid H.F., power detector, one R.C. stage and with 10-watt power output stage—illuminated dials.

PRICES from **45 GNS.**

MAINS UNITS

A.C. and D.C. models from stock suitable for all voltages. No hum. Everlasting—trouble free.

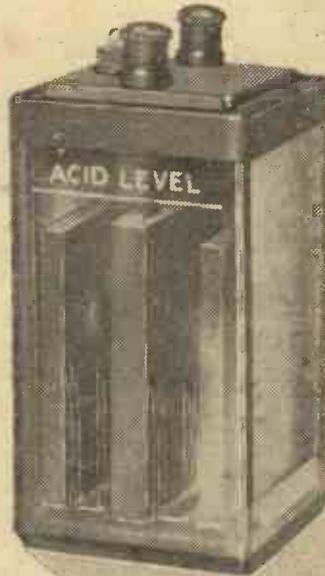
H.T. 120 v. at 15 m/a. **£2 17 6**

H.T. and L.T. combined (with Westinghouse Rectifier) **£5 10 0**

DALTON STREET, WEST NORWOOD, S.E. 27

★ ALL BRITISH ALL RELIABLE

For unfailing reliability and long service, there's no Accumulator like the All-British EDISWAN. It is heavily built throughout, and embodies the special EDISWAN paste-retaining grids. In every respect it is worthy of the EDISWAN reputation for dependability and long life.



B.W.G.2, 24 Ampere hours	-	8/9
B.W.G.3, 36 Ampere hours	-	11/9
B.W.G.4, 48 Ampere hours	-	13/9
Major, 70 Ampere hours	-	14/6
Minor, 45 Ampere hours	-	0/4
Little, 20 Ampere hours	-	4/3
Midget, 12 Ampere hours	-	2/9

From all good radio dealers and EDISWAN SERVICE STATIONS.

EDISWAN ACCUMULATORS



THE EDISON SWAN ELECTRIC CO. LTD.,

155 Charing Cross Road, London, W.C.2

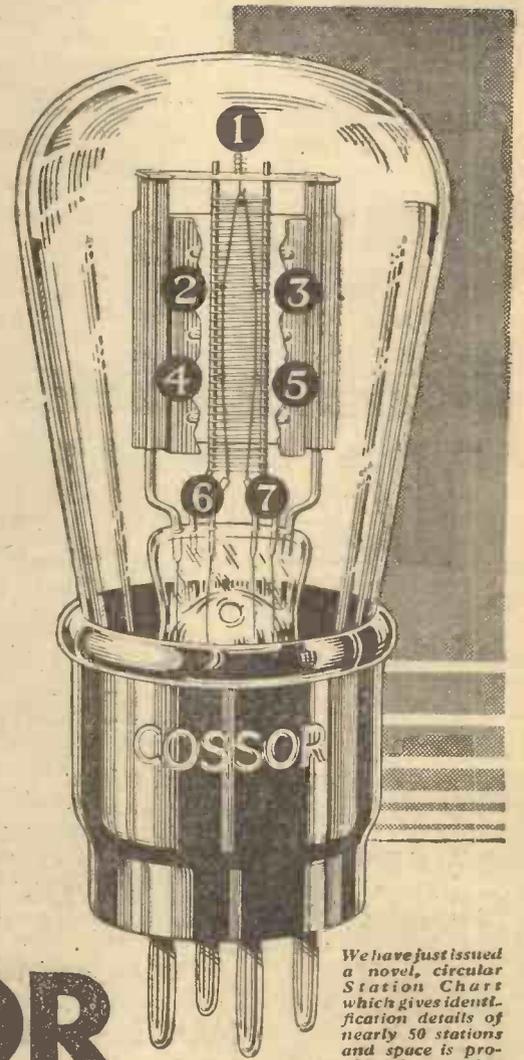
Branches in all the Principal Towns.

B.93

Microphonic noises
definitely eliminated by

Seven point suspension

THE cause of microphonic noises in a Receiving Set is generally to be found in a faulty Detector Valve. Usually it is due to filament vibration. The new Cossor Detector Valve (210 Det.) has been specially designed to overcome this fault. Filament vibration is rendered impossible by a new method of seven point suspension. The diagram shows the four insulated hooks which secure the filament in position and damp out any tendency to vibration. The use of this "steep slope" Cossor Detector Valve not only eliminates microphonic noises, but ensures great volume with exceptional purity of tone.



The New Cossor 210
DET., 2 volts, .1 amp.
Impedance 13,000.
Amplification Factor 15.
Mutual Conductance
1.15 m.a./v. Normal
working Anode Volt-
age 90-150. **8/6**
Price

THE NEW
COSSOR
DETECTOR VALVE

We have just issued a novel, circular Station Chart which gives identification details of nearly 50 stations and space is provided for entering your own dial readings. Price 2d, each they are obtainable from any Wireless Shop. In case of difficulty write us, enclose 2d. stamp and head your letter "Station Chart A.W."

DEFINITELY FREE FROM MICROPHONIC NOISES

A. C. Cossor Ltd., Highbury Grove, London, N.5.

8043 ♡

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



Amateur Wireless

and
Radiovision



EDITOR:
BERNARD E. JONES.

TECHNICAL EDITOR:
J. H. REYNER, B.Sc., A.M.I.E.E.

**THE LEADING RADIO WEEKLY FOR THE
CONSTRUCTOR, LISTENER & EXPERIMENTER.**

RESEARCH CONSULTANT:
W. JAMES.

ASSISTANT EDITOR:
H. CORBISHLEY.

NEWS · & · GOSSIP · OF THE · WEEK

BREAKING RECORDS

WELL, what did you think of last week's Special Christmas Number of "A.W." with its attractive coloured cover and its 84 pages packed with features of real interest to every radio man? Readers who omitted to order their copies and were disappointed when they found the local newsagent had sold out, missed a treat. We hope they will accept our apologies, but then we have so often advised "order your copy now." Some of the chief features in this double number—the popular "Challenge Two," for instance—are continued in this issue.

MUHLACKER STILL INTERFERES

COMPLAINTS about the new high-power German station at Muhlacker, near Stuttgart, continue. The B.B.C., in a recent statement, points out that since November 21 Muhlacker has been on high

power, transmitting 9 kilocycles above the frequency allotted to the London Regional, by international agreement. Early last week the possibility of a re-arrangement of wavelengths was discussed, but so far no change can be recorded. Meanwhile, the German authorities have promised to take every precaution against over-modulation, which would, of course, increase the present trouble.

GENEVA STATEMENTS

WE understand that Mr. Arthur Burrows, of the International Broadcasting Union at Geneva, has stated that the present working of the 75-kilowatt Muhlacker station in a channel adjacent to the high-power London Regional is a test of whether the waveband made available by the Washington Conference, and the 9-kilocycles separation provided by the Prague Conference, are any longer practicable. We think the two provisions referred

PRINCIPAL CONTENTS

	Page
News and Gossip	941
Making a Gramophone Tone Control	943
Wanted—A New Prague Plan ...	945
Analysing Speech and Sound ...	946
On Your Wavelength	949
Announcers Tell Their Stories ...	951
More About the "Challenge Two"	952
Without Fear or Favour	955
The "Loftin White 2"	956
The Ediswan "Power Pentode Two"	960
Making the Most of Reaction ...	962
In My Wireless Den... ..	964
We Test for You	966
Readers' Ideas and Questions ...	968
Broadcast Telephony	970

to could hardly have visualised the high power of present broadcasting.

A B.B.C. OPINION

BY the way; in connection with the subsidised opera scheme mentioned recently in "A.W.", on page 852, the B.B.C. says: "The B.B.C. is glad of the opportunity of again taking action which promises not only to be as effective in the cause of opera as it was in the saving of the Promenade concerts, but also to be of at least equal importance in enriching programmes and enhancing the value of the service to listeners."

NEW RADIO PLAYS

IN the January list of plays to be broadcast by the B.B.C. we note a considerable amount of original material. During the first week we shall hear *The Key to the Situation*, a thirty-minute play by Lance Sjevking. The second week is notable for *The Path of Glory*, by L. Du Garde Peach, a play lasting seventy minutes. A thirty-five minute play during the third week is *Mackintosh*, by Somerset Maugham. The last week of the month of January should be noted for a one-hour broadcast version of *Edward II*, by Marlowe. The B.B.C. continues to show that in radio drama it can lead the world.

A NEW PRAGUE PLAN

ELSEWHERE in this issue the suggestion is made that the time is ripe for the formulation of a new plan of wavelength



Another radio aid for the Army. Following on the news of the radio-equipped tanks comes this eight-wheeled armoured car, which is fitted up with a transmitter and a receiver, so that it can keep in touch with its objective while on the move. This new monster—a Crossley—is having its eight-wheel chassis and its radio gear tested out in the Derbyshire hills

NEXT WEEK: FULL DETAILS OF THE "CHALLENGE" RADIO-GRAMPHONE

NEWS & GOSSIP OF THE WEEK —Continued

distribution. The present trouble between Muhlacker and the London Regional will certainly be accentuated as more stations go on to high power. By 1932 we shall, in all probability, find that the present 25 per cent. of stations on high power will have increased to at least 75 per cent. It is well that the International Radio Telegraphic Convention plans to meet in Madrid in 1932. There will be plenty of trouble waiting for it! But it is the International Union's hope that an appreciable extension of the present wavelength band will then be granted.

WHAT AMERICA WANTS

JUDGING by latest news from America, the B.B.C.'s Symphony Orchestra is so much appreciated that the National Broadcasting Company has arranged for a further relay of the performance to be given on December 17. The 5SW short-wave transmitter has proved highly successful in the American relays of British programmes, and is to be used on this occasion. In one American newspaper we note a plea for the relay of more B.B.C. vaudeville shows and plays, which, the American writer contends, are done much better in this country than in the U.S.A.

TRANSATLANTIC APPLAUSE

WHAT must surely be a record in transatlantic radio applause was a message that arrived from America at the conclusion of the B.B.C.'s first Symphony Orchestra performance relayed by the N.B.C. of America. Hardly had the tones of the first selection, Borodin's Symphony in B minor, died out when Sir Henry Wood was handed a cablegram from America, congratulating him on the splendid per-

formance which, according to the sender, Alfred H. Grebe, a pioneer American radio experimenter, was received with so much clarity in New York that every one of the instruments was recognised.

REAL STOICISM

WHEN Walton O'Donnell was recently rehearsing the Wireless Military Band in one of the studios at Savoy Hill, a small boy popped his head in the door and exclaimed excitedly: "Excuse me, sir, but your car has been stolen!" By way of reply Walton O'Donnell turned to the boy and said: "Tell someone else to see about it." The boy disappeared. "And now, gentlemen," said Walton O'Donnell, turning to the band, "let us take that last movement again." Such indifference to personal affairs in the interests of listeners is surely rare!

ALL WELSH

TWO vaudeville programmes made up entirely of gramophone records were recently broadcast from London, and they were a great success; but when it comes to Welsh...! Anyway, an all-Welsh record variety programme will be given from Cardiff on December 23, which will include leading Welsh artists and well-known Welsh songs recorded by the principal gramophone companies.

FOR SLEUTHS

LISTENERS who are keen on amateur detective work will be able to gratify their Watsonian instincts when the B.B.C. starts up in January with the first twelve instalments of a new detective series. These will be broadcast every Saturday night. Such well-known exponents of

detective fiction as Dorothy Sayers, Agatha Christie, Clemence Dane and Freeman Wills Crofts will help to develop the plot. The last detective serial broadcast by the B.B.C. proved to be one of the most popular stunts of the year.

CHRISTMAS DANCE MUSIC

SO much has been written of the great possibilities of using the B.B.C.'s transmissions to enliven the Christmas festivities that we made a special point of asking the B.B.C. what it had arranged in the way of dance music. We are glad to be able to say that on Christmas night and Boxing night dance music will continue from 10.30 to 1 a.m. There will thus be plenty of scope for late revels via radio.

WHO THEY ARE

AS we said last week, on December 31 Amos'n Andy are to be relayed from America to B.B.C. stations. They broadcast in the interests of a toothpaste firm, but that is not evident in their material. Amos is Freeman Gosden, formerly an actor, and Andy is Charles Correll, who has been a bricklayer and an amateur minstrel.

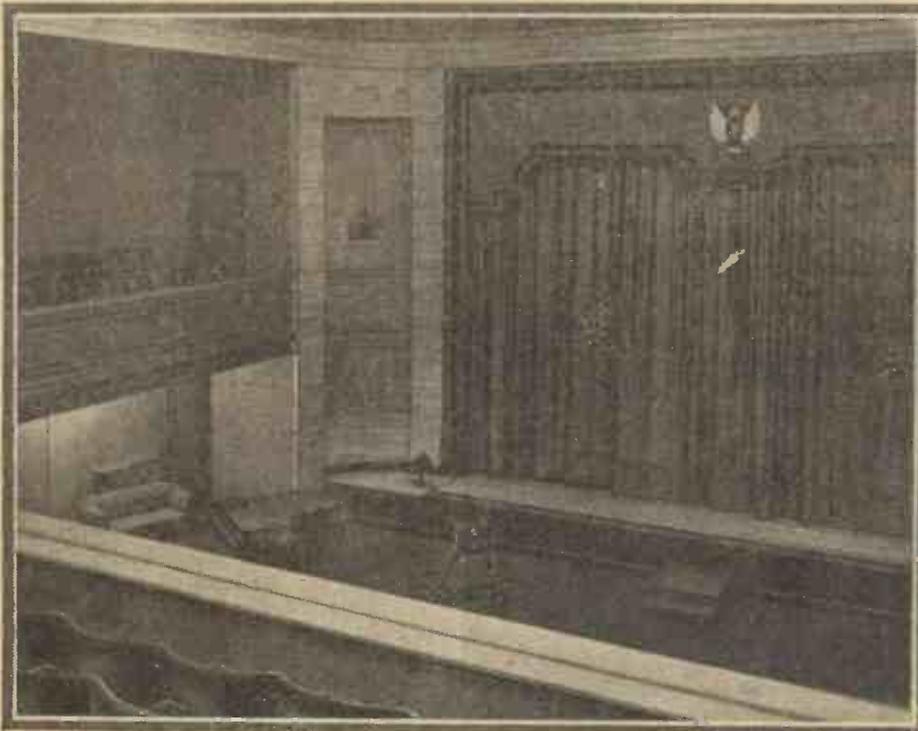
THE NEW SCOTTISH STUDIO

THE largest broadcast studio in Britain was in use last Saturday, when the Right Hon. Wm. Adamson, M.P., Secretary of State for Scotland, opened the new Scottish Broadcasting House at Queen Street, Edinburgh. Apart from its size, the studio is remarkable for its theatre, in which vaudeville, plays and concerts will be performed, while a large audience will be able to watch as well as to listen from the galleries and floor. The lighting is in the most modern style and the coloured fabric which lines the walls to prevent echo and to produce the true effect of silence essential for broadcasting has been woven by the "Edinburgh Weavers," who have also been responsible for the beautiful tapestry in the small talks studio, which will be decorated in the manner of a study, so as to give a talker all the circumstances of his own home. The third studio, of intermediate size, will be used for the broadcasting of chamber music and songs. The building is one familiar to Edinburgh citizens as the old Queen's Hall.

A JULES VERNE DREAM!

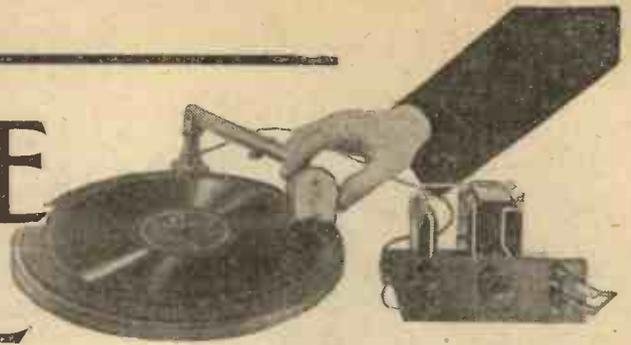
LORD INCHCAPE, chairman of the P. and O. Line, said last week: "It is perhaps not extravagant to anticipate that a time will come when ships will be propelled, heated, and lighted by the wireless transmission of current. It is possible that the sun's endless stores of heat and radiant energy may yet be harnessed to the service of mankind. That should still further reduce the cost of ocean travel." It should, but the idea of transmitting power by wireless still, unfortunately, seems too Jules Verneish to be true!

Signorina Maria Luisa Corsini, the present announcer at the Turin studio, was chosen by listeners from 180 candidates heard over the microphone during a period of more than one month.



A striking view of the new double-decker "studio" of the Scottish Broadcasting House. This building was formerly the old Queen's Hall in Edinburgh, and this fine studio, the largest in the country, has been converted from the concert hall

MAKING A GRAMOPHONE TONE CONTROL



With the aid of the simple device described below you can effect a wonderful improvement in the quality of your pick-up reproduction. The bass can be accentuated and the volume controlled

ONE of the big advantages of working a pick-up through your wireless set, so that you get electrical reproduction of gramophone records, is that it is easy to control the volume.

This is a thing which cannot conveniently be done with the ordinary gramophone unless it is modified to include some kind of acoustic damper. Merely shutting down the *louves* in front of the gramophone horn is not satisfactory, because, although this cuts down the volume, it muffles the sound. You can get a really satisfactory

"baseboard" for these few parts. The layout given here is merely a suggestion, but it need not be followed closely nor, indeed, need the unit be made up separately. It can, if desired, be included in the gramophone amplifier. However, it is well worth having the control within easy reach of the turntable, so that while the record is playing you can vary the amount of bass accentuation.

How it Works

The theory of this unit is quite simple, and depends upon the fact that the average pick-up deals more efficiently with the higher tones than it does with the lower, and its characteristic curve "falls off," as we say, on the lower frequencies.

The low-frequency transformer windings and the coupling condenser in this tone-control unit combine to make an acceptor circuit which is resonant at about the point where the pick-up is deficient.

Because of the special connections of the low-frequency transformer, a step-up effect is also gained, and this, combined with the boosting of the bass, produces a very effective tone. The volume is controlled by the resistance, but the tone is practically unaffected.

Obviously, the point on the characteristic curve at which the bass note accentuation takes place is dependent upon the values of the fixed condenser and of the low-frequency transformer. It is recommended that for the average pick-up the condenser should have a value of .1 microfarad and the transformer should have an inductance of 50-henries.

You will have no difficulty about connecting up the condenser, transformer, and resistance, and the only important point to note is that on the transformer the H.T. plus and G.B. minus terminals should be connected together. The grid terminal is then connected to one end of the resistance and the anode terminal to the other.

The pick-up is connected on the condenser side of the unit of course, and the

resistance side is then connected to the amplifier. To get best results out of this unit keep both these sets of leads from the pick-up to the unit and from the unit to the amplifier as short as possible.

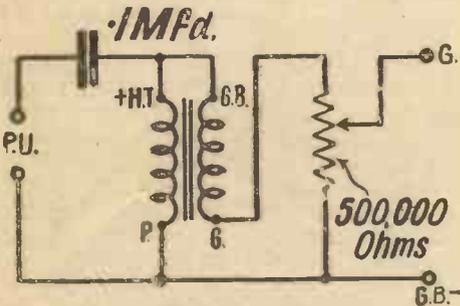
Using the Unit

It will be found that adjustment of the volume control has no effect upon the bass note boosting action of the unit—or, at least, it should have no effect if the following amplifying stage is properly set up. This volume control will be found very handy with pick-ups which are not already provided with a strength control.

You might consider it worth while fitting a switch to the unit or to the gramophone amplifier so that the bass-boosting section of the unit can be cut out if necessary. This will be found a particular advantage if one has a large stock of varied records vocal and orchestral, some of which call for more bass, and some for more treble.

It is really surprising what a deal can be done in this way, and what fine effects can be obtained—a big advantage over the mechanical gramophone.

With a unit such as this you can give



The theoretical circuit

control of volume in an electric gramophone.

What is not so generally realised, though, is that with electric reproduction it is quite a simple matter not only to control the volume, but to control the tone.

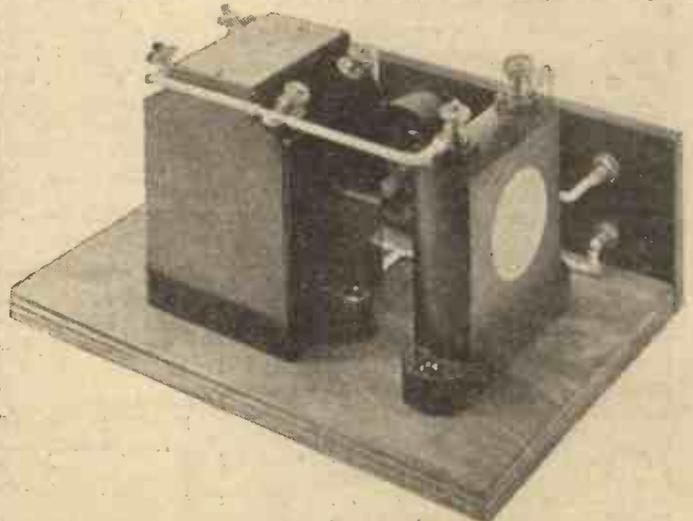
This is a most useful idea, because in your collection of records you probably have several which you prefer to hear either with more or less bass.

As rough examples, dance bands and orchestral recordings sound well with a rather accentuated bass, whereas too great an accentuation of the low notes is undesirable in vocal records, because the predominance of the bass may give a "boomy" effect to speech, which does not make for reality.

There is nothing very difficult in making up a tone control, and the only thing which is important is that you should get the values of the components quite correct.

As you will see from the accompanying photographs and layout, there are only three main parts needed for this little tone-control unit, these being a fixed condenser, a low-frequency transformer, and a variable resistance. There is a small terminal strip carrying two sets of terminals and the resistance. The resistance forms a volume control.

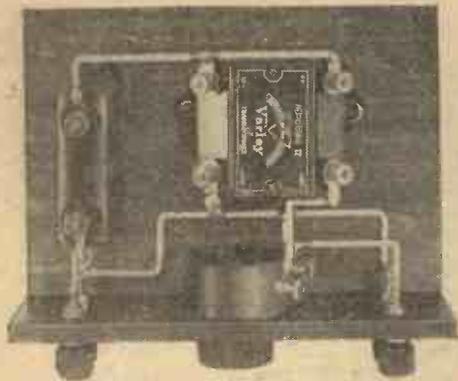
Any small piece of plywood does as a



This photograph shows clearly the entire construction of the unit

owners of mechanical gramophones a real surprise, for there is no ready means of altering the tone of a mechanical gramophone while a record is playing, though a certain difference can be obtained with individual records by fitting different needles, and by the use of special fibre
(Continued on next page)

needles such as the Burma Colour needle. With a pick-up, though, it is not advisable to experiment with needles. Usually one particular type (generally loud-tone



Compare this plan view with the layout opposite

steel) is best suited to each pick-up, and tonal change should be effected by a tone-shifter or bass-accentuator such as our little unit.

If a switch is provided, putting the unit in and out of action, then at a moment's notice a genuine "pedal" bass can be added to an organ record, for example, or the normal treble-accentuation of the pick-up can be used to give a realistic tone to a vocal record, or perhaps to instrumental records such as violin solos.

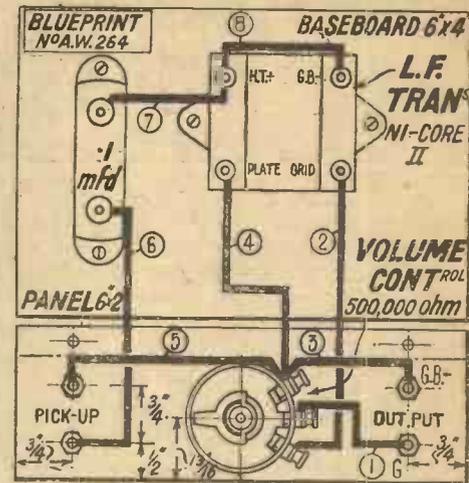
Care must be taken in wiring-up the unit to connect the volume control exactly as shown.

There are several different methods of volume control connection for pick-ups, but many of them cause a change in tone as the volume is cut down. This would nullify the effect of the bass-booster, and in this unit a scheme of connections has been adopted which really does result in a satisfactory control of volume without tonal change.

Make up this little unit exactly as shown, using the values specified, and you cannot fail to be pleased with the improvement it will effect to your radio-gramophone.

If you have any doubt as to whether the periodicity of the 50-henry .1-microfarad boosting circuit is best suited to your

pick-up, then the makers of the pick-up should be consulted. We have selected



The layout and wiring diagram of which a full-size blueprint is available, price 1-

values which are best suited to the large majority of pick-ups on the market.

THE BARGAIN

WHETHER it was the "Bankrupt Stock" placard or the little knot of shop-gazers that first attracted my attention I can't say. The fact remains, I crossed the road and edged my way in towards the window. The display, as I soon discovered, was nothing more than an assortment of feminine garments, such as silk stockings and—well, such as silk stockings and so forth. I was on the point of turning away when I happened to catch sight of something that really did appear a bargain. I hesitated, battling with my diffidence; then, squaring my shoulders, I entered the shop.

From behind the counter a pretty girl inquired my wishes.

"You . . . you have some ladies' . . . some . . . in the window at one and eleven," I stammered.

The girl thought for a moment. "Night-dresses?" she hazarded.

I nodded faintly. "At one and eleven-pence," I repeated.

"I'll get them."

Just to my right three women were discussing something pink; I sought for a patch of empty counter and riveted my eyes on that. Happily, the pretty attendant was not away for long. Slapping down a big white parcel, she broke the string and whipped aside the paper.

"A remarkable line, sir," she declared. "It's only possible by the fact that nowadays so many ladies prefer pyjamas."

"R-really." With a sudden movement she laid hands upon the top-most garment and shook it out for my inspection. "Yes, thank you," I said, hurriedly bundling it together. "I'll take that."

"I hardly fancy that this particular one is what you want," smiled the girl. "You see, it's an outside."

"But it's right—exactly right."

She regarded me intently. "Are you quite sure?"

I drew myself up.

"I know what I have come in here to buy," I remarked with dignity.

Without another word the girl turned and parcelled up my purchase.

The above took place some days ago. When George called round the other evening I told him all about it. I thought the story rather bored him. But he was tremendously taken with my new loud-speaker, and wants me to make a linen diaphragm for his. I think I will. After all, I've still got plenty of cambric left.

P.S.—At the time of writing some nine-pennyworth of the nightdress is grappling with a talk on "The Psychology of the silkworm," by Prof. Thredbear. Terribly dry, of course, but a wonderfully rich tone.

MICHAEL LAWRENCE.

BROADCASTING FINANCE

IN Parliament last week Mr. Lees-Smith informed Sir W. Mitchell-Thomson that the total receipts from wireless receiving licences during the year ended March 31, 1930, and their distribution, were as follows:—

Total receipts	£ 1,537,377
Deduct 12½% (for Post Office expenses of management)	192,172
Deduct contribution to cost of conversion of "spark" stations, etc.	6,686
	£ 1,338,519
Paid to B.B.C. (based on licence receipts for previous year)	963,171
Balance accrued to Exchequer	£ 375,348

The corresponding figures for the financial year ending March 31, 1931, were estimated to be as follows:—

Total estimated receipts	£ 1,725,000
Deduct 12½%	215,625
Deduct contribution to cost of conversion of "spark" stations, etc.	3,150
	£ 1,506,225
Payable to B.B.C. (based on licence receipts for previous year)	1,069,648
Balance accruing to Exchequer	£ 436,577

Mr. Lees-Smith said he was not in a position to furnish particulars of the total income of the British Broadcasting Corporation from all sources during the same two periods; but the total income during the year ended December 31, 1929, was shown in the Third Annual Report (Command Paper No. 3,599 of 1930) as £1,097,337 7s. 3d.

THE SUPERHETERODYNE

THE superhet receiver seems definitely to be coming back into favour. For instance, the new Stenode Radiostat is a superhet circuit with tuned intermediate-frequency stages and fitted with an extra selective filter in the shape of a piezo-electric crystal, followed by a shaping circuit for restoring the "cut" sidebands. One peculiarity of supersonic reception is that a given station can often be picked out at two different points on the tuning-dial, one point corresponding to the sum and the other to the difference of the signal and local frequencies. This is, however, not always a disadvantage, because if the desired station should happen to overlap with another station at one of the tuning points, it will almost certainly come in free from interference at the alternative setting.

M. B.

SINCE the winter began, we long-distance listeners have had a hectic time. With in our hands are sets capable of tuning in to the ends of the earth, of reproducing dozens of signals at loud-speaker strength. But, even assuming the set is good, how many of Europe's galaxy of broadcasters can you receive?

The answer will vary according to the reader's standard of reception. Critical listeners reject all stations that cannot be heard at a strength and quality similar to the local station; their nightly log is never more than a dozen stations and is often less.

Others, less critical, are willing to sacrifice a little, to put up with a background of interference, with varying strength and with some deterioration in quality. Then a log of twenty or thirty stations can be fairly readily compiled.

Necessary Co-operation

I imagine everybody must know that Europe's stations, controlled by dozens of separate organisations, are really trying to work together in wavelength allocations. It is clear to all concerned that complete co-operation in wavelength distribution is essential for the operation of the individual organisations. The Prague Plan is practical evidence that this condition is appreciated. Under this Plan, countries are allocated so many frequency channels, the number and position (in the frequency range allotted to broadcasting by the Washington Convention) being determined by a formula that takes into account such factors as geographical location, political importance, population, and transmitting power.

No one has ever pretended that the Prague Plan is perfect; but how can any perfect plan be formulated when one is faced with the insoluble difficulty of getting a quart into a pint pot? There are far too many stations for the frequencies available. The total frequency range between 550 and 200 metres is 955 kilocycles. As each station must be 9 kilocycles from the two adjacent stations, we can see that 107 stations can be fitted in on this basis.

Dividing the Wavelengths

In deciding how to share out these frequency channels to the twenty-six broadcasting countries of Europe, the Prague Conference really was up against it. Yet if one cares to count the present number of stations between the limits mentioned, namely 550 and 200 metres, the total is 108. Superficially, the plan seems to have worked out extremely well; but further investigation shows that the 9-kilocycle



Critical comments on the present distribution of wavelengths among European stations by ALAN HUNTER

stipulation has not been maintained. Now, however you may look at it, the fact is this; that as soon as the 9-kilocycle separation is reduced you get trouble, due to the modulations of the adjacent carrier waves overlapping and producing audible heterodyne notes.

Going round the dial at the present time, I can count nearly as many heterodynes as stations. That would not happen if the stations were 9 kilocycles apart. Unfortunately, the original 9 kilocycles separation of existing stations has, it would seem, been entirely nullified by newcomers. A few examples will show what I mean.

Talking in kilocycles, Vienna 581 is the required 9 kilocycles from Brussels 590, but in between is now Archangel 585. Midland Regional 626 and Langenberg 635 are 9 kilocycles apart, but in between is Simferopol 630. An international common wave 662 and Paris 671 are 9 kilocycles apart but in between is Moscow 665.5. Paris 671 and Rome 680 are 9 kilocycles apart but in between is Norway 674. Berlin 716 and Dublin 725 are 9 kilocycles apart but in between is Rabat 721. Over a dozen of these sandwiched stations are noted between the wavelengths of Vienna and Turin.

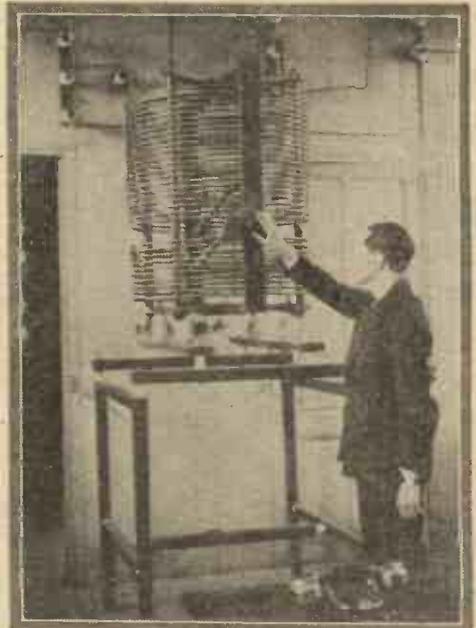
Clearly, then, the nightly cacophony of side-band whistles is not entirely due to stations wandering from their allotted frequencies. In fact it is a hopeful sign that most of the big stations now keep dead on their allotted frequencies of transmission. Lower down the wavelength range the congestion does not appear to be so bad, no doubt because the low waves, being erratic in range and strength, are not so keenly competed for. One has only to remember the ineffectiveness of the London National station on 261 metres—which for all its 68 kilowatts is poorly heard outside the swamp area—to realise why no station exactly scrambles for a wavelength below 300 metres.

A New Plan Wanted

In condemning the present Prague Plan, one must make considerable allowances for

two facts that are often overlooked. The first is the limitation in the number of stations imposed by the necessity for at least 9 kilocycles separation. The second fact is seldom understood; it is that the Prague Plan, or any other plan, cannot function on the assumption that listeners in one country want to hear broadcasting stations from another. All that can be visualised is non-interference, within a country's broadcasting organisation, from foreign stations.

The Plan might make Great Britain fit for heroic B.B.C. subscribers to listen in, but it cannot arrange matters so that British listeners can hear Italian stations with the same degree of non-interference. So with Italy; the Italians have a right to expect Rome and Turin and the other Italian stations to give good service in Italy; but they must not expect to hear Scandinavian stations over 1,000 miles away with the same degree of perfection



Operating one of the large tuners at Radio Paris—a "big noise" on the long waves

A good many listeners imagine that if all stations were equally separated by 9 kilocycles they could take their pick of Europe, irrespective of the location of the set. But take a simple example; Rome on 680 kilocycles is 9 kilocycles from Stockholm on 689 kilocycles. In London we are roughly midway between, with Rome 900

(Continued on next page)

ANALYSING SPEECH and MUSIC

IN the reproduction of speech and music, not only in broadcasting but in sound pictures, engineers now have to know exactly what the sounds consist of. There are two variable quantities in sound: namely, frequency of vibration and amplitude.

A broadcast sound consists, as a rule, not of one frequency but of many; and these are of various amplitudes. The peculiar quality of a sound depends upon which frequencies are present and upon their relative amplitudes. These variables in sound account for the different timbres of the same note as played by a piano, a violin, or other musical instrument.

From our point of view it is interesting to note that, if any of the component frequencies of a sound are not reproduced at the correct amplitude, the reproduced sound is distorted and unnatural. But we seldom hear one sound alone, since in speech and music different sounds follow

cal Research Department of the Bell laboratories.

The sound to be measured is first picked up by means of a condenser microphone, such as is commonly used for making sound pictures and as used by many American broadcasting studios. The sound is then amplified to some convenient level before being passed on to the measuring apparatus. One measurement gives the average amplitude and the other measurement gives the peak amplitude.

In order to analyse a sound into constituent bands of frequencies, a group of 13 filters is employed. Ten of them divide the range from 62.5 to 8,000 cycles into convenient bands. The twelfth passes all frequencies below 62.5 cycles and the thirteenth all above 8,000 cycles. A fourteenth filter is sometimes used to cover the extremely high frequencies between 8,000 cycles and 11,300 cycles. Further amplification is provided after the transmitter output has passed through the filter.

It will be clear that measurement can only be made on one frequency band at a time, so the selection being played or the words being spoken must, for complete analysis, be repeated fourteen or fifteen times; once to allow readings for each of the fourteen frequency bands and once for all bands taken together.

Tests with this new apparatus have been made on speech using male and female voices; also in various manners of

speaking and at various distances from the microphone. Street noises have also been measured. For music, short selections have been played by most of the common instruments, including piano and organ; and of entire orchestras composed of different numbers of instruments.

Many interesting results have been obtained from these measurements, which, by enabling sound to be analysed into its constituent frequencies and amplitudes, should eventually lead to more natural reproduction in broadcasting and sound pictures.

In order to make a closer study of the behaviour of sound, as handled by broadcasting and sound-picture systems, the engineers of the Acoustical Research Department of Bell Laboratories in America have recently developed special sound analysing apparatus

"WANTED—A NEW PRAGUE PLAN"

(Continued from preceding page)

miles south and Stockholm 900 miles north. On an average set we find these stations overlapping, but it is not probable that overlapping occurs when one is listening to Rome in Rome or to Stockholm in Stockholm, because the distance of the adjacent transmissions is nearly 2,000 miles. There is, indeed, a great deal more in station separation than the literal 9 kilocycles.

Muhlaker

How true this is can be emphasized by the latest trouble in Europe's ether. I refer to the starting of the Muhlaker station near Stuttgart. When Stuttgart was on 360 metres we, in London, with an average set, heard nothing of it, because only 9 kilocycles away is the London Regional! To-day the power of Stuttgart-Muhlaker is 75 kilowatts, but the frequency separation remains unchanged. Consequently complaints are coming in to Savoy Hill—"numbers of complaints," as the B.B.C. cautiously states—of serious interference between Muhlaker and London Regional.

Whenever a new high-power station starts up we hear talk of the "race for power." But of all Europe's medium-wave broadcasting stations I can only find twenty-two having a power rating of more than 10 kilowatts. Part of the problem is, in fact, due to the lack of high-power stations, and not to their increase in number. If there were more high-power stations there would be fewer stations altogether, because numerous low-power stations could be closed down.

To me, as a confirmed listener to foreign stations, the need for a new Prague Plan seems urgent. Since the last allocation many organisations have rationalised their stations, closing down redundant low-power stations whose service areas have been taken over by the new high-power stations. We can only hope that this rationalisation will continue rapidly, that more high-power stations will come into being and that many of the smaller stations will eventually close down, so releasing coveted frequencies for the formulation of a new Plan, to restore something like order.



H. R. Dunn and S. D. White recording with the new Analyser in the Bell Laboratories

each other in quick succession and are recognised as syllables or notes. The component frequencies are therefore changing from moment to moment.

In analysing speech and music it is not essential to determine the magnitude of each separate frequency at every moment, but it is very desirable to know the range of frequency and the manner in which the magnitudes vary over different sections of this range. Knowledge of both average and peak magnitudes is desirable. This information can now be obtained by means of new apparatus designed in the Acousti-

THE "QUEST" CABLES MULLARD FROM GREENLAND

THE GREAT NORTHERN TELEGRAPH COMPANY (LIMITED). <i>of Denmark</i> TELEGRAMS TO CHINA, HONG KONG, JAPAN, MACAO, THE PHILIPPINES, U.S.S.R. (RUSSIA), FINLAND, LATVIA, ESTONIA, LITHUANIA, POLAND, SWEDEN, DENMARK, FAROE ISLANDS, ICELAND, GREENLAND, ETC. <i>should either be written on the Company's own forms or marked:—</i> Via NORTHERN.		Date: _____ Delivery No.: 1168 19 NOV 1930 W.D.O. 1 NOV 30
Recd. at: <u>199 B.</u>	Sent to: _____	By: _____
Station from:— Nr. of Telegram:— Nr. of Words:— Date, Hour and Minutes of Time handed in:— Via indication (if any):— ANGMAGSSALIK R414 17W 19 14 20 = MULLARD CHARING CROSS ROAD LDN = CONGRATULATIONS YOUR VALVES STAND WORST TREATMENT IMAGINABLE NO CASUALTIES YET = LEMON ANGMAGSSALIK		
<small>In fractional numbers the integer is separated from the fraction by a double dash, for instance: 1 1/4 is rendered as 1-3/4</small> <small>Please mark replies "Via NORTHERN." Book of Forms supplied free on application from the Co.'s London Office, 5, St. Helen's Place</small> <small>No inquiry respecting this message can be attended to without the production of this form.</small>		

**BRITISH
ARCTIC
AIR
ROUTE
EXPEDITION**

STILL MORE EVIDENCE
OF THE RELIABILITY
AND EFFICIENCY OF
MULLARD
THE MASTER VALVE

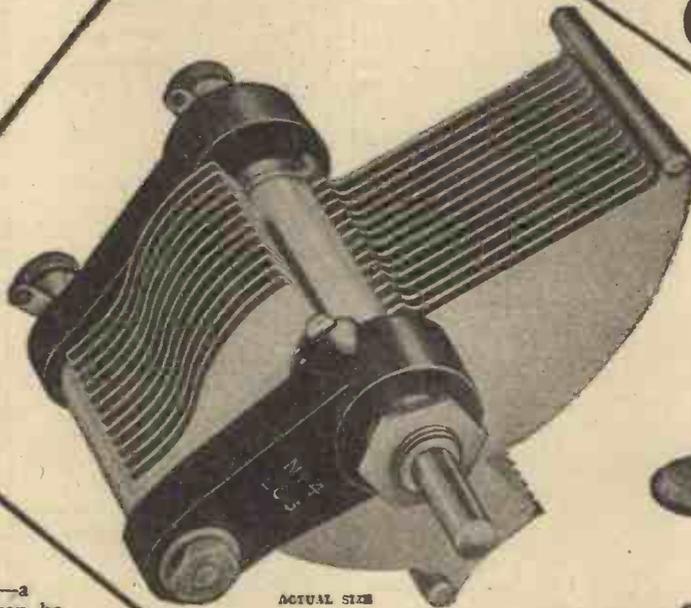
Advt. The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2.

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

There's nothing to equal these

ORMOND

Condensers!



ACTUAL SIZE

Rigid, robust and amazingly efficient—a condenser which can be relied upon to give the maximum performance and the maximum satisfaction always.

The ORMOND No. 4 LOG

Designed to follow the Logarithmic Law, it has such value that it will be found very suitable for use under average conditions in the modern receiver. The vanes are of aluminium, firmly secured to slotted spindles. The condenser ends are of best quality bakelite, with the greatest possible reduction in size. This condenser is not supplied with dial.

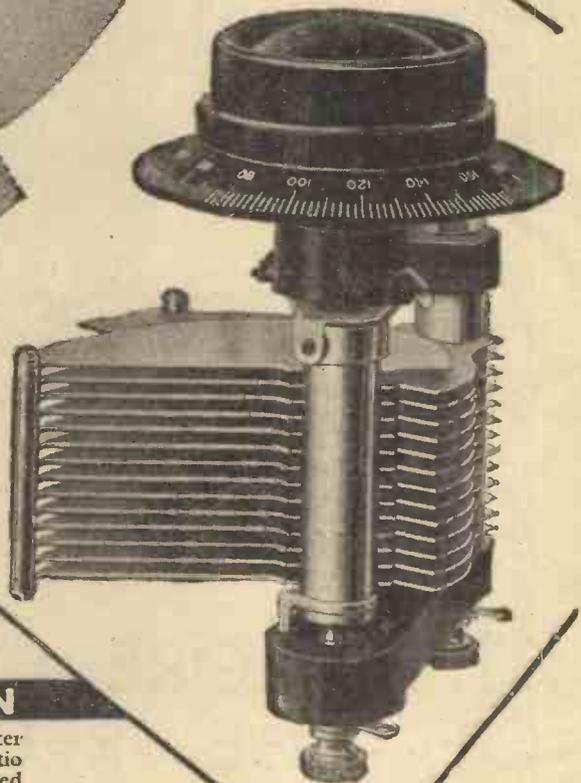
Capacity	.00025	Price	4/-
"	.00035	"	4/-
"	.0005	"	4/-

The ORMOND No. 4 LOG SLOW MOTION

Direct drive is obtained by means of a beautifully finished 2½ inch diameter bakelite dial engraved 0 to 180 degrees. Slow motion movement ratio approximately 9 to 1 is incorporated in the condenser and is controlled by means of the upper small knob.

Complete with 2½ inch dial and slow motion control knob. Easy to mount "One Hole" fixing, terminals and soldering tags for connections.

Capacity	.00025	Price	6/-
"	.00035	"	6/-
"	.0005	"	6/-



THE ORMOND ENGINEERING COMPANY LIMITED
Ormond House, Rosebery Avenue, LONDON, E.C.1
Phone: Clerkenwell 5334/5/6 & 9344/5/6. Telegrams: "Ormondengi, Smith."

FOR COMPACTNESS STRENGTH & ACCURACY

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

Oh You Waverer!

PICK-UPS AND VOLUME CONTROL

I INVENTED a new form of volume control the other day for a gramophone pick-up. I was experimenting in order to try and avoid that "zizzing" noise which one obtains with many pick-ups, particularly with some forms of record in which there is a good deal of "top." On these upper frequencies many gramophone pick-ups play audibly themselves, and in fact, one can often listen to the music without the amplifier switched on at all. If one's amplifier and loud-speaker are giving a loud volume, this effect is not noticed, but where one is cutting down the volume to ordinary room strength, the effect may be particularly unpleasant.

The trouble is aggravating if, as in my case, one is using a volume control which has to be cut down rather a lot. This almost inevitably loses the upper notes and the loud-speaker does not reproduce the treble properly. Therefore, one has the bass and middle register coming from the loud-speaker, and the top coming from the pick-up, sounding like a squeaky Jack-in-the-box that somebody has shut up. My experiments were designed to overcome this defect by reducing the volume from the pick-up itself, so that I should not have to use so much volume control externally.

A NOVEL EXPERIMENT

ONE of the most satisfactory ways, of course, is to use a step-down transformer, and I tried this with a certain amount of success. Another method is to make the pick-up itself less sensitive by increasing the gap. On my own pick-up I was able to do this quite nicely, and I made the gap about twice the size it was originally, giving the needle considerably more play, and thereby minimising the wear on the record. At the same time the voltage was cut down by something like one half, and I was able to play the record practically flat out without unpleasant loudness. For ordinary work I then just put a suspicion of volume control in and I found that I got the top out of the loud-speaker now, and the zizzing was not so noticeable.

It was while I was carrying out these experiments that I removed the magnet altogether. The results, of course, immediately faded away to nothing, and I found that by holding the magnet in my hand close to the pick-up I could bring the strength up. In fact, I could do the wizard act very well by simply passing my hand over the pick-up and the music came up as soon as I went anywhere near it. If I placed the magnet in the wrong position unfortunately it lifted the pick-up clean off the record, and let it fall down again with an annoying bang, which was not good for the record. It is, however, quite an interesting little experiment to do, and one which can be easily carried out. Simply remove the magnet from the pick-up and hold it near the pick-up again, leaving a gap of perhaps a quarter of an inch. As

the magnet gets nearer and nearer so the volume gets louder and louder. In fact I think I must design a special pick-up with an adjustable magnet as a new form of volume control!

LOOKING WELL AHEAD—

IT is always fascinating to try and probe into the future, though it takes a bold man to don the mantle of a prophet when it comes to possible radio developments. I see, however, that the Earl of Inchcape is already anticipating the time when ships will not only be propelled on their way by wireless energy but will also be heated and lighted by the same means. He doesn't say exactly how it is going to be done, or what would happen to any conducting body that might by accident cross the path of such a mighty beam of radiated power. Possibly the answer is similar to that given long ago by Stephenson to the farmer who was concerned about the problem of cattle straying on to the new railway. "It will be verra bad for the coo." At the same time I would not go so far as to rule Lord Inchcape's prophecy out of court. Inventors are already trying their hand at the problem of transmitting power by wireless, and I do not put it beyond the bounds of possibility that they will one day find ways and means of doing so safely.

—AND A GLANCE BACKWARDS

WHILST on this subject I remember many years ago by the famous inventor Tesla, for distributing wireless energy over the whole surface of the earth. I think he called it the "world oscillator." Roughly, the idea was to set up a powerful transmitter at a given point, and to tune the aerial to such a frequency that the outward going oscillations meet in phase at the Antipodes, and so set up a permanent "standing-wave" formation. The energy of the system was to be maintained by a steady input from the original transmitter, whilst power could be drawn at any desired point by merely erecting a receiving aerial. Ingenious—to say the least of it—and calculated to make one wonder whether there really is anything new under the sun!

AN OLD FRIEND

AS I write I can see workmen carrying out of the garden door my aerial mast, which they have just removed. It is a little sad to part with an old friend which during many years of service has helped to give me an enormous amount of pleasure by enabling my wireless set to bring in broadcasting from all over the world. At the same time, I never thought him beautiful; and living, as I do, in a particularly windy spot, there were times during great gales when I felt a little nervous, despite the strong wire stays that supported him. But why, the reader may ask, has "Thermion" uprooted his aerial mast? Simply because I find that the screen-grid valve of to-day makes an indoor aerial of some kind all that

is necessary for wireless reception. My house, as a matter of fact, contains no less than four of these in various places. For my own use I have a wire running round three sides of one room and a frame in another. The two remaining indoors belong to junior members of the family.

INDOOR AERIAL RESULTS

MY own experience with indoor aeri-als is an interesting one, though I don't claim that it holds good everywhere. What I find is that if you use the same set first on an outdoor and then on an indoor aerial—I am assuming, at least, one good stage of H.F. amplification—you will receive just about as many stations on either, though signal strength on the indoor collector will be smaller and you will need to push the reaction coupling rather tightly. Add a high-frequency stage to the receiving apparatus to be used with the indoor aerial, and it is just a little better all round than a set with one stage less used with the outdoor wire.

OTHER GOOD POINTS

AND the indoor collector has other advantages, quite apart from not spoiling the amenities of one's garden or making your hair stand on end when high winds are blowing. Being a less efficient collector of wireless impulses than its outdoor counterpart, it certainly brings in a smaller amount of interference from spark signals when these are about, and my own impression is that one is not nearly so much troubled by atmospherics. I have known nights on which X's of the mild, grumbly sort were about when I have heard nothing of them, though friends using outdoor aeri-als have reported that they were a distinct nuisance. Actually, spark signals and atmospherics affect a collector in very much the same way, both producing shock excitation, if they are powerful enough, and setting the aerial vibrating at its natural frequency. The more efficient the aerial is, the greater is its liability to shock excitation and vice versa. This is probably why the indoor arrangement often gives you a quieter background. And it needn't be an eyesore if you rig it up, as I do, about a foot below the ceiling, using white wire, miniature white insulators, and white whipcord for suspension purposes. In fact, unless your attention is called to it, you would probably never notice that it was there.

SURPRISING

IT is surprising how well an indoor aerial may serve a small set with no high-frequency amplification at all. For local reception of the Brookmans Park stations I often use a simple two-valve set consisting of detector and a very low-impedance note-mag. This same unambitious receiving set will bring in both Daventrys at full loud-speaker strength, and it will also give a very good account of itself when tuned to Strasbourg, Nürnberg, Rome, and Radio-

On Your Wavelength! (continued)

Paris. Many other stations are receivable, though, of course, at smaller volume.

THE BEST TYPE?

CURIOUSLY enough, you can never tell either how an indoor aerial is going to behave in any particular house or what type will be the best to use. Speaking generally, a wire suspended round three sides of a room is usually as good as anything, but there are cases where better results are obtained from several parallel wires slung between spreaders the length of an attic. Or, again, a single vertical wire hung down the well of a staircase may be better than anything else. Much depends upon the locality and upon the actual construction of the house itself, as well as upon the amount of screening introduced by other buildings in the neighbourhood. I have one friend, for instance, who lives just north of the Crystal Palace, and can receive nothing from a southerly direction owing to the blanketing effects of that building.

SCOTLAND'S ACQUISITION

THE opening of the new Broadcasting House in Edinburgh has provided Scotland with excellent headquarters for the B.B.C. officials responsible for her entertainments and with magnificent studios for the artistes providing them. At present the Scottish Broadcasting House is looking after Glasgow and Aberdeen, and the Edinburgh and Dundee relay stations. When the Scottish regional station is erected it will take charge of the regional programme radiated therefrom. The opening ceremony was quite thrilling. I heard it from Aberdeen, which was coming through very well on that particular night, and felt that all Scotsmen must appreciate the excellent programme provided.

HIGH TENSION

THE opening of the new Stuttgart station at Muhlaker has not been all jam so far as listeners in this country are concerned, for it has resulted in the London Regional programmes being mainly "jam." The interference experienced at present in most localities is quite sufficient to ruin the programmes, and complaints from all quarters are pouring in. I observe this morning a statement by the B.B.C. that they are reporting the matter to the International Committee in the hope that Stuttgart may be induced to accept either a small change in wavelength or a reduction in power. For myself, I should say that it is unlikely that the latter suggestion will recommend itself to the Germans.

The B.B.C. was the first to introduce super-power stations on to the broadcast band, and I have always said that by so doing it was simply "asking for it." If somebody starts shouting you down the only thing to do is to put your voice into training until you can shout a bit louder than he can. Stuttgart is now giving London a taste of his own medicine, and the dose is not pleasant.

THE RACE FOR POWER

IF the B.B.C. does not like Stuttgart, what will Germany and other nations

think of us when the Regional Scheme is in full swing, with nine British super-power stations transmitting within the limits of the broadcast band? Their only apparent course is to erect super-power stations of their own, and when this is done we are likely to arrive at a position of stalemate, since every station will jam every other. I cannot, I never could, and I don't think I ever shall, see the necessity for the use of more than about 10 kilowatts at the very outside by a broadcasting station. Considering the efficiency of modern receiving apparatus, this should give an ample service area, and it would not produce the enormous swamp areas that we are suffering from now and shall suffer from still more in the near future. One thing I do know, and that is that the old 2-kilowatt 2LO at twenty-six miles gave me far better quality than the new 54- and 68-kilowatt Brookmans Park stations at fifteen.

HAVE YOU REALISED?

YOU may, if you like, spend an interesting and very instructive half-hour by working out just what reception conditions will be like when all of the nine British transmissions are in operation on the broadcast band. Most people have not realised what things are going to be like, but what I am going to suggest will bring it home. The only necessities are a list of European transmissions in order of frequencies and a pencil. We are pretty safe in assuming that each of the whole super-power stations will have an average wipe-out of two channels on either side of its own wavelength. If it doesn't blot stations clean out it will, at all events, interfere with them so badly that they won't be worth receiving. Very well, then. Begin with 242 metres, Belfast's present wavelength. This corresponds to a frequency of 1,238. Adding eighteen to this, you have the upper limit of interference, and subtracting the lower—or t'other way on if you are thinking in wavelengths. With your pencil you can now blot out

DO YOU KNOW—

that if you experience constant "motor-boating" in a set in which one or two low-frequency transformers are used, the trouble may be cured by reversing the connections to one, but not both, of the windings? Generally speaking it is better to reverse the secondary winding.

that it is most important to clean away the transparent lacquer from metal shields before making connection to them? Some shields are provided with terminals for earthing and it is important to see that the lacquer with which the metal work is covered in order to preserve the colour, does not insulate the terminal from the shield itself.

that if you charge your accumulators at home, and you have several in parallel, you should put an ammeter in circuit occasionally to see that proper charging current is flowing through each? It sometimes happens that when accumulators are charged in parallel the internal resistance causes one to be charged at a higher rate than the others.

Nurnberg, Beziers, Cracow, and the common wave above, which doesn't matter very much. The National already accounts for Horby, Gleiwitz, Moravska-Ostrava, and Lille. Out they go. The 288.5-metre wavelength means a blot-out of everything between Copenhagen and Vibouig. The 301-metre wavelength accounts for Hilversum, Bordeaux, and Zagreb. The wipe-out patch overlaps, though, that of the 309.9-metre wavelength, so that you can wipe out everything until you get to Gothenburg.

AND STILL MORE

THE London Regional takes in—or, rather, takes out—Graz, Barcelona, Stuttgart, and Bergen; and it is met by the blanketing of the 376-metre wavelength, which accounts for Radio LL, Hamburg, Genoa, and Lvov. The 398.9-metre wavelength almost meets this, though Toulouse may be left clear between the two. Anyhow, it wipes out Frankfurt and Bucharest. On the other side it accounts for Berne and Kattowitz. If Dublin's power goes up, as seems likely, Berlin and Madrid Union Radio disappear. On the 479-metre wavelength 5GB wipes out Langenberg, Lyons Doua, and Prague. Blacken out all the areas mentioned and then see what is left. You will find that it doesn't amount to much. Heaps of the stations remaining are such as can be received only under the most favourable conditions with ordinary sets, and it really seems as if Budapest, Rome, Strasbourg, and probably Toulouse, will be the only foreign stations regularly receivable. Put that in your pipe and smoke it!

TRIED OUT AT LAST

I HAVE had my Stenode now for three days, and in next week's AMATEUR WIRELESS I will tell you all about its doings. I would do so now but for the fact that it takes a bit of time to calibrate a large set like this and to identify all the stations that it brings in. The set, too, has proved so engrossing that I have spent so many happy hours with its controls that I left myself no time in which to write fully about its doings. All I can tell you now is that it *does* live up to its reputation and that it is an absolute marvel to handle. At fifteen miles from Brookmans Park, where the wipe-out is so terrific that a good set with two S.G. stages is doing jolly well if it can bring in Barcelona or Hamburg perfectly clear of interference, this wonderful receiver gives you Stuttgart or Graz, one 3.7 metres above London and the other 4.3 metres below, at full loud-speaker strength and perfectly clear. It is exceedingly easy to operate, for there are only two tuning knobs, and such is its punch that you simply have the whole of Europe to choose from. Mine, as a matter of fact, is working with a tiny home-made frame with 16-in. sides, but with this it will bring in stations such as the 300-watt Kiel at full loud-speaker strength in the evening, whilst in the daytime I can receive at quite good volume Langenberg, Hilversum, Berlin, and a good many of the bigger Continental medium-wave stations.

THERMION.

ANNOUNCERS TELL THEIR STORIES



The control room at the Copenhagen Station

TO DX listeners on the Continent the name McCallum is well known. Professor McCallum, of the Radio Vienna station, has become quite an institution and is quite a "star" turn in Vienna's radio programmes.

What is, perhaps, not so well known is the fact that there are two McCallums upon the Continental ether. The Copenhagen station also boasts of a popular exponent of the art of teaching by wireless, of the same name.

Campbell McCallum—a Gordon High-



Campbell McCallum, a well-known broadcaster at Copenhagen

lander—who, with his 6 ft. 6½ in., is a worthy (if not wordy) representative of the Old Country, for the last nineteen years has left no means untried in his efforts to anglicise Denmark by broadcasting.

"In the Army days," says this announcer, "I was a signalling instructor, and have been profoundly interested in everything to do with 'flag-wagging,' telegraphy, and radio ever since. You will, therefore, understand something of my joy when, some seven years ago, I was invited to act as 'wireless teacher' to the Danish capital. In those days our energy was considerably less than even 1 kilowatt, so we did not carry much beyond the boundaries of Copenhagen; but the mere fact that one's

voice could be heard at all, even that distance, was then still so marvellous, that I felt that I had been invited to lecture to the world.

"Yes, those were amusing times, believe me. None of the regimental regime then which is now the order of the day.

"There was a jolly editor—chief of a certain Danish wireless weekly now long since defunct—who was always in or near the station on the off-chance of picking up news items for his paper. An incorrigible joker, he was, if ever there was one. He was always up to some prank to disconcert the engineers or the station 'orchestra,' such as it was.

"One of his favourite 'stunts' was to turn off the lights in the studio in the middle of a talk, leaving the unhappy victim in pitch darkness. A moment later it flashed on again, only to disappear a second time before the lecturer had recovered from the shock!

The Bowler Hat

"In those days the 'talks studio—a dingy, dusty room up under the roof of the General Telegraph Office—was supplied with a telephone receiver from the engineer's control room and with a switch to turn on and off the microphone.

"One day, when I was hard at work inculcating the rudiments of English into Danish listeners (I often wonder whether there were any) a practical joker entered the studio and, leaning on my shoulder, tried to whisper advice and comments! By the aid of dumb show, he was induced to leave, without doing any very serious harm, so far as I could gather during the course of my lecture.

"Shortly after the engineer on duty signalled to me to switch off the microphone and to answer a telephone call. 'What is the matter in there,' he called, 'we can't understand a word you say?'

"I glanced at the back of the microphone (which was encased and not normally seen by the speaker) and I saw a large bowler hat firmly jammed down over the 'mike' and effectually muffling anything I, or anyone else, might have to say.

"Nowadays, of course, all that sort of thing is definitely at an end. Nothing more orderly and circumspect could possibly be

Campbell McCallum,
of Copenhagen, on:

A STUDIO PRACTICAL JOKER

imagined than the studio and station arrangements at Axelborg, the building containing the studios.

"So well controlled, in fact, are the microphone arrangements, that on one occasion, at least, the inability of an announcer to switch the 'mike' on and off at his own convenience as had hitherto been the case, led to an amusing little contretemps.

Studio Lights

"The arrangements are these. The intending speaker enters the talks studio—a small but extremely lofty room brilliantly lit—where, high above his head he will see three bulbs: white, green, and red. White indicates silence, green that he is being announced, and red is the signal to begin. He cannot see or hear the announcer. He is shut up in a windowless, sealed dungeon, and is alone.

"A certain speaker did *not* spot the signal lights and, having no idea that the green light was on and that he was, therefore, being announced at that moment, he seized the water jug and poured himself a brimming glass of 'Adam's ale.' Very shortly afterwards some listeners 'phoned to inquire if Copenhagen had been submerged by a tidal wave! The speaker's glass had been right in front of the microphone and the pouring of water had sounded like a rushing torrent!"

E. Holm,
the Copenhagen
Station Director



More about The



CHALLENGE TWO

The constructional details of this receiver, designed by W. JAMES, were given in last week's issue. Below are some useful notes on its operation

IT is easy to tune a set having detector and low-frequency stages. There are just the two knobs to turn. The wavelength coil switch is on the top of the coil unit inside the set and the filament circuit switch is the one mounted on the panel.

Turning the left-hand dial alters the wavelength and the right-hand one alters the amount of the reaction. This reaction control will normally be used for regulating the strength of the signals as no other volume control is fitted.

Be careful not to allow the set to oscillate, as you do not want to interfere with other listeners. The amount of the magnification provided by the set is dependent upon the valves used, the characteristics of the transformer and the setting of the reaction circuit. With a detector valve having a magnification factor of 20 and a good transformer with a ratio of 3 to 1, the actual magnification of the stage is proportional to sixty times the effectiveness of the valve as a detector.

Then there is the last stage. With a power valve having a magnification factor of 6, the signals applied to it are magnified practically by this amount.

Thus you will see that it is important to use valves having the greatest amplification factors. But the impedances of the valves must not be too high, or the quality will be poor and perhaps the volume will be rather less than expected.

The Power Stage

In the case of the power valve, the impedance must not be too high, say, above about 5,000 ohms. What really matters is the "goodness" of the valves used, this being expressed by the slope.

A valve of 4,000 ohms impedance and having a slope of 2 is a much better valve

for a small set anyhow than a valve of equal impedance but having a slope of only 1. Steep-slope valves should always be used for detection, a steep slope-valve being one having a high value of "slope." The detector valve ought also to be a quiet one.

One of the newer types of detector valves would, therefore, be well worth having. You cannot expect the quality or the volume to be good if the valve has too high an impedance for the transformer following it. A reasonably good transformer ought therefore to be used and it would be foolish to buy the cheapest without regard to quality.

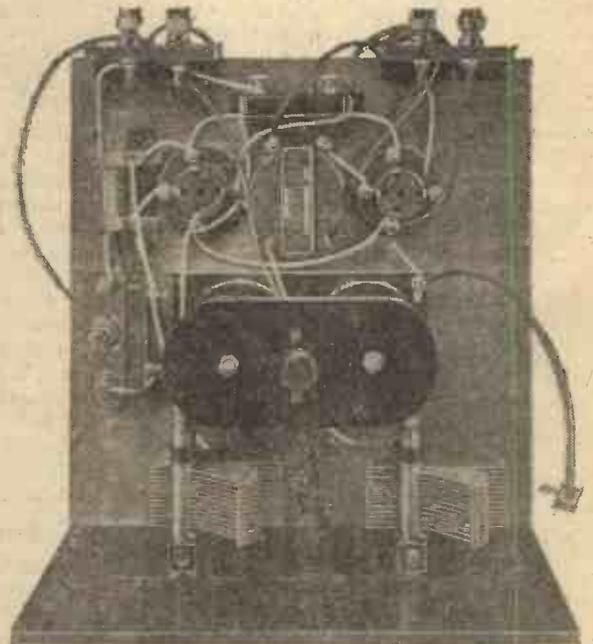
Some people make a point of always using an output choke-condenser circuit and one could, of course, be fitted to the "Challenge Two" set. The advantages of a choke-condenser output are first, that the steady anode current is prevented from passing through the coils of the loud-speaker, and, secondly, that the choke effectually stops the passage of low-frequency currents through the high-tension battery circuit.

Thus there are substantial advantages for the use of a filter output circuit. The chief disadvantage is the cost, and this I know will stop many builders of this little set from including one. You must not make the mistake of thinking that because only two valves are used the high-tension current is not very much.

It might well be 8 milliamperes and a battery which will supply this current

economically should be used. With a bigger power valve the current will be more than 8 milliamperes and a larger battery ought to be used.

I should use a moderately sized, but sensitive loud-speaker. Too large a loud-



Here is an additional view of the "Challenge Two" to those given last week

speaker will not be satisfactory in many instances.

The volume, as I have explained before, depends almost entirely upon the size of the power valve and the amount of the high tension. The biggest valve that you can afford to run should be used.

COMPONENTS FOR THE "CHALLENGE TWO"

Ebonite panel, 9 in. by 6 in. (Becol, Trelleborg, Lissen).

Baseboard, 9 in. by 9 in. (Cameo, Clarion, Pickett).

Two .0005-mfd. variable condensers (Formo, J.B., Lissen, Burton, Polar, Lotus, Ormond).

Push-pull filament switch (Readi-Rad, Bulgin, Benjamin, Lotus, Wearite).

Two slow-motion dials (Brownie,

Formo, Lissen, Igranic, Readi-Rad, Burton, Lotus, Ormond).

Challenge coil, with reaction winding (Readi-Rad, Wearite, Clarke's "Atlas," Tunewell, H. & B., Parex).

Two valve holders (Telsen, Lissen, Burton, Lotus, Benjamin, W.B., Igranic).

.0002-mfd. and .0001-mfd. fixed condensers (Lissen, Telsen, T.C.C., Igranic, Dubilier, Watmel, Atlas, Graham Farish).

Grid-leak holder (Lissen, Bulgin, Wearite, Readi-Rad).

2-megohm grid leak (Lissen, Dubilier, Graham Farish, Igranic).

Pre-set condenser, .0001-mfd. to .000005-mfd. (Sovereign, Polar, Formo, R.I.).

Low-frequency transformer (Igranic "Midget," Telsen, R.I., Lissen, Varley, Ferranti, Lotus, Brownie).

Two terminal blocks (Junit, Lissen, Belling-Lee).

Four terminals marked: Aerial, Earth, L.S.+, L.S.— (Belling-Lee, Ealex, Clix, Burton, Igranic).

Four yards of thin flex (Lewcoflex).

Five wander plugs marked: H.T.—, H.T.+1, H.T.+2, G.B.+, G.B.— (Belling-Lee, Clix, Ealex, Igranic, Burton).

Two spade terminals marked L.T.+ , L.T.— (Belling-Lee, Clix, Ealex).

HERE'S THE ACCUMULATOR YOU'VE BEEN WAITING FOR!

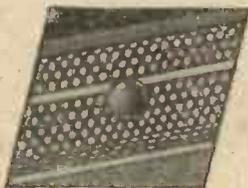


Always up to date . . . sometimes ahead, PERTRIX is again first in the field with something new.



THE PLATES

Of extraordinary thickness making them specially suitable for slow discharge, they may stand idle for many months without any fear at all of sulphation.



CHARGE INDICATOR

The ball in the small cage at the top of the cell indicates the state of charge. When it floats the cell is charged, when it sinks the cell requires re-charging. One float only does the job. No need now to commit to memory a verse of poetry.



THE PERFECT CARRIER

No more taking off and putting on carriers. The Pertrix Perfect Carrier is there—rigid when wanted—folded down when the accumulator is being used.



THE PRICE

As with all Pertrix Products, the price of this type of accumulator, compared with its ultra efficiency and unsurpassed quality, is low. PAC1, with a capacity of 20 a.h. on slow discharge, is 4/6. PAC2, with a capacity of 45 a.h. on slow discharge, is 8/6.

BUILT FOR SERVICE

THE IMPROVED
PERTRIX
SUPER LIFE
ACCUMULATORS

"The batteries you can trust"

ADVT. of PERTRIX LIMITED, BRITANNIA HOUSE, 233, SHAFTESBURY AVENUE, LONDON, W.C.2.

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

WORKING VOLTAGES OR TEST VOLTAGES?

AN
IMPORTANT
STATEMENT
BY THE
TELEGRAPH
CONDENSER
CO., LTD.

At the present time there is some confusion regarding the most suitable method of indicating Condenser voltages. Some manufacturers, including ourselves, mark their Condensers with their actual *working* voltages. Others adopt the more spectacular method of indicating *test* voltages.

Because test voltages are obviously much higher than actual working voltages, the Condenser buyer may be led to believe that the higher voltage indicates a more efficient and better insulated condenser. This is not necessarily the case.

In the past it has been fairly safe to assume that the continuous working voltage of a Condenser was half of its stated test voltage. Unfortunately, this method of grading Condensers can no longer be universally relied upon since it has been found that Condensers of similar capacity and size have been sold stamped with varying test voltages, but with no indication as to the working voltage. (This formed the subject of a statement issued by us earlier this year in reference to condensers of foreign manufacture).

We, therefore, recommend all users in their own interests to see that the Condensers they purchase are definitely marked with their maximum working voltage. This will always be found on "T.C.C." CONDENSERS.



TELEGRAPH CONDENSER CO. LTD., N. ACTON, W. 3

©1931

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

A Weekly Programme Criticism—By SYDNEY A. MOSELEY.

Without Fear or Favour



MODERN MUSIC

"Dr. JEKYLL AND Mr. HYDE"

THE Foundations of Music series finds a ready supporter in me; but the other evening when I switched on I thought it the "Kitten on the Keys." Alas, it was merely Stravinsky!

Now, this is not a general sneer against modern music. The night before I had heard the "Bolero for Orchestra" by Ravel, which the B.B.C. admits, when it was heard for the first time in London at one of the B.B.C. concerts last winter, "bewildered" a number of hearers. As a matter of fact, the other night a man left the hall in the middle of it, while the lady who accompanied me wrote on the programme "Chinese torture."

But I fully enjoyed it; so did she, in fact, as she afterwards admitted. It was something decidedly novel, the persistent drum-rhythm gradually catching hold of one and, as more and more instruments joined in, carrying one away. Whatever it was a year ago, this year it was an undoubted success.

Leon M. Lion certainly got away with his wireless interpretation of *Dr. Jekyll and Mr. Hyde*. He imparted all the horror, tragedy, and pathos into the dual characters, and truly deserves honours for the occasion. Mr. Utterson, played, according to the programme, by Henry Ford, was clearly understood, but the Doctor, down on the programme as William Fazan, may have had a good bedside manner, but not the perfect broadcasting voice.

Poole, the butler, played by Carleton Hobbs, was also clear.

I thought that the prologue, spoken by Hugh Dempster, sounded as if he were reading a part. Of course, there are dramatic difficulties in the play, but, on the whole, one of the best plays for broadcasting.

Readers of this page know full well how often I have endeavoured to put the best possible aspect of Talks in my criticisms. But I have had so many complaints that it is my duty to speak out.

The Talks have degenerated into a procession of dreary, badly delivered "lectures." Whoever is responsible for these talks is well intentioned and idealistic, but absolutely without a sense of balance.

Now, these lectures are not rubbish.

They are good stuff, but so devoid of interesting presentation and delivered in a funereal, high falutin' style that not one in ten thousand listens. I can assure my friends at Savoy Hill that the volume of complaints is not made up of jazz-ites and low-brows, but of all types of listeners.

As keen as I am on astronomy, I could not listen through the half-hour talk of Sir Arthur Eddington's lecture on "Science and Religion" or even Reginald McKenna's important lecture on "Monetary Policy."

I am glad by the way the latter was described as a "lecture." That is the worst of it all; they should be talks, and I haven't heard a real broadcast talk for weeks.

I am wondering what was the result of "The Week's Good Cause" when a departure was made from the usual method of appeal by a dialogue between Leon M. Lion, Gwen Davies, and Mrs. Seymour Obermer.

It is an extraordinary thing, but I could distinguish scarcely one word in twelve,

TALKS OR LECTURES?

TOO BAD!

and I assumed something had gone wrong with my set, when the announcer came on, and his voice was perfectly clear and distinct. What is the explanation of this?

I was not too favourably impressed at my introduction to the "Foursomes." Their chorus of "Oh, please do!" sounded like school children enticing uncle to sing. One of the voices at least suggested change of title to "The Vocal Wobblers."

Incidentally, Ronald Frankau always invites comparison with Leonard Henry, and I fear comes out second. Where Frankau gives the impression of a conscious effort to be clever, Henry manages to keep spontaneous.

Pity that Stuart Ross and Joe Sargent have to sing such varied stuff, but the xylophone solos come over well; although what an asset television would be to Teddy Brown!

Two bright letters. One complimentary, which I shall not quote, and the other, which I shall quote, from A. H. Browett, "Beverley," Dale Park Avenue, Carshalton, Surrey, who says: "If you do not like the programme between 1 and 2 o'clock on Saturday, do not switch on; but there are thousands who do. Perhaps you prefer switching on on Sunday afternoon at about 5.30. This is just the time I like to have a sleep. It does me more good."

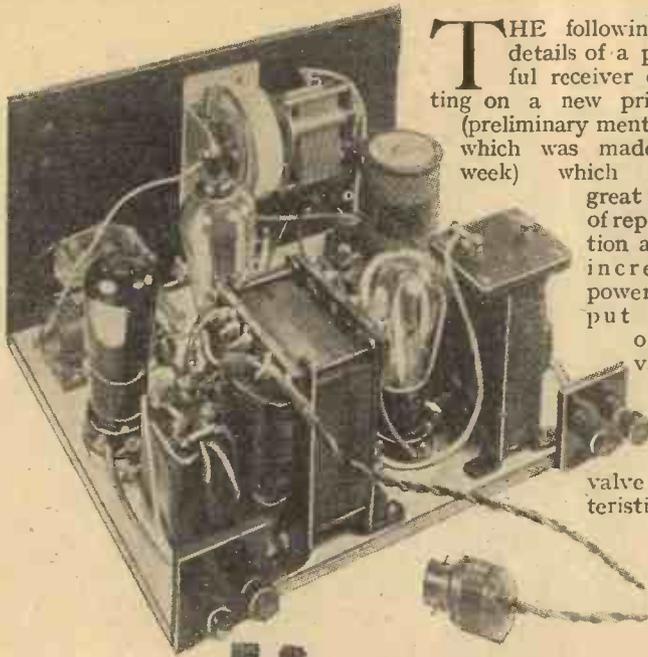
All I can inform my polite correspondent is that from letters I have received other listeners do not agree with him.

I was caught the other day in "The Children's Hour." I listened attentively to an exciting story where a certain Inspector Garvell set a trap; and, by Jove, he set it all right! But just as the wicked robbers were being rounded up there came a pause, and the intimation that it was "to be continued in our next." Too, too bad!

I do not remember having heard Jamieson Dodds over the wireless before. Jamie is a nice fellow, and I am glad to say that he was a great success; and he could give lessons to certain members of the Carl Rosa Opera Company, whom I heard the same afternoon, in point of enunciation.



Our Cartoonist's impression of Lady Tree



THE following are details of a powerful receiver operating on a new principle (preliminary mention of which was made last week) which gives great purity of reproduction and an increased power output from one's valves. The trouble

with the usual forms of inter-valve coupling is that their characteristics vary with the frequency of the current, and therefore different notes are amplified to a varying extent. In modern times this variation only becomes appreciable at the lowest

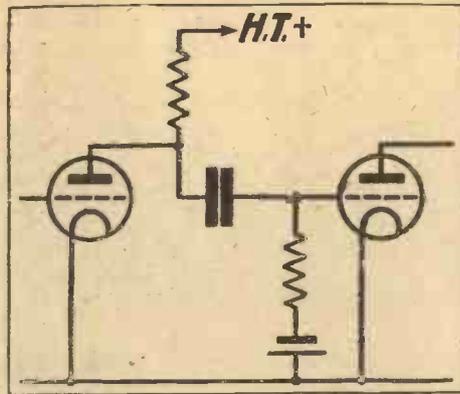
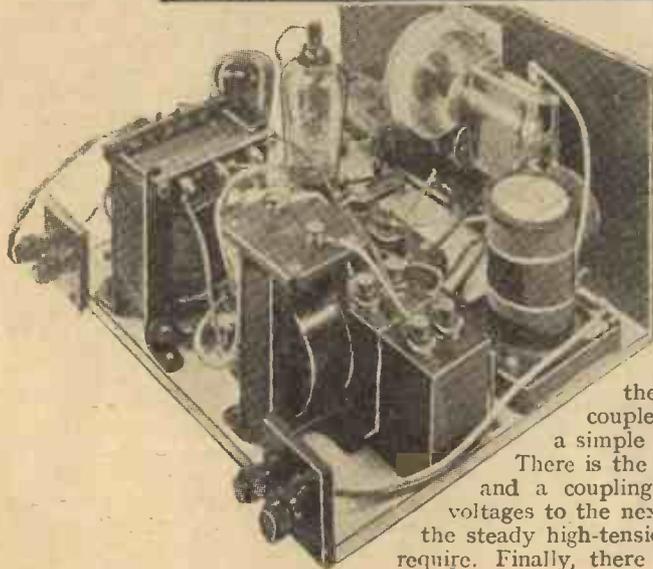
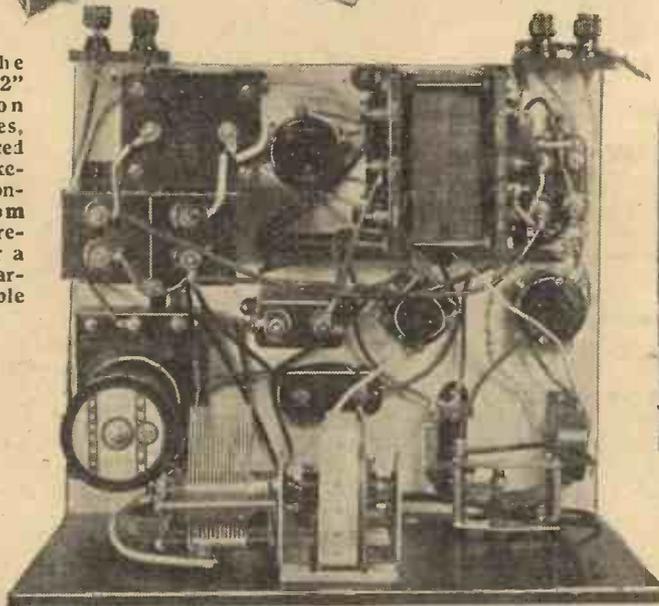


Fig. 1.—A simple resistance-coupled circuit

polarise the grid of the second valve to the correct bias. Fig. 2 illustrates the same system applied in a somewhat different manner. As before, we have a resistance in the anode circuit of the first valve, but this is connected directly to the grid of the second valve. The voltages are, therefore, transferred directly across without any loss on the way, but the grid of the second valve is now at the same steady potential as the anode of the first valve. If the filaments were connected together as in Fig. 1, the arrangement would not work, for the large positive voltage on the grid would render the second valve inoperative. Therefore, we do not connect the filaments together, but place a battery in between them approximately equal to this voltage, so that the second valve now operates under

Although the "Loftin-White 2" is built upon orthodox lines, it will be noticed its actual make-up differs considerably from an ordinary receiver and for a mains set is particularly simple



The LOFTIN-WHITE

A NOVEL MAINS SET

and the highest frequencies, where we get what is called a "cut-off";

but with the present system, no such cut-off occurs until well outside the usual audible limits.

This is because of the peculiar arrangement used to couple one valve to the next. Resistances only are employed, without any coupling condensers, so that one has the advantages of resistance coupling without its defects. The simplest way to explain the operation is by evolving

the system from a resistance-coupled arrangement. Fig. 1 shows a simple resistance-coupled circuit.

There is the resistance in the anode lead, and a coupling condenser to transfer the voltages to the next valve without transferring the steady high-tension voltage which we do not require. Finally, there is the grid leak in order

its normal condition.

This is the basic principle of the Loftin-White arrangement, and it will be seen to

COMPONENTS REQUIRED

- Ebonite panel, 12 in. by 8 in. (Trelleborg, Becol, Lissen)
- Small drum dial, with .0005-mfd. variable condenser (J.B., Burton, Polar, Formo, Lotus, Ormond)
- .0001 - mfd. reaction condenser, (Polar, Lissen, Bulgin, Lotus, J.B., Dubilier, Formo, Keystone)
- Pick-up jack and plug (Lotus, type J.K.2 : Igranic)
- 400-ohm panel-mounting potentiometer (Lissen, Varley, Igranic, R.I., Sovereign, Rotor)
- Single-pole mains switch (Claude Lyons, Bulgin, Utility, Igranic)
- Baseboard, 12 in. by 10 in. (Clarion, Cameo, Pickett)
- Two four-pin and one five-pin valve holder (Burton, Telsen, Lotus, W.B., Benjamin)
- Dual-range coil (Leweos, D.W.A.)
- .01-mfd. fixed condenser (Dubilier, T.C.C.)
- Two 1-mfd. fixed condensers (Dubilier, T.C.C., Lissen, Igranic, Ferranti)
- 2-mfd. fixed condenser (Dubilier, T.C.C., Lissen, Igranic, Ferranti)
- Two 2-mfd. fixed condensers (800

- volt D.C. Ferranti, .5-meg Grid-leak (Bulgin)
- 50,000 (Bulgin)
- 100,000 (Bulgin)
- 20,000 (Bulgin)*
- 5,000-ohm vernier, Ferranti
- 400-ohm High-frequency, Lissen
- Mains secondary (Read-R)
- 5-volt C. amp, 4-Wearite)
- Smooth Varley, L
- Two to Four L.S., A Burton, Lee)
- Screen Lee)

involve very simple coupling apparatus. It requires that the valves shall have separate batteries on their filaments, or that independently-heated cathodes shall be used, which comes to the same thing, and if we are using A.C. valves, this is quite an easy matter. Instead of using a battery to obtain the necessary voltages, we generate a large voltage of 400 volts, and connect this across a potentiometer on which we take tappings at different points to obtain the correct voltages.

The Potentiometers

This potentiometer arrangement can be seen in the circuit diagram Fig. 3. There is a simple eliminator circuit first of all providing 400 volts. This is applied to the reservoir condenser, after which there is a smoothing choke, and then a potentiometer consisting of a number of different resistances all in series. The potentiometer is made up this way because some of the resistances have to carry more current than others. For example, the 100,000-ohm and the 25,000-ohm resistances have only to carry a few milliamps, and are, therefore, of the spaghetti type. The remaining resistances have to carry 30 or 40 milli-

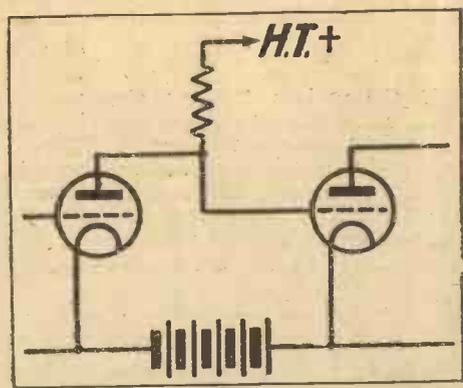


Fig. 2.—A modified resistance-coupled circuit

in great detail, and it will be sufficient to sketch its operation briefly. Across the grid circuit of the first valve, is either the tuning coil or a gramophone pick-up, according to circumstances. Free grid bias is obtained on this valve by means of the 50,000-ohm resistance in the cathode lead. The screen-grid of this first valve is connected to a suitable point on the potentiometer which gives the correct voltage. The anode circuit is connected

being connected to a suitable point on the potentiometer. The filament of the power valve is connected to a point a little farther down on the potentiometer, this point being so chosen that the filament potential is just a little negative with respect to the anode potential of the first valve (which is the same as the grid potential of the power valve) so that we obtain the necessary grid bias.

The output from the power valve goes to two terminals for the loud-speaker in the usual way. It is desirable to use an output transformer or choke-output circuit, but this has not been included in the receiver itself, in order to simplify its construction.

The Hum Balancer

There is one other matter of interest to which reference should be made, and that is the hum balancer. Between the cathode of the first valve and a suitable point on the potentiometer a 2-microfarad condenser is connected. This connection is made variable, being connected to the slider of a potentiometer, and it will be found that as the slider is moved round, so the hum decreases and becomes a minimum at one point. It is an easy matter to adjust the hum to the minimum when the receiver is first made, and thereafter this hum balancer does not require to be altered. It may, perhaps, be altered occasionally when receiving weak signals.

The construction of this set follows straightforward lines. The eliminator portion is arranged along the

LOFTIN-WHITE 2

RECEIVER SET WITH A NEW PRINCIPLE



amps, and are, therefore, power resistances. It is not necessary to go into the circuit

direct to the grid of the power valve as already mentioned, the H.T. end of the .5-megohm resistance in the anode circuit

back of the baseboard, with the power transformer on the right-hand side, and the other components occupying the remainder of the baseboard.

The tuning coil is on the left front end of the baseboard, a dual-range coil being used to tune in both wavebands. The tuning condenser is in the middle of the panel, the reaction condenser on the right, and the hum balancer on the left. The remainder of the components are distributed over the baseboard, in the proper circuit order, so that although the whole arrangement is compact, it is quite easy to wire as the leads are quite short.

Resistances

The only point that requires any comment is the use of the strip or spaghetti resistances. In several cases this form of resistance has been used, and as it is covered with insulating sleeving, it is at first sight indistinguishable from the ordinary wiring of the set, which in this instance has also been covered with insulating sleeving. The position of the resistance is clearly marked on the blueprint, and if this is followed no difficulties should arise.

- REQUIRED
- test) (Dubilier L.S.B., T.C.C., Igranite)
- ohm grid leak (Dubilier)
- ak holder (Lissen, Dubilier,
- ohm spaghetti resistance
- 0-ohm spaghetti resistance
- ohm spaghetti resistance
- ohm power resistance (Colverant, Varley)
- am resistance (Colvern)
- frequency choke (Telsen, Varley, Readi-Rad, R.I., Leweos)
- transformer, with following
- ies; 375 v.-0—375 v., 40 m.a.,
- T. 1.6 amp, 6-volt C.T. .25
- volt C.T. 1 amp (Savage,
- ing choke (Lotus, Igranite,
- issen, R.I.)
- terminal strips, 2 in. by 2 in.
- ad, Junit, Belling-Lee, Becol)
- terminals marked: L.S.+
- A, E (Belling-Lee, Clix, Eelex,
- Igranite)
- grid connector (Belling-

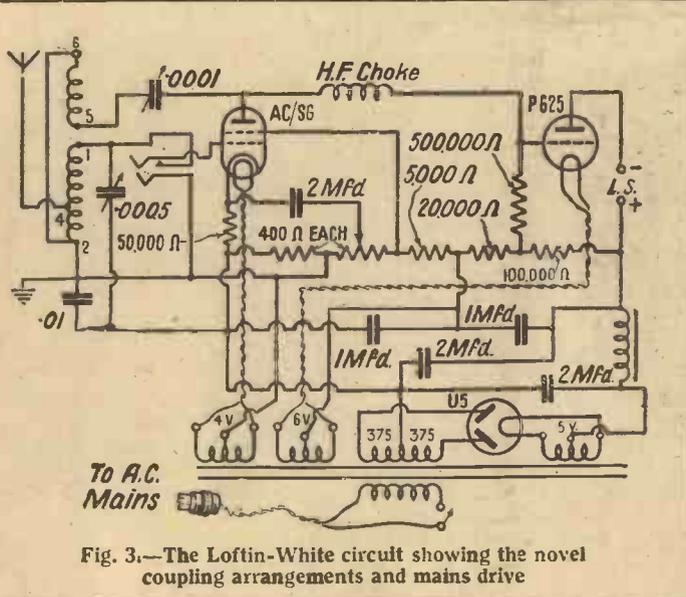


Fig. 3.—The Loftin-White circuit showing the novel coupling arrangements and mains drive

"THE LOFTIN-WHITE 2" (Continued from preceding page)

A metallised form of leak should be used for the .5 megohm resistance in the anode circuit of the screen-grid detector valve. This is important, as I have found that the composition type of leak changes its value rather badly under the influence of the anode current flowing through it. As the whole circuit is a rather nicely balanced one it is important that the resistance values should not vary much from those specified. The use of a metallised leak avoids any difficulty in this connection, since the value does not change with the current flowing through it, up to the limits required in this receiver.

Operation

The operation of this set is simple in the extreme. The valves required are AC/SG for the first valve, P625 for the second valve, and a U5 for the rectifier. Equivalent valves to these, made by other manufacturers, may of course be used, provided that their characteristics are reasonably the same. It should be borne in mind, however, that the rectifier valve has to stand 375 volts on each anode, and that the ordinary type of rectifying valve will not do. The total anode current is in the neighbourhood of 30 milliamps.

Having placed the valves in the correct sockets, the aerial and earth should be connected up and also the loud-speaker. The power plug should then be connected to the mains and the set switched on. Set the hum balancer in the mid position and vary it a little on either side to find which is the best point for minimum hum. That is all that is required. The set is now ready to receive stations. For gramophone reproduction the pick-up must be plugged into the jack immediately underneath the tuning condenser. This automatically changes the connections and turns the set into a gramophone amplifier. A volume control should be provided on the pick-up.

For radio the plug is removed, and the stations are tuned in on the main dial in the usual manner, adjusting the strength with reaction as required. Anode-bend rectification is used, since our experiments have shown that this method suits the Loftin-White circuit. It means, however, that the detector stage is not particularly sensitive and the receiver, therefore, must be considered as a local-station set.

It will give excellent quality with loud volume on the local stations, and, as I mentioned in an earlier article, the volume on a pick-up is truly extraordinary.

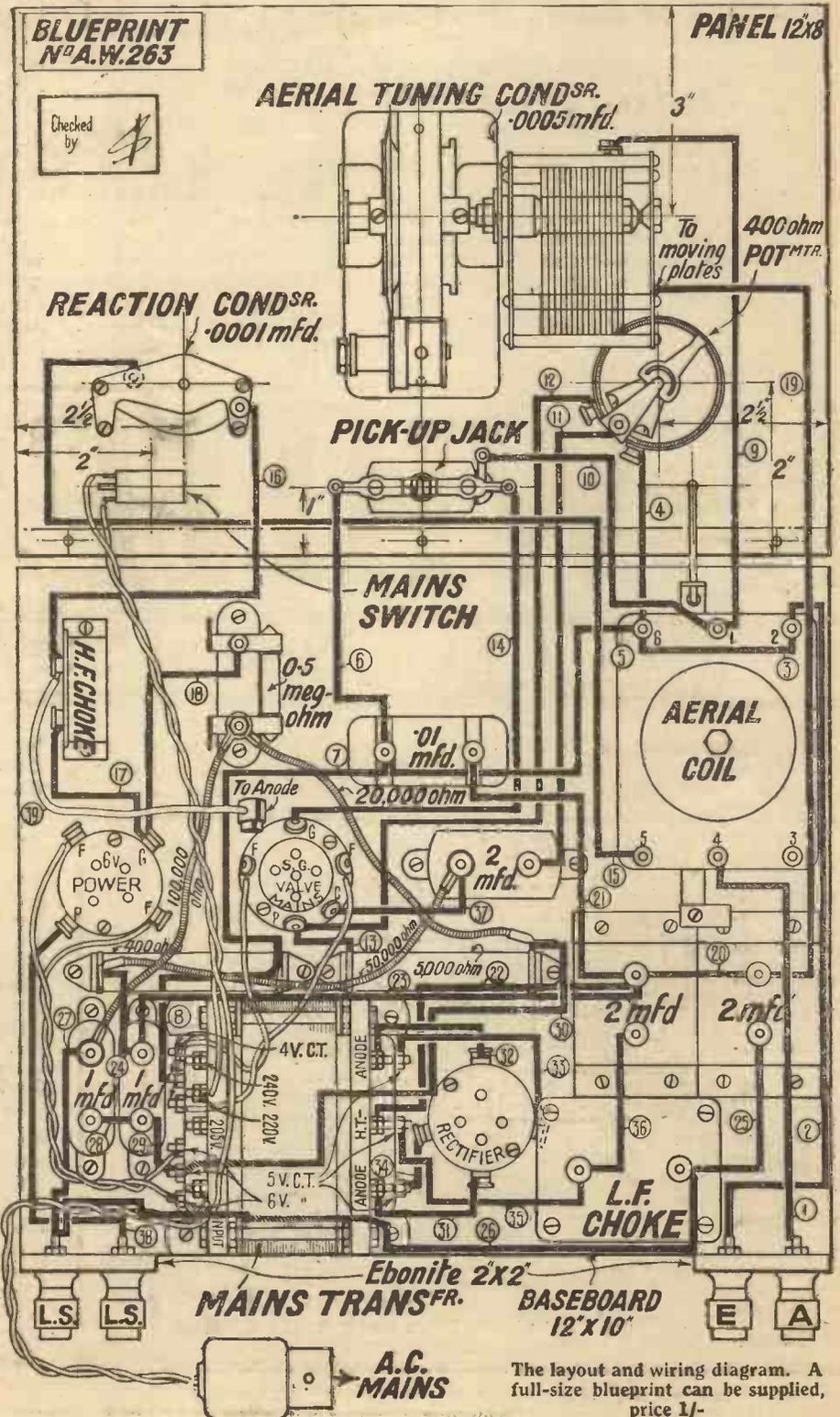
FOR GRAMO-RADIO ENTHUSIASTS

THERE'S good news for radio-gramophones enthusiasts who are on the look-out for a new instrument or who want to get better results than at present. In next week's issue will be a worthy addition to our successful series of "Challenge" sets—a "Challenge" radio-gramophone. This is the very latest thing in radio-grams, being a four-valver with one screen-grid stage, and having most up-to-date gramophone amplifier arrangements, and an induction-motor turntable drive. Don't miss this!

FIGURE OF MERIT

AMONGST the various "characteristics" of a valve, mutual conductance is one of the most important. It represents the ratio of "mu" or amplification factor to internal-resistance, and is often referred to as the "performance factor" of the valve. Actually it measures the change in plate current corresponding to a change

of 1 volt applied to the grid. Another term which measures the performance of a valve is the so-called "figure of merit." This is calculated by dividing the square of "mu" by the internal resistance. In actual practice the value of internal resistance usually quoted for screen-grid amplifiers is a more or less artificial figure which seldom holds good when the valve is in operation. M. A. L.



The layout and wiring diagram. A full-size blueprint can be supplied, price 1/-

LISSEN

FIXED CONDENSERS

Deliver all their stored-up energy

BECAUSE you are using bigger H.T. voltage—because you are seeking always more power and more purity from your set—because you are going out for ever more distant stations—your need for condensers that will stand up to all demands without leakage and without breakdown is more urgent now than ever.

Lissen Fixed Condensers have become the standard fixed condensers in almost every published circuit. Accurate to within 5 per cent. of stated capacity.

·0001 to ·001 mfd., 1/- ea.

·002 to ·006 mfd., 1/6 ea.

Insist upon Lissen parts always



D.C.
27/6
MODEL "A"

A.C.
60/-
MODEL "A"

**MOULDED CASES
MADE OF INSULATING
MATERIAL-HEAVY
"CAB TYRE" FLEX LEADS**

The current you get from Lissen Batteries is the purest form of current you can get for radio. But if you want to use an eliminator, use a Lissen Eliminator. You'll then get H.T. current from your mains smoother, steadier, better than before.

There are 4 types of Lissen Eliminators: one of them will almost certainly be just right for your set. Tell your dealer what voltage your mains supply is and whether it is A.C. or D.C.; tell him what output you require, or what valves you are using and he will demonstrate for you the Lissen Eliminator to suit your needs.

D.C. MODEL "A"
(100-150 volts and 200-250 volts)
Employs 3 H.T. + tappings: H.T. +1 giving 80 volts for 8.G. valves; H.T. +2 giving 60 volts at approx. 2 mA for detector valves; H.T. +3 giving 120/150 volts at 20 mA. PRICE .. **27/6**

D.C. MODEL "B"
(100-150 volts and 200-250 volts)
Employs 3 H.T. + tappings: H.T. +1 and H.T. +2 are continuously variable (by means of two control knobs) and capable of giving any desired voltage up to 120/150 volts at approx. 2 mA; H.T. +3 giving 120/150 volts at 20 mA. for power valves. PRICE .. **39/6**
D.C. Models working on 100/110 Mains Voltage give output of approx 80 per cent. above value.

A.C. MODEL "A"
Tappings as in D.C. Model A.
100-125 volts and 200-250 volts.
PRICE £3 : 0 : 0

A.C. MODEL "B"
Tappings as in D.C. Model B.
100-125 volts and 200-250 volts.
PRICE £3 : 15 : 0

LISSEN

ELIMINATORS

LISSEN LIMITED

WORPLE ROAD, ISLEWORTH, MIDDLESEX.

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

SETS OF DISTINCTION



The EDISWAN POWER PENTODE TWO

Makers : Edison Swan Electric Co., Ltd. Price : £14-19-6

EMPLYING "amazing Mazda valves," as they are described, the new Ediswan two-valver for A.C. mains put up a splendid performance when I tested it recently. The detector valve is an AC/EL, an indirectly-heated 4-volt mains valve of very high efficiency. Transformer coupled to this is the AC/Pen, an indirectly-heated pentode. The combination is extremely powerful and gives results comparable with a three-valver using battery-operated valves. The high-tension supply is derived from the A.C. mains by means of a UU60/250 rectifier valve.

Convenient Arrangement

I had to insert these valves before the set could be tested. In doing so I noted that the positions of the valves are very clearly engraved on the brown bakelite platform. Looking into the interior of the set, by removing the back of the cabinet, I noted a particularly neat mains voltage-tapping device, marked 200, 220 and 240 volts. A small link bar is adjusted to correspond with the voltage tapping nearest to the voltage of supply.

Connection to the mains supply is by means of a usefully long length of flex. At one end is a 2-pin plug for inserting in a wall socket and at the other end is a special bakelite socket for insertion in the back of the set. There is no separate mains switch.

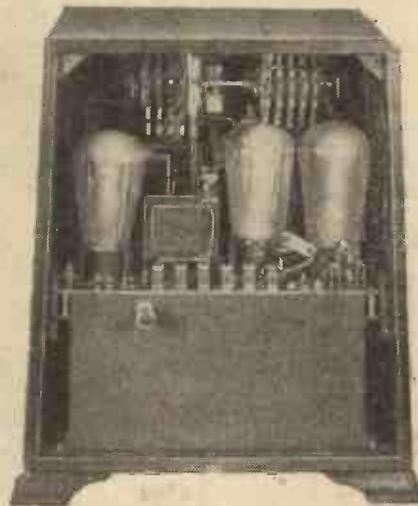
The controls, mounted on the front of the extremely attractive walnut cabinet, impressed me with their simplicity and handy size. The main control is a large tuning disc, rotating an easy-to-read dial engraved from zero to 100. Above the tuning control are three knobs. That on the left is for fine tuning, necessary owing to the inclusion of a two-circuit tuning arrangement. On the right is a knob marked "Volume," but it really controls reaction. I wish the makers had marked this knob "Reaction." The knob at the top is for changing the wavelength range, left for medium waves and right for long waves.

Tuning

In a two-valve set it is unusual to employ a two-circuit tuner. I see that primary and secondary tuning circuits are included in this Ediswan set. A two-gang condenser is included, with a separate aerial-tuning condenser for final trimming work, in conjunction with the two special tuning coils. These coils are mounted on a horizontal shaft so that the coupling between them can be varied to provide different degrees of selectivity.

The adjustment of coil coupling is not intended as a variable control device. Once the best degree of coupling has been determined there is no need for further adjustment. As a matter of fact the makers adjust the coupling for average conditions when the set is tested at the factory.

As a means of coping with the strong transmissions from Regional centres, such as Brookmans Park and Daventry, this variable coupling of tuned primary and secondary coils is highly effective. This is



The back of the Ediswan Power Pentode Two : note the special coils at the top

the first set having two valves to include such elaborate means of achieving selectivity. But when one remembers how considerable is the amplification of the two Mazda valves in this set, the need for selective tuning circuits is readily appreciated.

Using the normal aerial terminal (an alternative is provided for remote conditions of reception) I determined the selectivity by tuning in the National station from Brookmans Park. Maximum at 7

degrees on the tuning dial, the National had disappeared at 15 and could still be heard at zero degrees. This spread of 15 degrees is moderate for such a set. The Regional station was at its maximum at 49 degrees and could still be heard up to 58 and down to 38 degrees, a spread of 20 degrees, which in my opinion is very satisfactory.

I quickly got used to the operation of this set, the auxiliary tuning knob on the left being easy to work in conjunction with the main tuning disc. That selectivity has not been achieved at the expense of volume was proved by the great strength of the Midland Regional, which came in at 92 degrees. Just below it at 90 degrees I was surprised to hear Langenburg at fair loud-speaker strength. Rome at 77 was heard at good loud-speaker strength and so was Stockholm as 75 degrees. Toulouse at 57 was very strong, as was Goteborg at 33 and Bratislava at 18. Altogether I counted twenty strong carrier waves, all of which could have been resolved into loud-speaker signals of various strengths.

Good Quality

For listeners wanting a good local-station set the Ediswan Power Pentode Two more than adequately fills the bill. And for those who are prepared for critical adjustments of reaction and tuning this little set is quite capable of bringing in several of the more powerful foreign stations, especially if a good aerial can be erected.

I tested this set with one of the new inductor dynamic loud-speakers. I can say of the quality of reproduction just this; it is really first-class. The set fully justifies the use of a good loud-speaker.

When Submitting Queries

Please write concisely, giving essential particulars. A Fee of One Shilling (postal order), a stamped addressed envelope, and the coupon on the last page must accompany all letters. The following points should be noted.

The designing of apparatus or receivers cannot be undertaken.

Modifications of a straightforward nature can be made to blueprints, but we reserve to ourselves the right to determine the extent of an alteration to come within the scope of a query.

Queries cannot be answered personally or by telephone.

WIRELESS
MAGAZINE
The Best Monthly

TRUMPHS

OF BRITISH RADIO RESEARCH

With
NIKALLOY
Cores



RI revolutionised the standard of design, construction and performance in Transformers by the introduction of **NIKALLOY**

The amazing Improved Reception that the **HYPERMU** and **HYPERMITE** give proves that the association of efficiency with bigness and outward indications of construction as with older types is fallacious. These modern compact components yield positively unequalled results and ensure absolute reliability and lasting efficiency.

HYPERMU The highest and most uniform amplification between 25 and 7,000 cycles of any transformer in existence. Primary inductance 85 henries. Ratio 4-1. Weight 21'13 ozs. Incontestably the world's best transformer. **21'13**

HYPERMITE The most efficient transformer in existence for its size and weight. Primary inductance over 50 henries. Ratio 3½-1. Weight 7 ozs. Used by many of the largest set manufacturers in this country. **12'6**

Ask your dealer for the leaflets dealing with the **R.I. Nikalloy Three—Hypermu, Hypermite and Hypercore.**

R.I. LTD., MADRIGAL WORKS, PURLEY WAY, CROYDON

NULLI



SECUNDUS

A CHRISTMAS GIFT

That Your Friends will Appreciate
IT'S CHEAP. EASY TO BUILD
and Wonderfully Efficient—
THE CHALLENGE "2"



FOUR COLOURS

3/-

DIAL



Capacities:
.0005
.00035
.00025
.00015

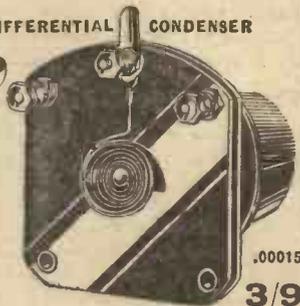
4/6



MIDGET REACTION CONDENSER

.0001
.0002
2/9

DIFFERENTIAL CONDENSER



.00015
3/9



A great little compression type Condenser.

F	.0001	-	-	1/6
J	.0003	-	-	1/6
S	.001	-	-	1/6
H	.002	-	-	2/3



1,000 volt test. Bakelite and Mica.
.0001 Gd. .0005 7d.
.0002 .001 8d.
.0003 .002 10d.

SIX OF OUR MANY LINES

BRITISH LEADERSHIP
SUPPLIERS TO THE LEADING SET MAKERS OF THE COUNTRY

CATALOGUE FREE. GOLDEN SQUARE, PICCADILLY CIRCUS, LONDON. GERBARD 1663.

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

THE HOW AND WHY OF RADIO

XIII—MAKING THE MOST OF REACTION

If you are a beginner in wireless, now is your chance to gain a clear conception of its theory and practice. In this series of articles, specially prepared for the beginner, no previous knowledge of wireless is assumed. It is intended to deal with every aspect of the subject and the whole series will endow the beginner with sufficient knowledge to enable him to derive the greatest possible interest from the fascinating hobby of wireless

EVERY beginner should know something about reaction. In simple sets reaction is indispensable. By its aid the signals passed on to the anode circuit of the detector valve from the grid circuit are reintroduced at the grid. The rectification process, as I have often explained,

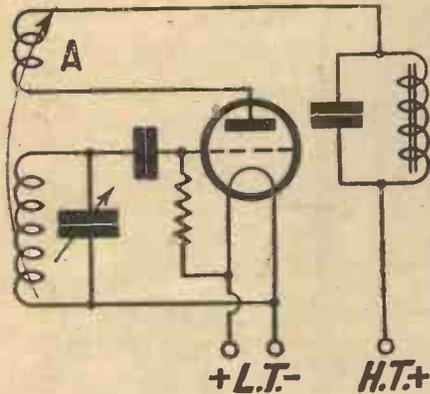


Fig. 1. Simple magnetic reaction circuit with variable reaction coil coupling

does not eliminate the high frequencies, but merely allows the super-imposed low frequencies of speech and music to actuate the low-frequency side of the set.

What Reaction Is

Reaction is the process whereby these high frequencies in the anode circuit are made to do useful work. Their reintroduction into the grid circuit results in a considerable build-up of the incoming signal. In a reaction set a signal arrives at the grid, is passed through the anode circuit, is reintroduced into the grid circuit, and is then finally by-passed to earth.

The grid circuit of the detector has a certain power loss, which can be made up by regeneration, that is, the reintroduction of grid voltages from the anode circuit. So long as the grid circuit is absorbing power, reaction, or regeneration, as it is sometimes called, is taking place.

It is quite easy to see that the power loss of the grid circuit may be more than compensated by reintroduced energy. And when this happens the regeneration process merges into oscillation, which means that the valve itself causes oscillations in the grid circuit, without the help of an outside signal.

The valve cannot act as a good detector while it is oscillating (except under a very special circumstance) so it is clear that the

greatest permissible amount of regeneration is provided just before the valve starts to oscillate. The object of all reaction systems is to feed back energy gradually, so that the amount of regeneration can be controlled, and so that when the maximum regeneration is wanted the feed back can be increased to that critical point just before oscillation.

Three Reaction Types

In this short article we can discuss only three of the many ways of obtaining reaction. The simplest possible way is shown by Fig. 1. The arrow, through the tuning coils connected across the grid circuit and the coil in series with the anode and the primary of the low-frequency transformer, indicates that the two coils are variably coupled together.

This system is known as magnetic reaction, whereby the high-frequency current flowing in the anode circuit is induced into the grid circuit, the amount depending upon the degree of coupling.

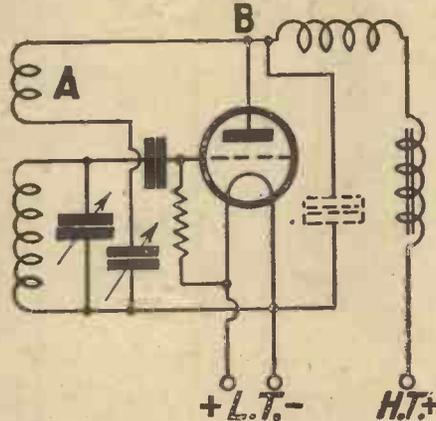


Fig. 2. Capacity-controlled reaction with fixed reaction coil coupling. Note dotted by-pass condenser

A very important point of this circuit is the .0001-microfarad fixed condenser shunted across the transformer primary. Without this condenser the reaction would be erratic, due to the difficulty of the high-frequency current passing through the high impedance of the primary windings.

This circuit is not in great use these days, except in one or two commercial sets, where a fine mechanical control over the coil coupling can be more readily achieved than by the amateur with standard accessories. There is no electrical drawback to the circuit, which, in my opinion, gives just as good results as the circuit of Fig. 2. But it is much easier to vary a

capacity than to vary an inductance. For this reason the Fig. 2 circuit is now almost universal.

Capacity Reaction

Fig. 2 is not so different from Fig. 1 as might at first be thought. The coil A in Fig. 2 is passing the high-frequency current of the anode circuit in just the same way as in A of Fig. 1. But the amount of current passing through the coil of Fig. 2 is under control, while the degree of coupling between the coils is constant; whereas in A of Fig. 1 the amount of current flow is constant but the degree of coupling is under control. Both actions have the same effect. High-frequency from the anode is induced into the grid circuit by a controllable amount.

In Fig. 2, the greater the capacity value of the variable condenser in series with coil A and low-tension negative, the greater is the flow of high-frequency anode current; and so the greater is the reaction effect. Since variable condensers are designed to give a very fine variation in capacity, this Fig. 2 system provides a very good control of reaction.

Its effective working depends upon the diversion of the high-frequency anode current, normally flowing through the anode circuit, to the parallel reaction circuit. At point B in Fig. 2 the high-frequency anode current has the choice of two paths, one through coil A and the condenser, and the other through the transformer winding.

It chooses the reaction circuit because of the insertion of the high-frequency choke in series with the anode and the transformer. The impedance of the choke to high-

(Continued on next page)

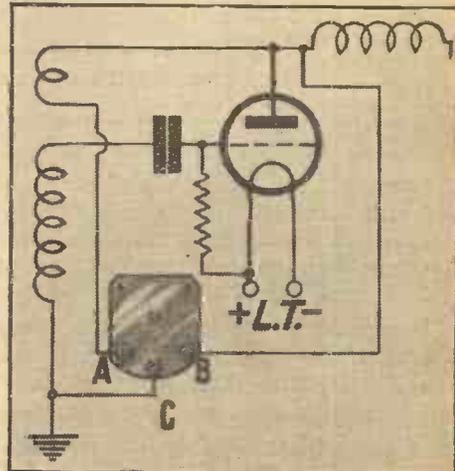


Fig. 3. Connections for differential reaction condenser

frequency current is very high compared with the impedance of the variable reaction condenser. Sometimes the primary winding of the transformer has sufficient impedance to high-frequency to enable the high-frequency choke to be dispensed with. Where great economy is desired, the choke can, therefore, be omitted. But erratic reaction and instability in the low-frequency side may quite easily be caused by the omission.

Under detector articles I have stressed the need for by-passing the high-frequency of the anode current to earth, to ensure stability on the low-frequency side, to produce efficient detection and to provide smooth reaction. A careful study of Fig. 2 will show that the high frequency is by-passed through the reaction coil and condenser, but by a varying amount.

Feed Back

When little or no feed back is taking place, due to the low capacity setting of the reaction condenser, *little or no high-frequency by-passing is effected*. This is a bad feature of a circuit that has held sway for many years. The inclusion of a .001 microfarad condenser across the anode and low-tension negative, as shown by the dotted lines in Fig. 2, remedies this defect by providing a constant by-pass independent of the variable by-pass imparted by reaction. This small by-pass condenser does not affect the working of the reaction and greatly assists in bringing about good detection and low-frequency stability.

Differential Reaction

Lately, a special three-plate reaction condenser, called the differential, has been widely used to bring about the same effect as a two-plate variable and a two-plate fixed condenser. Fig. 3 shows this development. A and B are equal-sized sets of fixed vanes, with the moving plates c common to both. As c moves away from A the reaction capacity between A and c is decreased and so, therefore, is the reaction by-pass of high-frequency to earth. But in moving from A, c moves towards B, increasing the capacity between c and B as much as it is decreased between c and A. Now the capacity between B and c corresponds to the fixed by-pass condenser capacity shown by the dotted lines in Fig. 2. So as the reaction by-pass decreases, the B to c capacity increases, thus maintaining a constant high-frequency by-pass between the anode and earth, while providing a variation of reaction between the anode and earth, via the reaction coil and the A to c portion of the differential.

HOTSPOT.

The British Blue Spot Co., Ltd., inform us that they and their customers are being caused trouble by loud-speakers, units, etc., imported from abroad and wrongly purporting to be "Blue Spot" products, and they ask us to request readers to see for themselves that the product bears the "Blue Spot" trade-mark, which appears in their advertisements from time to time. Readers should see that the goods are contained in standard packings which, in the case of units and chassis, are of yellow and two blues.

BY SPECIAL

ARRANGEMENT ALL "AMATEUR WIRELESS"

KITS ARE OBTAINABLE BY

EASY HIRE PURCHASE TERMS

USE READY RADIO AUTHORIZED KITS

"CHALLENGE TWO"

1 Drilled Ebonite Panel, 9 by 6 by 3/16 in. ...	s. d.
1 Solid Oak Cabinet, with baseboard, 9 in. deep ...	3 0
2 Readi-Rad .0005 Variable Condensers ...	16 0
2 Readi-Rad Duograph Dials ...	9 6
1 Readi-Rad Push-pull Filament Switch ...	13 0
1 Readi-Rad "Challenge" Coil with Reaction ...	10 10
2 Telsen 4-pin Valve Holders ...	2 0
1 Readi-Rad .0001-mfd. Fixed Condenser ...	10 10
1 Readi-Rad .0002-mfd. Fixed Condenser ...	10 10
1 Readi-Rad 2-meg. Grid Leak and Holder ...	1 4
1 Pre-set Condenser, type F ...	1 6
1 Telsen "Radiogrand" L.F. Transformer ...	12 6
2 Junit Terminal Blocks ...	1 4
4 Belling-Lee "B" Terminals... ..	2 0
1 Packet "Jiffilinks" for wiring ...	2 6
2 Valves, as specified, Detector and Power ...	19 0
4 Yards Single Flex; 5 Indicated Wander Plugs; 2 Spade Terminals; Screws, etc. ...	2 7
TOTAL (including Valves and Cabinet) ...	£4 19 3

KIT A less valves and cabinet £3 3 9 or 6 equal monthly payments of 11/3	KIT B with valves less cabinet £1 2 9 or 6 equal monthly payments of 15/-	KIT C with valves and cabinet £4 19 3 or 6 equal monthly payments of 18/-
--	---	---

"CHALLENGE THREE"

KIT A less valves and cabinet £3 1 9 or 12 equal monthly payments of 11/3	KIT B with valves less cabinet £8 0 9 or 12 equal monthly payments of 14/9	KIT C with valves and cabinet £3 5 9 or 12 equal monthly payments of 17/-
---	--	---

"CHALLENGE FOUR"

KIT A less valves and cabinet £8 6 9 or 12 equal monthly payments of 15/3	KIT B with valves less cabinet £11 5 9 or 12 equal monthly payments of 20/9	KIT C with valves and cabinet £12 18 3 or 12 equal monthly payments of 23/9
---	---	---

"LOFTIN-WHITE A.C. TWO"

KIT A less valves and cabinet £7 17 9 or 12 equal monthly payments of 14/6	KIT B with valves less cabinet £10 16 3 or 12 equal monthly payments of 19/9	KIT C with valves and cabinet £11 16 3 or 12 equal monthly payments of 21/9
--	--	---

TO OVERSEAS CUSTOMERS. Your goods are very carefully packed for export and insured, all charges forward.

TO INLAND CUSTOMERS. Your goods are dispatched post free or carriage paid.

TROUBLE-FREE SET-BUILDING

USE "JIFFILINKS" FOR WIRING-UP. NO SOLDERING

IMMEDIATE DISPATCH

You can get any RECEIVER EQUIPMENT or SET OF PARTS from **READY RADIO** by **EASY PAYMENTS**

Send for our new 1931 "RADIO OUT OF IN-COME" Catalogue of Modern Sets, Accessories and Components. Post Free.

Ready Radio
 159, BOROUGH HIGH STREET,
 LONDON BRIDGE, S.E.1.
 Telephone: HOP 5555 (Private Exchange) Telegrams: READIRAD, SEDIST.
 Ready Radio (R.R. Ltd.), London, S.E.1.



IN MY WIRELESS DEN

WEEKLY TIPS—
CONSTRUCTIONAL AND THEORETICAL

By W. JAMES.

Control of H.F.

THE potentiometer method of controlling the amount of the high-frequency signal applied to the first valve in the set is satisfactory up to a point. Given a good potentiometer, a fairly smooth variation is obtained.

The fact is, that owing to the capacity of the valve to which the potentiometer is connected, we do not obtain true potentiometer action. Thus, if the arm is set three-quarters of the way towards the full on position, we do not apply three-quarters of the signal to the valve. We apply rather less.

And when the setting is half way we apply a good deal less than half the signal strength to the valve, provided, that is, that the resistance of the potentiometer is about 100,000 ohms. With a lower resistance instrument the effect is not nearly so marked.

If you draw the circuit you will see that when the potentiometer is set anywhere but full on, the grid of the valve has a resistance in series with it. This resistance in series with the capacity of the valve produces the cutting down effect described. At the same time, the effective capacity across the tuned circuit is reduced and so is the amount of the feed back. This last effect is important, as the behaviour of the rest of the set may be affected.

Some Pick-up Points

During the week I had occasion to test a pick-up supplied complete with carrying arm and volume control. By the way, why do they still call a carrying arm made specially for a pick-up a "tone arm"?

The pick-up was fairly satisfactory, but I could not help noticing that the tonal qualities changed according to the setting of the volume control. When the control was adjusted so as to lower the volume, the relative strength of the higher notes fell off rather rapidly. This is unusual when the control is a suitable potentiometer, so I had a look at the volume control fitted. It turned out to be a plain adjustable resistance.

You may hardly believe me, but this is true. Of course, the resistance acted to load the pick-up and changed its frequency response characteristics every time an adjustment was made.

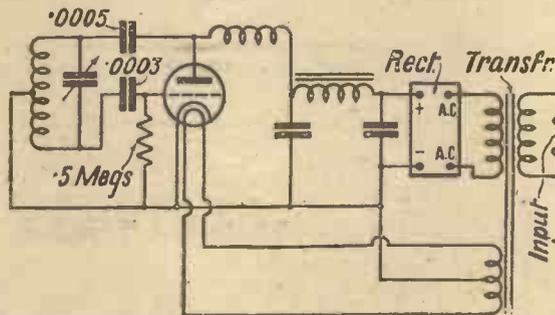
This just shows how careful you have to be. What I did was to fit a potentiometer in the usual way. Then I adjusted the resistance on the pick-up carrier to provide the best average tone.

A Simple Oscillator

There are occasions when a simple oscillator is needed for testing purposes. One of the simplest is shown in the accompanying diagram.

With an indirectly heated valve and a mains unit, ample power is readily to be obtained. A centre-tapped coil will be suitable. Its ends are connected to the tuning condenser and the tapping goes to the cathode. There is a grid condenser and leak and a high-frequency choke.

A plug-in type coil is perfectly suitable for this work. Do not overlook the fact that both sides of the tuning condenser are alive. If a modulated output is not objected to the smoothing condenser and



This is the circuit of a simple oscillator which may be very helpful in testing sets and checking up wavelengths. Full details are given in the accompanying paragraph. It will be seen that the unit is mains driven, and therefore has very constant characteristics, which is a great advantage in testing

choke of the mains part may be left out. Then the output will have a 100-cycle modulation for a supply frequency of 50 cycles and using a full-wave rectifier.

Any valve will do. It is better to use one of medium impedance as a rule, however, as we do not want to overload the rectifier. The oscillations will normally be of good strength and will be picked up by a receiver some distance away. All sorts of uses can be found for a simple oscillator of this description and it could, of course, be roughly calibrated.

Trailing Speaker Wires

A point I have written about before, I know, is that the speaker wires ought not to pass close to the aerial wire or lie near the unscreened coils of a set.

Often there are high-frequency currents in the speaker wires. There ought not to be, but the fact is there often are. And if the loud-speaker wires lie near the tuned circuits of the aerial itself, the set may be made unstable.

With a good high-frequency stopper in the detector stage and perhaps a condenser between the anode of the last valve and earth, the high-frequency currents flowing in the speaker wires will be negligibly small. When the currents are relatively large, however, trouble can be caused.

Naturally, the effect is much more noticeable in the case of a set having a powerful high-frequency amplifier. In portable sets, in which the speaker is quite near the frame aerial, precautions must be taken or howling will result.

Safe Mains Working

Mains sets, having relatively high voltages, ought to be fitted in some way with a device which will cut off the supply when the lid or back is opened. Under normal working conditions the voltage may be only 200 or so, but if, through a fault or when testing, the load is off, the voltage across the output of the mains unit and therefore the voltage actually applied to the anode circuits, may be 300 or more.

If the cover must be unscrewed one is reminded, I suppose, of the high voltage. But when the lid is hinged a switch ought to be fitted which will open the circuit when the lid is raised. It is not difficult to fit a protective device. A plug and socket can be arranged, for example, so that when the cover is opened the socket is pulled off the plug. It is usually easy enough to fit up this safety arrangement and it is quite effective, even when the socket must first be removed before the cover can be moved. Some may prefer the safety switch idea, such as was included in the Ferranti safety boxes for mains units.

Screening-off Valves

I see that some designers fit a screen having a hole in it through which the screen-grid valve passes, while others do not bother with this, but cover the valve as a whole or leave it standing without shielding it at all.

When the coils and condensers are completely shielded, there may seem no great advantage in also shielding the screen-grid valve. But actually, unless the valves in the set are well spaced, the stability is increased by covering the screen-grid valve and sometimes the detector as well.

A fairly strong coupling may exist between valves if they are close together. This is avoided by shielding. In sets having more than one high-frequency stage shielding carefully cannot be overlooked.



Bigger, Better, Cheaper, Power

Nothing to run down—no costly replacements—only a few shillings a year for current. Almost any set converted in a moment to A.C. Mains operation *without altering a single wire by*

The Six-Sixty A.C. All Mains Conversion Equipment

Supplies H.T., L.T., and Grid Bias at a fraction of the cost of batteries—takes no more room. Power Unit only £6 : 6 : 0. Complete Conversion Equipment from £8 : 5 : 0, includes Power Unit, 5/4 Pin Valve-Holder Adaptors, and a set of SIX-SIXTY A.C. VALVES to suit your circuit, giving added range and a large distortionless output.

Six-Sixty Valves

(A.C. or D.C.) are unsurpassed for efficiency and are standard replacements in any set.

SAY

Write for **FREE BOOKLET** giving full particulars of the whole Six-Sixty range



(B.V.A. RADIO VALVES AND EQUIPMENT)

SIX-SIXTY RADIO CO., LTD., SIX-SIXTY HOUSE, 17, 18, RATHBONE PLACE, OXFORD STREET., LONDON, W.1

Tel.: Museum 6116/7

THE FINEST RECEIVERS ARE BUILT WITH

WEARITE COMPONENTS

The following Coils are specially recommended in "Amateur Wireless" circuits:—

"ARROW TWO" COILS	"JAMES SCREENED GRID 3" COILS	"MUSIC MONITOR" COILS	"CHALLENGE FOUR" COILS (Dual Range)
3/6	7/6	7/6	10/6
Each	Each	Each	Each

Always use "Wearite" Components for better results.

Illustrated Lists of new Components Post Free.

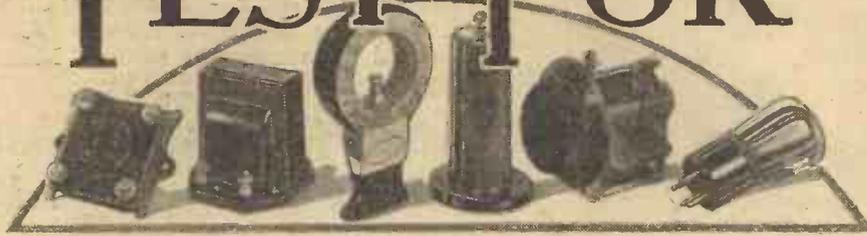
WRIGHT & WEAIR LTD.

740, High Road, Tottenham, London, N.17
Phone: Tottenham 3847/8.

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

WE TEST FOR YOU

A weekly review of new components



and tests of apparatus.

Conducted by our Technical Editor, J H REYNER, B.Sc., A.M.I.E.E.

A Station Indicator

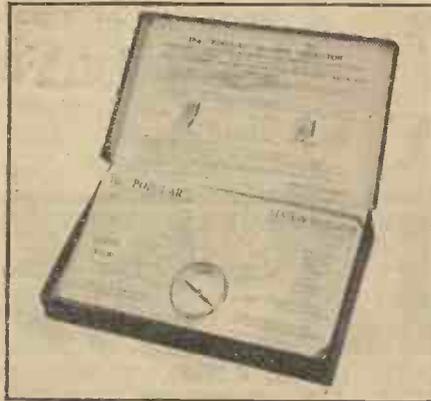
MANY sensitive portable sets have the advantage of being particularly selective, owing to the directional properties of their frame aeriars, and it is thus possible to receive numbers of foreign and English stations free from interference. Having picked up a station one can endeavour to obtain the utmost strength by rotating the frame into the correct position. When a number of stations are received, however, it is somewhat difficult to remember the optimum frame directions, and one can miss stations altogether owing to lack of this knowledge.

We should, therefore, think that the Popular Station Indicator made by the Danipad Rubber Co., Ltd., will be of real value to readers.

It consists essentially of a compass mounted in the centre of a semicircular chart. At various positions on this chart

popular English and Continental stations are printed against a set radius.

In attempting to receive a station,



A novel idea, a station indicator for portables

rotate the Indicator until the compass needle points towards the name on the chart, then place the portable set up against or parallel with the lid; it will then be pointing in the right direction.

It follows that the direction of different stations with respect to the north magnetic pole varies in different parts of the country; a number of different Indicators are, therefore, made for the various large centres such as London, Liverpool, Glasgow, Cardiff, Edinburgh, Birmingham, Leeds, and English and Welsh counties.

This device, which sells at 5s., may be recommended to readers.

Climax H.T. Unit

A NEAT and serviceable H.T. eliminator for use on D.C. mains has been submitted by the Climax Electrical Co. Smoothing apparatus and breaking-down

(Continued on page 967)

AS WITH TELSEN TRANSFORMERS . . . SO ARE TELSEN COMPONENTS

BUILT TO LAST

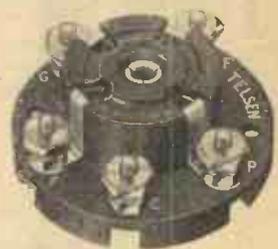
TELSEN components are being specified in continually increasing numbers for the various circuits published in the leading radio journals—convincing testimony to their wonderful efficiency. This great reputation has been gained because they are BUILT TO LAST! Strict supervision and rigid test at every stage of manufacture ensure a long life of maximum efficiency for all TELSEN components!



TELSEN H.F. CHOKES. Designed to cover the whole wave-band range from 18 to 4,000 metres, extremely low self-capacity, shrouded in genuine Bakelite. Inductance 150,000 micro-henries. Resistance 400 ohms. Price 2/6 each.



TELSEN FIXED (MICA) CONDENSERS. Shrouded in genuine Bakelite, made in capacities up to .002 mfd. Pro. Pat. No. 20287/30. .0003 supplied complete with Patent Grid Leak Clips to facilitate series or parallel connection. Can be mounted upright or flat. Tested on 500 volts. Price 1/- each.



TELSEN FIVE-PIN VALVE HOLDERS. Price 1/3 each.



TELSEN FOUR-PIN VALVE HOLDER. Price 1/- each.



Advt. of Telsen Electric Co., Ltd., Birmingham.

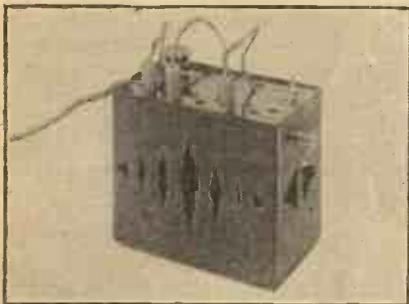
TELSEN VALVE HOLDERS. Pro. Pat. No. 20286/30. An entirely new design in Valve Holders, embodying patent metal spring contacts, which are designed to provide the most efficient contact with the valve legs, whether Split or Non-Split. Low capacity, self-locating, supplied with patent soldering tags and hexagon terminal nuts.

"WE TEST FOR YOU"

(Continued from page 966)

resistances are incorporated in a metal case measuring 4 1/4 by 2 1/2 by 3 3/4 in. high. On the top is an ebonite panel containing various sockets for selection of voltage. Three tappings complete with wander plugs are supplied, these being marked Screen Grid, V.1. and V.2. Ten different voltage tappings are provided marked from 50 volts to 200 volts. An interesting feature of this eliminator is the provision of a four-pin reversing plug, allowing the mains to be reversed, if by chance the mains cable has been inserted incorrectly.

On 240 volt mains, we obtained an output of 230 volts at 20 milliamps, 215 volts at 40 milliamps, and 205 volts at 60 milliamps. On the other tappings the rated voltages were obtained with reasonable load currents indicating adequate design. Despite its small size, therefore, this eliminator is capable of giving a high output and



A good H.T. unit for D.C. mains, made by Climax

yet will provide reduced voltages of suitable values for the requirements of the average set.

A Linen-speaker Accessory

THE new "A.W." linen-diaphragm speaker has proved exceptionally popular. The system is made possible by means of a tensioning wire, which takes the place of the smaller diaphragm, and allows an increased tensioning of the main diaphragm to be obtained.

Messrs. Moore & Co., 101 Dale Street, Liverpool, specialise in cone speaker parts of all varieties, and they have designed a serviceable tensioning wire for single-diaphragm linen speakers. It was originally found necessary to use Bowden cable for this work, on account of its exceptional strength, and non-resonating qualities. Messrs. Moore use Bowden nipples on the ends of the wire, these may be fitted into slots cut in two metal brackets provided for attaching to the sub-frame of the speaker. The length of the wire is one foot, as specified, and is threaded through a hole in a cone chuck which is provided with two celluloid and two brass cone washers.

This system should still further increase the simplicity of constructing one of these new speakers.

The Kone Dope Co. It should be noted that the address of the Kone Dope Co. now is 1 Plashet Road, Upton Manor, E.13.

EXCLUSIVE

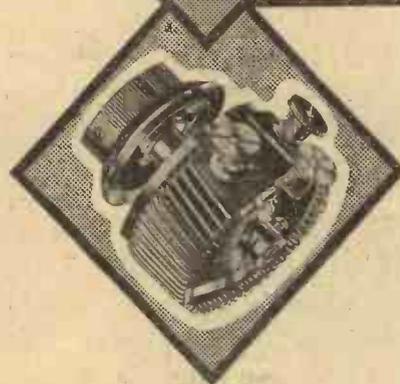


FEATURES



SPECIAL PLUG AND SOCKET ARRANGEMENT CONNECTING EXTERNALLY THE MAINS LEADS TO THE UNIT

THE "REGENTSTAT"—STANDARDISED IN ALL REGENTONE MAINS UNITS—THE ONLY TOTALLY WIRE-WOUND RADIO RESISTANCE CAPABLE OF CARRYING CURRENT, WITH VALUES AS HIGH AS 180,000 OHMS.



Regentone Mains Units incorporate a special plug and socket arrangement connecting the mains leads to the mains units *externally*, enabling any length of flex to be fitted easily and quickly.

Regentone Mains Units incorporate the "Regentstat"—the only totally wire-wound radio resistance capable of carrying current with values as high as 180,000 ohms.

Regentone D.C. Combined Unit is the only D.C. Combined Unit on the market.

Regentone Combined Mains Units *fit inside* every standard portable and there is no falling off in the efficiency of their performance. *Mains hum is entirely eliminated.*

REGENTONE COMBINED MAINS UNITS
(H.T. with L.T. Charger)
Model W.5. £5 : 17 : 6

D.C. COMBINED UNITS
(H.T. with L.T. Charger)
£3 : 19 : 6

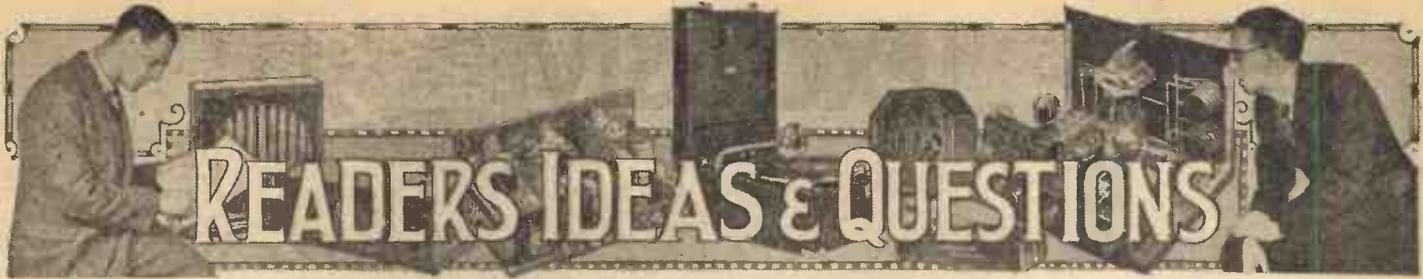
The "REGENTSTAT"
In two types
Prices 9/6 and 11/6.

Write for our **FREE Art Booklet**—"The Simple Way to All - Electric Radio"—giving full particulars of the Regentone range.



Regent Radio Supply Co., Regentone House, 21, Bartlett's Buildings, Holborn Circus, London, E.C.4. Telephone: Central 8745 (5 lines).

Irish Free State Distributors: Kelly & Shiel Ltd., 47, Fleet Street, Dublin.



READERS IDEAS & QUESTIONS

The Future of Belfast

SIR.—Your paper has a very large number of readers in Northern Ireland (one of the worst places for wireless reception in Europe), and I am sure we would all like to learn something of the probable fate of our Belfast station when the Regional Scheme nears completion.

Great Britain has only ten exclusive wavelengths. When the five great regional twins, London, Midland, Wales, Northern, and Scotland, are going, all ten will be needed (including long-wave Daventry) and there will be simply no room for Belfast.

There seems to be three alternative possibilities:

1. The reduction of 2BE to a "national" relay station on a "common" wavelength. This is what some of us fear most.
2. The removal of the transmitter to a central site (such as Magherafelt or Dunganon), with an increase of power to cover all or most of the six counties—in fact a small regional with one wavelength. We would then have the alternative of 5XX Daventry or the Scottish or Northern Regionals, that is, such of us who can afford

three-valve sets. But in this case where is the wavelength to come from?

3. It is possible, however, that owing to the small number of licences in Northern Ireland, the B.B.C. intends to close down the station altogether. J. D. (Belfast).

Dance Orchestras

SIR.—I am right glad to note that Mr. Moseley's friend "Harold" has discovered Marius B. Winter's Dance Band, as in my opinion this is one of the very best, and should be bracketed with Ambrose and Gross Bart—in any order one pleases—as the premier broadcast bands, for tone, rhythm, time—in short pleasing! I have discussed this with many wireless fans, and it seems to be a unanimous opinion. While on the subject of music, I very much agree with Mr. Moseley's preference for the hotel orchestras to the "brassy" effect of certain "Grand" orchestras, which are very unsuitable for wireless, though the musicians may be—as they say—of the very best quality in themselves, to hear in a cinema.

"OLD FOGY" (Beaconsfield).

Fitting a Pick-up

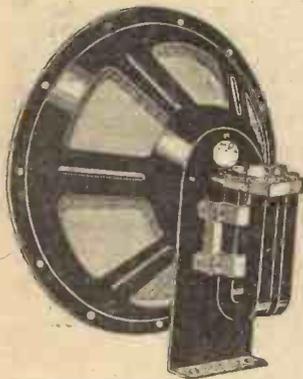
SIR.—It is my intention to use a gramophone pick-up in conjunction with my receiver. It is a straightforward detector and two L.F. receiver, having grid leak rectification. Can you advise me of what alteration to the wiring is necessary to enable me to achieve my object?—W. S. (Surbiton.)

You should disconnect the wire between the grid leak and condenser and the grid of the detector valve. Connect the grid of the valve to the arm terminal of a single-pole change-over switch, and wire up the grid condenser and grid leak to one switch-contact terminal. Connect the other switch-contact terminal to one terminal of the pick-up and take a flexible lead from the other terminal of the pick-up to a black wander plug. This plug should be inserted in the grid bias battery (at present in use with the receiver) at about one and a half volts negative. A volume control of some kind should be connected across the pick-up terminals.—Ed.

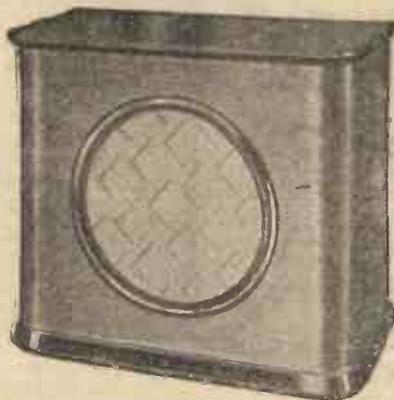
Adding an Output Filter

SIR.—Hearing a conversation among fellow-passengers in a train concerning the advantages of using a choke-filter out-

To render music faithfully IS THE AIM AND ACHIEVEMENT OF THE UNDY 8 POLE DYNAMIC SPEAKER



Complete 8-pole Unit with Chassis ready for building into Cabinet or Baffle-board - **50/-**



Undy 8-pole Dynamic Loud-speaker in attractive Mahogany Cabinet **70/-**



Undy 8-pole Dynamic Loud-speaker in highly polished Walnut Cabinet de-Luxe - **90/-**



Undy 8-pole Dynamic Loud-speaker in polished Walnut Cabinet. The Loud-speaker for the most exacting requirements, at a reasonable price - **55/-**

CHOOSE FROM THESE FOUR TYPES
The Undy 8-pole Dynamic Loud-speaker is the turning point in Loud-speaker design. The best Loud-speaker for sensitivity, power and frequency range. You must hear it to-day!

"UNDY"

Obtainable from your usual dealer.

ASK FOR DEMONSTRATION

"READERS' IDEAS AND QUESTIONS"

(Continued from preceding page)

put circuit with a loud-speaker, I am writing to ask if you can give me some hints on the components and wiring required for such an arrangement.—J. L. (Bedford).

Choke-filter output systems are incorporated in the design of most of our receivers which are intended for powerful speaker reproduction, but it is not necessary that you incorporate the components and wiring inside the cabinet of your set. They may be added externally and in the following manner. Connect one terminal of an L.F. output choke to the terminal marked L.S. positive on your set. Now connect the other terminal of the choke to the terminal marked L.S. negative on your set. Attach another piece of wire to the L.S. negative terminal on the set and take it to one terminal of a 2-microfarad fixed condenser. The other terminal of this fixed condenser should be connected to one of the terminals of your speaker. The other terminal of the speaker should be connected to the terminal marked negative L.T. on your set. Any well-known make of L.F. output choke, having an inductance of 20 to 32 henries and capable of carrying 50 milliamperes or more can be used.—ED.

"Dud" Components

SIR,—Recently "Thermion" gave an experience of "dud" components. The following is a recent one of mine. In putting together a short-wave two-valve set I came across:

1. A choke: one terminal severed due to corrosion by acid (soldering).
2. Two-microfarad condenser: one terminal fast and corroded; smell of amyl acetate.
3. Rheostat: ineffective over half its travel—broken wire.
4. Slow-motion dial: jerky—backlash.
5. Pentode: dud.

Happily, in cases Nos 1 to 4, I had bought from an honest dealer, who, at once and without question, admitted that the articles were faulty and replaced them. In case No. 5 I was told they could not replace unless the makers compensated them. I informed them my contract was with them, not the makers, and it would mean the County Court if I did not receive another valve. I did receive one!

W. E. H. (Seaford).

A Mains Matter

SIR, For the past two years I have used a James Touchstone Four receiver and this has given great satisfaction. The set is worked from an A.C. mains H.T. unit and operates a moving-coil speaker. Quite recently I noticed a falling off in quality. Can you help me to get the clear cut reproduction which I originally obtained from my receiver?—A. K. (London, E.)

If you are using one of the older type A.C. mains H.T. units, it probably has a valve rectifier incorporated in it. This rectifying valve, after two years' service, has no doubt finished its useful term of life. To prove whether the valve in your rectifier is faulty or not, you are advised to test the actual current consumption for each valve in your set. If the valves do not appear to be getting their rated amount of anode current, you may be sure the rectifying valve requires replacing. Should you decide to test the output voltages from your eliminator unit, use a voltmeter having a resistance of at least 1,000 ohms per volt.—ED.

The Easu Way TO PERFECT RADIO

DAY AND NIGHT FROM NOW UNTIL XMAS

Already our organisation is working day and night without cessation in meeting the demand for better Radio this Christmas. We are determined that every customer ordering from us before the Holidays will not be disappointed. Place your order now!

EVERYTHING RADIO FOR CASH OR EASY TERMS WITH SERVICE AFTER SALES

PILOT RADIO KITS

. . . build one of these fine "A.W." Sets for Xmas

Success Guaranteed. Every specified component for your new set, down to the last screw, in an attractive carton, including The Famous Pilot Test Meter, without which no set is complete.

THE CHALLENGE TWO

(See this issue)

Kit 'A' {	£2 15 10	Or 12	5/-
Kit 'B' {	£3 14 10	monthly	6/10
Kit 'C' {	£4 7 4	payments of	8/-

THE CHALLENGE THREE

(Described in "A.W." Nov. 31st, 1930)

Kit 'A' {	£6 6 7	Or 12 monthly	11/7
Kit 'B' {	£8 5 7	payments of	15/2
Kit 'C' {	£9 10 7	payments of	17/5

THE CHALLENGE FOUR

(Described in "A.W." Oct. 18th, 1930)

BATTERY MODEL			
Kit 'A' {	£7 19 10	Or 12	14/8
Kit 'B' {	£8 5 7	monthly	20/4
Kit 'C' {	£13 16 10	payments of	25/4

MAINS MODEL. For additional apparatus required add £2-3-3 to each of the cash prices above, or 15/- to each of the monthly payments.

THE "LOFTIN-WHITE" A.C.2

Kit 'A' {	£7 16 6	Or monthly	14/4
Kit 'B' {	£10 15 0	payments of	19/8
Kit 'C' {	£11 10 6	payments of	21 2

IMPORTANT NOTE

KIT "A" is less valves and cabinet. KIT "B" with valves less cabinet. KIT "C" with valves and cabinet. Any parts supplied separately.

SEND NOW FOR THE PILOT CHART

Contains detailed Price Lists of all the latest and best Kits, and over 30 valuable Hints and Tips for the Amateur Constructor.

MANUFACTURERS' KITS AND ACCESSORIES

Send **10/-** GOSSOR EMPIRE MELODY MAKER KIT, 1931 model, S.G., detector, and power. Cash Price £6 17 6

Only Balance in 11 monthly payments of 12/9.

Send **23/6** 1931 OSRAM MUSIC MAGNET KIT, two S.G., detector, and power. Cash Price £11 15 0

Only Balance in 12 monthly payments of 18/6.

Send **10/6** DYNAPLUS SCREENED THREE KIT, S.G., detector, and power. Cash Price £5 14 6

Only Balance in 11 monthly payments of 10/6. All above Kit prices include valves and cabinet

Send **10/9** REGENTONE W.5 COMBINED H.T. ELIMINATOR AND TRICKLE CHARGER. One S.G., 1 variable, and 1 fixed tapping for H.T. L.T. charging for 2, 4, and 6 volts. For A.C. mains. Cash Price £5 17 6

Only Balance in 11 monthly payments of 10/9.

Send **7/4** EKCO 3F.20 H.T. ELIMINATOR, 20 m.a. Tappings for S.G., 60 volts, and 120/150 volts. For A.C. mains. Cash Price £3 19 6

Only Balance in 11 monthly payments of 7/4.

Send **8/6** EXIDE 120-VOLT W.H. TYPE ACCUMULATOR, in crates. Cash Price £4 13 0

Only Balance in 11 monthly payments of 8 8.

Send **6/5** LAMPLUGH INDUCTOR SPEAKER, for perfect reproduction. Unit and chassis complete, ready mounted. Cash Price £3 10 0

Only Balance in 11 monthly payments of 6/5.

Send **8/3** EPOCH PERMANENT MAGNET SPEAKER, Type B.4. Cash Price £4.10.0.

Only Balance in 11 monthly payments of 8/3.

Send **7/6** STANDARD WET H.T. BATTERIES, 144 volts, 20,000 m.a. Cash Price, £4 2 0. Balance in 11 monthly payments of 7/6. Other voltages and capacities available. Detailed prices on application.

Buy by post - it's quicker. Post this Coupon NOW

PETO-SCOTT CO. LTD.

FIRST IN 1919 - FOREMOST TO-DAY

LONDON: 77 City Road, E.C.1 Phone: Clerkenwell 0426-7-8. 62 High Holborn, W.C.1 Phone: Chancery 8266. MANCHESTER: 33 Whitelaw Road, Chorlton-cum-Hardy. Phone: Chorlton-cum-Hardy 2028. NEWCASTLE, STAFFS: 7 Albany Road.

OUR NEW CATALOGUE describing ALL THE LEADING MAKERS' Receivers, Components, Radio Gramophones, Pick-ups, etc. A veritable guide to Radio. Get your copy to-day.

PLEASE SEND ME FREE YOUR (a) 1931 EASY WAY CATALOGUE; (b) LATEST PILOT RADIO CHART.

NAME _____

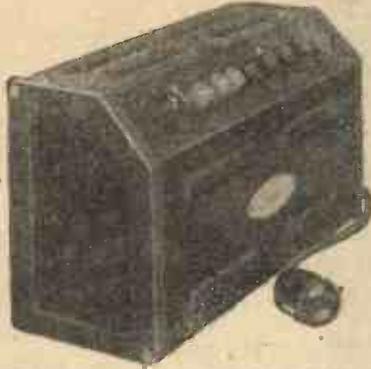
ADDRESS _____

A.W.13/12/30

PROMPTITUDE . . FAIR DEALING . . TRUSTWORTHINESS

(A customer's unsolicited testimony)

JUNIT MAINS UNIT



Junit Mains Unit, the finest unit that can be bought at any price, operates on mains of all voltages from 200 volts to 250 volts. It is so designed that it can be placed in a vertical or horizontal position to fit into any battery recess. You need not buy additional leads—your present leads will easily reach the terminals of a Junit Mains Unit.

MASTER OF THE MAINS

UNIT TYPE 150/4 A.C.
Giving 150 volts at 25 milliamperes load, and incorporating 4 volt centre tapped winding for supplying filament current for indirectly heated valves. Size 9 ins. x 5 ins. x 3 1/2 ins.

Tappings: One variable 0-150
" fixed 150
" " S.G.

Price £5 0 0

UNIT TYPE 120
Giving 120 volts at 20 milliamperes load. Size 9 ins. x 5 ins. x 3 1/2 ins.

Tappings: One variable 0-120
" fixed 120
" " S.G.

Price £4 7 6

UNIT TYPE 120/T.C.
Giving 120 volts output at 20 milliamperes load, and also containing trickle charger for 2, 4 or 6 volt accumulators. Size 9 ins. x 5 ins. x 3 1/2 ins.

Tappings: One variable 0-120
" fixed 120
" " S.G.

Price £5 17 6



SERVANT OF THE SET

Advertisement of the Junit Manufacturing Co., Ltd.,
2 Ravenscourt Square, London, W.6

M.C. 124

BROADCAST TELEPHONY

Broadcasting stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is *aerial energy*.

Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	
GREAT BRITAIN												
25.53	11,751	Chelmsford (G6SW)	15.0	316	950	Natan-Vitus.....	0.7	NORTH AFRICA				
200	1,500	Leeds.....	0.16	316	950	Marseilles (PTT)	1.5	303.4	825.3	Algiers (PTI)	13.0	
242	1,238	Belfast.....	1.2	328.2	914	Grenoble (PTT)	1.2	410	721	Radio Maroc (Rabat)	10.0	
261.3	1,148	London Nat.....	68.0	329.5	910.3	Caen (Normandy)	0.6	1,350	222.2	Tunis Kasbah	0.6	
288.5	1,040	Newcastle.....	1.2	347.7	862.8	Strasbourg (PTT)	12.0	NORWAY				
288.5	1,040	Swansea.....	0.16	370	810.5	Radio LL (Paris)	0.5	364	824	Bergen.....	1.6	
288.5	1,040	Stoke-on-Trent.....	6.16	385	779	Radio Toulouse	15.0	303.1	826.1	Frederiksstad	0.7	
288.5	1,040	Sheffield.....	0.16	447	671	Paris (PTT)	2.0	453.2	662	Porsgrund	1.5	
288.5	1,040	Plymouth.....	0.16	466	644	Lyons (PTT)	2.3	453.2	662	Nidaros.....	1.2	
288.5	1,040	Liverpool.....	0.16	1,445.7	207.5	Eiffel Tower.....	15.0	1,060	283	Oslo.....	75.0	
288.5	1,040	Hull.....	0.16	1,725	~174	Radio Paris.....	17.0	POLAND				
288.5	1,040	Edinburgh.....	0.4	GERMANY				214.2	1,400	Warsaw (2)	1.9	
288.5	1,040	Dundee.....	0.16	31.98	9,560	Zeesen.....	15.0	234	1,283	Lodz.....	2.2	
288.5	1,040	Bournemouth.....	1.2	218	1,373	Flensburg.....	0.6	244	1,229	Cracow.....	1.5	
288.5	1,040	Bradford.....	0.16	227	1,319	Cologne.....	1.7	312.8	959	Wilno.....	0.6	
301	995	Aberdeen.....	1.2	227	1,319	Münster.....	0.6	338.1	887.1	Poznan.....	1.9	
309.9	968	Cardiff.....	1.2	227	1,319	Aachen.....	0.31	381	788	Evov.....	2.2	
356.3	842	London Reg.....	45.0	232.2	1,292	Kiel.....	0.3	409.8	732	Katowice.....	16.0	
376.4	797	Manchester.....	1.2	239	1,256	Nürnberg.....	2.3	1,411	212.5	Warsaw.....	14.0	
308.9	752	Glasgow.....	1.2	246.4	1,217.2	Cassel.....	0.3	PORTUGAL				
479	626	Midland Reg.....	38.0	253.4	1,184	Leipzig.....	2.3	240	1,250	Oporto.....	0.25	
1,554	193	Daventry (Nat.)	35.0	259.3	1,157	Glowitz.....	5.3	320	937.6	Lisbon (CTIAA)	0.25	
AUSTRIA												
246	1,220	Linz.....	0.6	289.8	1,112	Augsburg.....	0.3	ROMANIA				
246	1,220	Salzburg.....	0.6	276	1,085	Heilsberg.....	75.0	394	761	Bucharest.....	16.0	
283.6	1,058	Innsbruck.....	0.6	283.0	1,058	Magdeburg.....	0.6	RUSSIA				
352	851	Graz.....	9.5	283.0	1,058	Berlin (E).....	0.6	427	702	Kharkov.....	4.0	
453	666	Klagenfurt.....	0.6	318.8	947.6	Bremen.....	0.3	720	416.6	Moscow (PTT)	20.0	
517	581	Vienna.....	20.0	325	923	Dresden.....	0.3	800	375	Kiev.....	20.0	
BELGIUM												
206	1,456	Verviers.....	0.3	380	833	Breslau.....	1.7	824	364	Sverdlovsk.....	25.0	
206	1,456	Antwerp.....	0.4	372	808	Hamburg.....	1.7	987.5	300	Kharkov (RV20)	25.0	
212	1,445	Binche.....	0.2	330	808	Frankfurt.....	1.7	1,000	300	Leningrad.....	20.0	
216	1,391	Chatelineau.....	0.25	418	770	Berlin.....	1.7	1,005	281.7	Tiflis.....	20.0	
243	1,235	Courtrai.....	0.1	452.1	662	Danzig.....	0.25	1,073	279.6	Kostov (Don)	4.0	
244.7	1,226	Ghent.....	0.25	473	635	Langenberg.....	17.0	1,103	272	Moscow Popoff.....	40.0	
244.1	1,229	Schaerbeek.....	0.5	538	563	Munich.....	1.7	1,200	250	Kharkov (RV4)	25.0	
338.2	887	Velthem (Louvain)	15.0	559.7	536	Kaiserslautern.....	0.5	1,304	214	Moscow (Trades Unions)	100.0	
509	590	Brussels (No. 1)	1.2	586	530	Freiburg.....	0.35	1,380	217.5	Bakou.....	10.0	
CZECHO-SLOVAKIA												
263	1,139	Moravska-Ostrava	11.0	570	527	Freiburg.....	0.3	1,481	202.5	Moscow (Kom)	20.0	
279	1,076	Bratislava.....	14.0	1,035	183.5	Zeesen.....	35.0	SPAIN				
294	1,020	Kosice.....	2.5	1,035	183.5	Norddeich.....	10.0	251	1,193	Barcelona (EAJ15)	1.0	
342	878	Brunn (Brno)	3.0	HOLLAND				280.7	1,125	Barcelona (EAJ13)	10.0	
487	617	Prague (Praba)	5.5	31.28	9,599	Eindhoven (PCJ)	30.0	319	860	Barcelona (EAJ1)	8.0	
DENMARK												
281	1,067	Copenhagen.....	1.0	299	1,004	Hilversum.....	8.5	308	815	Seville (EAJ5)	1.5	
1,153	260	Kalundborg.....	10.0	(also testing on 1,110m.)	299	1,004	Radio Iderda (The Hague)	0.6	413.8	725	Radio Espana.....	1.0
ESTONIA												
401	748	Reval (Tallinn)	0.7	1,071	230	Schevevingen-Haven	5.0	424	707	Madrid (EAJ7)	2.0	
FINLAND												
221	1,355	Helsinki.....	15.0	1,875	160	Huizen.....	8.5	424	652	San Sebastian (EAJ8)	0.5	
291	1,031	Viipuri.....	15.0	HUNGARY				239.6	1,301	Malmö.....	0.75	
1,796	167	Lahti.....	54.0	210	1,430	Budapest (Csepel)	1.0	257	1,266	Hörby.....	15.0	
FRANCE												
172.5	1,739	St. Quentin.....	0.3	550	545	Budapest.....	23.0	300.2	999.3	Falun.....	0.65	
200	1,500	Radio Roubaix.....	0.2	ICELAND				322	932	Göteborg.....	15.0	
210	1,430	Radio Touraine.....	0.2	1,200	250	Reykjavik.....	16.0	436	689	Stockholm.....	75.0	
222.9	1,346	Pécamp.....	1.0	(shortly testing)	IRISH FREE STATE				542	554	Sundsvall.....	15.0
235.1	1,275	Nîmes.....	1.0	224.4	1,337	Cork (IFS)	1.5	770	389	Ostersund.....	0.75	
240.8	1,247	Béziers.....	1.0	413	725	Dublin (2RN)	1.5	1,224	245	Boden.....	0.76	
240.7	1,201	Juan-les-Pins.....	0.5	ITALY				1,348	222.5	Motala.....	40.0	
256	1,171	Toulous (PTT).....	15.0	80	Rome (3RO)	9.0	320	937.5	Basle.....	0.05		
265	1,130	Lille (PTT).....	1.0	296	1,013	Turin (Torino)	8.5	403	743	Bernc.....	1.1	
272	1,103	Rennes.....	1.2	312	916.3	Genoa.....	1.5	459	653	Zurich.....	0.75	
286	1,049	Montpellier.....	2.0	332	905	Naples (Napoli)	1.7	078.7	454.6	Lausanne.....	0.6	
286.8	1,040	Radio Lyons.....	0.5	441	680	Rome (Roma)	75.0	700	395	Geneva.....	1.5	
296.4	1,012.1	Limoges (PTT).....	0.08	453	662	Bolzano (IBZ)	0.2	TURKEY				
300	1,000	Strasbourg.....	1.0	504	599	Milan (Milano)	8.5	1,200	250	Istanbul.....	5.0	
304	983	Bordeaux (PTT)	35.0	LATVIA				1,958	153	Ankara.....	7.0	
315	952.5	Neuilly (Paris)	0.3	525	572	Riga.....	12.0	YUGOSLAVIA				
LITHUANIA												
1,935	155	Kaunas.....	7.0	LITHUANIA				300.8	978	Zagreb (Agram)	0.7	
LITHUANIA												
LITHUANIA												

AT THE QUEEN'S HALL

SIR LANDON RONALD conducted the performances of Beethoven's "Leonora Overture No. 3" and the "Fifth Symphony" on December 3. His interpretation of this symphony is classic, but the concert did not come up to expectations.

Moiseiwitsch played the "Emperor Concerto" in the Russian manner. The orchestra supported him well, but this pianist, with all his ability, is temperamentally unsuited to play Beethoven. He played with great technical skill, but Tchaikowski was ringing in his ears.

L. R. J.

"Amateur Wireless and Radiovision." Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. Post free to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to "Bernard Jones Publications, Ltd."

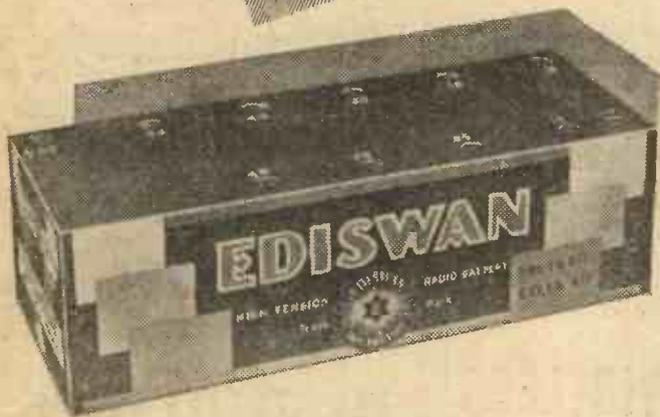
General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets.

Contributions are always welcome, will be promptly considered, and if used will be paid for.

Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.

"A.W." Solves your Wireless Problems

before
YOU BUY YOUR
NEXT BATTERY
THINK of the
new process
EDISWAN
RADIO BATTERIES



Now Ediswan give you a dry battery with a greater capacity than ever before. Made under a new process, it gives tremendously long service—longer than ever before. And greater power—power that is steady and silent—giving new life to your set, new sparkle to your reproduction.

Super capacity at ordinary prices. Get an EDISWAN Battery to-day—all good radio dealers sell them.

60 volt	10 m/a	...	...	...	...	...	7/9
66 volt	10 m/a	...	...	...	...	...	8/6
120 volt	10 m/a	...	...	...	...	...	14/6
60 volt	super power	20 m/a	...	...	...	...	15/6
120 volt	super power	20 m/a	...	...	...	...	31/6

LOWER PRICES—SUPER QUALITY



THE EDISON SWAN ELECTRIC CO. LTD.
 155 Charing Cross Road, London, W.C.2
 Branches in all the Principal Towns

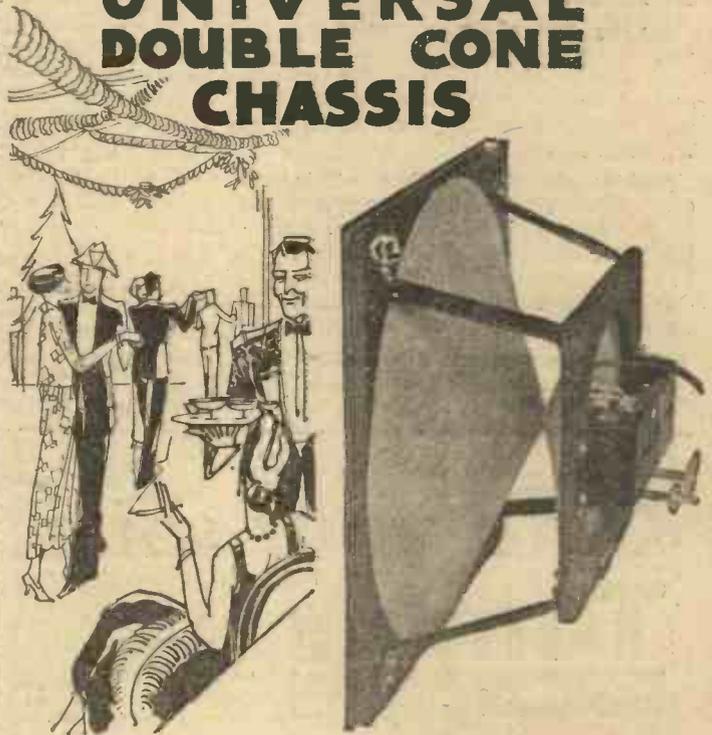
B.100

For Christmas!
 BUY A

WATES
 ORIGINAL AND GENUINE

12 in. Price 11/6 20 in. Price 17/6
 14 in. Price 12/6

20"
UNIVERSAL
DOUBLE CONE
CHASSIS



THESE EXCLUSIVE FEATURES
ARE FOUND ONLY IN THE "WATES."

- (1) SCROLL CUT CONE.** This special joint in the chemically treated paper of the cone avoids a direct cut through the sound waves, thereby enabling the cone to respond freely and without distortion, resulting in a purity and fidelity to the original that has earned its reputation for the finest reproducer obtainable.
- (2) THE WATES UNIVERSAL BRACKET** is an ingenious plate cut to a special design enabling the chassis to be fitted to the following units without any adjustment or difficulty:—Blue Spot 66B, 66P, Ormond, Blue Spot 66K, Watmel, Ediswan, Hegra, G.E.C., Lissen, Triotron, Brown Vec, Amplion B.A.2, Loewe, W. & B., Silver Chimes, Gröwor, Grassman, Tegai, Six Sixty, Kukoo,
- (3) THE UNIQUE SUSPENSION** of the large cone is a feature exclusive to this chassis and is a vital contributor to the wonderful results obtained.

Do not be "put off" with spurious imitations—insist on the Wates and enjoy the remarkable reproduction that it achieves.

Obtainable from all Radio dealers. Fully descriptive leaflets on request from:
THE STANDARD BATTERY CO., (Dept. A.W.)
 184, 188 Shaftesbury Avenue, London, W.C.2

M.B.

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



THE short studio service on Christmas evening, which is to be conducted by Rev. J. A. Mayo, Rector of Whitechapel, will be relayed by the Columbia Broadcasting Company of America.

Two band concerts will be broadcast from Midland Regional on December 27. In the afternoon the Hasland Prize Band, conducted by H. T. Moseley, will be heard.

Several carol programmes early this month will remind listeners of the approach of Christmas. The annual carol concert by the Royal Choral Society will be relayed from the Albert Hall on December 20, on the National.

On December 18 a midday relay will take place on the Regional of a carol service from St. Martin's Church, Birmingham; and on December 21 the Wireless Singers will be heard by Regional listeners in modern carols.

The Wireless Military Band will include Christmas music in its Regional programme on December 22, while on Christmas night the B.B.C. Orchestra, conducted by Joseph Lewis, will play seasonable items. Cardiff station will broadcast Welsh carols on December 22.

Gillie Potter states that he will begin on December 12 a new series of talks entitled, "Heard at Hogs Morton." In these talks, he

aims, so he says, "to tell the truth," and the first of the series will deal with "The Truth about Russia!"

Listeners unable to pick up the Radio Maroc (Rabat) programmes direct can hear the Oriental transmissions through Radio Toulouse every Saturday evening, the latter station having arranged to relay the Rabat entertainments through the short-wave transmitter.

The new Radio Paris station at Essarts-le-Roi is now ready for testing, and preliminary experimental broadcasts will be made as soon as the special cable connecting the transmitter to the Paris studio has been laid. Although nominally of 60 kilowatts aerial power, when necessary the output of the new plant can be doubled, thus making Radio Paris one of the most powerful broadcasting stations in Europe.

Radio Sud Ouest (Bordeaux) has returned to its broadcasts on 237 metres. For the present and until authority has been obtained to increase the power of the plant, transmissions will only be made between 11.30 a.m. and 12.30 p.m. and from 6 to 8 p.m. G.M.T.

The gigantic 800-ft. masts at the Rugby wireless station sway only 8 ft. in a moderate wind.

The B.B.C.'s permanent musical combination in Glasgow is now known as the "Studio Orchestra." This does not portend any alteration in its character, however. The change from "Octet" to "Orchestra" has been made because augmentations are made from time to time.

CAPTAIN PETER ECKERSLEY

(Late Chief Engineer of the B.B.C.)

supervises

"REYNOLDS'S" WIRELESS NOTES

Special Answers
to
Queries Service

Give your set a Tungar this BATTERY CHARGER

Xmas



FOR A.C. MAINS
ONLY - PRICE 35/-

EDISWAN



Advt. of The Edison Swan Electric Co., Ltd.
Incorporating the Wiring Supplies, Lighting Engineering
and Radio Business of the British Thomson-Houston Co., Ltd.

B.94

WIRELESS MAGAZINE

The
Big
British
Wireless
Monthly

1/-

REYNOLDS'S ILLUSTRATED NEWS

Best on Sunday
News, Sport
Features, Pictures

ORDER YOUR
COPY TO-DAY

WIRELESS IN PARLIAMENT

From Our Own Correspondent

MR. SNOWDEN, the Chancellor of the Exchequer, informed Mr. Oswald Lewis that His Majesty's Government had agreed, subject to the voting by Parliament of the necessary funds, to make a grant of £5,000 for the last quarter of the current calendar year and a grant of £17,500 a year for five years, beginning on January 1, 1931, towards the expense of presentation of grand opera, not merely at Covent Garden, but also in the provinces. The remaining necessary funds would be provided by the British Broadcasting Corporation and by private subscriptions. The Government grant would actually be paid through the British Broadcasting Corporation, a special addition to their normal income being made for that purpose, and a revised agreement between the Postmaster-General and the Corporation would be laid before Parliament in due course.

Mr. D. G. Somerville asked the Postmaster-General whether, in view of the fact that the State proposed to give a subsidy to opera out of taxation, the money being derived from the proportion of revenue annexed by the Treasury from broadcasting licences, he would consider the reduction of the amount of such licences since money, not needed for the purposes of broadcasting, was applied to purposes to which many subscribers objected owing to the economic depression in the country.

Mr. Lees-Smith said he felt sure that the general body of listeners would prefer the opportunities which they would obtain of hearing grand opera to an equivalent reduction in the licence fee, which would amount to 1¼d. per annum.

Mr. Oswald Lewis asked whether the rent of Covent Garden Opera House was to remain as at present throughout the period of the proposed Government grant; and, if not, what the rent was now and what increase was to be made in it.

Mr. Lees-Smith said that up to December 31, 1932, the new opera company would acquire the benefit of the existing lease of the Covent Garden Opera House held by the Covent Garden Opera Syndicate, Ltd., and at the present rent; and the agreement between the company and the British Broadcasting Corporation might be terminated at December 31, 1932, at the option of either party.

Mr. Lewis asked what was the present rent and what would be the additional rent when the lease was ended.

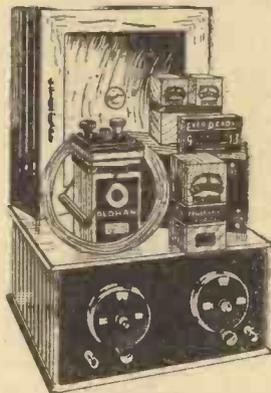
Mr. Lees-Smith said that the present rent, he thought, was between £3,000 and £4,000 a year. The termination of the lease would not be until two years hence, and the agreement provided that the payment by the Government and the agreement with the B.B.C. should be terminated at that time if the new arrangements were not satisfactory. At the end of the two years the new rent would have to be arranged.

Mr. L. Smith asked the Postmaster-General if he would state the annual sum appropriated by the Post Office during each of the last two years from the total revenue of the British Broadcasting Corporation; whether this sum was on a fixed percentage basis representing the exact cost of collection; if not, what was the basis; whether

(Continued on next page)

K. RAYMOND LTD.
27 & 28A, LISLE ST., LONDON, W.C.2
Nearest Station, Leicester Square Tube Station. Back of Daly's Theatre

RAYMOND'S
"STRAIGHT THREE"
 Now available on
EASY PAYMENT TERMS



Comprising COMPLETE KIT with Three TRIOTRON New Process Valves, OLDHAM 45 amp. Accumulator, 100 v. High Tension and EVER READY Grid Bias Battery, CLIFTOPHONE £3 : 3 : 0 Loud-speaker and Aerial Equipment. Carriage Paid

CASH PRICE £4 : 5 : 0
DELIVERED IMMEDIATELY for 9/-

and 12 monthly payments of 9/-

"RED STAR"
3-VALVE WONDER SET



As illustrated, COMPLETE with Three TRIOTRON New Process Valves, OLDHAM 45-amp. Accumulator, 100 v. High Tension, and EVER READY Grid Bias Battery, CLIFTOPHONE £3 : 3 : 0 Loud-speaker and Aerial Equipment. Carriage Paid.

CASH PRICE £6 : 6 : 0
 Ready for Use. NOTHING ELSE TO BUY
DELIVERED IMMEDIATELY for 12'9

and 12 monthly payments of 12/9

RAYMOND'S
"SCREENED GRID 3"



Comprising Complete S.G. Kit with Three TRIOTRON New Process Valves, OLDHAM 45 amp. Accumulator, 100 v. High Tension and EVER READY Grid Bias Battery, CLIFTOPHONE £3 : 3 : 0 Loud-speaker and Aerial Equipment.

CASH PRICE
£5 : 10 : 0

Carriage Paid

DELIVERED IMMEDIATELY for 10'6

and 12 monthly payments of 10/6

100 SPECIAL BARGAINS
 ON VIEW IN OUR WINDOWS
 Part of Large Bankrupt Stock Purchase—
 EVERY ARTICLE GUARANTEED—NOW IS YOUR OPPORTUNITY.

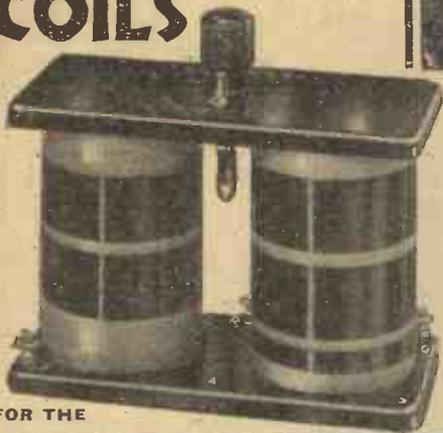
Send no Money—PAY THE POSTMAN

NOTE.—We are open all day Thursday and Saturday and every day from 9 a.m. till 6 p.m.

- Pye 110 Henries Chokes, 12/6 List. Our price . . . 4/11
- Undy Pick-up and Tone Arm complete, 57/6 List. Our price . . . 35/-
- Peto-Radford 20-40 Non-spillable Portable Accumulators. Our price . . . 5/11
- Oak Loud-speaker Cabinets, 13 in. by 13 in. . . 4/12
- Oak Loud-speaker Cabinets, to fit Blue Spot R. or P. . . 10/6
- Chassis to fit Blue Spot R. or P., Large Type, 16 in. . . 6/11
- Dual Range Coils, Panel Mounting . . . 4/11
- Dual Range Coils, Baseboard . . . 4/11
- Differential Condensers, .0015 . . . 2/6
- Reaction Condensers, .0001 . . . 1/11
- Baseboard Neutralising . . . 1/11
- S.L.F. Variable Condensers, .0005 . . . 2/6
- S.L.F. Variable Condensers, .0003 . . . 2/6
- Valve Holders with Terminals . . . each 5d.
- Valve Cone Units, latest model . . . 8/6
- Triotron T.D. 2 valves . . . 4/6
- Triotron Z.D. 2 valves . . . 5/6
- Triotron Z.D. 6 valves . . . 6/11
- 12 in. Cone Chassis, take any unit . . . 4/11
- 15 in. Cone Chassis, take any unit . . . 2/11
- 12 in. by 7 in. Oak Cabinet, complete with polished panel . . . 8/11
- 14 in. by 7 in. Oak Cabinet, complete with polished panel . . . 9/11
- 18 in. by 7 in. Oak Cabinet, complete with polished panel . . . 10/11
- Dual Range 6-pin Coils . . . 4/6
- 200-700 metres 6-pin Coils . . . 3/6
- Sovereign Dual Range Panel Mounting Coils . . . 6/11
- Titan Coils, Dual Range . . . 9/11
- New Ormond Geared Dial . . . 2/6
- New Ormond Log Condenser . . . 4/-
- New Ormond Log Condenser with double dial . . . 6/-
- Undy 8-pole Units . . . 16/9
- Undy 8-pole Units and Chassis . . . 32/6
- Pifco All-in-One Volt Meter . . . 12/6
- Dead Beat Volt Meters . . . 3/9
- Accurate Hydrometers, Float or Ball Reading . . . 2/6
- Gramophone Pick-ups, guaranteed, British made . . . 7/6
- Panel Brackets . . . pair 6d.
- H.F. Chokes, reliable . . . 1/11
- Fully guaranteed 5-1 or 3-1 Transformers . . . 4/9
- Set of S.W. Coils, No. 2, 4, 6, 9 . . . set 6/6
- Plug-in Coils, Nos. 25, 35, 50, 60, 75 . . . each 1/3
- Plug-in Coils, Nos. 100, 150, 200, 250 . . . each 2/3
- 60x Coils, 1.9 each: 60 C.T. . . each 1/4
- 250x Coils, 3/6: 250 C.T. . . each 2/9
- Wall Plugs, complete . . . 8d.
- Linen Double Chassis Solid Oak Frame, Linen fixed and stretched, complete with dope and brush, etc. . . 5/11
- 10 in. by 6 in. Aluminium, with 8-in. bend . . . 1/3

IMPORTANT.—All letters and communications must be addressed to **K. RAYMOND LTD.** 27 and 28a LISLE STREET, LONDON, W.C.2. The name of the street is not sufficient.

TUNEWELL COILS



FOR THE 'CHALLENGE TWO'

Made to the Specification of Mr. W. James
Careful positioning of the windings and materials of the highest insulation give TUNEWELL Coils their very low capacity. That is why they are more selective than others, why they give louder signals, why they will tune down to such low wavelengths.
Always choose TUNEWELL—for maximum efficiency.
For the CHALLENGE TWO with Bakelite moulded top and bottom plates **10/6**

New "Popular Wireless" Dual Range Coil.	Tunewell Trans-former. Ratios 3 to 1 and 5 to 1.	Two-pin coils. Plain, Centre-tapped and X type. BRITAIN'S FAVOURITE.
10/6	12/6	Prices from 1/6
New dual range coil for Rehnartz circuits. X-tapped on both high and low waves. Super-selective.	Tunewell range of Speakers, including plaque types from	Condensers, 0005, 0003, 00015. 3/11 each H.F. Chokes 97% efficient. Price 6/6
10/6	28/6 to 42/-	

Write for Lists.

TURNER & CO.
54, STATION ROAD, LONDON, N.11

"WIRELESS IN PARLIAMENT"

(Continued from preceding page)

the sum accruing to the Post Office was more than the cost of collection and, if so, how much; what amount had been handed over to the Treasury in each of the first two years; and what percentage this sum represented of the total amount received for licences.

Mr. Viant, who replied, said that the gross revenue from wireless receiving licences was apportioned in accordance with clause 18 of the B.B.C.'s licence, which was published as a Parliamentary Paper, Command No. 2756, of 1926. The Post Office retained 12½ per cent. of the total revenue to cover management expenses; the British Broadcasting Corporation was paid a certain percentage of the remainder based on a sliding scale, and the balance accrued to the Exchequer. The commercial accounts showed that the Post Office retained £169,773 for management expenses in 1928-29, as against a cost of £152,028, and £192,172 in 1929-30, as against a cost of £154,811. The balance which accrued to the Exchequer was £291,885 for 1928-29 and £375,348 for 1929-30, representing about 21 per cent. and 24 per cent. respectively of the total wireless licence revenue for the year.

Mr. Lees-Smith informed Captain Cazalet that it was probable that the supplementary agreement between the British Broadcasting Corporation and the Post Office would deal with other matters besides the opera grant, and he was not yet in a position to say when it would be concluded.

BROWNIE

Not just a "box of tricks"—but a really superb all-electric 3-valve receiver in a handsome, richly polished, solid walnut cabinet—that's the wonderful new Brownie DOMINION MAINS S.G.3. It's the modern set for the modern home... no batteries, no accumulators... no bother, no expense! Just switch it on—and then sit back and enjoy at last—the perfect broadcast!



MAINS S.G.3

Price, including royalty and valves **£18/10** or

Ask your dealer to demonstrate the new Brownie DOMINION MAINSETS. In any case, write now for illustrated catalogue of the complete range of mains and battery operated receivers.

32'3
DOWN

BROWNIE WIRELESS COMPANY (G.B.) LTD., Dept. U, Nelson Street Works, London, N.W.1

T. W. THOMPSON & CO. (FROM GREENWICH)

14 & 17 STRUTTON GROUND, WESTMINSTER, S.W.

OFFER Some GREAT CHRISTMAS BARGAINS

Satisfaction Guaranteed.

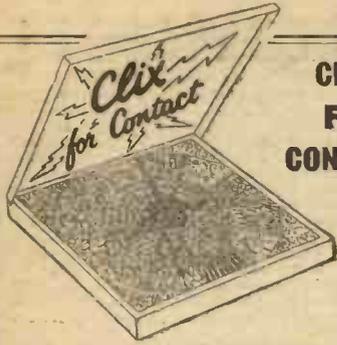
3 Days Approval Against Cash.

H.T. MAINS UNITS.—By Pye, Cambridge. Last few of these brand new five-guinea units, supplying 120-volt 20 m/a. from 200/250-volt A.C. mains. Fit any portable set. Clearing at 60/-; post 1/-.
ALL POWER UNITS.—For H.T., L.T., and G.B. mains 200/250 volt 40-60 cycles. H.T. up to 140 volts 20 m/a., 2 pos. (1 variable). L.T. charger at ½ amp, complete with accumulator, grid bias up to 9 volts, self contained in metal case, with Westinghouse rectifier. Your set fully electrified without alteration. Brand new and guaranteed. 50/-; passenger train, 2/6.
L.T. TRICKLE CHARGERS, charging 2-, 4- and 6-volt accumulators from 200/250-volt A.C. mains, incorporating metal rectifier. New and guaranteed, 25/-; post 1/-.
STEP-DOWN MAINS TRANSFORMERS, for use on 200/250-volt A.C. mains. Output, 3, 5, and 8 volts at 1 amp. Ideal for charging bells, model railways, lights, etc. Handsome moulded case, new, 5/11; post 6d.
BROWN'S MICROPHONE AMPLIFIER. Very high-class instrument, doing the work of two valves; only require flash-lamp battery to work same. Listed £5. Clearing at 15/8; post 9d.
ACCUMULATORS.—Really remarkable opportunity. Peto & Radford, finest in the world, at almost half list prices. These have the very latest improved type plates. 2 volt 20/40 amp, 6/6; post 6d. 2 volt 30/60 amp, 7/9; post 9d. 2 volt 40/80 amp, 9/-; post 1/- Also with gravity floats, indicating state of charge, 1/6 extra.
PORTABLE ACCUMULATORS, unspillable, with jelly

acid, 2 volt 20/40 amp, fit any portable, 9/6; post 9d.
PORTABLE SETS.—Last opportunity for some amazing bargains: Burgoyne and Aeonic five-valve, hide suitcase type, new and complete, ready to tune in. Listed 16 guineas. Final clearance offer, £7/10/0; passenger train, 2/6. An offer you should not miss.
B.T.H. MOTOR CONVERTERS.—Brand new. Input, 12/20 volts; output, 300/500 volts 100 m/a. D.C. Knock-out price, all guaranteed, with smoothing condensers. List £15. Price £2.
BLUE SPOT IDEAL UNITS, complete with Blue Spot cone and chassis. Very special offer of these 4-pole balanced armature units, 15/6 complete; post 9d.
GRAMOPHONE PICK-UPS.—The well-known 15/- Ajax balanced armature, finest results obtainable, offered at 7/6; post 6d.
GRAMOPHONE SOUNDBOXES.—Big purchase of the 30/- Tremusa Sboundboxes enables us to offer them at 2/6; post 6d. Magnificent reproduction.
GRAMOPHONE MOTORS.—Brand new British Collaro, complete on handsome unit plate, ready assembled. The finest on the market. Special price, 25/-; post 1/-.
TRUPHONIC TRANSPORTABLE CASES, beautifully french polished, in oak or mahogany, silk lined, fret front. Size, 16 by 14 by 8 in. Genuine bargain. 10/6 each; post 9d.
TRUPHONIC SPEAKERS; with Celestion unit, in mahogany-finished cabinet. Perfect natural tone. List £1/10/0. A few only at 25/-; carriage 1/6.

MACKIE AND B.T.H. H.T. AND L.T. DOUBLE GENERATORS.—Output, 6/12 volts 3 to 5 amps at L.T. end and 200 to 400 volts 100 milliamperes at H.T. end. Ready smoothed, suitable for charging station and power amplifiers. List £15. Clearance, £2.
HIGH-CAPACITY CONDENSERS.—All brand new, 4 mfd. (750 volt), 3/6; 4 mfd. (500 volt), 3/-; 2 mfd. (500 volt), 1/8. Post on each, 3d.
GALVONOMETERS.—Post Office type, by Silvertown, Pye, G.E.C., etc. Deflection, 30 m/a. Beautiful instruments. Cost £4. Clearing at 7/6; post 9d.
CABLES, FLEXES.—Some keen offers. Twin lead-covered 1/18, 50-yard coils, 21/-, or 6d. yard; carriage forward. Lighting flex, 2/- dozen yards. Heavy loud-speaker flex, 2/- dozen yards. Government Aerial Wire, high conducting tinned steel and copper, also useful for stays, telephones, garden, etc., 1/2 per 100-ft. coil. Special quotation for one-mile drums. Red and Black Rubber-covered flex, 1/6 dozen yards. Post in each case, 3d.
OTHER GOODS IN STOCK.—Officer's Table Oil Lamp, with heater, large glass globe, all brass. Worth £2. To clear, 10/6; carriage 2/-. Electric Motor Horns, by Graham, 3/6; post 1/-. Oak and mahogany-finished Radiogram Cabinets, all new, £4. Sensitive Microphone Buttons for amplifying and speech, 9d.; post 3d. All-mains Three-valve Sets: £10/10/0. Intervalve Transformers, 3 and 5 to 1, 4/6 each; post 6d.

We stock everything electrical, including motors, sliding resistances, dynamos, switchboard gear, meters, engines and all proprietary wireless. Our terms are the lowest. Enquiries invited.



**CLIX
FOR
CONTACT**

Is your Set O.K. for Xmas?

Look to your contact points and specify Clix for your replacements.

The New CLIX Showcase

to be seen on your dealer's counter will help you. It's the little things that count!



No. 3. Pro. Pat. Reg. D.S.

CLIX
"SPRINGSCREW" WANDER PLUG, 2d.
One of the 14 Clix lines included in the Showcase.

Clix 27 different devices for contact.
Write for descriptive leaflets.

LECTRO LINX, LTD.
254 VAUXHALL BRIDGE ROAD, S.W.1

H & B
PERFECT KIT for
"LOFTIN-WHITE A.G. TWO"

	£	s	d.
Ebonite Panel, 12 in. by 8 in. (Trelleborg)	3	6	
.0005 Drum Condenser (Polar)	15	0	
.0001 Reaction Condenser (Polar)	3	0	
Pick-up Jack and Plug (Lotus)	4	3	
400-ohm Panel-mounting Potentiometer	2	6	
Single-pole Mains Switch (Belgin)	2	3	
2 Four-pin-Valve Holders (Telsen)	2	0	
1 Five-pin Valve Holder (Telsen)	1	3	
Dual-range Coil, D.W.A. (Lewcos)	15	0	
.01 Fixed Condenser (Dubilier)	3	0	
2 1-mfd. Fixed Condensers (Dubilier)	5	0	
1 2-mfd. Fixed Condenser (Dubilier)	3	6	
2 2-mfd. Fixed Condensers, 800-volt test (T.C.C.)	10	0	
1 5-meg. Grid Leak (Dubilier)	1	8	
1 Grid-leak Holder (Lissen)	1	6	
50,000 Spaghetti Resistance	1	6	
100,000 Spaghetti Resistance	2	6	
20,000 Spaghetti Resistance	1	6	
5,000 Wire-wound Resistance (Ferranti)	5	0	
400-ohm Resistance (Colvern)	2	6	
H.F. Choke (Telsen)	2	6	
Mains Transformer, as specified (Savage)	1	19	0
1 Smoothing Choke (Pye)	12	6	
2 Terminal Strips, 2 in. by 2 in.	8		
4 Terminals: A, E, L.S., L.S.	1	6	
1 Screen-grid Connector (Belling-Lec)	6		

CASH PRICE £7 2 1

Included in every kit, panel drilled, Wire, and Screws.

Hand-polished Oak Cabinet, 16/- extra.

ANY COMPONENT SUPPLIED SEPARATELY

NOTE.—We construct this set FREE OF CHARGE if desired with the kit purchased from us.

CHALLENGE TWO

Excellent, Inexpensive Two.
H. & B. KIT contains all you want to construct this receiver. Full details of the Kit is given in our advertisement on page 865, "A.W.," December, 6.

CASH PRICE, £2 7 8
2 Mullard Valves, 19/- extra, Oak Cabinet, 14/6 extra.
Carriage Paid all Cash Orders. C.O.D. Charges Paid over £1.

H & B RADIO CO.,
34, 36, 38, Beak Street, Regent Street, London, W.1.

LOTUS ALL MAINS UNIT



FOR ALTERNATING CURRENT ONLY
The Lotus All Mains Unit has a very generous power output and is most suitable for 4-valve sets; it may also be used as H.T. Eliminator for sets having battery heated valves. The whole apparatus is contained in a handsome metal case 12" x 8" x 8" high. Price complete £7 7s., or 12 monthly payments of 13/3.
From all Radio Dealers.

Write for illustrated Catalogue to
GARNETT, WHITELEY & CO., LTD., LIVERPOOL.



PON-N-G!!
Modern valves may be less microphonic, but so are our ears very much more critical. Keen constructors are not content merely to have less "pong," they want it cut right out. That's why Benjamin antiphonic valve holders never lose their popularity. See that your valve holders are Benjamin.
Write for our Catalogue No. 1142
The BENJAMIN ELECTRIC LTD.
Tarliff Road, Tottenham, N.17
Tottenham 1500

BENJAMIN

POSTAL BARGAINS
A FEW OF OUR LINES

Double Reading Voltmeters, Bakelite cased	4/9
Guaranteed Transformer, 3-1, 5-1	3/6
Loud-speaker Bobbins, each 1,000 ohms, per pr.	1/9
Loud-speaker or Phone Leads	each 11d.
Aluminum Panel Brackets	per pair 9d.
Bakelite Radio Fuse, complete	1/-
Carriage paid. Cash with order.	

I. DRUCE, 159, Goswell Road, London, E.C.1

YOU
can make
this test in your
own home



OHMITE
Anode Resistances.
100 ohms to 500,000 ohms,
2/3 each

MEGITE
Grid Leak.
All values, 1 megohm to 5 megohms.
2/- each

Connect an Ohmite or Megite in series with a NEW H.T. battery and a pair of headphones, then observe the absolute silent functioning of the Resistance due to lack of molecular displacement, a feature of Ohmite and Megite Resistance.

Compare with any other resistance obtainable at the price and you will immediately endorse our claim that every Graham Farish component is the finest value for money obtainable.

Graham Farish components carry a written guarantee of accuracy.

GRAHAM FARISH
LIMITED - BROMLEY - KENT

Have You had our NEW GREEN LIST?

Saves you Pounds!

Cramped with illustrations and details of all sorts of fascinating and useful gear, at very reasonable prices.

RADIO ELECTRICAL SCIENTIFIC INSTRUMENTS MOTORS GENERATORS

Just send a stamped envelope

ELECTRADIX RADIOS,
218 Upper Thames Street, E.C.4.
City 0191 Electradix, Cent, London

RELIABILITY WIRELESS GUIDE^{296 X}
A Complete List of all that is best in Radio at Keenest Prices. Trade Enquiries Invited.
J. H. TAYLOR & CO
3, Radio House, MACAULAY STREET, HUDDERSFIELD. Phone 341.

SPECIFIED FOR THE LOFTIN-WHITE A.C. 2

Savage transformer, type I.W.2, 39", postage 1/- State voltage and periodicity of mains when ordering. Many other types available, also smoothing chokes and condensers.

Write for List

SAVAGE, 292 Bishopsgate, London, E.C.2
Phone: Bishopsgate 4297

DX THE STANDARD PLUG-IN COIL
Sold everywhere from 1/-
DX COILS Ltd, London, E.8

YOU CAN BUILD A £40 GRAMOPHONE WITH OUR SCALE DRAWINGS FOR 40/-
Book of instructions 3d. Catalogue of Motors, Tonearms, Soundboxes, latest internal amplifiers Gramophones and Cabinets Free. Cash or Terms.
W. BURT, 185 High St., Deptford.

'Build Your Own Batteries'—'The Cells that Satisfy'
We supply complete Kits for making Super Capacity, Grid Bias, Block Type, Pocket Lamp, Wet Type and Bell, Batteries. You can build a 60 Volt Wet Battery for 15/-. We supply a Standard size 120 Dry Battery for 12/-. All Batteries guaranteed.
Send 3d. for The Leyton Booklet, "Build Your Own Batteries," to—
The Leyton Battery Co., 305 Church Rd., Leyton, E.10

BUILD YOUR OWN HIGH-TENSION ELIMINATOR FOR 37/-
all components required, (including valve) supplied for 37/-. Post Free. Output 16 milliamps, 120 volts.
Stamp for Diagram and Lists.
FEL-ECTRIC RADIO, 56 Garden St., Sheffield.

MAKE OR BUY A GRAMOPHONE AT a quarter shop price. Or buy Cabinets for Wireless. British double spring motor, 12 in. velvet turntable, swan arm, metal sound-box, amplifier, needle cups, for £1 8 8 net, and build your own cabinet. Portable Gramophones from 15/6, postage 1/8. Motors from 7 6. Lists free. 64 pp. 1931 Catalogue No. 220 with Reduced Prices, Drawing and How to Make Gramos 3d. Established 26 years.
Regent Fittings Co., A.W., 120 Old St., London, E.C.1

TAYLOR WET H.T. BATTERIES
New Prices: Jars 1/3. Sacs 1/2. Zincs 1 Od. Sample doz. 18 Volts complete with bands and electrolyte 4/1 post 9d. Sample unit 6d. Illus. booklet free. Bargain list free. **AMPLIFIERS, 3/1-. 3 VALVE ALL-STATION SET £3.**
A. TAYLOR, 57, Studley Road, Stockwell, LONDON.

FULL-SIZE BLUEPRINTS

When ordering, please send Postal Order, NOT STAMPS

CRYSTAL SET (6d. each)	
Regional Crystal Set	WM175
ONE-VALVE SETS (1s. each)	
Monodyne	AW258
Hartley Single-valver	WM195
TWO-VALVE SETS (1s. each)	
Talisman Two (D, Trans)	AW194
No-battery A.C. Mains Two (D, Trans)	AW230
No-battery Gramo-radio 2 (D, Trans)	AW238
1930 Talisman 2 (D, Trans)	AW239
Easy Tune Short-wave 2 (D, Trans)	AW242
Searcher Two (D, Trans)	AW245
Arrow Two (D, Trans)	AW249
Forty-five-shilling Two (D, 8 Trans)	AW250
Searcher Short wave 2 (D, Trans)	AW259
Challenge Two (D, Trans)	AW267
Loftin White Two (A.C. Mains)	AW262
Brookman's Two (D, Trans)	WM168
New Crusader (D, Trans)	WM182
Radio-Record Two (SG, D)	WM187
Gleaner Two (D, Trans)	WM201
Music Monitor (D, Trans)	WM208
Merlin Two (A.C. Set)	WM213
Five-Point Two (D, Trans)	WM220
THREE-VALVE SETS (1s. each)	
1930 Ether Searcher (SG, D, Trans)	AW211
Best-by-Balot Three (SG, D, Trans) Price 4d. free with copy of "A.W."	AW217
Everybody's All-electric Three (SG, D, Trans) —A.C.	AW221
1930 Clarion Three (SG, D, Trans)	AW223
Beginner's Regional Three (D, 2LF)	AW233
Britain's Favourite Three 1930 (D, 2 Trans)	AW243
"The A.W." Exhibition 3	AW247
Brookman's Three (SG, D, Trans)	WM161
Brookman's Push-Pull Three (SG, D, Trans) 1/6	WM170
All-nations Three (D, 2 Trans)	WM178
Inceptor-dyne (SG, D, Pentode)	WM179
Brookman's A.C. Three (SG, D, Trans) 1/6	WM184
Music Marshal (D, 2 Trans)	WM190
Gramo-Radio D.C. Three (SG D Trans)	WM196
Concert Three (D, 2 Trans)	WM199
New Lodestone Three (HF, D, Trans)	WM205
De-Luxe Three (D, RC, Trans)	WM209
Five-Point Three (SG, D, Trans)	WM212
Falcon Three (A.C. Set)	WM217
New Brookman's Three (SG, D, Trans)	WM218
FOUR-VALVE SETS (1s. 6d. each)	
Horizon Four (SG, D, 2 Trans)	AW337
Challenge Four (2SG, D, Trans) with copy of "A.W." 4d. post free	AW251
Challenge Four (2SG, D, Trans, mains operated) with copy of "A.W." 4d. post free	AW252
1930 Monodial (2SG, D, Trans)	WM158
Brookman's Four (2SG, D, Trans)	WM174
Transportable Four (SG, D, 2 RC)	WM180
Lodestone Four (HF, D, RC, Trans)	WM193
Searcher's Four (SG, D, RC, Trans)	WM194
Invitation Four (SG, D, RC, Trans)	WM200
Regional Band-pass Four (SG, D, RC, Trans)	WM211
Five-Point Four (SG, D, RC, Trans)	WM216
Regional A.C. Four (SG, D, RC, Trans)	WM222
FIVE-VALVE SETS (1s. 6d. each)	
James Quality Five (2SG, D, RC, Trans)	AW227
All-wave Lodestone Five (HF, D, RC, Push-pull)	WM146
1930 Five (2HF, D, RC, Trans)	WM171
Dual-screen Five (2SG, D, RC, Trans)	WM185
Radio-Record Five (SG, D, Trans-parallel)	WM188
Overseas Five (3SG, D, Trans)	WM191
SIX-VALVE SET (1s. 6d. each)	
Hyperdyne Receiver (Super-het)	WM221
PORTABLE SETS	
Continental Portable (SG, D, Trans)	AW241 1/-
Pedlar Portable Two (D, Trans)	WM195 1/-
Pedlar Portable Three (D, 2 Trans)	WM197 1/-
James Portable SG3 (SG, D, Trans)	WM207 1/-
Foursome Portable (SG, D, 2 Trans)	WM206 1/6
MISCELLANEOUS (1s. each)	
Simplest H.T. Unit	AW197
By-pass Unit (Wavetrap) with copy "A.W."—4d.	AW218
"Twin" Brookman's By-pass (6d.)	AW222
James H.T. and L.T. Charging Unit	AW232
Simplest H.T. Eliminator for D.C. Mains	AW234
Simplest H.T. Eliminator for A.C. Mains	AW236
Choke Output Unit	AW240
Simple Tester Unit (6d.)	AW246
"A.W." Improved Lincn-diaphragm Speaker	AW248
Handy L.T. and G.B. Unit for A.C. Mains	AW254
Novel Lincn-Diaphragm Speaker	AW260
Ohmic-coupled DX Unit	AW255

Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of any of these sets can be obtained at 1s. 3d. and 4s. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine."

AMATEUR WIRELESS 58-61 FETTER LANE LONDON, E.C.4.

WANTED
Immediately keen Young Men with good radio experience for general all-round constructional work by radio manufacturers. Good wages. Hours 8 till 6. Write giving full details of experience to—
"D.J.F." c/o Amateur Wireless, 58/61, Fetter Lane, E.C.4

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. It is here explained.

Intending purchasers should forward to the Publishers the amount of the purchase money of the article advertised. This will be acknowledged to both the Depositor and the Vendor, whose names and addresses must necessarily be given. The deposit is retained until advice is received of the completion of the purchase, or of the article having been returned to and accepted by the Vendor. In addition to the amount of the Deposit, a Fee of 6d. for sums of £1 and under, and 1s. for amounts in excess of £1, to cover postage, etc., must be remitted at the same time. In cases of persons not resident within the United Kingdom double fees are charged.

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

DECORATE YOUR LOUD-SPEAKER YOURSELF. Transfers giving painted effects on Fabric, Wood, Metal, etc. Sample and catalogue 1/-. A.W., Axon Ltd., Jersey, England.

ENGINEERS.—IMPORTANT NOTICE.—Results now to hand show that 93 per cent. of our candidates pass their Exams. at the first attempt, a remarkable record, unapproached by any other organisation and showing why we alone guarantee "NO PASS—NO FEE." It is out of every 100 ordinary men can succeed, why should you remain in the ranks? Now is the time to "get busy" and investigate. Our handbook, "ENGINEERING OPPORTUNITIES," explains the most simple and successful home-study methods of passing B.Sc., A.M.I.Mech.E., A.M.I.C.E., A.M.I.E.E., A.M.I.A.E., C.P.O., C. & G. Matric., etc., Exams. This book outlines Courses in all branches of Civil, Mech., Elec., Motor and Wireless Engineering, shows the unique advantages of our Appointments Dept. and includes a brilliant foreword by Prof. A. M. LOW, in which he shows clearly the chances you are missing. Send for FREE HANDBOOK now (state branch, post, or Exam.).—BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY, 109 Shakespeare House, 29-31 Oxford Street, London.

SPEAKERS, 18x18x7, polished oak, 16 in. floating cone, 8 magnet fret, Gauge Tritron unit, splendid tone, handsome appearance, 22/6 complete.—Parke Radiograms, 790 Turnpike Lane, N.8.

RADIO SATISFACTION.—Osram, Mullard Kits, Cosmor, Varley, McMichael Sets. Speakers. Kits assembled, no extra. Portables and Transportables. Delivery free. London area same day C.O.D. Send card for quotation. Batteries, Valves, Pick-ups, etc., at right prices.—Dudley, 37 Hartley Street, London, E.2.

BANKRUPT STOCK BARGAINS, new and genuine, all satisfaction or cash refunded, any C.O.D. or A.W. deposit system. Telsen Ace transformers 3-1, 5/6. Watmel H.F. chokes, 1/6. Cosmor transformers, 10/6. Mullard Permacore, 10/6. Ferranti AF3C, 16/6. Lotus reaction condenser, 00034, 3/6. Wearite 4-pole rotary switches, 2/9. Graham Parish resistances, 250,000, 500,000 and 5,000 ohms, 1/2 each. Precision valve holders, large, 7d. each. Ediswan 1/2-meg. leaks, 8d. each. Ebonite leak holders, 3d. Ediswan 2-volt valves all new, H.F., L.F., 5/6 each; RCC, 4/6; Power, 6/6. Phillips 506 H.T. rectifier valves, 12/6. Osram U8, 12/6. L85 and Mullard DFA7, 16/6, all new. Note callers any time. Bus stop outside door, slight Fitzalan Street.—G. A. Ryall, 182 Kennington Road, London, S.E.11.

REPUTABLE firm requires representatives in all towns for the sale of probably the best-known All-Electric Receiver. (Whole or spare time). Salary and commission. Box 47, c/o "Amateur Wireless," 58 Fetter Lane, E.C.

WET BATTERY REPLACEMENTS.—New Process Sacs, approximately 20,000 m.a., 2/6 per dozen. Particulars free.—Scottish Batteries (A.W.), Branside, Uphall Station.

ALEXANDER BLACK, Wireless Consultant, will call and cure your set: (London and Home Counties). Radio Association appointed representative. Components and McMichael Portables on hire.—55 Ebury Street, S.W.1. Sloane 1655.

WRITE for particulars of 3-valve Kits in Polished Cabinets, £2 15s. 0d. Mann, 10. Baroness Rd., Hackney Rd., E.2.

20 HENRY 80 milliamperes chokes for eliminators, etc., 12/6. Chingford Electrical Products, Willow St., Station Road, Chingford, Essex.

BANKRUPT BARGAINS.—Telsen ACE, 6/6; Radiogram, 9/6; Sutra, 3/-; 0005 variable, 2/6; differential, 2/9. S.M. Dials, 1/6; geared, 2/-. Bullphone Dual Coils, 8/6; others, 5/-. Fixed 1-mfd., 1/8; 2-mfd., 2/-; small, 9d. Grid Leaks, 9d. A.C. Eliminator, £2; D.C., 22/6. Speaker Kits from 12/6. Three-valve Kits, 35/-; Two-valve, 24/-; Portables, five-valve, £6/10/0. List free. Any kit supplied.—Butlin, 143b Preston Road, Brighton.

WE WILL ACCEPT YOUR SURPLUS APPARATUS (making you a high allowance) in part payment for any new apparatus; your inquiry will be dealt with promptly.—Bostock & Stonnill, 1 Westbourne Terrace, S.E.23.

"CRAFTSE" CABINETS for Wireless and Gramophones. Ready for assembling or assembled. Lists free.—Craftse Works, D Mendip Industries, Winscombe.

Amateur Wireless COUPON Available until Saturday DECEMBER 20, 1930

DUBILIER RESISTANCES NOW COST YOU LESS



Dumetohms reduced to 1/9. All values

There is no excuse for using inferior resistances, because Dubilier now pass on to you the benefits of increased production, namely—lower price.

Good resistances are essential if the best results are to be obtained, so ask for Dubilier next time. Use Dubilier Condensers too!



Duwireohms now from 4/6 to 17/6, according to value



FIXED CONDENSERS
TYPES 610 and 620

.00005 to .0009	1/8
.001 and .002	2/-
.003, .004, .005	2/3
.006	2/6
.01	3/-

Use Dubilier Components and be Certain of Satisfaction

DUBILIER CONDENSERS

DUBILIER CONDENSER CO. (1925) LTD.,
Ducon Works, Victoria Road, N. Acton, London, W.3.

OBTAIN THIS XMAS GIFT FROM YOUR DEALER

THIS FINE WATES PICK-UP ARM (VALUE 7/6)

GIVEN FREE!

TO EVERY PURCHASER OF A **WATES GRAMOPHONE PICK-UP** DURING DECEMBER

The value of a Gramophone can be greatly increased when a pick-up is used. The Wates Star Pick-up immediately gives ordinary gramophone music a life-like reality that brings out all the more subtle sounds with a purity and accuracy of tonal value that is amazing. For the Xmas festivities, a Wates Pick-up enables you to have gramophone dance music to equal the actual players in volume and tone.

THIS UNIQUE FREE OFFER

enables you to fix a pick-up to your gramophone without interfering with the ordinary sound box.

TAKE ADVANTAGE OF THIS OFFER IN TIME FOR THE XMAS FESTIVITIES

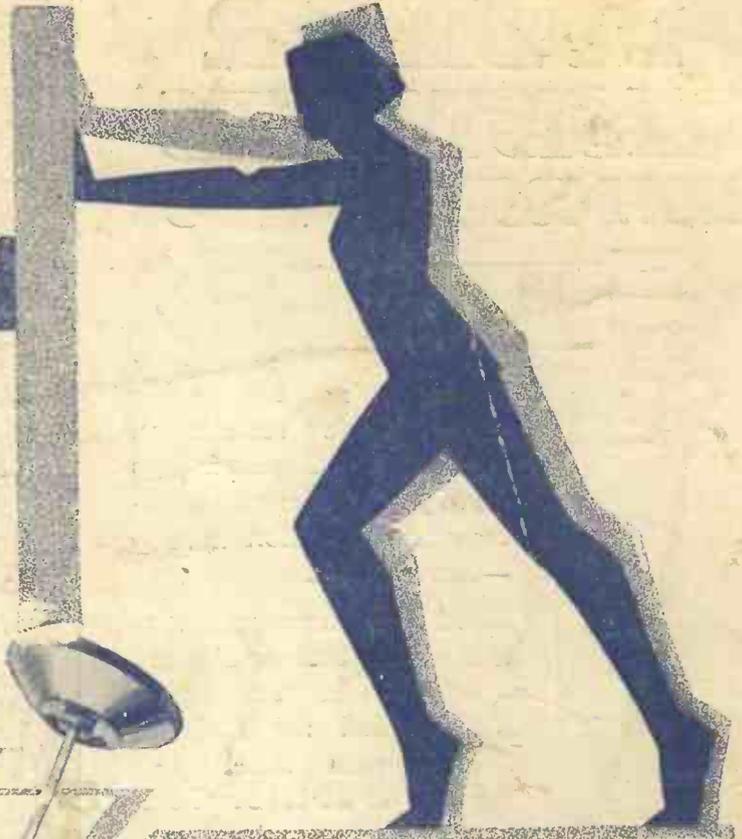
Buy your Wates Pick-up now at any Radio dealer's. If any difficulty regarding supply, write direct, giving name and address of your usual radio supplier, to:—

THE STANDARD BATTERY COMPANY (DEPT. A.W.)

184 188 SHAFTESBURY AVENUE, LONDON, W.C.2 M.B.



Release
that
imprisoned
force
that
lives



within
your set!

**BLUE
SPOT
66R**

35!



The loud-speaker is the final arbiter on all sounds broadcast. It is in many cases a barrier which holds back volume, coarsens reproduction, through lack of sensitivity, and mars the work of a first-class receiver. Not merely a good loud-speaker is good enough — only the superlative excellence of the Blue Spot can reveal with unquestionable perfection everything broadcast. Though highly sensitive, a Blue Spot carries heavy loads without a hint of "blare" or "boom." Hear the Blue Spot demonstrated at any radio store and realise its superiority.

- Blue Spot Power Unit, Type 66P - 27/6
- Blue Spot Power Unit, Type 66K - 25/-
- Blue Spot Major Chassis, Type 37R - 15/-
- Blue Spot Special Chassis, Type 31R 10/6

THE BRITISH BLUE SPOT COMPANY LTD
BLUE SPOT HOUSE • 94/96 ROSOMAN STREET • ROSEBERY AVENUE • LONDON • E.C.1
Phone : Clerkenwell 3570. Grams : "Bluspot, Smith, London."
Distributors for Northern England, Scotland, and North Wales : H. C. RAWSON
(Sheffield and London), LTD., 100 London Road, Sheffield ; 22 St. Mary's Parsonage,
Manchester ; 183 George Street, Glasgow.