

"AMATEUR WIRELESS", DECEMBER 7, 1929

CHRISTMAS DOUBLE NUMBER 3rd

Amateur Wireless

*Full details
of "1930
ETHER
SEARCHER"
in this
issue*

No. 391

Sat., Dec. 7, 1929

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AT HOME**

**HOW YOUR
SET WORKS**

**GENTLE ART
OF WIRING**

**COMEDY
BROADCASTING**

By Tommy Handley

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



The Double Range Tuner

A HIGHLY attractive and ultra efficient all-purpose tuner, which completely eliminates coil changing. It gives, when shunted by two .0005 variables, perfect tuning and reaction control over each of two wave bands. These are 250 to 600 and 1,000 to 2,000 metres, and the change over is effected by the push-pull switch supplied. Complete wiring diagram, with each Tuner. This beautiful instrument, wound with green silk-covered wire on a paxolin former, and mounted on bakelite base, with terminals and solder tags costs only **12/6** COMPLETE

The Imperial H.F. Choke

A WONDERFUL little choke which has appeared in the Cossor Melody Maker as well as in thousands of other sets up and down the country. Can be fitted to most wireless receivers, and gives ease of control enabling you to make the utmost use of your reaction and thus get the loudest possible signals without making your set oscillate or howl.



The self capacity of this choke is extremely low owing to the sectional cross windings given on our own special machines. It will improve the range, the volume and the stability of the majority of receivers. **5/-** EACH

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CONNECT a Watmel Wave Trap in series with your aerial lead, and you will be enabled completely to eliminate undesired stations. Four sockets will be noticed on the base, and with these it is possible to obtain no less than 6 different inductance values, thus assuring that you can suit your particular aerial conditions. Operating the small variable condenser gives you minute control over the tuning, and makes your set highly selective. An ideal present. **8/6** AS SHOWN

4-pole Balanced Armature Unit

ALREADY famous as "the best of the British Units," this 4-pole Speaker Unit makes an ideal Christmas present. It owes its magnificent reproduction, great sensitivity and even response over all musical frequencies to the great care expended in the selection and assembly of its parts.

18/6 Aluminium shoes are provided, as shown, for clamping the Unit at any desired angle. AS SHOWN



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Watmel

PRODUCTS

WATMEL WIRELESS CO., LTD., Imperial Works, High Street, EDGWARE

PHONE: EDGWARE 0323

P. & T.

Features that matter

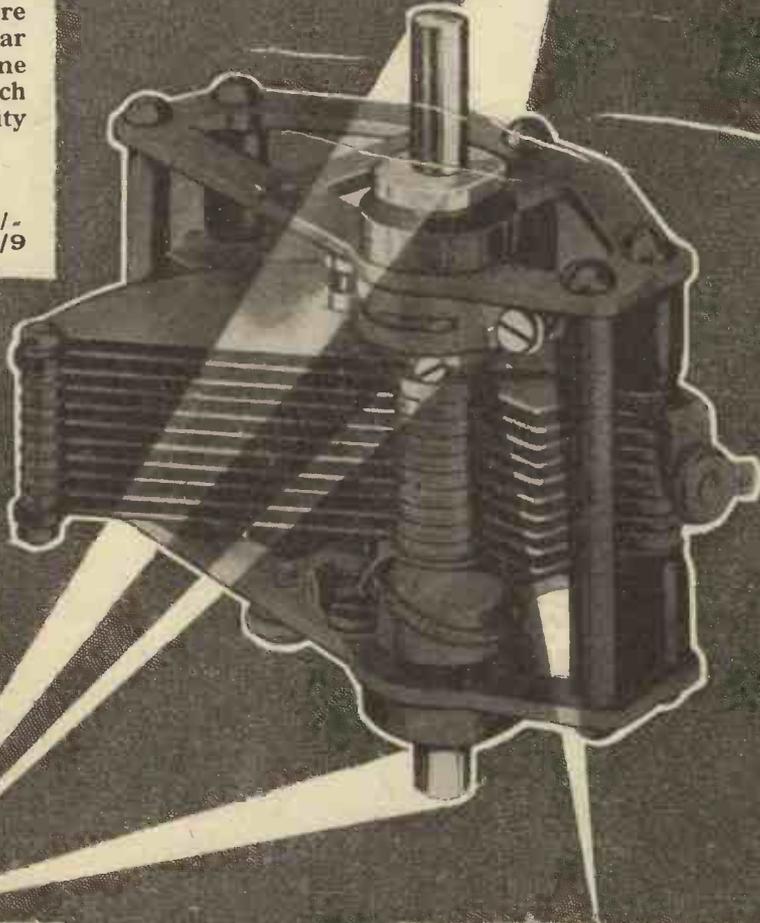
IT'S when you begin to look into J.B. Condensers that you appreciate the skill, the accuracy, the endless patience with which they are designed and made.

This is the Universal Log—one of the new models. It will be the Condenser of the season, and will feature in many of the Star Circuits. The frame construction is such that complete rigidity is assured.

PRICES:

'0005 - 9/6 '0003 - 9/-
'00025 - 8/9 '00015 - 8/9

This bush is removable, enabling the Condenser to be fixed to Panel either end, left or right hand.



Steel Centre Spindle, adjustable for length and particularly useful for ganging and attaching to Thumb or Drum Control.

Showing the well-known J.B. adjustable tension to Centre Spindle.

Advertisement of Jackson Brothers, 72, St. Thomas' Street, London, S.E.1. Telephone: Hop 1837.

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ARE YOU LOOKING

LISSEN'S NEW POWER PENTODE —battery-driven!

Any two-valve set becomes at once a fine loud-speaker set when you put this new Lissen Power Pentode into it. You can use this Power Pentode Valve in any set with one stage only of L.F. amplification and you will get full loud-speaker volume on stations previously weak.

And you do not need to make a single other change in your set—you do not need more H.T. current—as long as you have at least 100 volts available—nor does this extra volume that you get cost you any more in running expenses. Because Lissen have produced at last a Power Pentode that is battery driven—the only Power Pentode of its kind on the market, the only Power Pentode Valve that you can economically run off ordinary H.T. batteries.

Most good dealers also have stocks of the following 2-volt Lissen Valves.

H.210 R.C. and H.F. 10/6

H.L.210 General Purpose..... 10/6

L.210 L.F. Amplifier 1st stage 10/6

P.220 Power Valve..... 12/6

Insist upon a Lissen Power Pentode, because no other valve is 'just the same.'



LISSEN
NEW PROCESS
VALVES

If you have a set with one L.F. stage from which you want more power get a Lissen Power Pentode Valve.

17/6
(2 Volts—Consumption Only 7 M.A.)

LISSEN, LIMITED, WORPLE ROAD, ISLEWORTH, Middlesex.

Factories also at Richmond (Surrey) and Edmonton. (Managing Director, T. N. COLE.)

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

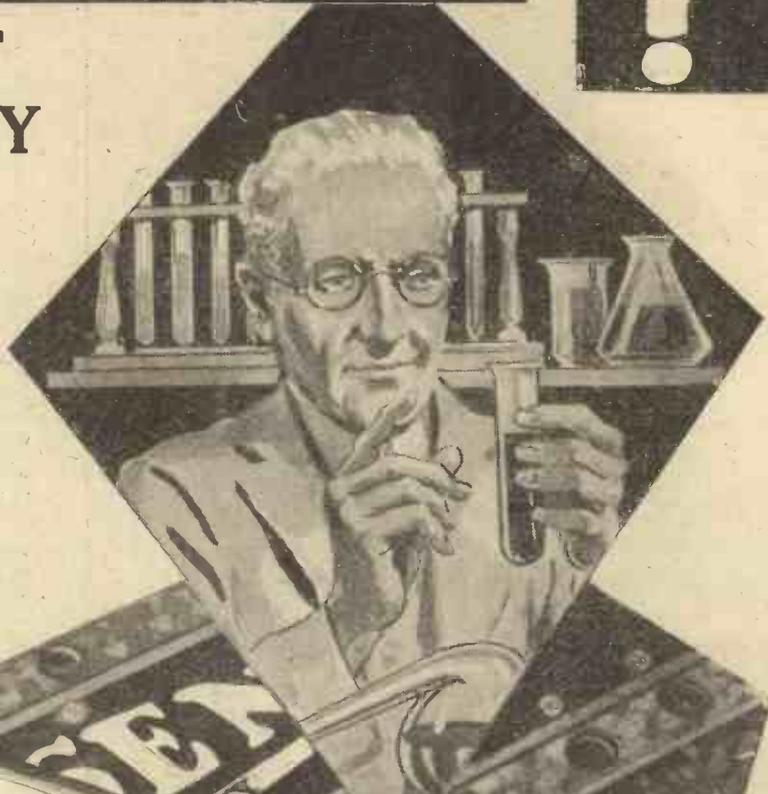
FOR POWER



LISSEN'S SECRET PROCESS BATTERY

There is a secret process and a new chemical combination used only in the Lissen Battery which puts new power into your radio set. It gives to your reproduction of dance music a new liveliness, makes speech distinct, song clear and true.

The current of a Lissen Battery flows smoothly, steadily, sustainedly throughout the longest programme. The large cells have a great oxygen content which gives the battery long life and produces all the time pure power with never a trace of ripple in it, never a sign of hum.



You want pure power for your radio; any good wireless dealer will supply you with the Lissen Battery that will give it to you.

PRICES.

60 volt (reads 66)	7/11
90 volt (reads 108)	12/11
20 volt	15/11
36 volt	4/6
60 volt (Super power)	13/6
100 volt (Super power)	22/-
9 volt Grid Bias	1/6
4 1/2 volt Pocket Battery	5d. each (4/6 a doz.)
Single Cell Torch Battery	4 1/2d.



LISSEN LIMITED

Worple Road, Isleworth, Middlesex.
Factories also at Richmond (Surrey) and
Edmonton.
(Managing Director: T. N. Cole.)

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5/6

General Purpose



7/6

Super Power

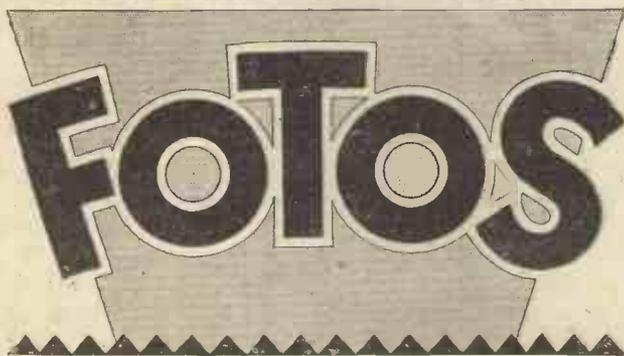
For Purity of Reception . . .

you cannot beat FOTOS—the Concert Valve. Made by men who know valves; perfected by extensive research and tests—that's FOTOS! Obtainable in these types and prices:—

Type	Volts	Amps.	Use in Set	Price
B.A.9	1.9v	0.05	General Purpose	5/6
B.C.9	1.9v	0.1	General Purpose and Power Valve	5/6
B.D.9	1.9v	0.2	Super Power Valve	7/6

Same Types in 4 volts: Also Pentode 18/6 & Screened Grid 15/6

SAY "FOTOS"—AND MAKE SURE



THE CONCERT VALVE

IF YOUR DEALER DOESN'T STOCK IT—
WRITE FOR LEAFLET A12 FROM
CONCERTON RADIO &
ELECTRICAL CO., LTD. ↑

256/7, BANK CHAMBERS, 329 HIGH HOLBORN, W.C.1 Phone: Hol. 8667

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With knob, dial and slow-motion device, .0003 or .0005, 12/-

Without knob, dial or slow-motion device, .0003 or .0005, 8/-

K.C. DRUM CONTROL CONDENSERS

With Drum Control and slow-motion device, .0003 or .0005, 15/6

Triple K.C., each condenser .0003 or .0005, 38/6

Triple K.C. Combinations of .0003 & .0005, 40/-



MIDGET CONDENSER

A small variable condenser for panel mounting .00005, .0001 or .0002, 5/6

DUBILIER

VARIABLE CONDENSERS

Ask your dealer for the Dubilier Booklet—"A Bit about a Battery"—it's free.



Dubilier Condenser Co. (1925) Ltd., Ducon Works, Victoria Road, N. Acton, London, W.3 BC249/V

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FOR EXAMPLE 80 STATIONS

all over Europe were received at loud-speaker strength on this Burndept Screened Four on a short aerial. That is one specific example of the range of this magnificent receiver.



A four-valve receiver with a five-valve performance—the result of Burndept's skilful use of the Screened-grid valve. No coils to change—a single switch covers wave-lengths 220 to 560 metres or 750 to 2,000 metres. Tuning-in is simple—the left tuning dial is calibrated direct in wavelengths. There is a selectivity control and a volume control. The cabinet is of handsome french-polished mahogany.

PRICE,
including valves and royalty
£27-18-6
or for first payment of £2-15-6

Burndept SCREENED FOUR

Write for full specification to BURNDEPT. WIRELESS (1928), LTD., 17, Eastnor House, Blackheath, S.E.3.
London Showrooms: Roxburghe House, 283, Regent St., W.1, & 15, Bedford St., Strand, W.C.2.

NOW THERE ARE 3 GOOD NEWS

Pocket & Panel models in the WATES

8/6

THE FAMOUS POPULAR MODEL
Crystallised black finish, clearly engraved dial, substantial leads, fully guaranteed. 8/6; Case 2/6 extra.

RANGE OF METERS.
Who would be without it? Certainly not one of the quarter-million users of this famous Three-in-One Meter. Three distinct readings on one dial—L.T. and H.T. and milliamps, and now there is a panel-mounting model too! Can be used as a pole finder and also to test Eliminator voltage.



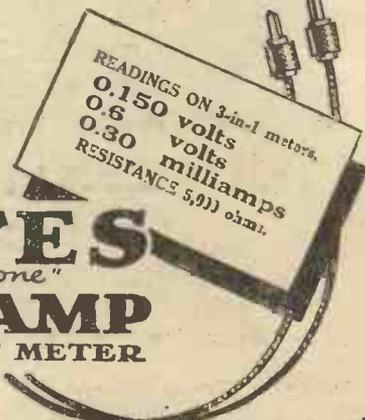
PANEL MODEL.
Fixes on to panel as illustrated. Readings on three scales obtained by simply rearranging plugs in coloured sockets. Price 13/9. With full instructions for use.

THE STANDARD BATTERY CO.,
(Dept. A.W.),
184/188, Shaftesbury Av., London, W.C.2.

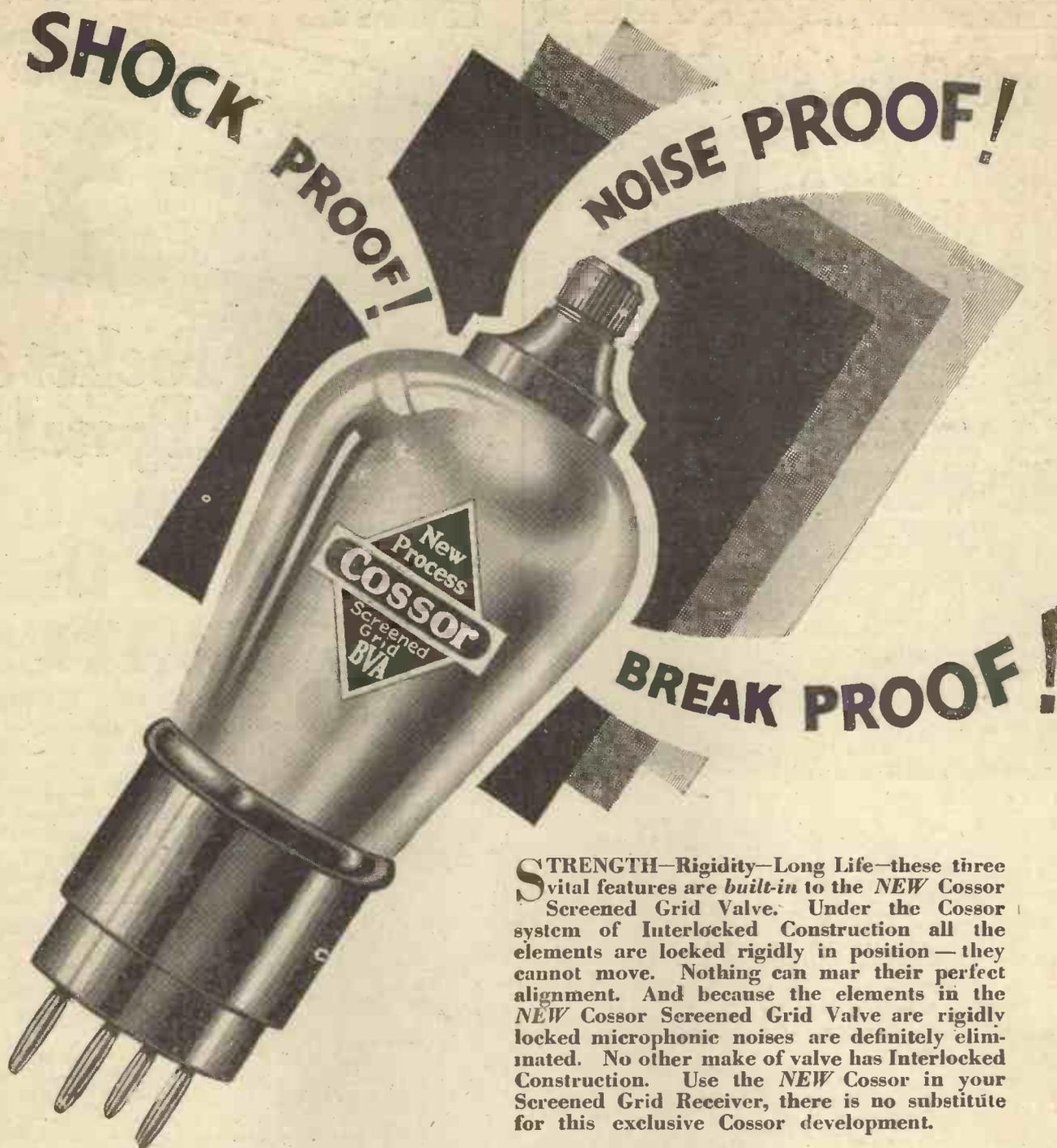
From Halford's Stores; Curry's Stores; all dealers, or direct.



MILLIAMMETERS.
0-50 or 0-25 M.A. with jewel bearings, 9/6.



WATES "three in one" VOLT-AMP RADIO TEST METER



**2-volt type
now available.**

The **NEW** Cossor 220
S.G. (2 volts, .2 amp.)
Max. Anode volts 150,
Impedance 200,000,
Amplification
Factor 200. **22/6**
Price

Cossor 4 and 6 volt Screened
Grid Valves are also available
with similar characteristics at
the same price.

STRENGTH—Rigidity—Long Life—these three vital features are *built-in* to the **NEW** Cossor Screened Grid Valve. Under the Cossor system of Interlocked Construction all the elements are locked rigidly in position—they cannot move. Nothing can mar their perfect alignment. And because the elements in the **NEW** Cossor Screened Grid Valve are rigidly locked microphonic noises are definitely eliminated. No other make of valve has Interlocked Construction. Use the **NEW** Cossor in your Screened Grid Receiver, there is no substitute for this exclusive Cossor development.

The **NEW** **COSSOR** Screened Grid Valve

A. C. Cossor Ltd., Highbury Grove, London, N.9

2517

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Amateur Wireless

December 7, 1929

Editor: BERNARD E. JONES

No. 391. Vol. XV

Technical Editor: J. H. REYNER, B.Sc., A.M.I.E.E

:: Research Consultant: W. JAMES

:: Assistant Editor: H. CORBISHLEY

"Amateur Wireless" Goes Portable-izing—The "Unseen Eye"—A Cables Accident—More Train Radio—A New Short-waver—See the Searcher!

"Amateur Wireless" Goes Portable-izing—Last week in AMATEUR WIRELESS it was described how the running commentary of the recent dirt-track motorcycle race was given from the Wembley Stadium. A correspondent is moved to inquire if there is any connection between this and the fact that he saw a happy party at the track listening-in on what appeared to be strangely like the "Music Leader." Yes, sir, it was a member of the AMATEUR WIRELESS staff, who took the original "Music Leader" to the Stadium to see how it would operate! It did, despite the barrier put up by the mass of steel-work in the grandstands. It seemed quite unaffected by the metal.

The "Unseen Eye"—The scene is at the Thames Police Court recently, when an elderly man was fined 5s. for using a receiver without a licence. He asked, not unnaturally, if he could be given the names of the people who gave information about him. "You are not entitled to the information," said Mr. Sharpe, the magistrate, "and you must assume that there is an all-seeing eye which sees these things." But was the "all-seeing eye" really the G.P.O. van or just a neighbour who had "split"?

A Cables Accident—During the last two weeks there has been a tremendous upheaval of the Atlantic Ocean floor and at least ten out of the twenty-one cables between New York and Nova Scotia are broken. The cable companies are rushing cableships to repair the damage and radio is doing its best to carry on with the tele-

graph business. Our good friends the Radio Corporation of America have been swamped with cable business, so it's an ill wind . . .!

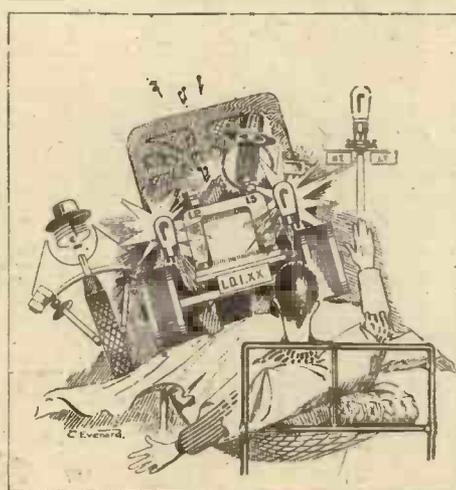
More Train Radio—Recently we described the way in which it is now possible on all large Canadian trains to listen to a radio programme, or to talk to friends via a radio telephone while the train is doing, perhaps, seventy miles per hour. The German Telefunken engineers are trying a similar "stunt," and now we understand that three of the largest French express trains are being fitted up with receivers.

A New Short-waver—Here's a new station to be logged by all you keen radio fans. WGY, Schenectady, has added

another short-wave station to its already large family. In addition to W2XAF and W2XAD, there is now W2XAC, which operates on 34.5 metres.

See the Searcher!—The "1930 Ether Searcher," described in this issue, is going to be a winner, and the presentation of this set is such that anybody can make it up, even those who have previously fought shy of wiring up an electric bell! If you still want convincing, then why not see the set for yourself. The "Ether Searcher" will be on show next week in four important centres in England. In Messrs. Selfridge & Co., Ltd., in London, the set will be on show in the windows, and a model will also be demonstrated in the radio showrooms. In the branches of Lewis's, Ltd., in Manchester, Liverpool, and Birmingham, the set will also be on show. Take advantage of this great opportunity to see an actual original AMATEUR WIRELESS receiver.

"Situations Vacant"—Somebody has made the bright suggestion, in view of the striking increase in unemployment figures, that the B.B.C. should alleviate matters by regularly announcing a list of "situations vacant." It should be borne in mind, however, that this would only be duplicating what is already done by the daily papers and other existing services. Also, to be of use, the employment bureau would have to be broadcast at a time when the greatest number of listeners might be expected to be switched on—and this would be the time when the microphone would be most needed for entertainment.



The Radio P.C.'s Dream!

COMEDY BROADCASTING

by
Tommy Handley



"THE play, I remember, pleased not the million; 'twas caviare to the general."

So said Wil Shakespeare in *Hamlet*, so showing that the Grand Old Man of literature knew a thing or two about broadcast productions!

What I am most concerned about, however, is not radio plays—which, apart from the big fellows, such as *Journey's End* and *Carnival*, are sometimes too "caviare-ish"—but comedy broadcasts. Listeners still say that they get too little real humour.

This is only partly true; there are difficulties from the B.B.C. end, and difficulties from *your end*, too. Let me explain.

A Lack of Humorists—

For one thing, there isn't, and never was, an over-abundance of humorists—good humorists. In pre-B.B.C. times we were content to let our drawing-rooms be graced at party-times by alleged "funny" men, but their humour isn't good enough, or always sufficiently fresh, to please millions of listeners. You might suggest that the broadcasters should draw on the stage for their humorists, but the stage technique is different, and the funny men of the footlights often fall flat—not literally, of course!—over the microphone: unless they've adapted their stage training to the new broadcast requirements.

Point Number One, therefore, is that there's hardly enough humorists (or humoristes, for that matter) to go round.

—and a Lack of Humour

Point Number Two is that there's always a shortage of humour. A stage comedian can hear a good joke and repeat it nightly to a theatre-full of different people every night; perhaps a couple of thousand a day—12,000 a week. But the broadcaster-humorist has to give his joke away in one fell swoop to *millions* of listeners; and if he comes out with one twice in one week his reputation "goes flop." He *must* be fresh.

New gags, new tricks *must* be found. And they must depend on words and song alone. On the stage a comic bowler hat or a red

moustache can cause roars, but the knowledge that a broadcaster-comedian has a red moustache which can't be seen, simply draws a red herring across the path of the listener's mirth. The art of the "mike" is to make the listener forget that he is using only his ears, and not his eyes. The trouble was the same with the cinema until talkies came, and television will in like manner solve the lack-of-humour problem.

At least, it will partly solve it. It won't solve the difficulty that artistes will still usually have to give their performances in a studio; I presume that it will be many years before television direct from a theatre is possible. It is killing work to newcomers who try to be funny in front of the microphone; that fact I wish to impress as strongly as possible in listeners' minds.

Where Television Would Come In.

I know it so often happens that one sees a variety turn billed for broadcasting. "Floppie and Floss," you say. "Yes, I remember seeing them at the *Colisedeum*. They ought to be good."

But "Floppie and Floss" somehow don't sound the same when strained through the loud-speaker as when you saw them clowning on the stage. "Floppie and Floss" are a "flop" to you, but don't blame them; rather blame the medium of broadcasting itself, which places a great and new onus on artistes.

It isn't only that it's difficult to be funny in front of the microphone. It's also difficult to sit and listen to anyone being funny through the loud-speaker. This is where I refer to *your end*.

So many people don't give a radio set a fair chance; they use the programmes only as a background for conversation. I don't say *you* do; but if you know anybody who does, then ask them, from me, to stop it! It's hopeless to be funny to people who won't listen to you.

If people want to talk, then let them switch off the radio set and save the "juice." But if they want to listen, then let them give all the attention they would willingly *dévoté* were the performance being

given in a theatre, and not in their own homes.

I haven't a Christmas present for you, I'm afraid, but I'm going to ask one of you. It is simply to extract a promise to *be polite to the loud-speaker!* Listen to it when it speaks or switch it off entirely.

Perhaps some people's trouble is that their sets give poor reproduction, and are difficult to listen to, anyway!

Have You Heard This?

Anent this, and the subject of getting a good set, did you ever hear of the Scotsman who thought he really would buy a respectable set for Christmas. So he went to the local radio stores.

"I want a grrrramo-rrrrradio set, laddie," he said.

"Yes, sir," said the willing showman.

"Here's a nice one—£50, complete with turntable and all doohickies. Or a smaller one, price £40, with only one doohickie . . . or a smaller one still at £20 with no doohickie at all . . ."

The Scot nodded sagely.

"Yes," he said. "I don't think I'll be buying now, though, ye ken. Your prices are all right—but *your sets aren't small enough!*"

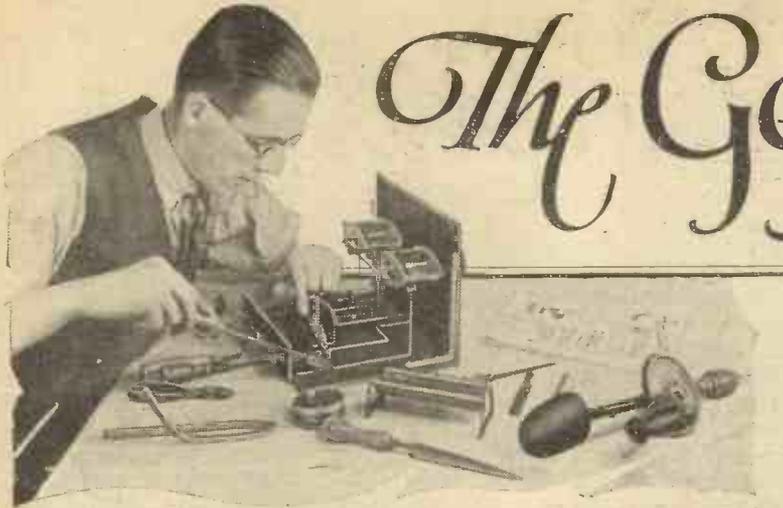
If you've heard it before, please forgive me! I tell you, it's a hard job always to know new ones!

And a happy listening Christmas to you all!

Tommy Handley

8FM, an experimental station operated by French wireless amateurs and situated in a Paris suburb, transmits a musical entertainment nightly towards 11 p.m. G.M.T. on 320 metres.

Our special cover design, printed in full colours, is based upon a design submitted in competition for the National Radio Exhibition poster by Mr. R. P. Davies.



The Gentle Art of Wiring

By JOHN B. CROFTS

The writer of this article, who carries out the constructional work of the "A.W." sets, secured the highest award in an All-Britain Set-building Competition, a distinction which was gained by careful attention to the points on which he now offers suggestions

IN this article I propose to give a number of tips to the set-builder in order to help him to make really efficient and neat-looking receivers. Amateur constructors have argued for and against soldering — usually against — but only because they have failed in their attempt at soldering. Actually, soldering is a surprisingly easy process if one or two simple rules are adhered to. In the course of this article I am also going to give a few hints on tools to use for soldering and wiring. There is no need for anybody to have to apologise to their friends for the untidy appearance of the wiring of their set.

Perhaps you have often wired up experimental hook-ups in a haphazard fashion and have found them quite satisfactory in operation. Upon re-wiring neatly in the finished form, the results may not have seemed any better than in the rough hook-up and therefore you ask yourself whether soldering is worth while.

In considering the rough hook-up, you must remember that as such it was only used for a short time. Had you left it in that state permanently it is more than probable that you would have been troubled by crackling noises similar to bad atmospherics. However tight the rough flexible connections may have been screwed, they seem to have an uncanny way of working loose without this fact being apparent to the eye. Also oxidation of the surfaces gradually develops and causes a high-resistance contact.

The average set

has between 70 and 100 joints in its wiring. If each of these is clamped by pressure contact only, the total resistance in the joints will appreciably impair the efficiency of the set.

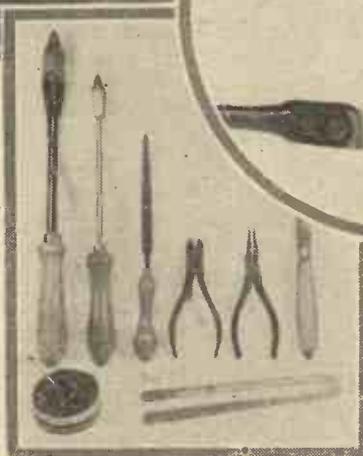
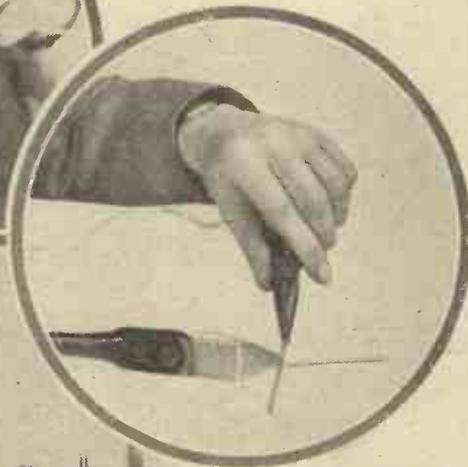
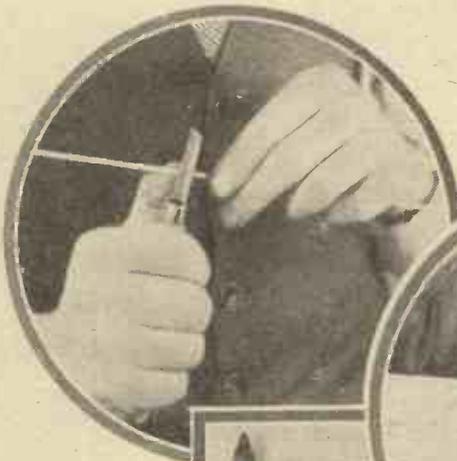
of these, special T pieces are used as they make a very much stronger joint. I have tried to make you see the value of soldering; now let me get down to details. I am often asked whether "square" wiring is worth while. By square wiring I mean the system that is adopted in most of the AMATEUR WIRELESS sets, whereby every wire is either parallel to, or at right angles with, the panel or baseboard.

You will see on this page two close-up views of commonly used joints. In one

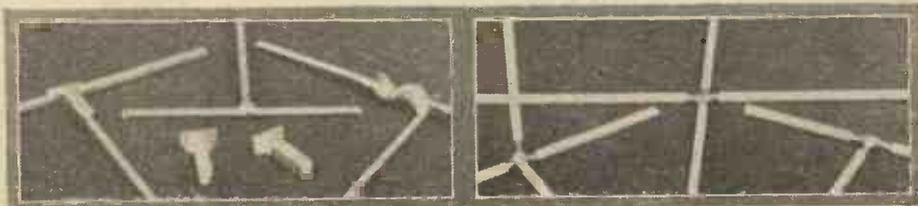
Many constructors assert that the square method of wiring introduces losses into the circuit, thereby causing quite avoidable inefficiency. Personally, I do not agree with this assertion. I have always made a practice of wiring my sets neatly, and have never found the set any less efficient for so doing.

There is this to be said for square wiring; firstly the whole appearance of the set is improved and when finished has that professional look so much desired by the amateur constructor. Secondly, you can very easily check up the various circuits without getting hopelessly involved. Thirdly, the wiring is well spaced and there is little chance of your introducing stray capacities between the circuits.

Photographs are shown of the same set wired in three different ways, namely, square wiring, point-to-point, and flex. A glance at these views will immediately (Continued at foot of page 911)



Insulation is best removed with a knife, as shown in the top picture. The tools required for wiring are indicated in the lower photograph, and the other picture shows the application of the iron. Below, different types of joint are shown.



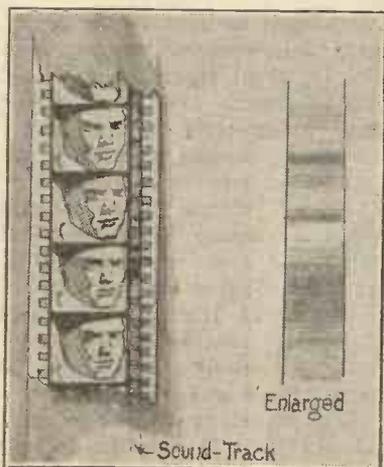
THINGS YOU OUGHT TO KNOW ABOUT THE TALKIES

By BAYNHAM HONRI

WHATEVER the merits or demerits of the talkies are, there is no doubt that they will be the most popular breaking-the-ice topic of conversation at this season's "at homes." The query, "Do you like the talkies?" will be ringing through many a suburban drawing-room, giving new life to a phase of civilisation which has hitherto existed almost solely on weather and servant problems. Arguments are bound to arise, and one can imagine that even the pet aspidistra, long since resigned to its fate as an ashtray, will perk up and take notice of the extraordinary state of affairs. Well, do you like the talkies?

The Ayes and the Noes

You may answer "Yes" or "No," as the case may be, but it is almost certain that



A variable-density film; projector sound "slots" 80 mills wide

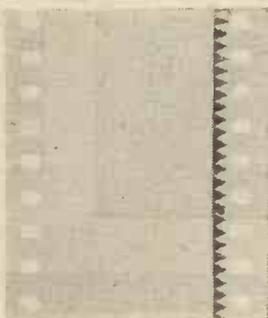
your opinion will have been formed on the "face value" of your own experiences—a few visits to your local picture palace. If you are in the "noes," it is almost certain that you have not seen the talkies at their best or visualised the possibilities of their development. Few people will dispute the fact that perfect reproduction of dialogue is infinitely superior to the clumsy "spoken" sub-title. The action part of films will remain as before, with the possible addition of restrained "effects" or musical accompaniment. Therefore, the objections of the "noes" must be based, on absolute prejudice or, more likely, the apparent technical imperfections. Let us try to find out why talking films sometimes go wrong and put incorrect ideas into the heads of you, "noes." The reasons are all technical, and as such will certainly be of special interest to readers of AMATEUR WIRELESS.

A Broadcasting Simile

Few of my readers will dispute the fact that with modern amplifiers and loud-speakers it is possible to obtain well-nigh perfect reproduction of broadcast music and speech. In talking pictures the broadcast transmitter is replaced by the recorder, the film or disc becomes the ether, and the projection apparatus at the cinema takes the place of the receiver. All the other links in the sound chain remain the same. At the cinema studio, microphones which respond evenly to the air pressures of all audible frequencies faithfully pick up the sounds of voices and musical instruments. Here, at the source, every different "set up" of the microphone has its own acoustic problem, a question of echoes and placement in which experience, trial, error and luck all play their parts in achieving the right result. I am a sound-film recorder myself and am well acquainted with these little tricks of fate that daily please or horrify the critical ears of my managing director. For the information of the "noes," very little bad sound recording ever leaves the cinema studio. If a scene is not good it is re-taken until it is entirely satisfactory.

Various Systems

The frequency characteristics of modern sound-film recorders are uniformly good though differing slightly in various systems. The R.C.A. and British Acoustic recorders use an oscillograph for photographing the sound on the film, and both of these systems are capable of dealing with all audible notes. In the case of the R.C.A. system, I have recorded a pure note of approximately 15,000 cycles per second, generated by a beat note oscillator or "squeak." This is nearly an octave



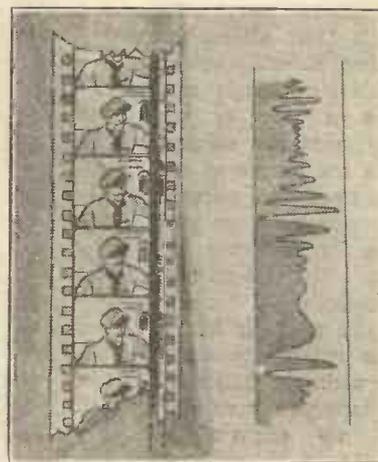
A recording made at the Gainsborough Studios on R.C.A. system of the fundamental tone of middle C of the piano, 256 cycles per second

higher than the limit of the average person's audibility. British Talking Pictures, Cinephone, Western Electric, Tobis, and other systems vary the illumination of the film at audible frequencies, thereby pro-

The British Talking Pictures optical system detached from a sound-film projector. This instrument focusses a strong light on the film sound-track



ducing a sound track of variable density. British Talking Pictures use a peculiar kind of neon lamp, a "photon tube," the



A variable-width film

light of which varies according to the voltages applied. Western Electric use a light valve somewhat similar in principle to the air valve of the Creed Stentorphone gramophone, that compressed air instrument of great power in which the sound is "super-charged."

The "Ether"

We will assume that the sound has now been faithfully recorded by one system or another on the film. You will notice that I have not mentioned the disc in connection with recording. This has now been abandoned owing to its practical limitations. Once started, a disc recording must go on and on until it is finished. Short scenes cannot be recorded at odd times on the same disc. But for reproduction of talking pictures the gramophone disc is still widely used. The sounds, originally recorded on the film, are transferred electrically to the disc, special compensating

circuits being arranged to deal with possible distortion introduced in making the transfer. There is a loss of quality both in making the disc and printing the original sound at the side of the picture on the positive cinema film. But the loss is chiefly in the very high frequencies.

The Projector

It is when we come to the actual cinema projection machine, the "broadcast receiver" link of the talking picture chain, that we come to the chief cause of dissatisfaction with talking films. The film has to travel evenly at 90 ft. per minute through the projector, and if a disc is used, that has to revolve constantly at 33 1/3 revs. per minute. Variable-density sound track is 100 mils. wide, and variable width (oscillograph method) has a track 70 mils. wide. The optical system on the projector has to be accurately set to pick up an area of 80 mils. by 1 mil. of either track, this pick-up being less in width than the variable-density sound track and greater in width than the variable-width track. A mil. is a thousandth of an inch. A glance at the

diagram will give an idea of the straight and narrow path to which the film track has to keep on its progress through the projector. A photo-electric cell responds to the variation of the light projected through the sound track and three stages of resistance-capacity amplification bring the sound up to what is popularly known as "loud-phone strength."

Discs

Before passing on to the power amplifiers and loud-speakers, we must consider the possible distortion caused by the common or garden electric gramophone pick-up, used when discs are synchronised with full-width picture film instead of film sound track. The resonances of this instrument are fairly well known, and it is a positive fact that little or no measureable pick-up is obtained of frequencies above four or five thousand per second. This accounts for the lack of sibilants in the speech of early talking pictures. To a great extent, this is now compensated for by the introduction during transfer of sound to disc of known resonances which will give a

little more "punch" to the higher frequencies. The disc requires considerably less amplification than the sound film track, and is capable of giving a moderately good result with the minimum of effort on the part of the operator. There are less valves to maintain and, at the present time, the general results are more consistent.

On the other hand, it is possible to achieve almost perfect results with film sound track when everything is in good adjustment. In the long run, there is no doubt that the film sound track will be used exclusively; but that will not happen until cinema operators are more proficient in the art of projecting talking pictures, or the projection equipment becomes as robust and fool-proof as a tram-car motor controller. In the meantime, you "noes" must be patient. If the talkies at your cinema are unpleasant to your ears tell the manager that his apparatus is out of adjustment.

Bayhamtown

"THE GENTLE ART OF WIRING"

(Continued from page 909)

settle which method looks the neatest. It took very little more time and patience to wire up the neat-looking set than was necessary for the other two.

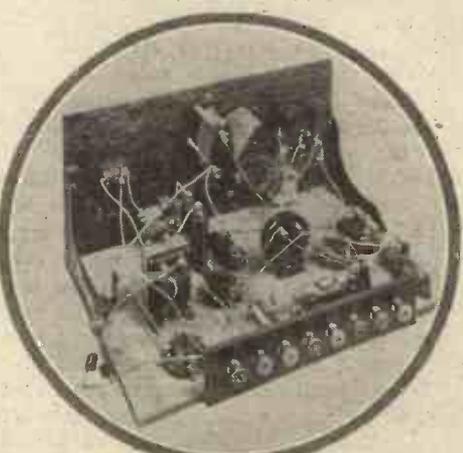
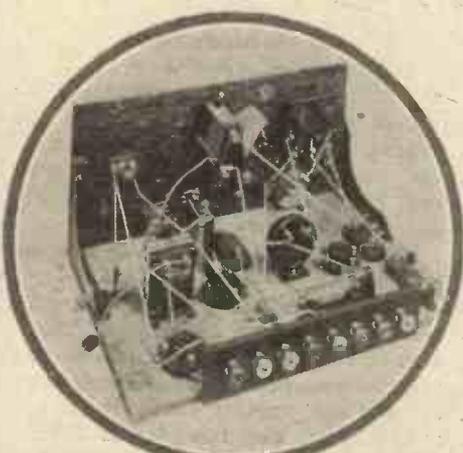
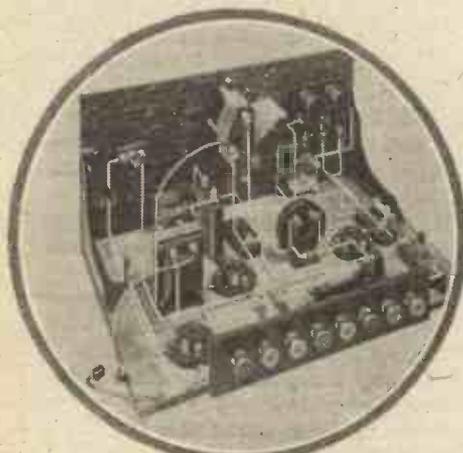
Most component manufacturers fit either permanent or loose soldering tags to their

of generous dimensions. It is in the choice of an iron that many constructors are apt to go wrong; it is often assumed that a very small iron is best for wireless set construction. It is argued that a small iron will be equally useful for heavy or delicate work.

But, as I have said, a necessity of the copper bit is its ability to retain heat to

ing; many constructors make the mistake of using this file for trimming ebonite panels thereby impairing its utility as a cleaner. What happens is that the ebonite dust clings to the file and tends to dirty the iron and contact surfaces instead of cleaning them.

Now we come to the side-cutting and long-nosed pliers. For cutting wires in



Compare these pictures of different systems of wiring and note the improved appearance of square wiring

products. A glance over the chassis will soon tell you whether all the components have tags; it is a good plan to keep a quantity of these so that they can be fitted when not supplied. Soldering tags can be obtained in various sizes and types.

Suitable Tools

The necessary tools for wiring are those illustrated. These consist of a large and a small soldering iron, a three-corner file, side-cutting and long-nosed pliers and finally a knife. The equipment is completed by a stick of solder and a tin of good flux.

Large soldering irons have a copper bit

melt the solder; the smaller the size of the bit the quicker will its heat be dissipated; consequently the joint-making has to be hurried. From my considerable experience I strongly recommend you to purchase an iron having a bit as large as you can wield with comfort. Whereas the smaller iron is certainly useful for joints that cannot be reached by a very large iron, most set wiring is accessible enough for a large iron.

The three-cornered file in our modest kit of tools is for cleaning before soldering. This file should on no account be used for anything else except for the purpose of cleaning the contact surfaces before solder-

ing. These pliers should be a good strong pair as they are often required to cut quite stout wire. A pair of long-nosed pliers are indispensable to the set wiper, for with these the bending of wires is greatly facilitated.

The knife is useful for cutting off insulation at each end of the connecting wires. I find that a potato knife with the blade broken down to about 2 inches long is the most useful.

[The conclusion of this article giving many practical operative hints will be given in next week's issue.—ED.]

The Newcomer to Wireless Buys A Valve

(Scene: A wireless shop. At the counter a SALESMAN has just finished packing up some components which an OLD HAND has selected with great care. Enter a NEWCOMER TO WIRELESS.)

NEWC.: Good morning. I want a valve.

SALESM.: What kind of valve?

NEWC.: Well, I don't know. I just want a valve. I've a three-valve set and I broke one of mine the other day.

SALESM.: Which valve was it, the high-frequency, detector, or low-frequency?

NEWC.: ? ? ?

OLD HAND (to NEWCOMER): Perhaps you will let me help you, for I see that the salesman here has his hands rather full.

NEWC.: It's most awfully good of you, but I really hardly like to bother you in this way.

OLD H.: Not a bit. What is your set?

NEWC.: It's a Blankophone.

OLD H.: I wonder if they've got one here. (To SALESMAN): Do you happen to have a three-valve Blankophone here?

SALESM.: Yes, you'll find one on that table over there.

OLD H.: Splendid! Let's go and have a look at it.

(They go across to the table and the OLD HAND raises the lid of the set, a three-valve transportable.)

Now which of these three valves is the one that you've broken?

NEWC.: If you stand facing the set it's the one on the right.

OLD H.: I see. That's what's known as the output valve. Perhaps I'd better tell you the name of each of the three, then you'll know what to ask for whenever you want to make another replacement. You needn't bother a bit about the meaning of the terms for the moment so long as you just remember the names.

NEWC.: I'll make a note of them.

OLD H.: This one on the left is the high-frequency valve, the one in the middle is the detector, and that one on the right is the low-frequency or output valve. It's called the output valve because it delivers the output of the set to the loud-speaker. Now, do you like big volume or medium volume from your loud-speaker?

NEWC.: As a rule I use the set in quite a small room and then when I've tuned in I have to slacken off that knob (he points to one of the condenser dials) a bit because the reproduction is too-powerful.

OLD H.: Then you tune in the local station to its maximum strength?

NEWC.: I'd like to do so, but I find that when I'm getting enough volume to fill the big room, both speech and music become rather harsh at times.

OLD H.: I expect that you've been using in the output stage what is known as a small power valve. In a big room that kind of valve is not sufficient since it can't handle the volume.

NEWC.: But a power valve sounds as if it ought to be powerful!

OLD H.: A most unfortunate name, for it gives a wrong impression. Actually

make. Has your accumulator one, two, or three cells?

NEWC.: Only one.

OLD H.: Then what you want is a two-volt super-power valve, here it is in the catalogue and you'll see that the makers show what are called characteristic curves.

NEWC.: What formidable looking things!

OLD H.: They're quite simple really. There's only one point that I want to show you about them. Do you happen to know the voltage of your high-tension battery?

NEWC.: A hundred and twenty.

OLD H.: Then look at this curve marked one hundred and twenty volts.

NEWC.: It goes straight down for quite a long way and then bends off towards the bottom.

OLD H.: Put your finger in the middle of the straight portion and then run straight down to the horizontal line at the bottom of the diagram.

NEWC.: That's labelled "Grid Volts."

OLD H.: Yes. And how many volts are shown at the point where your finger meets the line?

NEWC.: About fifteen.

OLD H.: That's the amount of negative grid bias that you want. And here's how you connect up that black wander plug (he shows on the sketch which socket the negative plug goes into).

NEWC.: Supposing that I break my high-frequency valve, what should I ask for when I want to buy another?

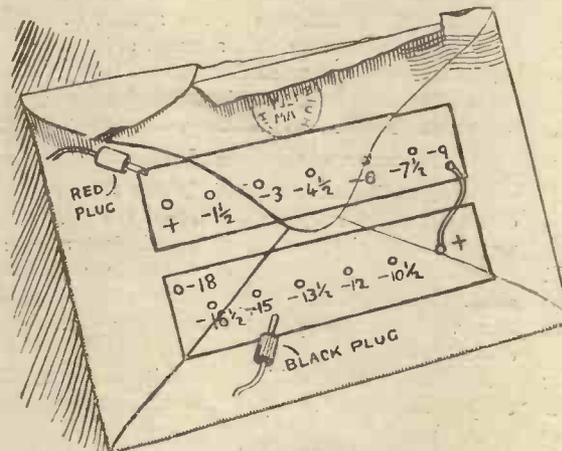
OLD H.: A two-volt high-frequency valve. So long as the original valve gave good service and performed well I should buy a replacement of the same make.

NEWC.: What about the detector?

OLD H. (looking into cabinet): You may use another H.F. valve here, but since you rely mainly upon the local station for your programmes and obtain ample signal strength you might get rather better quality by using either a valve specially made for detecting, or what is known as a first-stage low-frequency valve.

NEWC.: What's the difference between a good valve and a bad one?

OLD H.: Every good valve is most carefully tested before being passed into stock.



The Old-hand's Sketch

output valves are of two classes, power valves and super-power valves. The super-power valve magnifies less than the power type, but it can handle a good deal more volume without producing distortion.

NEWC.: Then ought I to buy a super-power valve?

OLD H.: Yes, but you'll have to make one little alteration in your set. You'll require a larger grid bias battery—one of sixteen-and-one-half volts. Or you can purchase another nine-volt battery and connect the two together like this.

NEWC.: I see. Then what about these two plugs?

OLD H.: The red one will go into the socket marked + of the battery and the black one into a suitable negative socket.

NEWC.: Yes, but which socket?

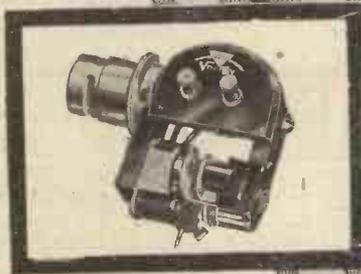
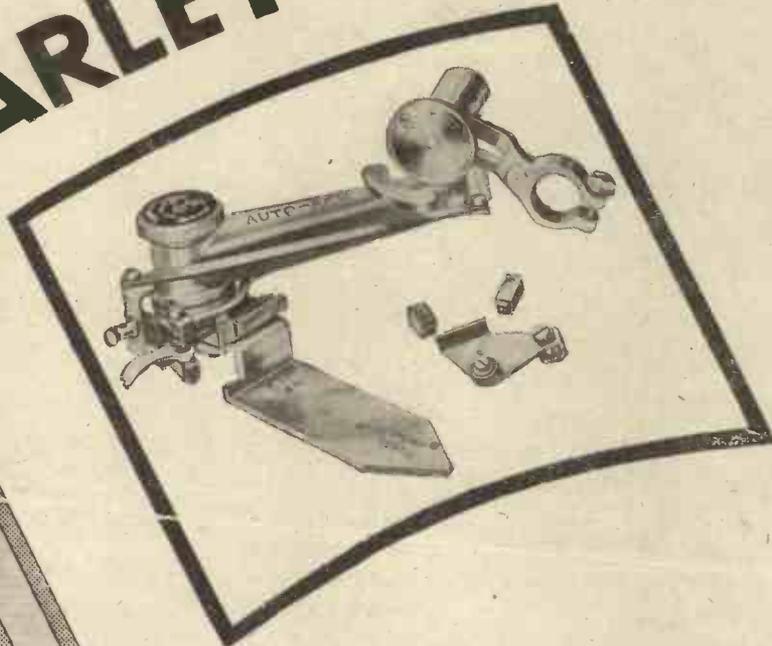
OLD H.: I'll show you how to discover that as soon as we've selected the valve that you're going to buy.

NEWC.: Well, what shall I buy?

OLD H.: You won't go wrong if you buy a super-power valve of any good

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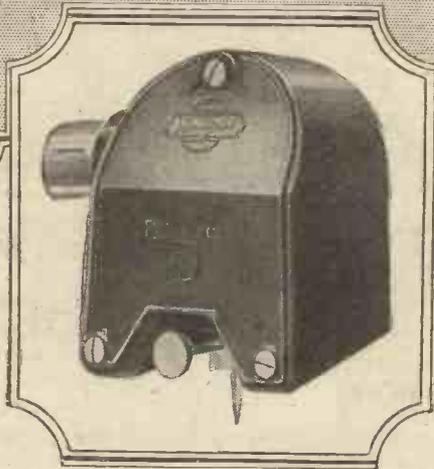
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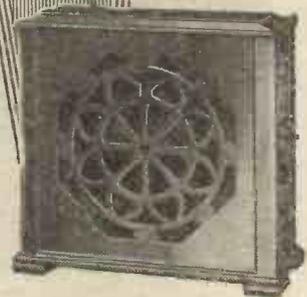
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On Your Wavelength!

What Next?



FROM the technical point of view, the B.B.C. has developed its transmissions to a very high state of efficiency. The Brookmans Park transmitters are, without any possible, probable shadow of doubt, the finest broadcast transmitters in the world. The quality of studio and outside broadcasts is first rate; dissolves, acoustics, artificial echo, line correction, and other developments have reached an advanced state. One is prompted to ask what will be the next development.



Automatic Broadcasting



About two years ago one of the B.B.C. line engineers had a bright idea. This visionary foresaw the time when broadcasting would become automatic, so far as the technical side was concerned. With slight exaggeration, his idea was that the chief engineer should press a button which would set all transmitters going, turn on microphones, amplifiers, dissolvers, and gadgets. The great idea met with some opposition and not a little ridicule, but the gentleman in question, Mr. A. S. Atkins, was given permission to work out the practical side on paper. Mr. Atkins went right ahead, and before many months had passed he had a huge schematic diagram covering the wall of his office, showing the lines, relays, and solenoids necessary for controlling a complete broadcasting station. Further, many manually operated circuits in the London control-room were converted to "automatic," so that the engineers practically "dialed" lines instead of using plugs and jacks. And then, when the product of his brain was fast forming itself into steel, copper, and ebonite, Mr. Atkins heard the call of Elstree and departed from Savoy Hill. He is now in charge of the sound side of British International Pictures, the company which made that fine picture, *Blackmail*.



Progress



But you can't keep a good idea down; neither can you stay the march of progress. Mr. Atkins had discovered that the recipe for a "complete broadcast transmitter" was so many tons of ebonite, so many pounds of brass, so many miles of wire—and a push button, and the B.B.C. had it in blue and white, safely locked up in the Avenue House vaults. It now remained for them to carry on the good work, mix the ingredients, stir well, and serve up piping hot. The first cooking

resulted in the new Manchester station equipment, which is now just getting into running order. Manchester has benefited by all the experimental work that has been going on in the makeshift Savoy Hill premises. The London station will remain "experimental" until the last minute of the change over from Savoy Hill to Broadcasting House.



Relays and Relays



Once upon a time the switching and simultaneous broadcasting circuits at Savoy Hill were controlled by a number of knife switches on porcelain bases and a few two-valve broadcast receiver amplifiers, such as can now be bought at disposal stores for about £1 each. Older readers will remember, possibly, that favourite photograph of Captain Eckersley speaking at a telephone on the old simultaneous broadcasting board—that historic lash-up which required a highly skilled operator to make it work. It is a far cry from that stage of broadcasting to this automatic or semi-automatic era. I suppose that, ultimately, the operation of a broadcasting station will require less skill than the driving of a tram-car or the mixing of an ice-cream soda. With the partial departure of the human element (presumably to Elstree) has also gone a great deal of the glamour and "romance" of the technical side of the service: No longer will an engineer wax reminiscent of the time he inadvertently plugged his control telephone on to a music line and broadcast strange oaths; the automatic bad word relay will now come into action and prevent such a thing ever happening!



Money No Object



There has been a good deal of grousing at one time or another about the general lowness of the fees paid by the B.B.C. to artists who broadcast from its studios. The trouble is, of course, that quite a number of different programmes are sent out on most nights of the week from the various stations, and if you have to provide first-rate broadcasters for all of these even a million does not go very far in the course of a year. Before now I have called attention to the policy of the American stations, which derive a very considerable income from leasing the microphone for an hour at a time to big commercial concerns. Very little direct advertising is done. At the beginning of the Bone-Rattler Motor Car Company's hour, for example, it is announced that this company, whose pro-

ducts are so well known, is responsible for the programme, and that is about all. But big firms have found that it pays and pays, and pays again, to put on absolutely first-rate items during the hour for which they hire the station.



No Licence Fee



Recent figures from America show that the salaries paid to artists who help to make such "hours" a success are enormous and that all the brightest lights in the musical, theatrical, and variety worlds are falling over one another to reap the golden harvest. Not only is a first-rate performance assured, but the broadcasting station secures an ample rent for the use of its station, and has thus plenty of cash in hand to pay well for the turns that it puts on itself. Personally, I think that there is a lot to be said for this kind of method of running broadcasting. And don't forget that the American listener pays no licence fee.



But—



But advertising via the microphone can be the ruination of any station which sets about it in the wrong way. The fearful example on this side of the Atlantic is Radio Toulouse, whose once excellent programmes have now become, one is sorry to say, generally very poor indeed. An enormous amount of direct advertising is incorporated in them; one can hardly tune in Toulouse without hearing impassioned appeals to purchase waterproofs, hot-water bottles, patent medicines, provisions, or wireless goods from certain shops, which are, of course, the cheapest and the best of all! At Toulouse, though, advertisers do not hire the microphone and do not put on entertainments. They simply pay so much to have their advertisements broadcast. The revenue from this source is probably not very great, for the French do not seem to believe in costly publicity nearly so much as do we or the Americans. The result is that Toulouse can give us only occasional first-rate programmes and fills in a great deal of his time with what must surely be the world's worst gramophone records.



Valves to the Rescue



For the thermionic valve all kinds of useful jobs are always being found. One of the latest is to help those who are deaf to use the land-line telephone without trouble. The Post Office has designed a special small amplifier which is attached to the

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On Your Wavelength! (continued)

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ordinary apparatus. It consists of a single note-magnifier operated by dry cells contained in the case. There is a three-point switch marked "direct," "medium," and "maximum." With this in the first position the amplifier is out of action and the telephone has its ordinary strength. Turn the switch to "medium" and the volume from the receiver is doubled. When it comes over to the "maximum" position the sound produced is great enough to enable even the very deaf in most cases to use the instrument with comfort. The device has already been tried out in Scotland, where it has proved most successful. It is now available at a very moderate rental for general use.

**"Beat It for A Bob"**

That, I see, is the slogan used to draw attention to the merits—if such a course be necessary—of the December issue of *Wireless Magazine* which contains 128 pages, fifty different features and no less than 225 illustrations. Can you beat it for a bob? The answer is, of course, that you cannot.

So many articles interested me in this issue that it is difficult to say what is the most outstanding feature amidst such a gamut of good things. Most listeners will come to the conclusion, I think, that the loud-speaker guide, which occupies more than eight pages, is invaluable for purposes of quick comparison.

Many of the loud-speakers reviewed were actually tested in the new *Wireless Magazine* Laboratory, and I was particularly interested in the commonsense reports that are given. My own impressions regarding the pitch of a number of instruments are confirmed.

By the way, I wonder how many listeners know by now of the valuable work being done by the *Wireless Magazine* in testing commercial receivers? In the particular issue of which I am writing, there are six pages of such reports, backed up by a free service of impartial advice if you want to know of a selection of sets that will suit your own particular conditions.

**A Prediction Fulfilled**

It is not often that one can foretell anything in wireless matters with any kind of certainty. One of the most remarkable predictions I have come across is that made as long ago as last March by Professor Stetson, of the Astronomical Laboratory of Harvard University. He prophesied then that we should have a very bad outbreak of sunspots during the present autumn and winter, and that the

result would be very poor conditions for wireless reception upon the short waves. This prophecy has been fulfilled to the letter, for the short waves have been most disappointing for the last couple of months. Sometimes one comes across a period when distant stations are coming in fairly well, but more often than not transmissions are weak or fading or distorted. Sunspots come in cycles, the period from maximum to maximum outbursts being, if I remember rightly, about eleven years. The present disfiguration of Old Sol's countenance has lasted, I believe, longer than it really ought to have done, and we may take comfort in the knowledge that we should now be past the worst. In that case we have many years of rapidly improving reception conditions on the short waves to look forward to.

**Breaking It In**

I am just now at the exciting stage of breaking in a new set which has just passed from my workshop to the wireless table. The circuit is an original one, and naturally I wondered how it would behave when it was first given a trial. It is doing pretty well, but already I can see ways in which it can be improved by slight alterations. I am one of those who are not content to buy their coils, and so on, ready made, but like to design and make them up at home. This means, of course, that one is always experimenting, but I know of no joy to equal that of turning out a receiving set that really does prove first-rate when every possible part has been made in one's own workshop. This set is a three-valver with a S.G., an anode-bend detector, and a pentode. It is especially designed for selectivity and big magnification with a minimum use of reaction. What is so interesting is to adjust the nice balance between signal strength and selectivity.

**Automatic Synchronism Misinterpreted**

There would still appear to be some misunderstanding existing concerning that all-important question of synchronising in television. I noticed that a correspondent in a recent issue of this journal made a statement under the heading of "A Television Problem" which is not consistent with up-to-date development. He stated that any purely automatic system of television must involve the transmission of a synchronising signal simultaneously with the picture signals, and went on to say that this would involve an additional modulation frequency over and above those necessary to transmit the picture.

Furthermore, the writer suggested that the only practical way to find room in the ether for the wider band of frequencies without interfering with the present broadcasting service was to go below the 100-metre wavelength.

**Baird Synchronism**

As a statement of the conditions in America this would be quite in order, but in England, thanks to the unflagging efforts of Mr. Baird and his engineers, the situation is quite different. It was realised that before anything approaching a commercial form of television system could be fostered, the synchronising mechanism would have to be made operative from the picture signal itself and yet be simple and cheap to use. This is the only true interpretation of the term automatic as applied to synchronism, and, if readers remember, on the occasion of the first B.B.C. test in March of this year the televised picture was transmitted through 2LO and the speech through Marconi House on a separate wavelength. No separate synchronising signal was employed, the picture itself providing the synchronising impulses necessary to keep the receiver in step with the transmitter.

**Using the Strip Sequence**

Details of the method employed have been disclosed quite recently by the Baird Company and published in the columns of this journal, so there is no need to retrace the same ground. One point should be borne in mind, however, and that is that the component part of the television signal which possesses an unvarying characteristic—or we should say one that varies exactly in accordance with the transmitter disc—is the strip sequences. We know that the object televised is dissected into thirty strips, and thus the strip sequence occurs thirty times for each revolution of the disc. It is the only part of the television signal which does not depend upon the light, shade, or contour of the subject televised. Assuming that 12½ pictures per second are transmitted, there is a signal radiated having a well-defined beginning and ending with a definite intervening period 375 times per second, and this is the fundamental component pressed into service for synchronising. In practice this feature of beginning and ending is emphasised by masking off a slight horizontal band at the top of the total available light area and hence for the top end of its travel the "light spot" explores a narrow black edge.

THERMION.

My Impressions of American Broadcasting By CAPTAIN ROUND

I COMPARE THE AMERICAN PROGRAMMES WITH OURS



Dinner given by the Radio Club of America to Capt. Round. October 4, 1929.

Diners at Head Table, reading from left; Paul Godley, Major Armstrong, Capt. Round, Lewis M. Clement (Pres.), David Sarnoff, J. K. L. Hogan, R. H. Marriot

I HAVE recently returned from a two months' visit to Canada and the United States, and some of the information I have obtained there, particularly as to the present broadcasting conditions, may be of interest to readers of this magazine. During a large proportion of the time I was guided by Major Edwin Armstrong, whose fame as the inventor of reaction circuits, super-heterodyne, and super-regenerative circuits is well-known.

My first experience of broadcasting on the American side was in Montreal, where with the assistance of Mr. Paine, the Chief-Engineer of the Canadian Marconi Company, I was enabled to listen-in on a standard Canadian receiver. This particular receiver—a type of neutrodyne circuit with one knob control—did not give me the idea of being very sensitive as there was no mush or local noise when all out. Although we were still in Montreal where one would have expected some sort of local electrical noise to be present, notwithstanding this, however, I received nine stations, apart from the local one, easily and with acceptable quality at strong and adequate loud-speaker strength.

Conditions in New York

The absence of mush and heterodyne notes—which later on I got in plenty when receiving down near New York—was really remarkable and indicated that the stations, some of which were a thousand miles away, were actually exceptionally strong.

Arriving at New York, I was taken down on Long Island to a place some sixty miles from New York, and here, at his own house, Major Armstrong had an array of receivers of all types, with which I was allowed to play. I soon learned that quite a number of the United States stations are of 50-kilowatt power and that 5-kilowatt stations are quite common.

American Wavelengths

The American band of wavelengths runs only from 200 to 550 metres. No long-wave range is used and I am of the opinion it would not be of much use.

Such waves as 200 to 550 metres give good signals up to 100 miles, and then from 100 to 300 miles conditions are liable to be bad owing to fading, but after that signals at night-time are comparatively steady and loud and these conditions over land, at least in America, seem to maintain up to distances of at least 2,000 miles.

In England, of course, our ranges do not, as a usual thing, extend 300 miles, except when one considers working right up and down the British Isles, so that except for the first 100 miles or so, the 200-500 metres range of wavelengths is rather of doubtful value. If one was to consider the European continent as a whole, however, conditions could undoubtedly be made to obtain as they do in the States, presuming, of course, that people took as much interest in foreign stations as they do in stations transmitting in their own language.

Our longer wavelength range, such as Daventry 5XX, maintains this good quality up to ranges of 300 miles without any serious fading and is thus very suitable for our own conditions; but probably at greater distances, if one were considering Europe as a whole, the short range of wavelengths would be preferable if stations of sufficient power were erected.

In the United States, listening in the neighbourhood of New York, stations at Pittsburgh, Cincinnati, Chicago, Denver, etc., roar in at night-time with good quality; and particularly on some of the recent receivers fitted with automatic strength control, they are every bit as good as the local station. The number of stations that one can get is really remarkable. On

several occasions I took count of what one could get, and can say quite definitely that invariably eight or nine stations, all of first-class character, were available, and from twenty to thirty other stations acceptable if the programmes were attractive; in addition, hosts of others come in at hairlike differences on the receiver adjustments. There seems to be considerably less heterodyning between stations.

A Peculiar Problem

New York itself has a peculiar problem in radio, and I doubt if we ever meet any such bad conditions as exist there, particularly in three sections of New York. One is in the business section down town; another in the semi-business section near 42nd Street, and the other out in the residential district above 100th Street. The masses of steel buildings and the great difficulty of putting up an aerial make reception very troublesome indeed notwithstanding the great stations near New York. I was in a flat in the city where they had a very good receiver with an aerial round the picture rail, and only the feeblest of reception of one station resulted. The station, which was only a mile away and was of the 5-k.w. order, was actually drowned by the electrical noises in the building.

A lot of these flats, and whole residences in fact, are now supplied with aerials which run up the side of the building and then branch out on the roof, but even with such aerials the reception is extremely poor. An experiment is now being tried on the big residential blocks of having one big antenna on the roof which is untuned; at its base are placed a large number of valves in parallel, and from the plate circuit of each of these valves a lead comes down to

(Continued at foot of next page)

HOME "BROADCASTING" A STUNT FOR THE CHRISTMAS PARTY

HERE'S a good idea for brightening up those Christmas programmes! When there's nothing being broadcast which appeals to you, why not make your own programmes and "broadcast" them through the loud-speaker? It's really quite easy, and there are almost innumerable ways of making good fun out of this simple trick.

Practically any set having one or two stages of low-frequency amplification is suitable, and if your set already has provision for a gramophone pick-up, then there'll be no difficulty.

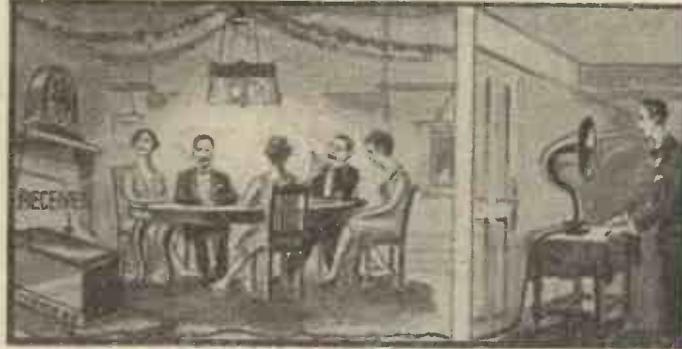
The principle of the thing is to put an improvised microphone "in front" (electrically speaking) of the set, so that the microphone currents are amplified and the speech put through the loud-speaker in the ordinary way.

There are many things you can use for a microphone. The best, of course, is the proper thing! Small carbon-type microphones as used in Post Office telephones are fairly easily obtainable, and microphones suitable for amateur work of this

kind are also advertised in this journal.

Also it is possible to use one of the ear-pieces of a pair of telephones or a loud-speaker unit for this purpose.

Just try the idea out with a phone ear-piece. Connect the telephone terminals to



Home "Broadcasting" is quite easy to carry out

the pick-up terminal or leads of your set, taking care to keep the polarity correct or the ear-piece may be demagnetised. Switch on the set—and then speak close to the ear-piece!

If you use a carbon "mike" then it may not be possible to connect it direct to the

set. You may have to use a microphone transformer (an ordinary L.F. transformer may perhaps be pressed into service) with the secondary connected to the pick-up terminals, and the primary connected in series with a 1½-volt flash-lamp cell and the microphone.

If your set is not adapted for a pick-up, then try connecting the microphone or transformer between grid and filament of the detector valve or the first low-frequency valve. You may also have to use a little grid bias.

How can you use your home broadcaster? It presents endless opportunities for party games. You can have guessing competitions as to who is speaking; rig the microphone up behind a screen and put the loud-speaker

out in front of the listeners. If you want to have some fun, try connecting fixed condensers across the speaker to alter the tone and make the voice unrecognisable!

Or split the party up into sections and get each section to give a "concert" in turn, letting the other section judge.

CAPT. ROUND'S IMPRESSIONS OF U.S.A. BROADCASTING (Continued from preceding page)

each flat. The result is that each flat has now a decent connection to the aerial through the valve, and as no nice American uses oscillation in his receiver, he has an excellent aerial on which there is no interference and neither does he cause any interference to the other users who are supplied through the other valve traps. The minute one gets outside the thickly populated quarters, however, all these difficulties vanish and the ether is simply one mass of stations waiting to be listened to:

The Programmes

While listening to programmes I asked myself repeatedly whether the American programmes are better than ours and except for minor points, and considering the difference in temperament of the two nations, I came to the conclusion that there was not much difference between any one American station and any one British station.

If we concentrated on only one American station such as WEAJ and its allied chain of stations, or WJZ and its allied stations, the differences to be noted were as follows. The programmes extend over a much longer period of the day; actually there are quite a lot on the air at 6.30 in the morning.

One point of difference that occurs to me on my return when I am again listening to London and stations at close quarters, is the snappiness with which the change from one programme to another takes place in

America. There seems to be no delay at all in changing, and this has probably been brought about by the fact that the air is valuable; time is sold for advertising purposes by the stations, and therefore every minute is valuable, also there is the fact that each station is trying to hold its public and any pauses would tend to turn that public away to some other station.

There is more light music and jazz in American programmes, and almost at any time of the day one can get an excellent dance band, so that the necessity for the gramophone is by no means as great as it is here.

The transmissions over land lines (which are extensively used) seem to be very good indeed. I did come across cases of land line distortion but they were not very frequent. But with all these criticisms of their stations and ours, my own opinion is still that the major difference is only in the number of hours which any station transmits.

There is, however, one very big difference between their conditions and ours, and that is the choice of programmes. It is almost impossible to conceive, without visiting America, the variety with which one is presented; and it is this great variety which has given the big success to American broadcasting and the radio trade generally. I heard very little gramophone music, or what I could detect to be such.

Broadcasting Control

The major control of broadcasting in the

United States is by an organisation which is an off-shoot of the Radio Corporation of America and which is called the National Broadcasting Company, or N.B.C. This corporation at the moment controls two chains of stations, spread throughout the United States. As a rule these run independently—although they are joined together for any important event, and one such event occurred just before I arrived there. That was the broadcasting of the Schneider Cup Race, which was picked up from 5SW and went over exceptionally well on both N.B.C. chains.

These two chains consist of branches from WEAJ and WJZ, both of which are 50-k.w. stations, and there are several other 50-k.w. stations in the chains, besides numbers of 5 k.w. and smaller types.

In addition to these chains, there is another chain of stations called the Columbia Broadcasting Chain, which, initiated by WABC, in New York, a 5-k.w. station, sends out to a chain of stations across the States programmes of really excellent quality.

In addition again to these main chains are hundreds of minor stations, some developed by radio manufacturers, some by newspapers and others by various firms. The radio map is certainly very full and moderately well organised with regard to cross interference.

H.T. Round

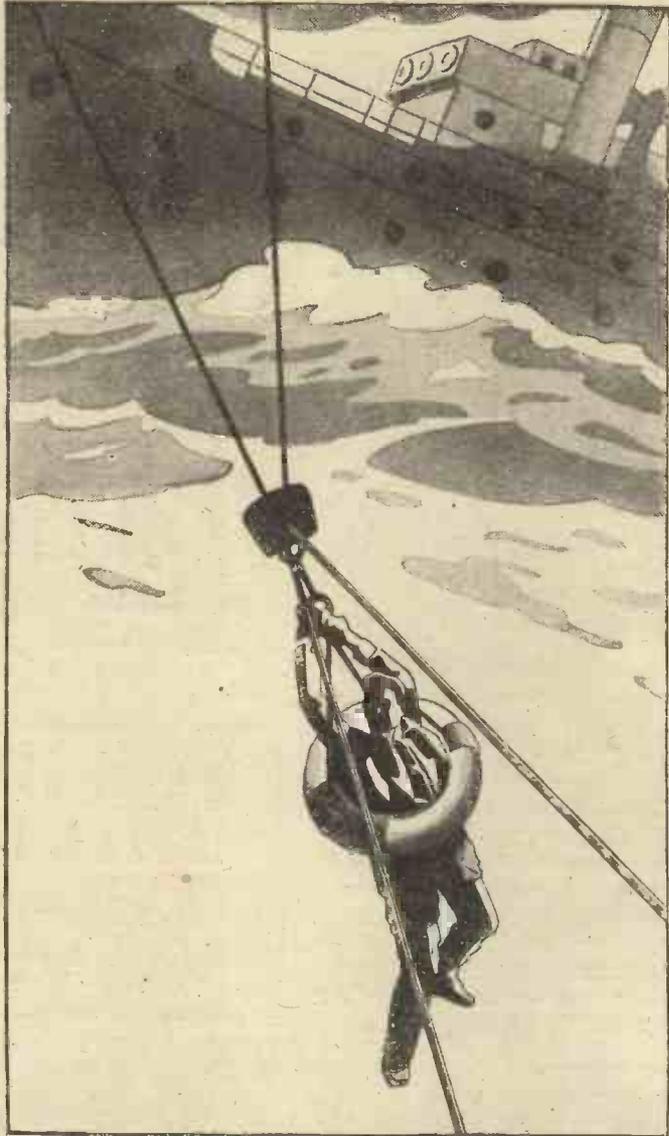
TRAWLER AGROUND!

When danger is
greatest

MARCONI VALVES
come to the rescue

80-MILE-AN-HOUR GALE! Seas like mountains! Tossing, wallowing, lightship rides it out. Anxiously, handful of men watch through night. Suddenly . . . light shows trawler aground on sandbank! At once, wireless to ships, lifeboat stations. Fair weather or foul, lightships protect shipping . . . summon aid, through reliable *Marconi Valves*.

Marconi Valves are used in all Trinity House lightships. For their reliability. For their wide range. For their long life. *They will make your radio set better.* Give you clearer tone, fuller volume. Cost not a penny more. Fit any set.



MARCONI
G. Marconi
VALVES

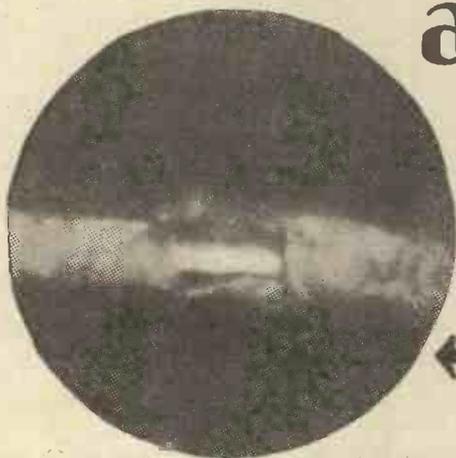
The first and greatest name in wireless

Write for an interesting valve catalogue to the Marconiphone Company Limited, 210-212 Tottenham Court Road, London, W.1

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



It's costly to test valves after you've bought

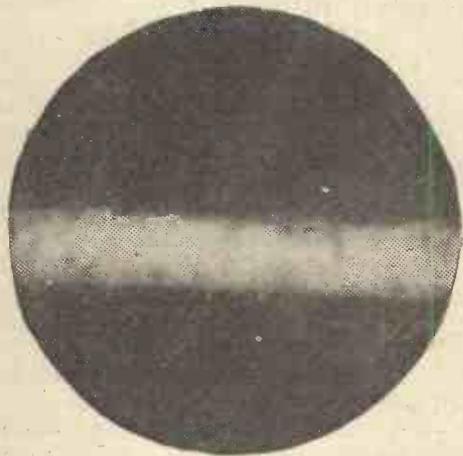


A BAD Filament WITHOUT "TENACIOUS COATING"

Reproduction from an untouched microphotograph showing part of the filament of a badly coated valve before use, showing a serious gap in the coating. A gap such as this starts the valve off in its life with a poor performance. The valve then prematurely falls.

YOU MAY BE GETTING THIS

YOU GET THIS IN OSRAM VALVES



MADE IN ENGLAND.

SOLD BY ALL WIRELESS DEALERS,

WRITE for booklet "OSRAM WIRELESS GUIDE" (1929 edition) giving full particulars of the full range of OSRAM VALVES with the "TENACIOUS COATING." Also helpful wireless information of importance to every listener. Sent post free.

Osram Valves

with the

"TENACIOUS COATING"

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

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

The MODERN RADIO SLEUTH



As Visualised by JAY COOTE

This amusing satire on a type of popular fiction will entertain you. And, in addition, it hides some helpful hints for knob turners and DX "fans." Read on.

IN the later stages of his brilliant career, Sheerluck Coames, sated with problems in criminology, had turned his activities to the study of radio, and in all leisure moments could be found seated in his chambers in Dacre Street, before a multi-valve receiving set. As was his wont, even in the case of a mere hobby, he was thorough in all his methods, and brought to play, in every instance where difficulties arose, those amazing qualities of deduction which had secured to him in other circles so great a name in the solving of problems.

It would be impossible to set down the innumerable puzzles which, in his charac-



"Well, last night I heard the song of the nightingale . . ."

teristic graciousness, he was willing to elucidate for beginners in the new science, but such outstanding episodes as "The Tragedy of the Hoarse-voiced Announcer," the "Incident of the Straying Wave," "The Adventure of the Lost Transmitter," and other equally startling European sensations have been chronicled by me in their time.

Visualise, therefore, one foggy evening in November, when no duties compelled Sheerluck Coames to leave the comfort of his bachelor flat. Picture again this great man, wrapped in a flowered dressing gown, the indispensable pipe stuck in his mouth, idly twirling with his delicate hands the condensers of his latest instrument. A peal at the front door bell, steps on the stairs, and Dr. Botson, bringing with him the full flavour of the "London particular" cut-

side, entered the room and carefully closed the door behind him.

"Sit down, Botson, and make yourself comfortable. The decanter, syphon, and glasses are on the table to your right; cigarettes to your left."

"But my dear Coames, how did you know it was I?"

"Botson, there are twenty stairs to this flat and I have noticed that you take exactly eighteen seconds to climb them."

Botson seated himself by Sheerluck Coames, lit a cigarette, and took from his breast pocket a small slip of paper, bearing a number of written notes:

"You are marvellous!"

"Perfectly simple, as you see. You look worried. Has your latest set given you any trouble, or have you brought with you a number of those little problems which so often puzzle you?"

"A good guess, my dear Coames, and I should like your help."

Sheerluck Coames lay back in his chair and adopted his characteristic attitude: "Life during the past few days has proved tiresome, the local programmes have contained but little of interest; any break in this monotony is welcome. I am listening."

"Well, last night I heard the song of the nightingale. Roughly speaking, it was—" said Dr. Botson.

"Be more precise, my dear sir. The song of that bird, in November, is unusual. I have here a small paper I wrote—"

"It was undoubtedly a nightingale. I was on the point of adding that the time was about 9 p.m., and that the wavelength of the transmission, although not registered at the time, was well below that of London. I may say that I also heard it again later in the evening."

"Here we have some data to work upon," replied Coames. "Let us consider two alternatives, namely, the relay of the bird's song, or a gramophone record. The first supposition we discard, for the reason already stated; the second is possible. On the other hand, as a means of entertainment the record would be a poor one, and as it was repeated, we must presume that it was not part of a programme, but used for a specific purpose."

"I have it. An interval signal!"

"Exactly; it is that adopted by Turin.

Make a note of it, and also bear in mind that there are other bird calls, such as that of the canary used by Lille, and the cuckoo practised by Wilno, Ljubljana, Strasbourg, and Leningrad. Any more questions?"

"Many more," replied Botson. "Later in the evening I caught a portion of a call, but the only word I picked up clearly was *Allah*. This would point to a Turkish station, perhaps?"

"No, for firstly, the word would not be used; secondly, you cannot believe that you heard the Muezzin calling the Faithful to prayer; and, thirdly, the only Moham-medan station you might possibly tune in would be Stamboul. You say yourself that you only registered a portion of the call. On about what wavelength was it?"

"Somewhere between Kalundborg and Warsaw."

"In that case, the problem is solved. The words heard were Stockholm-*Motala*. The latter name is not pronounced in the Italian fashion, with a long A, but sounds uncommonly like *Mott-allah*. Next, please?"

Sheerluck Coames had dismissed the



"My dear Coames, how did you know it was I?"

problem with a wave of the hand, as though it were beneath his dignity to bring his powers to bear on such an easy solution.

"Now here is where some concentration of thought will be necessary," said Botson, with a smile. "According to all wavelength lists—and the one given in AMATEUR WIRELESS 'Broadcast Telephony' is peculiarly complete—there exist no Spanish or

(Continued on page 945)

OUR READERS' WIRELESS TIT-BITS



THE BIRD TRAINER

Quite recently I was in a friend's house looking over his set, when someone in the district started oscillating pretty badly.

I passed the remark that I should like to be behind the person doing it, and my friend said: "Good gracious, is someone else doing that?" When I explained the whys and the wherefores he said: "Oh, I am so glad you told me! *We often do it; it makes our canary sing.*"—ARTHUR E. MARLOW (East Ham).

REALLY SELECTIVE

My Aunt Charlotte had dropped in to see us, and I was demonstrating to her my latest effort in transportables.

A cathedral organ was being transmitted, and the rolling tones were coming through beautifully. "Now, I like that," she said. "I can't stand those sets that always play that jazz."—HORACE T. SAVAGE (Ilford).

Here is a selection of Tit-bits received from readers in response to our request. As announced, a half-guinea will be sent to the writer of each

TOO LOOSE

Having heard faint whispers on my two-valve set of a Frenchman—which I discovered to be Toulouse—I determined to await a favourable evening and bring him in on the loud-speaker.

A week or so back I had my opportunity.

Now, my reaction is a bit fierce, and in bringing in Toulouse I went slightly "over the top" with reaction, with results that may be imagined.

"Whatever is it making that row?" my wife demanded.

"Toulouse!" I answered shortly.

"Well, tighten it up a bit, for goodness sake!" she replied. "It sounds awful like that!"—R. E. DUROE (London, S.E.).

A FIRST LESSON

SCENE: A schoolroom.

Dead silence. The fulfilment of many expectations is at hand. The class is to have its first wireless lesson from Sir Walford Davies. All eyes are drawn to the loud-speaker as the tuning note is heard.

YOUNGSTER (*excitedly nudging boy next to him*): "Listen, Bill: he's blowing his whistle."

L. H. BARFIELD (Grantham).

(More Wireless Tit-bits on page 960)

AN EASY PRIZE COMPETITION FOR EVERY READER

WHAT IS YOUR IDEAL SET

WE are giving here a series of questions which we should like every reader to answer. Will you, both to please us and to assist your fellow-readers, take up your pen now, while the matter is fresh in your mind, and insert your answers? Then cut out the form and post it to us at once.

The competition definitely closes on Monday, December 16, 1929.

With all your votes before us we shall be able to decide which is the set that our readers collectively regard as their ideal. Our Technical Staff will enjoy themselves in digesting the information and in due course will be able to give all of you the benefit.

Readers whose replies agree, or most nearly agree, with the majority result will win the prizes. We bind ourselves to present prizes to the value of at least £26 15s. 6d.

CASH PRIZES.

1st Prize, £10 : 10 : 0

2nd Prize, £5 : 5 : 0

5th Prize, £2 : 2 : 0

3rd Prize, £4 : 4 : 0

6th Prize, £1 : 1 : 0

4th Prize, £3 : 3 : 0

7th Prize, 10 : 6

RULES:

Every competitor agrees to accept the Editor's decision as final and legally binding.

The list here printed must be used and the replies inserted IN INK.

A competitor may submit more than one coupon, but cannot gain more than one prize.

Should two or more competitors tie for place, the Editor will decide the next step.

We shall not be responsible for entries lost or mislaid.

No employee of Bernard Jones Publications, Limited (the proprietors of AMATEUR WIRELESS) may compete.

The names and addresses of prize-winners will be announced (*if possible*) in the issue of AMATEUR WIRELESS published just before Christmas.

LIST OF 12 QUESTIONS

(1) How many valves would you have in your ideal set?	
(2) What sequence do you prefer—(H) H.F. detector, and L.F. stages, or (D) the detector valve followed only by L.F. stages?	
(3) If an H.F. stage is used, do you want single-dial tuning of the whole set? Say "Yes" or "No"	
(4) Do you prefer a screen-grid valve in the H.F. stage? Say "Yes" or "No"	
(5) In L.F. stages, do you prefer (R) resistance-capacity coupling or (P) push-pull transformer, or (O) ordinary transformer?	
(6) Do you prefer (C) output choke or (T) transformer output? If neither, leave blank	
(7) Would your ideal set act also as an amplifier for gramophone records? Say "Yes" or "No"	
(8) In wiring, do you prefer (N) nut-and-screw or (S) soldered joints?	
(9) For tuning-in both medium and long waves, do you prefer (Ic) interchangeable coils or (Sw) panel switching?	
(10) Do you prefer (E) ebonite panel with wooden baseboard or (M) metal panel with metal baseplate?	
(11) Should the volume control be (A) after the detector or (B) before the detector?	
(12) Which suits your convenience—(Ba) battery operation or (Ma) mains operation?	

I agree to abide by the printed rules governing this competition.

NAME.....

ADDRESS.....

7/12/29

Address Your Envelopes: "Ideal Set," Amateur Wireless, 58-61 Fetter Lane, London E.C.4.

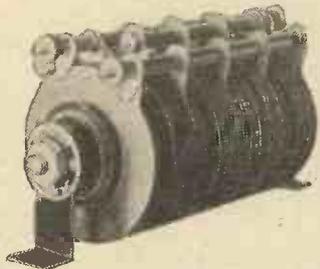
THIS CHRISTMAS, GIVE—

Practical Suggestions for Presents

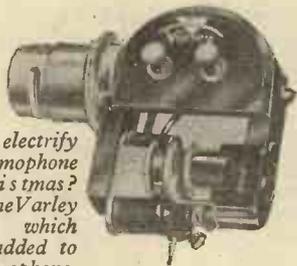
THE problem of what to give for a Christmas present is easily solved if the recipient is a wireless enthusiast, for amongst radio sets and accessories you have a wide choice of useful gifts ranging from a complete receiver, costing five pounds or more, down to a grid-bias battery priced at one and six—or even a spare fuse-lamp, which only lightens your purse of sixpence!

If you want to give a complete set, you have the choice of several alternatives. The first is to buy a ready-made receiver; the second, to get the necessary components to build a set in accordance with one of the latest circuits published in *AMATEUR WIRELESS*; and the third, to buy one of the complete "kits" put on the market by some of the big radio manufacturers.

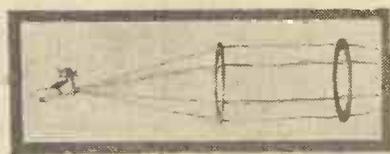
(Continued on page 931)



Just the gadget to give to the man who wants to make his own mains eliminator—the Westinghouse metal-rectifier unit. Available in many types.



Why not electrify the gramophone at Christmas? Here is the Varley pick-up, which can be added to any gramophone.



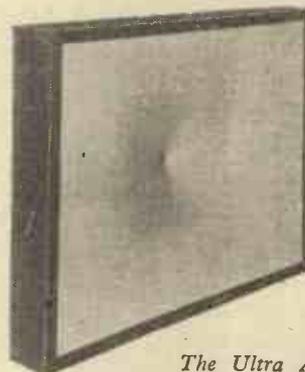
The R.C. indoor aerial forms a good gift, while the R.I. dual astatic choke (right) will please a set builder.



The New Cossor Melody Maker—just the thing for a friend who wishes to build a good receiver. Available for battery or mains working.



A Carrington cabinet would make an excellent present.



The Ultra Air-chrome double-diaphragm loud-speaker, which can be obtained in several sizes and models.



The Varley R.C.C. unit incorporates an anti-motor-boating device to prevent L.F. "plopping."



A neat plaque loud-speaker—the G.E.C.



A gift popular at any season—an Exide accumulator, complete with carrier.

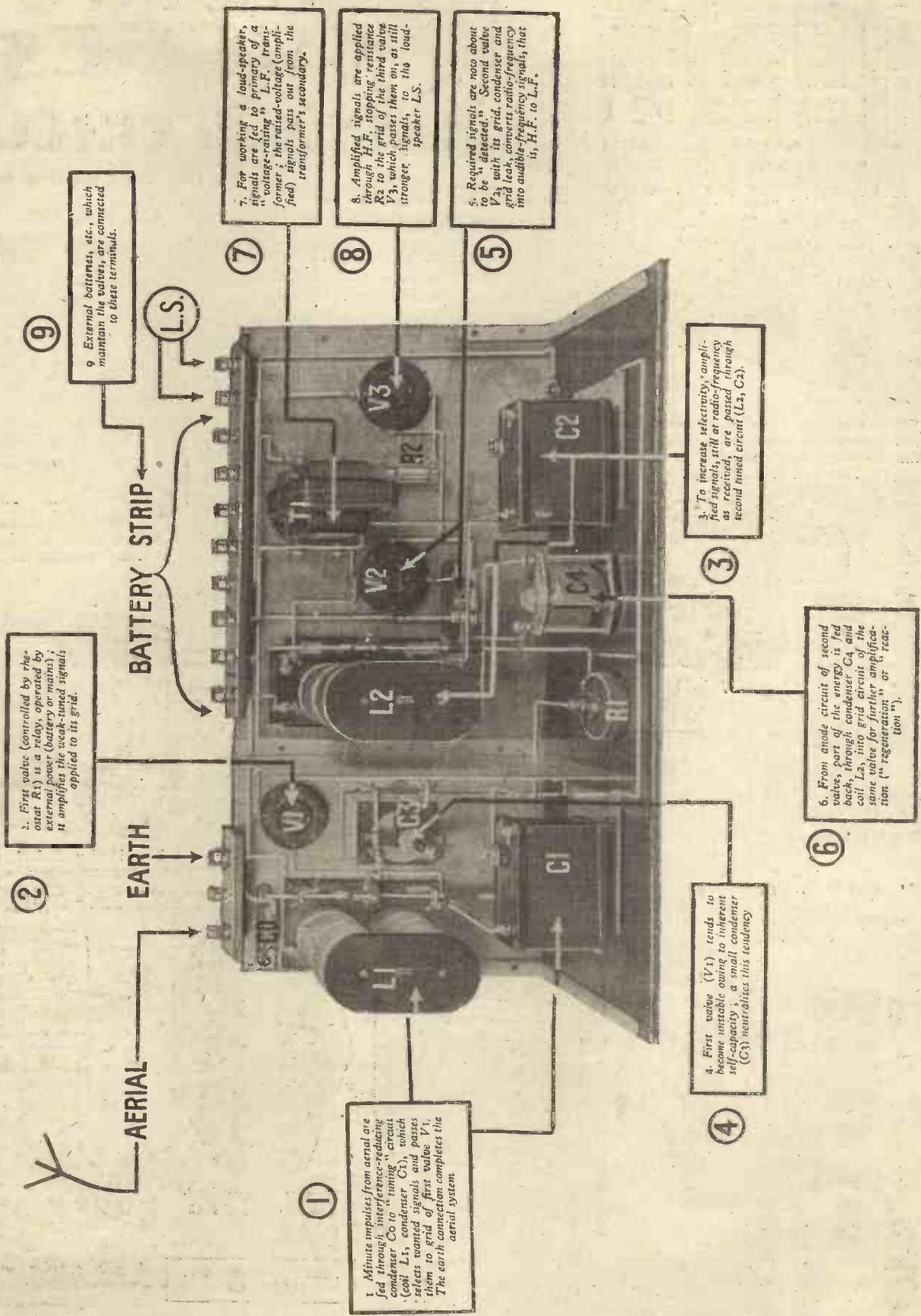


If you have a friend who has been grumbling about the cost of dry H.T. batteries, give him this C.A.V. H.T. accumulator.

MORE GIFTS ON PAGE 931

Your Set - Minus Mystery

Follow the sequence of the numbers and see how it works.



2. First valve (controlled by rheostat R1) is a relay, operated by external power (battery or mains); it amplifies the weak-tuned signals applied to its grid.

9. External batteries, etc., which maintain the valves, are connected to these terminals.

7. For working a loud-speaker, signals are fed to primary of a "voltage-raising" L.P. transformer; the raised-voltage (amplified) signals pass out from the transformer's secondary.

8. Amplified signals are applied through H.F. stopping resistance R2 to the grid of the third valve V3, which passes them on, as still stronger, signals, to the loud-speaker L.S.

5. Required signals are now about to be "detected." Second valve V2, with its grid condenser and grid leak, converts radio-frequency into audible-frequency signals, that is, H.F. to L.F.

3. To increase selectivity, amplified signals, still at radio-frequency as received, are passed through second tuned circuit (L2, C2).

6. From anode circuit of second valve, part of the energy is fed back, through condenser C4 and coil L2, into grid circuit of the same valve for further amplification ("regeneration" or "reaction").

4. First valve (V1) tends to become unstable owing to inherent self-capacity; a small condenser (C3) neutralizes this tendency.

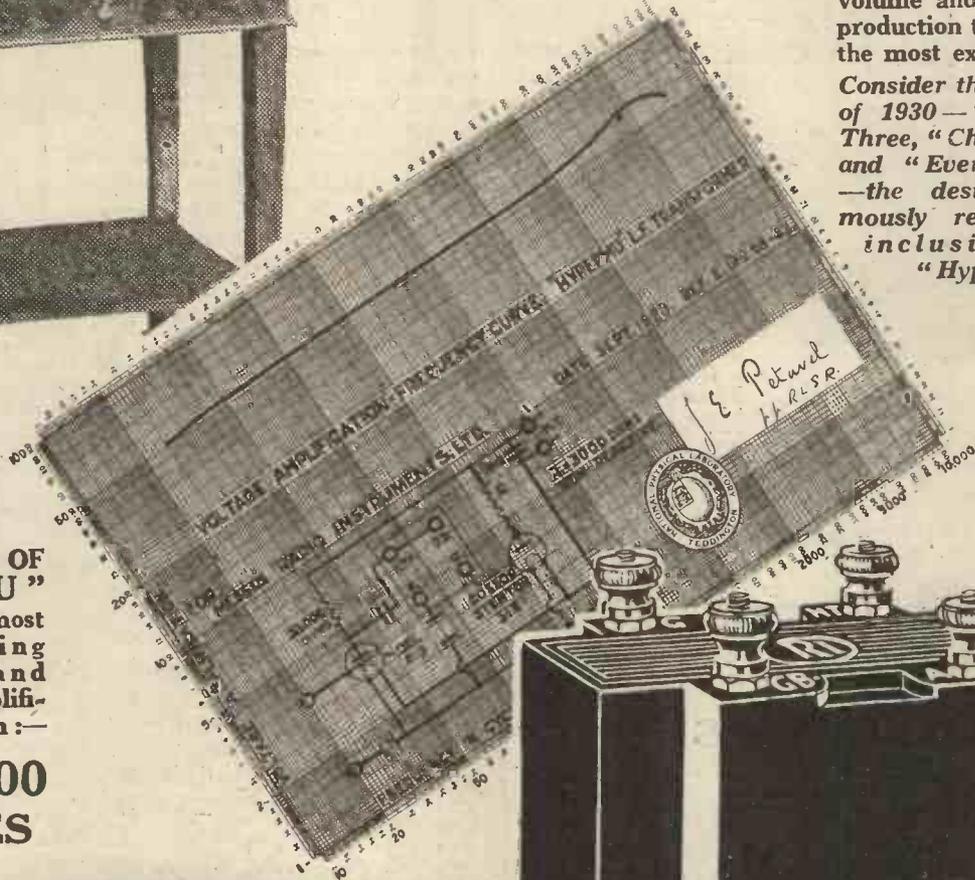
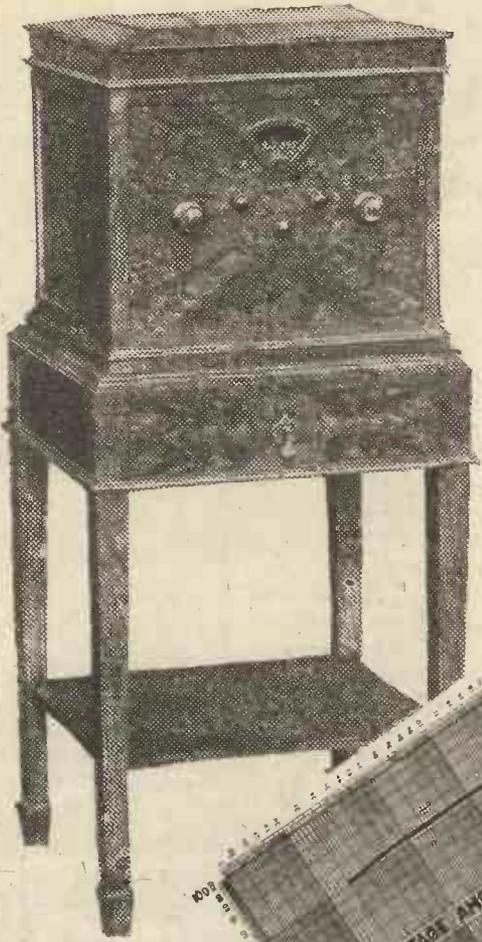
1. Minute impulses from aerial are fed through interference-reducing condenser C0 to "tuning" circuit (coil L1, condenser C1), which selects wanted signals and passes them to grid of first valve V1. The earth connection completes the aerial system.

The CURVE OF SUCCESS IN SET AND CIRCUIT

The "Hypermu" L.F. Transformer is the genie of success in modern circuits.

Note how the TRANSPORTABLE ALL-ELECTRIC Screened Grid 3 has been acclaimed by experts and the public as miraculous, amazing, wonderful — one tiny "HYPERMU" provides all the necessary L.F. coupling, and supplies both volume and quality in reproduction that will satisfy the most exacting listener.

Consider the star circuits of 1930 — The "Magic" Three, "Chassis" Three, and "Everyman" Four — the designers unanimously recommend the inclusion of the "Hypermu."



THE CURVE OF "HYPERMU" is still the most complete, giving maximum and uniform amplification from:—

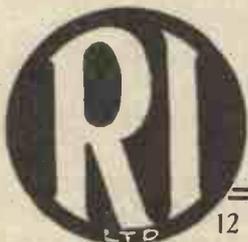
25 to 7,000 CYCLES

THE HYPERMU GIANT IN PERFORMANCE COLOSSUS IN VALUE MIDGET IN SIZE

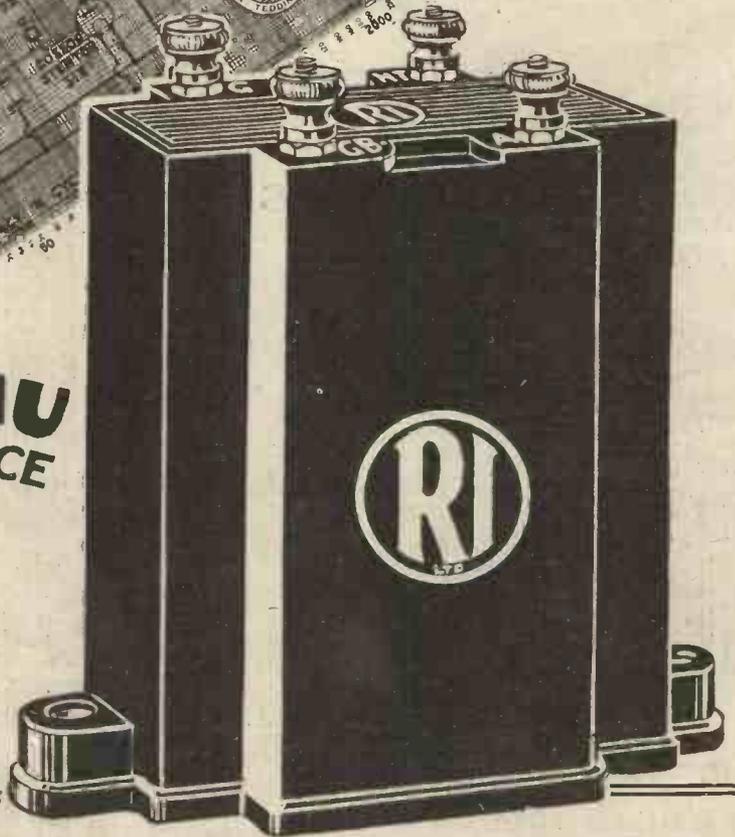
"HYPERMU," the outstanding triumph of British Radio Research. Encased in Bakelite. Weight 14 oz. Size 3 in. X 1½ in. X 1½ in. Obtainable everywhere.

21/-

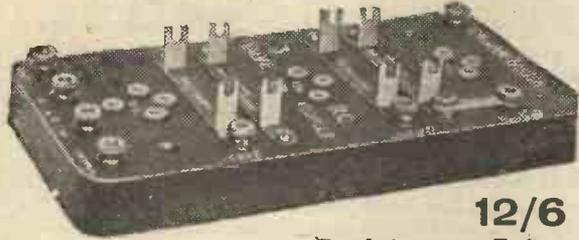
Write for "Hypermu" Leaflet.



12 HYDE ST., LONDON, W.C.1



Just Perfection
GRAHAM FARISH
 RADIO PRODUCTS
for Reception



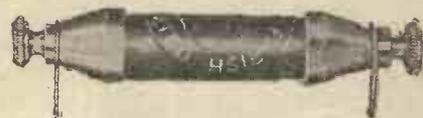
12/6
 Resistances Extra
THREE-VALVE R.C. COUPLER



.0003 4/3 **.0005 4/6**
"MICROFICIENT" VARIABLE CONDENSER



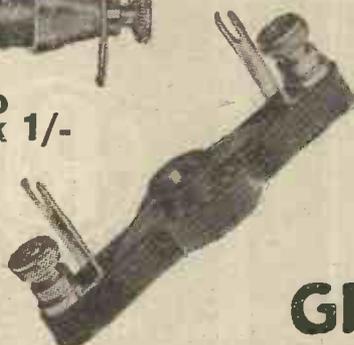
.0001-.002 1/-
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.01 2/6
FIXED MICA CONDENSER



STANDARD GRID LEAK 1/-



6D. VERTICAL HOLDER



HORIZONTAL HOLDER 6D.



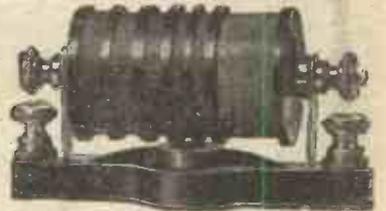
ANODE RESISTANCES
"OHMITE" 2/3
"MEGITE" 2/-



"MEGITE" NEW PROCESS GRID LEAK 2/-



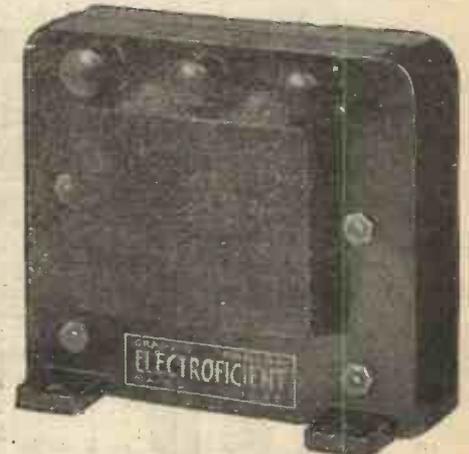
"AUDION" RESISTANCE CAPACITY UNIT 5/6



"MULTIWAVE" H.F. CHOKE 5/-



COMBINED FIXED CONDENSER & STANDARD GRID LEAK 2/-



"ELECTROFICIENT" ELIMINATOR CHOKE 22/6

GRAHAM FARISH

BROMLEY



KENT.

The Queer Old Days



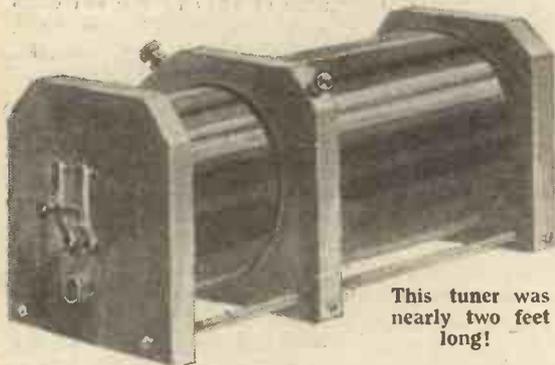
BY R. W. HALLOWS

FEW of us realise the enormous strides made in wireless receiving gear even in the few short years that broadcasting has been in existence. Look back with me now

or complete with headphones and aerial materials £5."

Do you remember those single-slide tuning inductances? They were generally 12 in. long and contained many hundreds of turns of enamelled wire. It was our proud boast that we could tune in with them either Writtle on 400 metres or the Eiffel Tower, which then worked on 2,760 metres. The great thing about them was that they made a variable condenser unnecessary, for variable condensers cost money in those days

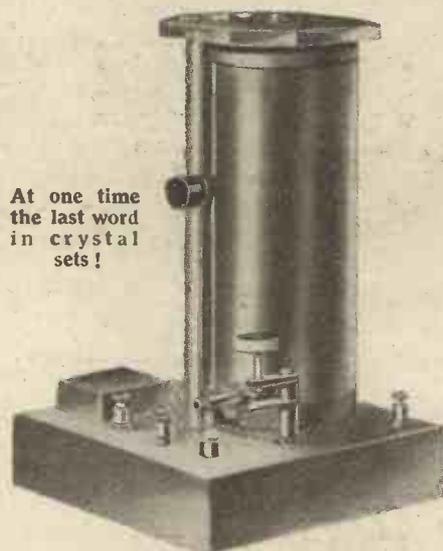
denser that you can now buy for about ten shillings. Most of us, of course, made up our own condensers from parts. My first was actually made up without any



This tuner was nearly two feet long!

at the queer old days when you first took up radio as a hobby. We won't go back beyond the war (though a good many of us started some time before that) and we will not take in the war period, for only the reader who was "Sparks" on board ship or a member of the Signal Corps had much to do with it in those days. In 1919 it was exceedingly difficult to obtain even a receiving licence, for war-time restrictions were removed slowly. Not until 1920 did wireless begin to make really big headway as a hobby, but once the ball was started it began to roll with a vengeance.

The first that I bought complete had a maximum capacity of .001 microfarad and ran me in to five solid pounds. It was certainly a beautiful piece of work; though not, I think, any better than the con-



At one time the last word in crystal sets!

A Receiving "Station"

Unless we were millionaires, most of us in those days were content with crystal sets—and these were expensive enough, goodness knows! The accompanying photograph gives a pretty good idea of the kind of thing whose possessor in those days required a size larger in hats. Look at it carefully and then recall the pride that you took in your own monstrosity of the same kind. It is described by the makers as "A well-built receiving station, in no way stinted in finish or material, that will give wonderful and surprising results on an exceedingly small aerial. . . . A single-slide tuning coil, telephone condenser, and special crystal detector make up the unit, which is well mounted. Overall dimensions, 13 in. high, base 8 in. by 8 in. Price 60s.,

Two Christmas Days

OLD STYLE

He and the lady of his heart
On Christmas Day were
miles apart
But, leaning back with
fast-closed eyes
He used the magic love
supplies,
And fondly dreamed that
he could trace
Each feature of her charm-
ing face.

MODERN STYLE

The modern youth con-
trariwise
"Takes notice," opens both
his eyes,
Imagination plays no part,
He sees the lady of his heart
Distinctly, and is not sur-
prised,
Because her face is "tele-
vised!"

PAUL LENNOX.

parts at all, the plates being cut with shears from sheet zinc and afterwards straightened out with a red-hot flat iron. The spacer washers were pared off in the lathe from stout brass tubing, whilst the spindle was made from a piece of 1/4-in. square brass rod, the ends being turned up and afterwards threaded.

When sets of condenser parts were put on to the market we fell upon them with avidity, for they saved both time and money. It then became possible to make up a condenser quite cheaply (!).

My first single-valve set occupied considerably more space than my present multi-valver, and incidentally cost a good deal more money to build. It was regarded at the time as the height of efficiency, for it incorporated the loose-coupler shown in the first photograph, which will probably bring back old memories to you. In case you have forgotten it, the loose-coupler consisted of a fixed winding about 4 1/2 in. in diameter and from 10 in. to 12 in. in length, provided with one or two sliding contacts. In and out of this moved the other winding, on a former 3 in. or so in diameter. The moving winding was

tapped in various places. Like the old single-slide solenoid inductance, this contraption tuned from about 300 to 3,000 metres, but when fully extended it measured about 2 ft. in length.

Efficient though Clumsy

Large and clumsy as it was, the loose-coupler was surprisingly efficient and allowed very fine tuning to be done. I can well remember in 1921 obtaining regularly quite good loud-speaker reception from the Eiffel Tower with a detector tuned in this way and one note-magnifier.



The simple set of yesteryear!

To return to the single-valve set. The loose-coupler cost £3 10s. and the .0005-microfarad tuning condenser £2 2s. The valve was mounted on what was known as a valve panel. This consisted of a neat box with an ebonite top, upon which were mounted four valve legs, four terminals, and a rheostat. It cost a guinea, but we marvelled in those days at the cheapness of the thing and told each other how neat and compact it was. There was a fixed condenser in a little box across the telephones (cost 7s. 6d.) and another in parallel with the high-tension battery (cost, if I remember aright, 10s.). The valve cost 32s. 6d.; the telephones, £3 3s.; the high-tension battery, £1 and a 4-volt accumulator, £3—remember that we had to use fat accumulators then, because even in a single-valve set the filament current was rather more than three-quarters of an ampere. Putting up the aerial and making a suitable earth contact brought the total cost of this funny old set up to just over £20.

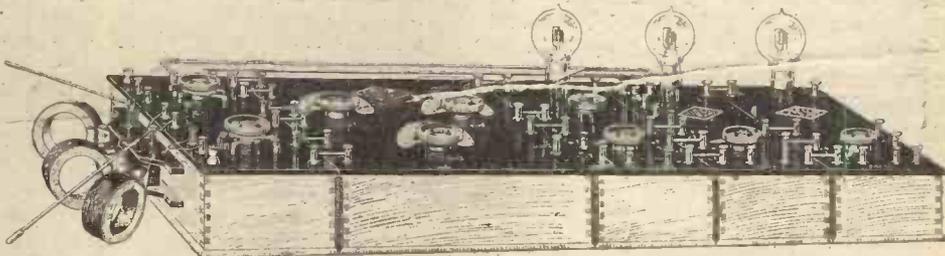
What was there to hear after one had spent all this money? The only regular broadcasting in Europe was provided by the Eiffel Tower, which gave a short daily programme, and Writtle (who can forget 2MT with "P.P.E." as chief engineer, announcer, humorist, vocalist, and entertainer?). The Eiffel Tower had even then a rating of several kilowatts, but Writtle was only a half-kilowatt station. We relied

mainly upon amateur transmitters who, besides eternal conversations on technical points ("I heard you quite well, old man, but your modulation is not quite so good as it was last night" or "That banjo solo came over fine . . . you say it wasn't a banjo old man, but a piano; anyhow, I heard it very well, old man"), frequently gave us excellent musical programmes.

Anyone who had got as far as a single-valve set immediately aspired to something bigger and better. What most of us wanted was the five-valver with two H.F. and two L.F. stages, which was regarded as the acme of perfection in radio receiving gear. I well remember the day when I completed mine after enormous labour and expense. With the exception of the variable condensers, almost the whole of this set was home-made; and you can obtain a good idea of what it looked like from the picture, though I hasten to say that I am not the operator portrayed.

Everything Home-made

It was a wonderful affair, and what its reproduction was always like one shudders to remember. All transformers, including those on the L.F. side, were made in my own workshop and the valves used throughout were those of the "Ora" type. These drew nearly .7 ampere apiece of filament current. Their impedance was 40,000 ohms and the amplification factor 6 or 7. My plate voltage was about 80, and I don't think



Unit sets were very popular at one time; this is an example of an early Peto Scott model

that there was any grid bias on the L.F. valves, though possibly there may have been the 1½ volts or so that they would stand. Since the overall amplification was really considerable, the amount of overloading to which the output valve was subjected must have been appalling.

Later I became one of the first users of dull-emitter valves, having invested in a rash moment in a set of D.E.R.'s at a cost of £2 15s. a piece. These consumed .4 ampere at 2 volts and were regarded as the *ne plus ultra* in the valve line.

Can you recall the early loud-speakers? The first to make its appearance was the original Brown H5. This was simply a glorified telephone receiver with a trumpet-shaped spout attached to it. It cost five

guineas, and in the early days one had to wait a month or two for delivery. A little later we had a miniature edition consisting of an ordinary Brown telephone earpiece provided with a horn about 12 in. high. They didn't give us even a suggestion of the bass and they suppressed all pitches much over an octave above the middle C. Still, they were loud-speakers!

Only seven years ago it was difficult if not impossible to distinguish between a piano and a harp, or a violin and a clarinet, as reproduced by the wireless receiving set. The fault was not entirely ours at the receiving end for the microphone used in the studio differed very little from that which forms part of the ordinary land-line telephone instrument. Transmitting equipment showed a complete cut-off below 100 cycles and an almost complete cut-off above about 2,500 cycles.

I can well remember spending an evening in the studio of 2LO in the old days when it was still at Marconi House. Mr. A. R. Burrows (Uncle Arthur) was in charge of the programme consisting entirely of songs, violin, and piano solos. One of the artistes who contributed to this programme was Ronald Gourlay, who was making his first appearance. I was allowed to play the part of announcer and I recall the thrill that came over me when I realised that my voice might be heard by people a hundred whole miles away. The microphone was mounted by means of a clip upon a vertical rod fixed to a circular base standing upon the floor of the studio. The announcer had to tiptoe his way to it and a vocalist was instructed to stand so many feet away from it. Whilst he was singing Uncle Arthur listened-in on headphones beckoning him forward if he was

too faint or motioning him backward if he was over strong. When a piano solo came along the microphone was detached from its clip and held by Uncle Arthur above the grand piano.

They certainly were queer old days. Sometimes I wonder whether the listener of to-day, who either buys his set ready made or makes it up from easily obtainable parts, gets quite the same thrill as we obtained just a few years ago, when there was hardly any telephony to listen to and when almost everything had to be made at home or saved up for!

W. J. Johnson

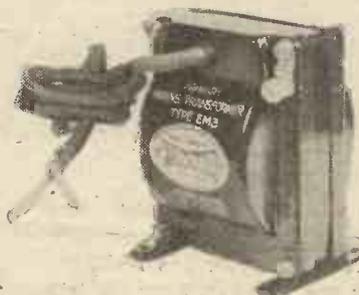
**"THIS CHRISTMAS,
GIVE—"**—continued.



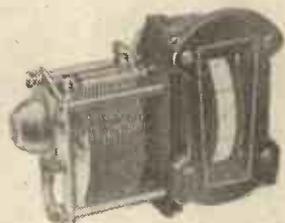
A newcomer to the ranks of moving-coil speakers—the Philips. It can be had in various colour schemes



New Amplion receiver



If you know a set constructor who needs a really good mains transformer, here's just the thing—the Ferranti transformer



This will look very neat on the panel of your friend's set—or yours! It is the Polar drum dial condenser



A new selectivity unit. It costs only 10s. 6d., and is marketed by Currys Ltd.



A handy Christmas gift. A glass-cell C.A.V. accumulator for L.T. work



Here's an attractive cabinet speaker—the Kolster Brandes speaker, various other models are available



If you know of anyone troubled with interference, give them this I.D.S. wave-trap



A reasonable present for any radio friend. The Letts' Quickref AMATEUR WIRELESS diary is a present which is sure to please. Bound in leather, price 2/6, or in cloth, 1/6.

**MORE GIFTS
ON PAGE 933.**

Should you decide on the second or third choice, you can either build the set and give it in its completed form all ready for use or, if you happen to know that the recipient of the gift is a keen constructor, you can give the separate components and let your friend assemble them.

The fact that anyone already possesses one set does not necessarily mean that they would not welcome the gift of another! For instance, you may know some owners of crystal sets who would be delighted with, say, a two-valve receiver which would enable them to extend the scope of their listening activities or to work a loud-speaker instead of being restricted to headphones. Or, again, a portable set would make a very acceptable present for anyone who at present possesses only an ordinary "fixed" receiver. Outdoor reception is admittedly not a very attractive idea at Christmas-time, but an efficient portable has at all times of the year a great advantage over an ordinary set in that it can be carried about the house, with the result that its owner is not tied down to one room when he wants to "tour the ether."

An all-from-the-mains receiver or a battery eliminator would make welcome gifts for anyone who has the electric light
(Continued on page 933)



A very popular M.P.A. model. A moderately-priced cabinet speaker



A novelty in loud-speaker-cum-clock made by Paroussi. Available in different models, £2 2s. and £7 7s.

My Television

By JOHN L. BAIRD



THE Editor of AMATEUR WIRELESS has asked me to send a short contribution to the Christmas issue, and I do so willingly.

AMATEUR WIRELESS has always kept its readers so well informed of events in the television world, that there is little I can really add to what has been told of the events of the past twelve months.

Present Transmissions

Television is now being broadcast five days a week through the B.B.C., between 11 and 11.30 a.m., and amateurs are able to hear the television transmissions, if not to see them, although I have no doubt that by the time this appears in print many of the readers of AMATEUR WIRELESS will have constructed their own apparatus and will be beginning to see something of what television looks like.

The television transmissions in going out through Brookmans Park pass from our studio at Long Acre along a telephone line to the control room at Savoy Hill, where we have a check receiver, in charge of the B.B.C. engineers, then the television signals are sent by land line to Brookmans Park, where they are put on the ether. It will thus be seen that the television signal before reaching the wireless transmitter has to pass through quite a considerable length of land line, and in first putting television through the B.B.C. broadcasting channel,

one of our difficulties lay in the distortion produced by these land lines, and they had to be very carefully balanced before proper results were achieved.

Television is much more stringent in its requirements than is telephony. The ear will tolerate a good deal more than the eye; in fact the amount the ear will tolerate is

amazing. Some of the noises which used to come from the early loud-speakers were absolute travesties of music and speech, but I have seen the owners of the instruments listening to them throughout an evening, with complete enjoyment—continued listening-in had dulled their ears to the discord, *but no amount of looking-in would make a twisted line appear straight.*

There is, however, one point about television which the amateur will, no doubt, discover for himself, and that is a peculiarity of persistence of vision; the eye becomes accustomed to looking at television images, and the expert looker-in sees much more clearly than one who is unaccustomed to this process. In the early days, when we used to send at a very low speed, as low, sometimes, as four images per second, and even slower, long after the image had disappeared to the unaccustomed observers and all they could see was a red line moving backwards and forwards, the whole image could be seen by the expert.

Recent Progress

So much for the present. Now what of the past progress, and our hopes for the future? This year has really been a red-letter one in many ways for television, so a brief retrospect is excusable. The history of the B.B.C. controversy need not be gone into, but we may look at the progress made

(Continued on page 950)



The first Television photograph ever taken. This is an actual untouched photo of the image as it appeared on the screen of the first "Televisor"

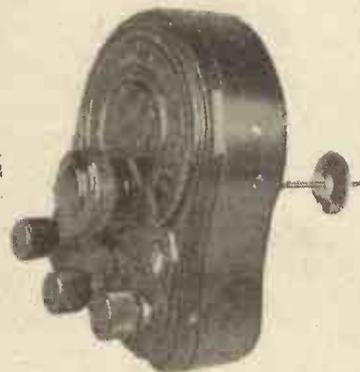


There is considerable difficulty in obtaining photographs of televised images, but these reproductions give some idea of the progress that has been made

"THIS CHRISTMAS, GIVE—"—Continued.



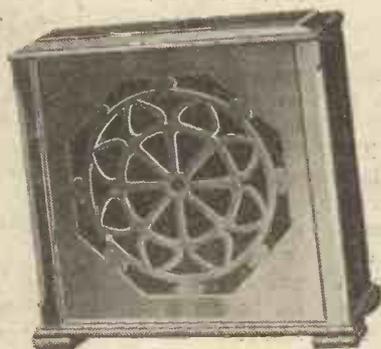
If you have battery troubles and want to solve them with an eliminator, why not consider this Climax unit? These can be had for A.C. or D.C. mains



The Bullphone loud-speaker unit is a seasonable gift for any friend whose loud-speaker is not all that it might be. These units can be had in various types and prices



This simple TeKaDe unit will charge an accumulator from the mains at a very low cost. A good gift for a friend who lives far from a charging station



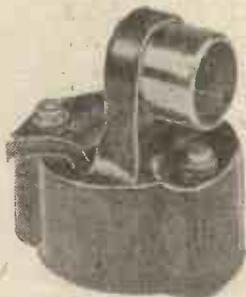
Above is shown one of the reed-type Celestion speakers, in this case a handsome cabinet instrument. This is a really "Christmassy" gift

laid on in their house. But if you contemplate giving any kind of mains-driven apparatus, you must, of course, be careful to find out beforehand the exact nature of the supply—whether A.C. or D.C., etc.—to which the apparatus is to be connected.

Another very acceptable present for anyone with a small or moderate-sized set is a single-stage H.F. or L.F. amplifier that can be linked on to the existing receiver to increase the range and selectivity or volume. And, speaking of selectivity, what about an efficient wavetrap? A good one would receive an appreciative welcome from any wireless friend who is troubled with interference from the new regional station.

If you know anyone with a rather antiquated horn loud-speaker that is dumb from middle C downwards, why not give an efficient cone model that will really do justice to the output from the set? You can either buy a good quality cone speaker ready made in an attractive cabinet or, if you prefer it, you can get an efficient balanced-armature reed-driving unit with a chassis and cone only at quite

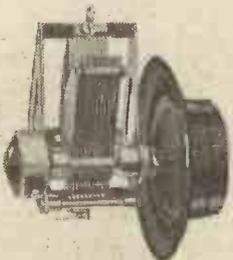
(Continued on page 949)



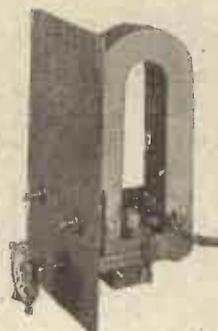
Here is the latest needle armature Lissen pick-up. The needle just slips into a holder and needs no tightening



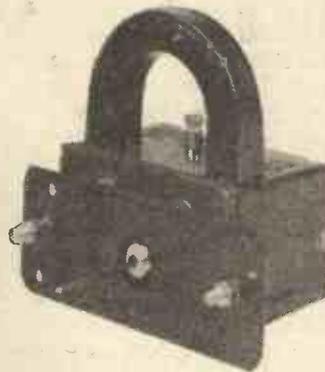
E. K. Cole's are well-known makers of eliminators. This is one of their A.C. models—a kindly thought for a man who is dispensing with batteries



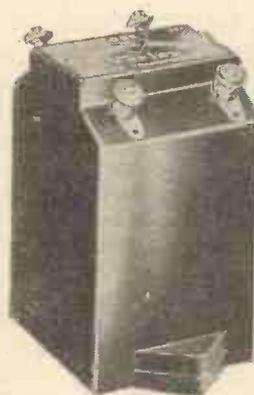
It is an easy matter to choose a present for a set constructor. For instance, what about a variable condenser from the J.B. range? Above is shown a .0003 slow-motion instrument of excellent construction



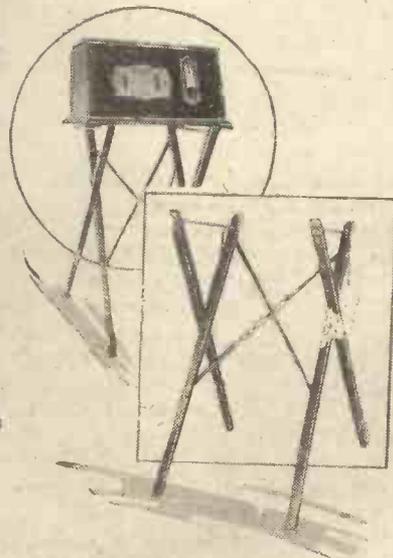
This Gravor loud-speaker unit, of the four-pole balanced-armature type, will work almost any kind of diaphragm



Here is a new Amplion product, a loud-speaker unit for adding to many types of chassis. It sells at 21s.



There are many sets in which a good L.F. transformer would improve quality. What about this Varley new Ni-core transformer? Varley's market a large range, including power transformers



These Belling-Lee radio legs, which cost 15s. 6d., make a good gift. They can be used with almost any type of set

IN this Christmas Number of AMATEUR WIRELESS it behoves us to be of good cheer. That is quite easy—indeed, natural—when we have such a pleasant task before us as the presentation of full working details of the “1930 Ether Searcher.” Given the blessings of peace in the ether and goodwill amongst oscillators, we can promise readers a notable radio Christmas if they build a “Searcher.” The “1930 Ether Searcher” is, we believe, the lowest-priced three-valve constructors’ set of its type. Without the cabinet the total cost of parts is just six pounds. With all accessories, except loud-speaker, the total cost need not greatly exceed £10.

A 1930 Set

It is a three-valver; its screen-grid valve fully justifies the name “Searcher.” Few stations in the European ether will be able to evade it! The other two valves in the set are the detector and power valves. No more generally useful combination of three valves has yet been conceived.

Such a combination of valves can be moulded into a set that will meet most present-day needs. The “1930 Ether Searcher” has, we claim, the most convenient controls of any set of its type. Although there are two entirely separate tuned circuits in the set, *only one knob has to be adjusted.* Moreover, the adjustment of this knob for any given station is entirely independent of the reader’s aerial system. The list of 43 stations actually received on the set, to be given next week, will therefore hold good for every set con-

structed. No coil-changing is necessary to tune from the medium-waves to the long waves. A simple two point switch provides medium- or long-wave reception, as desired.

So powerful is the “Ether Searcher” that in the reception of many stations a reduction of volume is essential. A separate control of volume is therefore provided. The bad practice of de-tuning a station to reduce volume is avoided.

In passing, we mention that if the “1930 Ether Searcher” is de-tuned it will in all probability tune in another station!

Much as we should have liked to leave it out, reaction has been included in the set. It is applied by the detector valve to the coupling coil of the screen-grid valve and is controlled by a differential condenser. No oscillations can reach the aerial, so that even when reaction is abused the neighbourhood will not know about it.

So far we have, in the way of controls, one-knob tuning, a volume control, a reaction control and a wave-change switch. To put the set in and out of action a further two-point switch is arranged to connect or disconnect the low-tension accumulator.

The clear illustrations going with this article should reveal to the reader the simplicity of the layout of the “1930 Ether Searcher.”

An examination of the reduced reproduction of the full-sized blueprint will also show the simplicity of the wiring scheme. The basis of the design is a metal chassis, consisting of an aluminium baseplate, an aluminium panel and a small aluminium cross screen. To the panel are fixed all the controls and to the base plate the remaining components are bolted. We

The 1930 ETHER

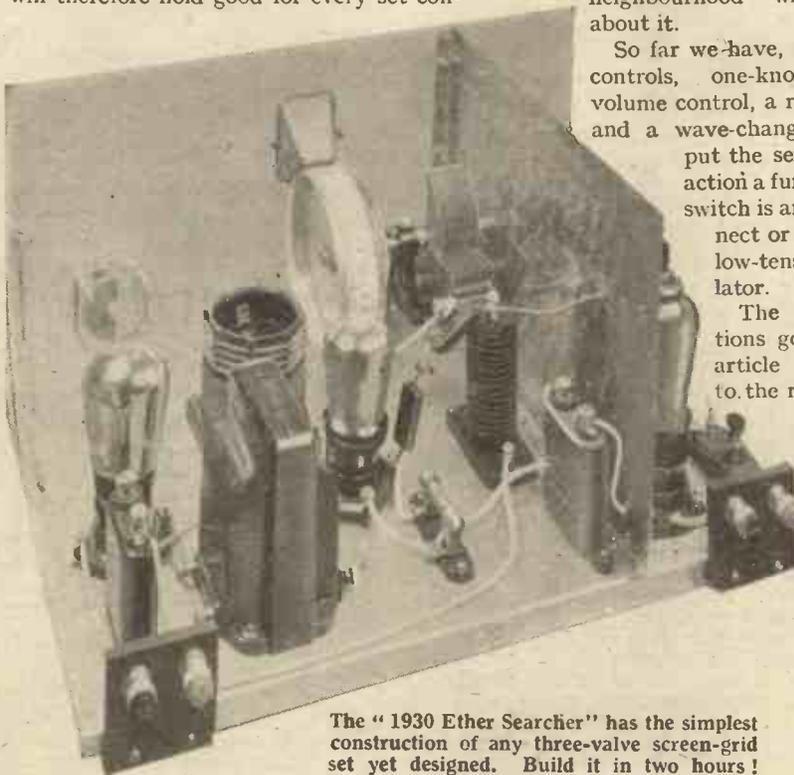
THE LAST WORD IN RECEIVERS



Designed by J. SIEGER

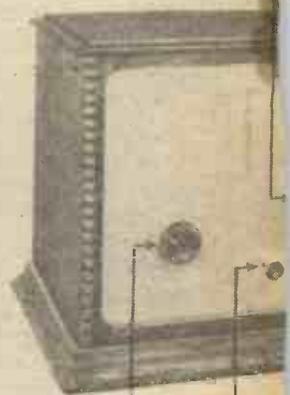
LIST OF COMPONENTS

1 Drilled aluminium panel, 15 in. by 8 in. (Keystone, Colvern)	7 0
1 Pair panel brackets (Keystone)	2 0
1 Drilled aluminium chassis and screen (Colvern, Keystone, Parex)	8 6
1 Slow-motion drum dial with special bush (Keystone)	5 6
1 30-ohm rheostat (Varley, Lissen, Igranic, Wearite)	3 0
1 .00013-mfd. differential reaction condenser (Lotus, Utility, Parex)	7 0
2 Push-pull switches (Bulgin, Lissen, Benjamin)	3 0
3 Anti-microphonic valve holders (Benjamin “Vibrolders,” Lissen, W.B., Lotus, Igranic)	4 6
1 .0005-mfd. gang condenser (Formo)	15 6
1 Pair special gang condenser supports (Formo)	9
2 Dual range coils (Colvern type R.2.R., Rotor No. 60)	17 0
1 .0003-mfd. fixed condenser (Ormond)	7
1 .0002-mfd. fixed condenser (Ormond)	7
1 High-frequency choke (Lewcos, Lissen, Wearite, Keystone)	7 9
1 Low-frequency transformer (Lissen “Super,” Ferranti, Marconiphone, Varley)	19 0



The “1930 Ether Searcher” has the simplest construction of any three-valve screen-grid set yet designed. Build it in two hours!

SINGLE KNOB



VOLUME WAVE-CHANGE

The simplicity of the control panel is shown in this photograph of the complete set.

ETHER SEARCHER



and ALAN S. HUNTER

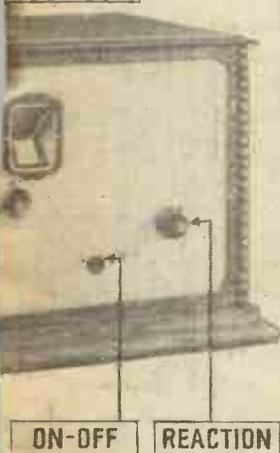
**UNIQUE ;
CHEAP :
GUARANTEED
PERFORMANCE**

COMPONENTS REQUIRED

1 Grid-leak holder (Bulgin, Lissen) ..	9
1 2-megohm grid-leak (Dubilier, Lissen, Ediswan) ..	2 6
2 1-mfd. fixed condensers (Dubilier, Lissen, T.C.C., Ferranti) ..	5 0
2 Drilled ebonite terminal strips, 2 in. by 2 in. (Peto Scott) ..	8
4 Terminals, type M, marked A, E, L.S., L.S.— (Belling Lee, Ealex) ..	1 6
1 Pre-set condenser .00025- .0003-mfd. (Formo, type J) ..	2 0
4 Red wander plugs, marked H.T.—, H.T.+2, H.T.+1, G.B.+ (Belling Lee, Ealex) ..	1 2
2 Black wander plugs marked, H.T.—, G.B.— (Belling Lee, Ealex) ..	7 6
1 Screen-grid connector (Belling Lee) ..	6
2 Spade tags, marked L.T.—, L.T.+ (Belling Lee, Ealex) ..	9
4 doz. 6B.A. 1/4-in. round-head screws and nuts (Keystone) ..	1 9
10 ft. 6 in. tinned copper wire and 9 ft. insulated sleeving (Keystone) ..	9
8 yds. rubber-covered flex (Keystone) ..	8

N.B.—The prices quoted are for the components specified first. If the alternatives are used, the drillings for the panel and base-plate will have to be modified.

CONTROL TUNING



Details are apparent from this photograph of the "1930 Ether Searcher"

have arranged with the manufacturers, specified in the list of components, to supply the panel finished in an attractive brown colour. This panel is supplied complete with the tuning-condenser escutcheon plate and condenser knob and dial. The panel is already cut and drilled for the

price quoted. Similarly, the base plate can be obtained from the makers specified, already cut and bent to shape, and drilled to take the fixing bolts of the specified components. Where any deviation is made in the use of these drillings will have to be altered accordingly. We do not advise the constructor to attempt to alter the panel layout in any way.

As will be seen, the use of a metal chassis has greatly simplified the wiring. It is not so obvious, but it is nevertheless true, that the metal chassis construction also simplifies the assembly. There is not a single wood screw in the whole set. A standard size of bolt has been chosen to fix all the parts into place.

The layout divides itself into two natural sections. The cross screen separates one side of the gang condenser, with its associated dual-wave coil, screened-grid valve holder and aerial compensating condenser, from the rest of the set. In the larger section is the other half of the gang condenser, with its associated drum dial and the remaining components; namely, the grid tuning coil, the high-frequency choke, detector- and power-valve holders, low-frequency transformer and fixed condensers and grid leak.

Easy Construction

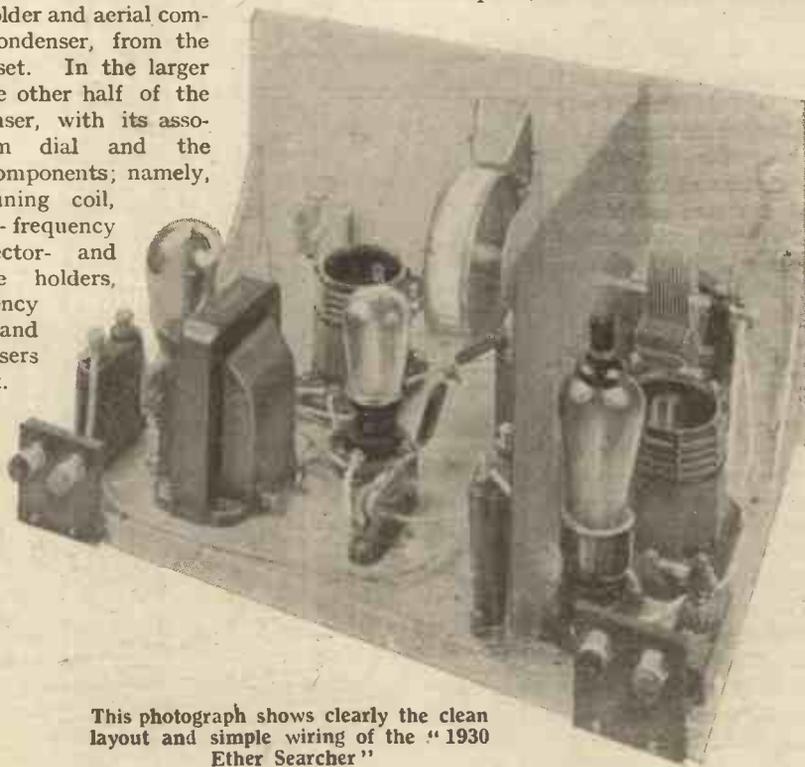
We propose to explain the assembly of the "1930 Ether Searcher" in a series of eight stages. We will assume that

the intending constructor has got together all the specified parts and is ready to carry out our instructions.

Stage 1.—Mount the escutcheon plate on the "finished" side of the Keystone panel by means of two small bolts and nuts supplied. Then mount the drum-dial bracket by removing the knob from the drum-dial spindle. When the bracket is mounted, this spindle protrudes through the front of the panel. Two more fixing bolts are required here. Looking from back of panel, stage 1 is completed by mounting the volume control on the right, the differential condenser on the left and the two two-point switches between them. The holes to take the spindles of these components are already drilled in the panel when purchased and the parts will be found to fall into place. Note that the fixing of these panel components automatically connects their "moving" terminals to the panel.

Stage 2.—Bolt the panel with its assembled components to the metal base-plate. This is done by first mounting the panel brackets loosely on the base-plate and then with seven bolts fixing the panel to both the base-plate and panel brackets. This is a simple job, but very satisfying, since the set begins to take shape and is ready for :

Stage 3.—Bolt the components to the base-plate. Here, the position of the two dual-wave coils, which have identical windings, but different connections, is important. The aerial coil, which, looking from the back of the set, is at the right-hand end of the base-plate, must be fixed so that the



This photograph shows clearly the clean layout and simple wiring of the "1930 Ether Searcher"

“THE ‘1930 ETHER SEARCHER’” (Continued from preceding page)

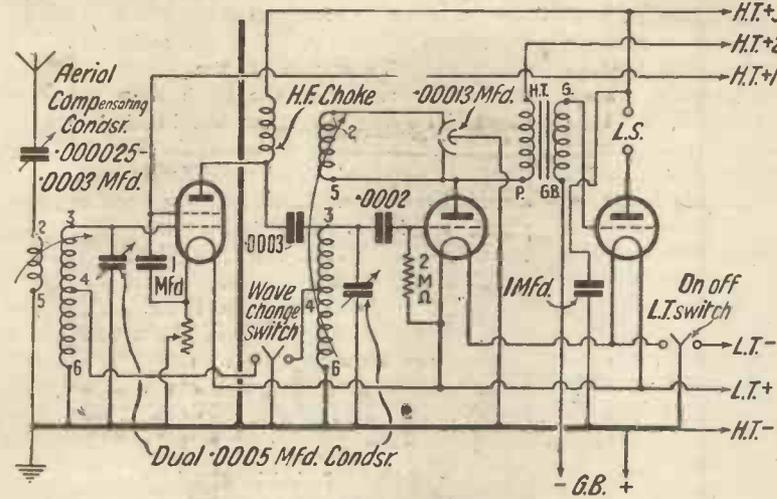
side numbered 4, 5, and 6 comes nearer the panel. The high-frequency coil, which is fixed immediately in line with the panel

bered so that there is no possibility of going wrong.

The blueprint gives the exact full-size length of each of the “master” wires

secure one end under connection A1, slip on the specified length of sleeving and make a loop round connection A2; proceeding thus, complete the third contact for wire “A.” Then start in the same way with wire “B” and so on to connection Q39. Messrs. Keystone are supplying the necessary wire and sleeving at a very reasonable price.

Stage 5.—Fit the gang condenser to the base-plate. This component is supplied to “Ether Searcher” constructors with two lengths of 4B.A. screwed rod for fixing. These two screwed rods should first be fitted to the two holes in the base of the gang condenser remote from the spindle end. Nuts are provided for this purpose. The two “free” ends of the rods can then be dropped into the two holes provided in the base-plate. The spindle will then slide through the bush of the drum-dial bracket. From the base-plate end of the supporting rods, adjust the height of the gang



The “1930 Ether Searcher” circuit

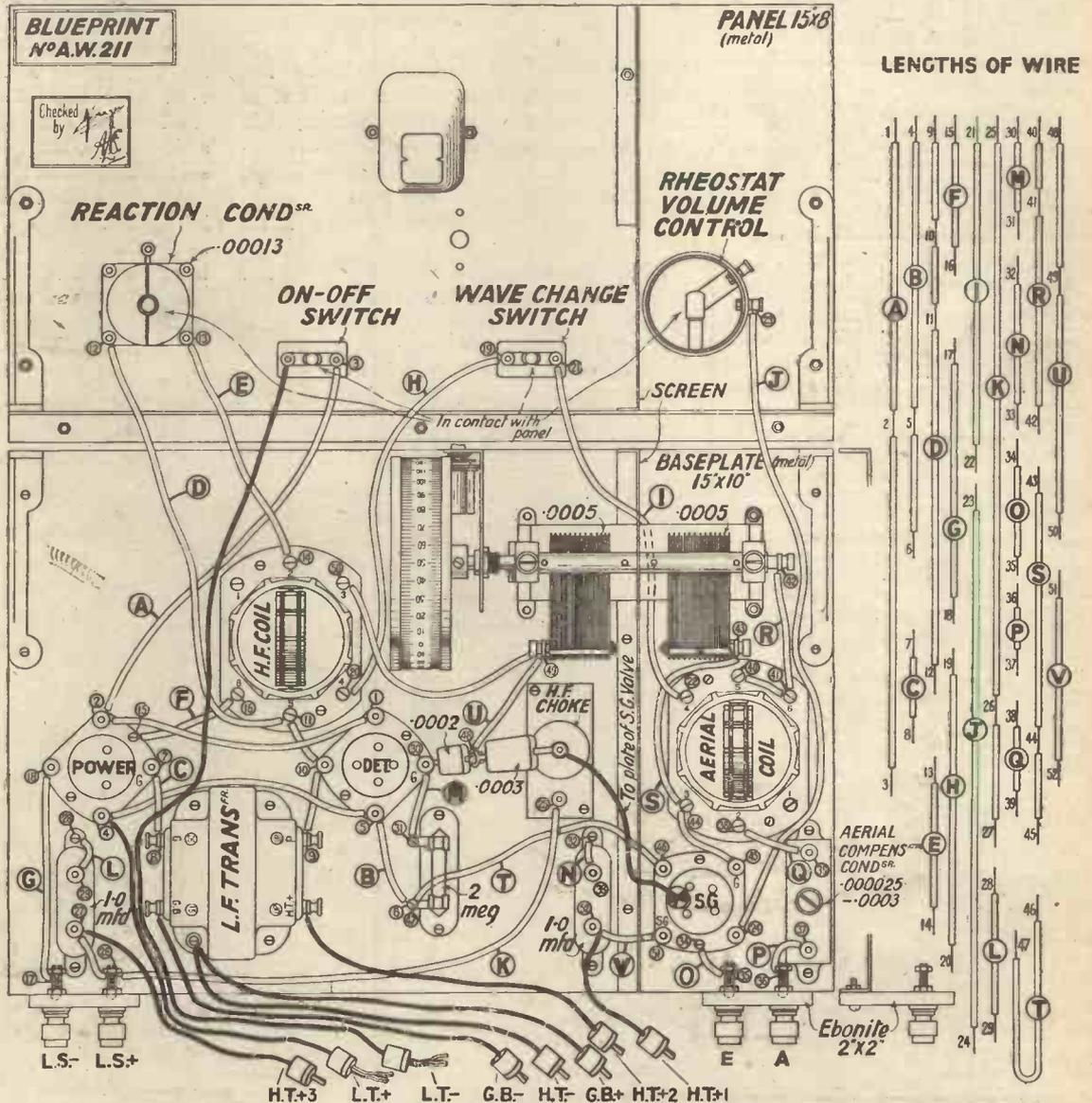
The set is being demonstrated at Selfridge & Co., Ltd., in London, and is on show at the Birmingham, Liverpool and Manchester branches of Lewis's Ltd.

Measure off a specified length of the tinned copper wire,

on-off switch, must have the side numbered 1, 2, and 3 nearer the panel. The fixing of most of the other parts on the base-plate is child's play.

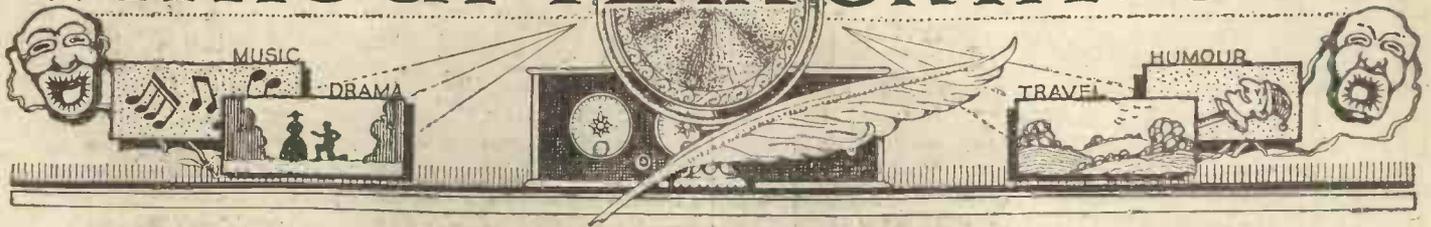
It will be seen that we have used two of the Ormond fixed condensers between the high-frequency choke and the detector-valve holder. In assembling these, use one of the standard-sized bolts to connect the end of one to the end of the other. The free end of the one marked “.0003” should then be clamped under the terminal on top of the high-frequency choke and the free end of the one marked “.0002” should be clamped under the grid terminal of the detector-valve holder. This stage is completed by the fixing of the loud-speaker and aerial-earth terminal strips to the back flange of the base plate.

Stage 4.—Start the wiring of the base-plate components and continue up to connection Q39. Here we must explain the simplified wiring system. All points of common contact are joined together with a single length of wire. Each of these lengths of what we might call “master” wires is distinguished by a letter of the alphabet. The points of contact along each “master” wire are num-



The wiring diagram of the “1930 Ether Searcher.” A full-size blueprint can be had (price 1/-) which will greatly facilitate the wiring

WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

OF course, the solution of the Church Services problem is to confine all the services to the studio, where they would be under the control of the announcer, as all broadcasts should be.

The National Lectures are decidedly big; but require concentration—in one's own study. Since nine listeners out of ten do not have these opportunities, their purpose must necessarily fail. It merely resolves itself into history lessons after the day's work. It is a pity, but 'tis true.

Music-hall relaying, as a rule, is not very successful, but the substitute for the Alhambra relay was quite an exception. We had from the Coliseum, Rupert Hazell and Elsie Day, a turn which makes good fun without the usual suggestiveness. The difficulty with these outside broadcasts is the frightful noise, which is not so bad in a huge auditorium but is magnified beyond all endurance in one's homestead. Curious how it is often forgotten that broadcasting is for the homes.

Typhoon being a wonderful word-picture, it was, of course, difficult to broadcast where action was relied on. However, here's to a good effort!

Fed Up was a good revue with a good cast, the light side being well catered for. Leonard Henry, however, was not quite so good, nor were his jokes quite so original. The previous night he was in great form, being in his element in a funny, impromptu speech.

The "silly ass" speech was not so good as the speech by Alfred Butler, was it?—or Charles Herbert?

Edith James is a good character comedienne. We ought to hear more of her.

Now, what shall we say of that Austrian broadcast? I should say it was a scream in more ways than one, and in saying this I am aware that my highbrow friends at the B.B.C. and elsewhere are not in agreement. To me it seemed like a Baedeker and Harrod's catalogue rolled into one.

These National programmes, in my view, are generally unsuccessful. Let us have National programmes nearer home. There

is a good deal that we would like to know about in our own country and the Empire generally. Why boost the foreign resorts, the names of which mean nothing to the majority of listeners?

By the way, do these countries pay for the advertisements?

Of the last two Symphony Concerts, one I heard at home and the other I went to hear at the Queen's Hall. I was glad to notice that the late-comers were shut out until the First Movement was ended. This is a custom which should be generally adopted. It is simply a scandal the way a good performance is spoilt by people who linger over their port.

"Harold" has sent me a discourse on dance broadcasts and "song-plugging," and since this subject crops up quite a lot in my correspondence from readers the point he stresses will, no doubt, create interest generally.

"The titles are back again," he writes, "and with their reinstatement comes a plague of 'song-plugging' much worse than before."

He seems to think that the real fault lies not so much with the publishers boosting their wares as with the B.B.C.

"It is a most unusual event for a dance band to play the same tune more than once

in one broadcast," he states. "Furthermore, I don't think there is any band which broadcasts more than twice a week. This means that, as things are going, it cannot be the fault of any individual band that we get the same tunes over and over again. The trouble lies in the fact that we have more than one band broadcasting in the space of an evening."

He points out, as an instance, that at 10.15 the Piccadilly Players, catering to the public taste, play the numbers of the moment—say, "Red Hot Wail" and "Blue Murder." At 10.45 Jerry Hoey's Band, also wishing to please the public, play "Red Hot Wail" and "Blue Murder." At 11 the Blue Lyres, prompted by the same motive and not knowing what has been played by their confrères, trot out "Red Hot Wail" and "Blue Murder"; and the result is an irate postbag the next morning.

"The remedy for this state of affairs," he adds, "is obvious. The motto for outside dance broadcasts should be, 'One night—one band.' But before this happens I hope better bands will be featured. . . ."

A Dalston reader asks me to ventilate a point.

It appears that by the time he gets home from the City, has a "clean up and eats" it is about 7.45—a nice time of the evening. He then settles down to listen-in. He is a vaudeville fan, and naturally expects that on at least one night of the week there will be something light and amusing for him at his hour of peace. On the contrary, he finds that the variety hours lessen in number, and when they do come on they are at the wrong times.

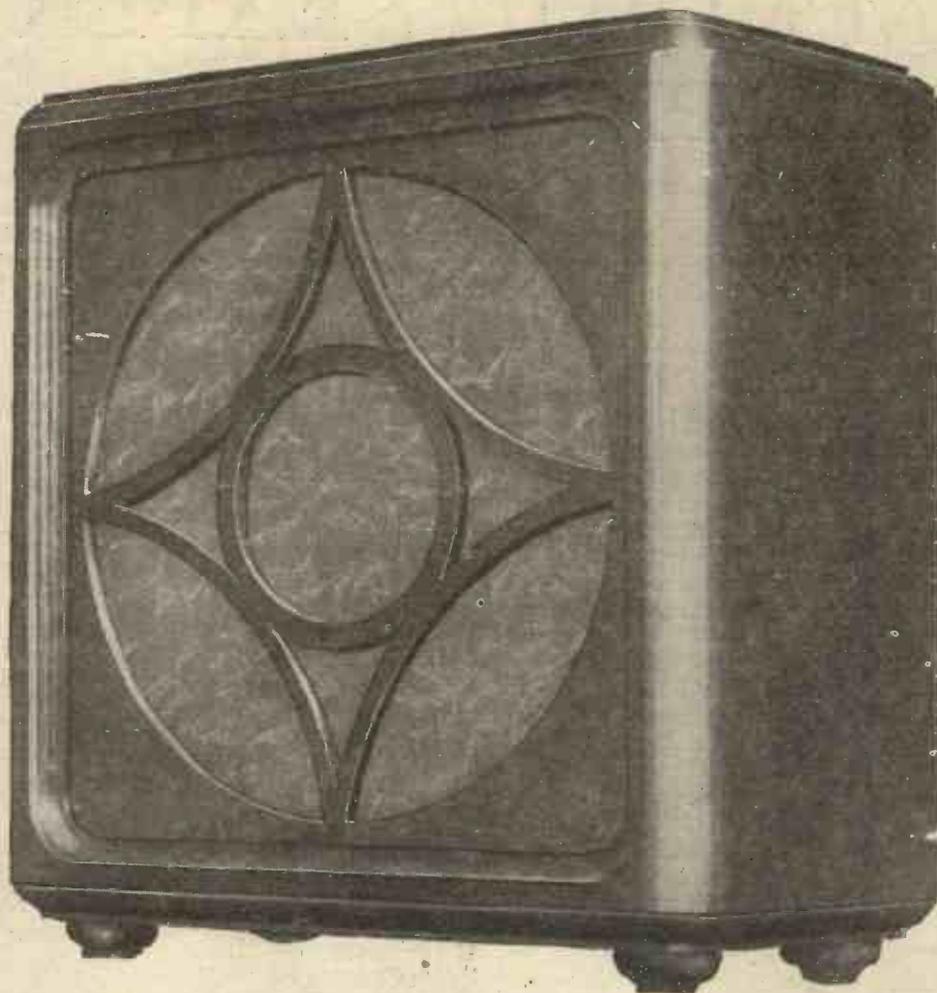
He appends a list of what was arranged for a whole week at the daily hour of 7.45 p.m. :—

- Monday - Military Band.
- Tuesday - Ballad Concert.
- Wednesday - Highbrow Recital.
- Thursday - Military Band.
- Friday - Baritone, followed by Symphony Concert.
- Saturday - Orchestral Concert.

On verifying this list I found that the only vaudeville hours were on Tuesday at 9.40 and on Saturday at 9.35. But isn't this a case where they can't please everybody at the same time?



Our Cartoonist's impression of Bransby Williams



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

AMATEUR EXPERIMENTS WITH PHOTO CELLS

By T. THORNE BAKER, F.Inst.P.

THE attention that has been directed in recent years to phenomena connected with photo-electricity has resulted in finding an astonishing number of applications for the photo-electric cell. A new method of weighing paper during the actual process of manufacture has lately been devised in which the "weighing" is done by a photo-electric cell. Such cells are employed for indicating the uniformity or otherwise of the colour of manufactured articles; a machine will test the tint of tobacco when cigars pass before the cell on an endless band, and when a cigar too light or too dark passes before the cell, a relay is thrown into action which causes mechanism to tip the faulty cigar into a rejection basket, and so on.

Photo-electric cells are used to measure the brightness of stars, the intensity of light beams in photometry, to time the transit of stars, to operate illuminated buoys, for the transmission of pictures by wire and wireless, for television, and so on. The latest application of the photo-electric cell is to the talking picture art, and there are so many applications, in the laboratory and in industry, that I am going to suggest that we change the unwieldy name of the cell to the simpler term "photo cell."

Perhaps the simplest photo cell is a simple crystal of silver bromide. Photographic films are coated with a gelatine emulsion containing millions of grains or crystals of silver bromide, and after exposure in a

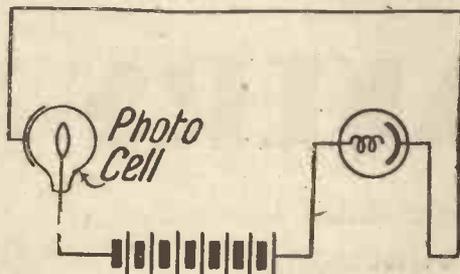


Fig. 1. An experiment with a neon lamp

camera these grains become developable, so that when the film is developed they lose their bromide and become reduced to a black form of metallic silver. Dr. Toy has recently shown, by a brilliant piece of investigation, that the effect of light on these grains is a photo-electric one, that if light is alternately allowed to fall on and off the tiny crystals, their electrical resistance changes correspondingly.

Change of resistance with change of light is, of course, known best to us in the case of the selenium cell. There is a definite relationship between the conductivity of the cell and the intensity of the light illuminating it, but when the light is re-

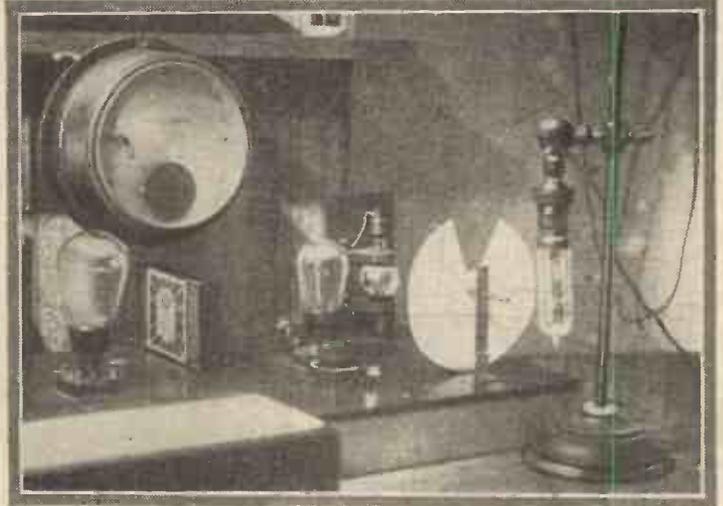
moved, the cell takes some seconds, or even minutes to regain its normal, lower conductivity. On the other hand, it is very convenient because one can pass relatively high currents through it, sufficient to work quite heavy relays, while with photo cells the current generated is exceedingly small, and valve amplification is essential.

There is, however, one simple experiment that can be carried out with a photo which shows up well the fundamental principle of television. The arrangement is seen in Fig. 1. A photo cell is placed on the table or bench, and is connected in series with a battery and a neon lamp. If a 40-watt lamp be placed in front of the photo cell, electrons are emitted and it becomes conductive and the neon lamp lights up. If now a cardboard screen be intercepted between the light and the cell, the neon lamp is instantly extinguished. The strength of glow of the neon lamp is proportional to the strength of the light illuminating the cell, and is brighter the nearer the electric lamp is held to the photo cell. The experiment is thus one of television in its simplest form. Every flash of the light falling on the photo cell is reproduced in another spot by a correspondingly intense flash of the neon lamp.

Selenium cells, depending on change of conductivity only, do not strictly come under the category of photo cells, and will not be considered on this occasion. I will, on the other hand, describe a very simple and inexpensive chemical cell which may legitimately be classed as a photo cell—which generates sufficient current to be read on an ordinary micro-ammeter. While on the subject of micro-ammeters, it may be of interest to mention an excellent little sensitive galvanometer, which may be used either direct-reading, or with a mirror and scale. The cost is only two or three pounds, yet it will read direct 0.09 microampere per scale division, or give a deflection on the scale of 250 millimetres per microampere. It is made by Griffin and Tatlock, of Kingsway, W.C.

The wet photo cell referred to above is made as follows. Two thin strips of copper sheet, about five inches by one, and about 1/32 of an inch thick, are separated by two

strips of ebonite or two small pieces of glass tubing or rod, and held together with an elastic band top and bottom. The pair are then put into a thin glass beaker—or a small "pony" tumbler—which is filled with a solution of copper sulphate, 20 grains, distilled water 2 ounces. A wire lead should be soldered to the top of each copper strip



Revolving sector and photo cell

(Fig. 2). The complete cell is left in the dark for two or three days. If then the leads be connected up with a micro-ammeter, and the light from a 60 or 100 watt lamp be shone on one side of the cell; i.e., on one plate (the other being kept "dark"), a current of several microamperes will be

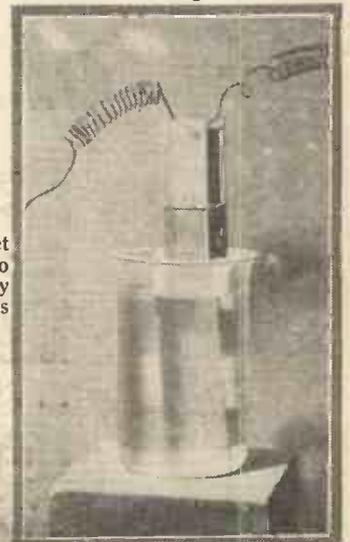


Fig. 2. A wet type of photo cell is easily made as shown

obtained. Immediately the light is switched off, or removed, the current will cease. Cells of this type usually improve considerably with age.

T. Thorne Baker

(To be concluded next week)

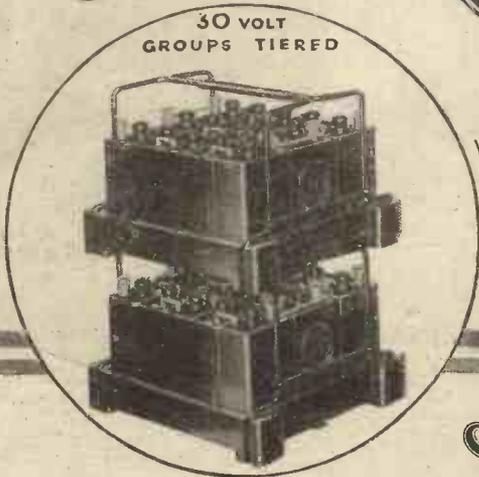
We're giving Father a new H.T. for *our* radio



I'm sure nothing will please him better—or us! From the time that we first had the wireless set Dad has continually preached the virtues of what he calls a wet H.T. of the C.A.V. make; how it will improve reception by cutting out those funny crackling noises, and then he goes on to talk about less trouble, constant volume and all that.

Anyway, if all the things are true that he said about the new C.A.V. type, the one which he says is “built like a car battery” it will be a good investment. So we have taken the hint, and I'm certain that the improvement will make it worth while, for Dad does know what he is talking about on the subject of wireless.

The new **C.A.V.** of course!



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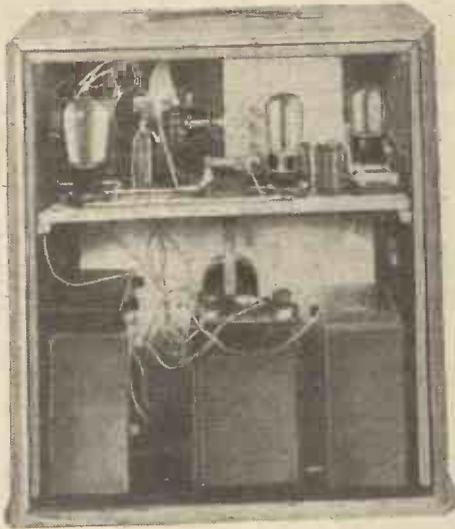
WRITE FOR CATALOGUE P.

C.A.V. Vandervell & Co. Ltd.
ACTON, LONDON, W.3.

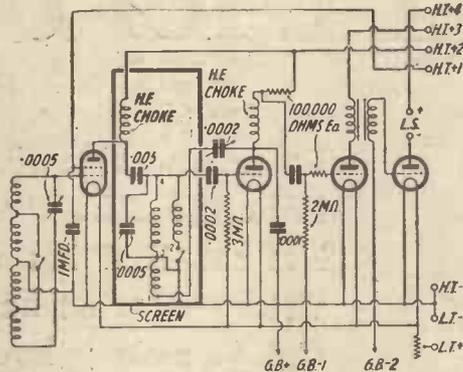
SPECIFY THE C.A.V. JELLY ACID BATTERY—THE PERFECT L.T. FOR ALL PORTABLES.

BEST SETS AND THEIR CIRCUITS

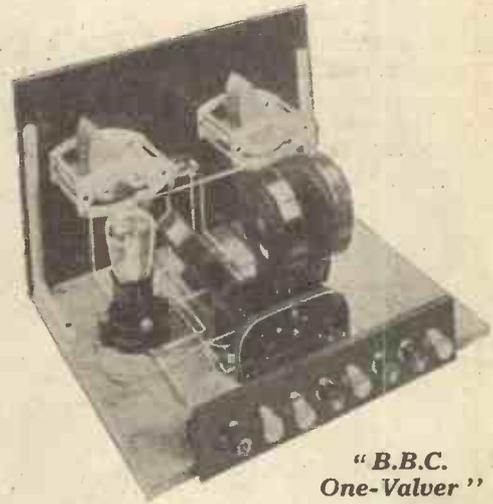
A selection from some of the recent "A.W." receivers of all types. Full constructional details are given in the issues mentioned. For particulars of the blueprints, turn to the blueprint list on page 966.



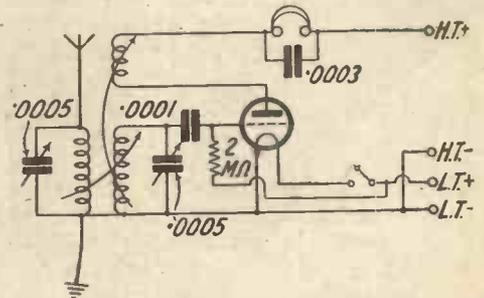
"The Music Leader"



Here's a good set for indoor use—"The Music Leader." The circuit used was tested out in a portable set taken by two AMATEUR WIRELESS staff members to the U.S., and which has travelled a total of 9,000 miles! The "Music Leader" is a transportable, and can be used in any room, without worrying about aerial, earth, or loud-speaker connections. A frame aerial, a linen speaker and all batteries are contained in the cabinet. The circuit is a successful one; note how the screening is arranged. This ideal set for the home is described in AMATEUR WIRELESS No. 384, blueprint No. 203.



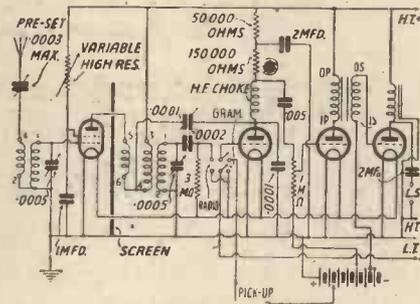
"B.B.C. One-Valver"



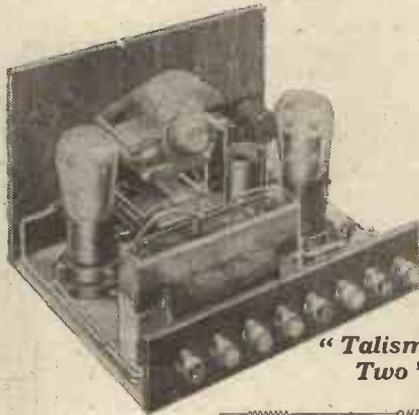
In the "B.B.C. One-valver" (AMATEUR WIRELESS No. 388, blueprint No. AW208), we have the very simplest type of set, and one suitable for working with phones at moderate distances from a main station. The tuning arrangements provide the greatest selectivity, which is a factor of the utmost importance when the set is being operated close to such a powerful station as Brookmans Park. It is important to note that this receiver is made up on a circuit officially recommended by the B.B.C.



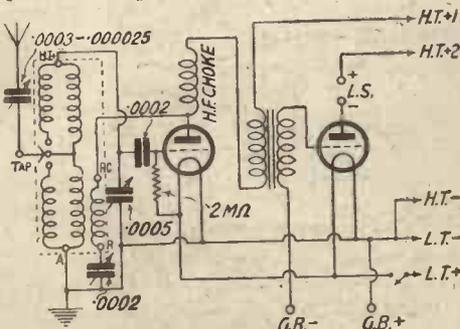
"Music-Lover's Gramo-Radio"



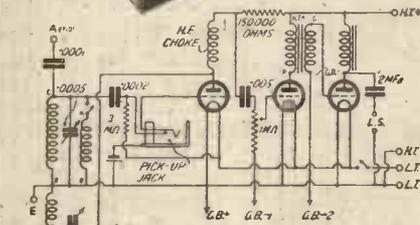
The "Music-lover's Gramo-radio" (AMATEUR WIRELESS, Nos. 381, 382 and 383, blueprints Nos. AW202a, AW202b, and AW202c), is a comprehensive electric gramophone incorporating a four-valve radio set, a gramophone unit and a linen-diaphragm loud-speaker. The receiver unit is illustrated above. The three blueprints relate to the set, to the linen speaker, and to the gramophone unit respectively.



"Talisman Two"



"One of the best two's yet," is the slogan which was applied to the "Talisman Two" (AMATEUR WIRELESS, No. 373, blueprint AW194) and it is amply justified. This is a very simple little set to build, and it gives amazing results. It used the new Talisman coil for tuning, and selectivity is very good. The control of the set is simple, and it is the very set for the family. The circuit is shown above.



If you are in search of a portable set, which is essentially simple to work and which has none of the complications of a set having an H.F. stage, then just the thing you want is the "Holiday



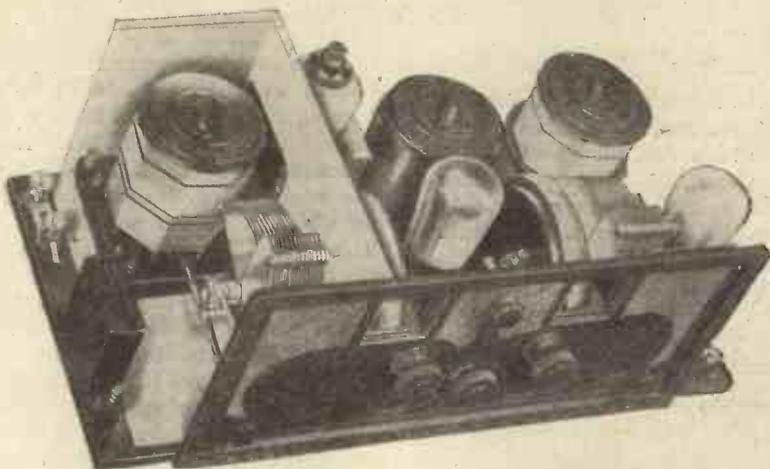
"Holiday Portable"

Portable Three" (AMATEUR WIRELESS, No. 365, blueprint No. AW188). This is a three-valver, incorporating frame aerial and loud-speaker. As the circuit shows, there is provision made for the addition of a gramophone pick-up. This set will work equally well indoors or out.

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"A.W." TESTS OF APPARATUS

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

I.D.S. Wavetrap

THE new Regional station at Brookmans Park has caused some confusion amongst listeners in the surrounding area. Although many of those affected are aware that by the aid of special sets they may cut out Brookmans Park and receive other stations, the majority are only interested in a means of adapting their present set to the new conditions.

One of the most effective solutions to such a problem lies in the use of a suitable



This I.D.S. wavetrap is a cure for interference

wavetrap which, when inserted in the aerial circuit, rejects to a large extent signals on some particular wavelength. Now the effectiveness of such a wavetrap depends upon certain factors, including sharpness of tuning. If, however, the tuning is excessively sharp, the cutting-out effect will not be sufficient.

This week, we have received for test and

report, a device known as an I.D.S. Regional station eliminator made by the Ideas Development Syndicate, Ltd., of 4 Golden Square, Piccadilly Circus, W.1. Essentially it consists of a tuned inductance covering the medium wavelength broadcast range to which a second winding is coupled. This second winding is placed actually in the aerial circuit between the aerial and the set, and on tuning the condenser contained in the trap to the wavelength of the interfering station, the circuit acts as a rejector.

The sharpness of tuning depends upon a coupling factor between the two windings, and this has been arranged to suit average conditions. We found that at a distance of six miles from Brookmans Park we could almost cut this station out, even on a single circuit tuner, and receive 5GB free of interference. The strength of 5GB did not appear to be affected in the least, whilst it was also possible to receive certain distant stations normally blotted out by Brookmans Park. The range could be varied from approximately 250 metres up to 520 metres.

Readers will realise that at a distance of six miles from this powerful transmitter, the results indicate that the device is thoroughly practicable.

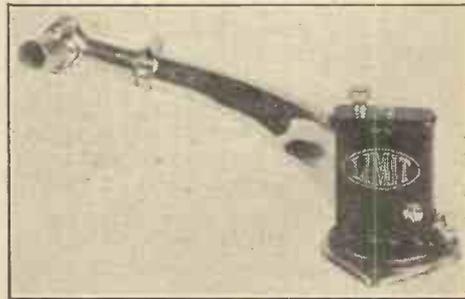
Limit Pick-up Arm

THE increasing popularity of electrical reproduction of gramophone records, using the low-frequency side of a receiver for magnification of the pick-up output, has

resulted in the rapid development of various types of pick-up and pick-up arm.

This week we have tested a balanced arm for pick-up mounting, manufactured by Limit Radio Ltd., of Albion Works, Albion Street, London, N.1.

This component is finished in the high-quality manner associated with Limit products, and has been carefully designed to be of the utmost utility. The length of the arm itself can be varied within fairly



A good pick-up arm—the Limit

wide limits, while a simple ball-and-socket type of joint at the pick-up end enables the tracking to be set accurately.

A counter-balance spring housed in the arm mounting can be adjusted by means of a convenient thumb adjuster, and on test we found that the range of adjustment was amply sufficient to correct for the weight of all normal pick-ups.

This pick-up arm can be recommended to gramophone enthusiasts.

"THE '1930 ETHER SEARCHER'" (Continued)



condenser until it is exactly horizontal away along to the spindle at the other end. Then lock the supporting rods with the nuts provided so that the gang condenser is absolutely rigid.

Then mount the drum dial on the condenser spindle. In doing so, open the two washers on the condenser knob spindle so that the edge of the drum dial is gripped between them. Then screw the dial as

that it clears the gang condenser. Only two bolts on the base plate and one on the panel are needed for this fixing.

Stage 8.—Complete the wiring, including the battery-lead connections. We can now safely leave the constructor for a week and in the next issue, when many "1930 Ether Searcher" sets will have taken shape, we can go into the details of operation and maintenance. That over 40 stations have

tight as possible to the condenser spindle. A spot of vaseline should then be applied to the washer movement to ensure smooth operation.

Stage 6.—Wire up the gang condenser connections. There are only two master lengths, these being R and S.

Stage 7.—Fix the side screen, which when purchased will be already slotted so

been tuned in with this set in one evening is sufficient proof of its remarkable powers. We are going to show how every constructor can duplicate these results with an ease of operation never before equalled.

Using Phones with the Ether Searcher

Constructors wishing to use phones on occasion with this set are recommended to incorporate a choke-filter output unit between the last valve and the phones. The reason for this is to prevent shock to the wearer of the phones should there be a defect or short-circuit between the phone winding and the metal headbands.

Such a thing can only occur if phones are being worn or the loud-speaker is being adjusted, and either the phones or the loud-speaker are defective in regard to an internal short-circuit, whilst the set is being tuned. If a mains supply unit is used then either choke-filter or transformer output is essential.

"THE MODERN RADIO SLEUTH"

(Continued from page 923)

Italian stations operating on more than 550 metres, yet an evening or so ago, just under the Hilversum transmission, I listened to an announcement in a language which had a Latin flavour to it. I must definitely emphasise that it was not Russian, and, consequently, it could not have been Leningrad or Moscow Experimental."

"Why definitely?" replied Sheerluck Coames, with a pitying sort of smile. "The Russian language is a difficult one and seldom learnt by other nationalities; yet the Russian is anxious that his programmes should be heard by foreign and more distant listeners. For this reason news bulletins—'cooked,' maybe, for special consumption abroad—are given out in a language which is rapidly gaining numerous adherents, Esperanto, my dear Botson; a tongue which possesses a decided Italian—but not a Spanish sound. Your station, if you were so close to Hilversum, was undoubtedly Leningrad. You can prove this at any time by comparing the condenser readings for that powerful transmitter. Besides, from that station you will also hear the cuckoo calling to his mate. These questions are childish and I am surprised that you should put them."

"In no instance do you appear to encounter any difficulty. How is this?" replied the crestfallen Botson.

"It is merely a question of practice, some experience, and a good memory for data collected at a number of sittings. If you spend some time at your receiver, you must necessarily become familiar with both the calls and the peculiarities of the various studios. Although you may not know more than your own native language, after a few days you should experience no difficulty in differentiating between Teutonic or Latin tongues, and further experience will soon permit you to classify in your mind, as you hear them, the languages of Slavonic origin. The actual identification of transmissions heard is dependent on two important factors, language and position of the transmitter in the wave band."

(To be concluded next week)

"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. Queries should be addressed to the Editor, and the conditions printed at the head of "Our Information Bureau" should be closely observed. 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.



for Radio on Easy Terms with Service after Sales

Here is a small selection of lines in popular demand.

EVERYBODY'S THREE. Complete kit, including drilled Panel, Cabinet, and Valves. Cash £9 19s., or 12 monthly payments of 18/3. Free Blueprint included.
THE WORLD-WIDE SHORT-WAVE THREE (see Nov. 9 issue). Complete kit, including Metal Cabinet and Valves. Cash £9 0s. 9d., or 12 monthly payments of 16/7. Free Blueprint with complete kit.
OSRAM MUSIC MAGNET. Cash £9, or 12 monthly payments of 18 6. Valves included.
COSSOR 1930 THREE-VALVE KIT. Cash £8 15s., or 12 monthly payments of 16/-.

THE MUSIC LEADER (described in Oct. 26 and Nov. 2 issues). Complete kit, including Cabinet, Valves, Batteries, and all requisite accessories. Cash £12 15s. 6d. or send only 25/-; balance in 11 monthly instalments of 23/-.

MUSIC LOVER'S GRAMO-RADIO (described in Sep. 28 and Oct. 5 issues). Complete kit contains exact parts as specified and drilled Panel. Full-size Blueprint free with complete kits. Cash £10, or 12 monthly payments of 18 4. Valves, cabinet, gramophone motor and accessories, extra.

THIS WEEK'S SPECIAL FEATURE!

THE 1930 ETHER SEARCHER (described in this issue)

Complete kit of components, including drilled panel, drilled chassis and valves **£8 : 2 : 1** or 12 monthly payments of 14/10. Any parts sold separately.

1930 MULLARD "ORGOLA" KIT, including Cabinet and Valves. Cash £10 15s. 11d., or 12 monthly payments of 20/-.
REGENTONE W.I.B. S.G. (A.C. Mains). For S.G. and Pentode Sets. Cash £4 19s. 6d., or 12 monthly payments of 9 2.
EKCO 3 F.20 (A.C. Mains). Also for S.G. and Pentode Sets. Cash £3 19s. 6d., or 12 monthly payments of 7 4.
ALL LEADING MAKES OF ELIMINATORS from 4 7 first payment.
EXIDE 120-VOLT H.T. ACCUMULATOR, Type W.J., 2,500 m/a. In Crates. Cash £3 15s., or 12 monthly payments of 6 11. Type W.H., 120 volts, 5,000 m/a. In Crates. Cash £4 13s., or 12 monthly payments of 8 6.
EASY PAYMENT ORDERS DELIVERED TO APPROVED ACCOUNTS ON RECEIPT OF FIRST INSTALMENT. All goods sent Carriage Paid.

LISSEN S.G.3 KIT, excluding Valves, Accumulator and Cabinet. Cash £4 9s. 3d., or 12 monthly payments of 8 3.
CELESTION C.12 LOUD-SPEAKER, in Oak. Cash £5 12s. 6d., or 12 monthly payments of 10 4; in Mahogany, £5 17s. 6d., or 12 monthly payments of 10 9.
ULTRA AIR CHROME U.12, Cabinet Model Loud-speaker. Cash £3 19s. 6d., or 12 monthly payments of 7 4. All Chassis and Cabinet Models also available.
PHILIPS CONE SPEAKER, type 2016. Cash £2 10s., or 9 monthly payments of 6/-.
BLUE SPOT 66K UNIT, with **SQUIRE MODEL 101 CONE KIT.** Cash £3 4s. 6d., or 12 monthly payments of 5 11.

LESS THAN 3 WEEKS TO CHRISTMAS! ORDER NOW FOR PROMPT DELIVERY

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COUPON.

Please send me your 48-page Illustrated Catalogue, describing the 1929-30 products of all the leading makers.

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 ADDRESS

A.W.7/12

H.B.



My Wireless Den



Weekly Tips—Constructional and Theoretical—by W. JAMES

Mush!

THOSE who try receiving distant stations will be aware of the disturbances received with the signal. This mush, as it is called, is usually of a fairly high audible frequency and will, therefore, be the more strongly received when the set is a good one!

If the tuned circuits are so selective that the higher notes are cut off, the minimum of mush will be heard. Similarly, when the low-frequency side fails to deal properly with the higher notes, little interference is heard.

A heterodyne whistle produced by two broadcast stations working near together, if high-pitched, may be heard on a good set and not on a poor one.

The question, therefore, arises as to whether the higher notes should not be cut off when tuning to distant stations. This

can be effected easily enough by adding a fixed condenser to the low-frequency part of the set. One can be joined across the loud-speaker, for instance. It is better to put it across one of the other parts, however, as there is no sense in allowing the currents to pass through the amplifier and then to remove them at the loud-speaker.

The size of the condenser required will depend partly upon which part of the set it is to be joined across, and is easily found by trial.

Is Your G.B. Correct?

Referring to my note about the correct grid bias for a power valve, in a recent issue, it is worth noting that certain of the 2-volt types, having the relatively high magnification factor of about 8, should have a grid bias of no more than 6 for a high tension of 120.

Much poor reproduction, apparent as lack of body, is to be attributed to too much grid bias, which cuts down the anode current. It causes the power valve partially to rectify the signals.

Those Series Condensers

Those who experiment a fair amount will find one of the pre-set condensers, such as a Formo-denser, of value in the aerial circuit instead of a fixed condenser.

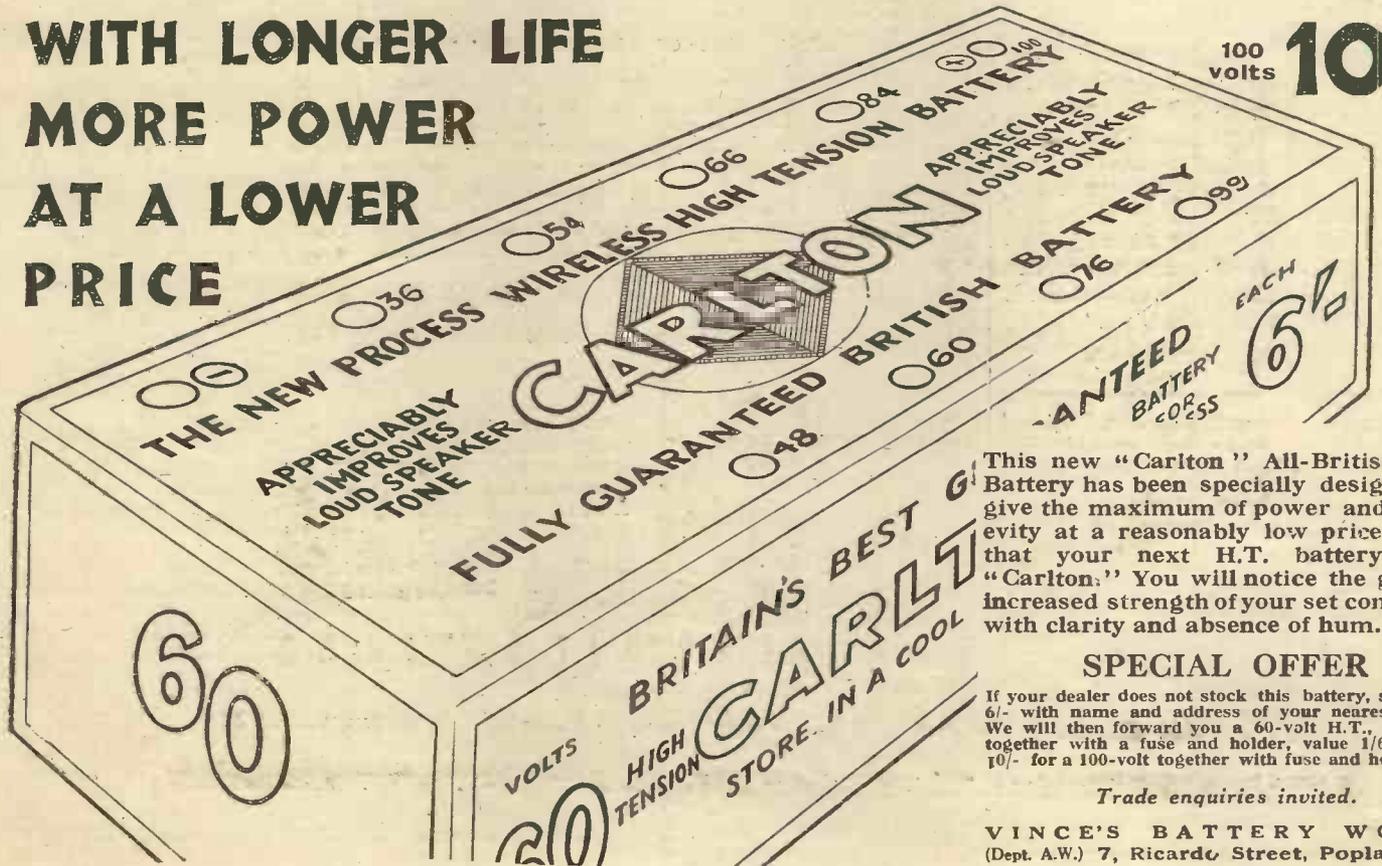
As a rule, a fixed condenser of .000 microfarad is used, but this may be on the small side for many aerials. When a pre-set type is used, the condenser can be adjusted to suit the aerial and the circuit and much time be saved.

After all, it is not important to know the value used. The pre-set condenser can be adjusted and then left.

[It has been necessary to curtail this feature in this special issue.—ED.]

A NEW BRITISH BATTERY
WITH LONGER LIFE
MORE POWER
AT A LOWER
PRICE

60 volts **6/-**
 100 volts **10/-**



This new "Carlton" All-British H.T. Battery has been specially designed to give the maximum of power and longevity at a reasonably low price. See that your next H.T. battery is a "Carlton." You will notice the greatly increased strength of your set combined with clarity and absence of hum.

SPECIAL OFFER

If your dealer does not stock this battery, send P.O. 6/- with name and address of your nearest dealer. We will then forward you a 60-volt H.T., post free, together with a fuse and holder, value 1/6, or send 10/- for a 100-volt together with fuse and holder.

Trade enquiries invited.

VINCE'S BATTERY WORKS
 (Dept. A.W.) 7, Ricard Street, Poplar, E.14

A DISCOVERY IN WIRELESS!

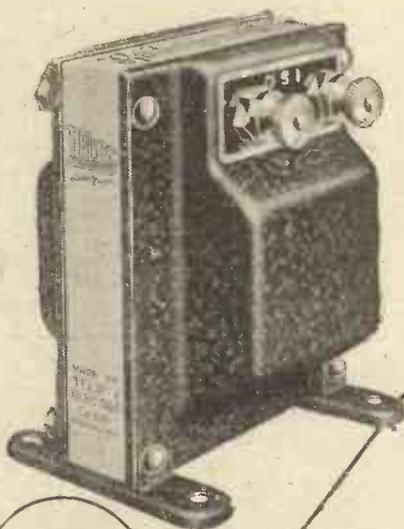


BY A MAN WHO SET OUT TO LOG THE WORLD

AN ACTUAL EXPERIENCE

of a wireless enthusiast whose desire it was to get world-wide reception—and failed. He then changed his transformers and fitted Telsen, and writes that the moment he began to search around the dial, foreign stations came rolling in one after the other with strength and purity, many of which he had never heard before—a discovery by him—profit by it. Fit Telsen Transformers now.

**RADIO'S CHOICE
FOR WORLD-WIDE RECEPTION**



RADIOGRAND
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Ratios 5-1 or 3-1

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

BROADCAST TELEPHONY

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

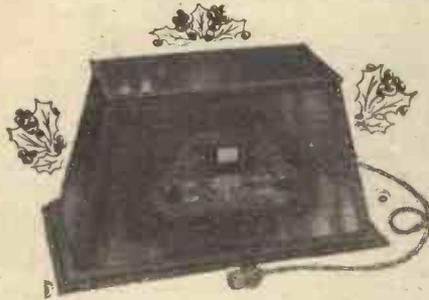


CLIMAX

ALL-ELECTRIC RADIO

Climax H.T. Mains Units this Xmas. For your own set and to give to your friends. The best you can get—the best you can give. Popular prices. Every modern improvement. A.C. models have new metal rectifying units eliminating all valve trouble. Negligible upkeep costs. **Ten Voltage Tappings.** For all Mains voltages 40/100 cycles. A.C. Model U.20, Price £4/5/0, up to 120-v. H.T., up to 20 milliamperes. A.C. Model U.50, Price £5/15/0, up to 200-v. H.T., up to 50 milliamperes.

Improved D.C. Model H.T. Unit—the most popular D.C. Mains Unit on the market—has **Ten Voltage Tappings.** Output 50 m/a total, 10 m/a at tappings. Price complete, 34/-.



CLIMAX CHELLOSET

AN AMAZINGLY SELECTIVE LONG RANGE 2-VALVE ALL-ELECTRIC RECEIVER

Many important features, one dial tuning, dual wave switch to eliminate coil changing, Westinghouse metal rectifier, volume control. No batteries whatever. Operates entirely from A.C. Mains. Walnut finished cabinet. Price only £9/17/6 complete with valves, royalties and full mains equipment. The finest value yet offered in all-electric receivers.

Obtainable from all Radio Dealers.

CLIMAX

A YEAR AHEAD

CLIMAX RADIO ELECTRIC LTD.,
Haverstock Works,
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Telephone: Primrose 1171-2

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	11,757	Chelmsford (5SW)	15.0	*283		Montpellier (PTT)	0.2	*441	680	Rome (Roma)	3.0
*200	1,500	Leeds (2LS)	0.13	286	1,049	Petit Parisien	0.5	453	667	Bolzano (BZ)	0.3
*242	1,238	Belfast (2BE)	1.0	288.5	1,040	Mont de Marson	0.3	*501	599	Milan (Milano)	7.0
£61	1,148	London (2) tests		291.4	1,029.3	Radio Lyons	0.5	YUGOSLAVIA			
*288.5	1,040	Newcastle (5NO)	1.0	*291	1,020	Limoges (PTT)	0.5	308	973	Zagreb (Agram)	0.7
288.5	1,040	Swansea (5S)	0.13	304	986	Bordeaux (PTT)	1.0	420	698	Belgrade	2.5
288.5	1,040	Stoke-on-Trent (OST)	0.13	305.5	987.7	Agen	0.25	583	507.3	Ljubljana	2.5
288.5	1,040	Sheffield (6LF)	0.13	309	970	Radio Vitus	1.0	LATVIA			
288.5	1,040	Plymouth (5PY)	0.13	*316	950	Marseilles (PTT)	0.5	*525	572	Riga	3.0
288.5	1,040	Liverpool (6LV)	0.13	329	914	Grenoble (PTT)	0.5	LITHUANIA			
288.5	1,040	Hull (6KH)	0.13	364	824	Algiers	12.0	*1,035	155	Kovno	7.0
288.5	1,040	Edinburgh (2EH)	0.35	368	815	Radio LL (Paris)	0.5	NORWAY			
288.5	1,040	Dundee (2DE)	0.13	*381	788	Radio Toulouse	8.0	240	1,250	Rjukan	0.18
288.5	1,040	Bournemouth (8BM)	1.0	411	729	Radio Maroc (Rabat)	2.0	*283	1,058	Notodden	0.05
288.5	1,040	Bradford (2LS)	0.13	447	671	Paris (Ecole Sup. PTT)	3.0	345	869	Frederikstad	0.7
*301	995	Aberdeen (2BD)	1.0	468	640	Lyons (PTT)	5.0	364	824	Bergen	1.0
*310	968	Cardiff (5WA)	1.0	1,444	207.5	Eiffel Tower	12.0	453	662	Tromsø	0.1
356	842	Brookman's Park 30		*1,725	174	Radio Paris	12.0	453	662	Aalesund	0.3
GERMANY											
*377	797	Manchester (2ZY)	1.0	*218	1,373	Flensburg	0.5	*313	959	Cracow	0.5
*390	753	Glasgow (5SC)	1.0	*227	1,319	Cologne	4.0	*385	896	Posen	1.2
*479	626	Daventry (5GB)	25.0	*234	1,283	Muenster	3.0	385	779	Wilno	0.5
1,554	193	Daventry (5XX)	25.0	*239	1,256	Nurnberg	2.0	*408	734	Katowitz	10.0
AUSTRIA											
*246	1,220	Linz	0.5	*246	1,220	Kiel	0.35	*1,411	212.5	Warsaw	8.0
*283	1,058	Innsbruck	0.5	*246	1,220	Cassel	0.25	ROUMANIA			
*352	851	Graz	7.0	*253	1,184	Gleiwitz	2.0	751	751	Bucharest	12.0
*453	666	Klagenfurt	0.5	*259	1,157	Leipzig	1.5	RUSSIA			
*517	581	Vienna	15.0	*270	1,112	Kaiserslautern	0.25	825	364	Moscow (PTT)	20.0
CZECHO-SLOVAKIA											
*263	1,139	Morava-Ostrava	10.0	*276	1,085	Koenigsberg	2.5	938	390	Moscow (C.C.S.P.)	75.0
*270	1,076	Bratislava	12.5	*283	1,058	Magdeburg	0.5	1,000	390	Leningrad	20.0
*293	1,022	Kosice	2.0	*283	1,058	Berlin (E.)	0.5	1,080	883	Tiflis	10.0
*342	878	Brunn (Brno)	2.4	*283	1,058	Stettin	0.5	1,100	272	Moscow Popoff	40.0
*487	617	Prague (Praha)	5.0	*319	941	Dresden	0.25	*1,304	230	Kharkov	4.0
BELGIUM											
208	1,440	Radio Conference, Brussels		*319	941	Bremen	0.35	1,481	230.5	Moscow (Kon)	40.0
235.5	1,273.5	Charleroy (LL)	0.25	*325	923	Breslau	1.5	SPAIN			
246.1	1,218.8	Schaerbeek-Brussels	0.25	*360	833	Stuttgart	1.5	251	1,193	Almeria (EAJ18)	1.0
244	1,229	Ghent	0.5	*372	806	Hamburg	1.5	298	1,121	Barcelona (EAJ13)	10.0
270	1,112	Radio-Binche		*390	770	Frankfurt	1.5	311	956	Oviedo (EAJ9)	0.5
294	1,020	Liege	0.1	*418	716	Berlin	1.5	*343	860	Barcelona (EAJ1)	8.0
312	961.4	Arlon	0.25	*456	657	Aachen	0.35	368	815	Seville (EAJ5)	1.5
339	887	Louvain	8.0	*473	635	Langenberg	13.0	403	743	San Sebastian (EAJ3)	0.5
*500	590	Brussels	1.0	527.8	568	Herzogstand (Bavaria)	0.5	424	707	Madrid (EAJ7)	2.0
DENMARK											
*281	1,067	Copenhagen (Kjbenhavn)	0.75	*563	563	Munich	1.5	453	662	Salamanca (EAJ22)	1.0
1,153	260	Kalundborg	7.5	*560	536	Hanover	0.35	231	1,301	Malmö	0.6
ESTHONIA											
*297	1,010	Reval (Tallinn)	0.7	566	529.8	Augsburg	0.25	*257	1,160	Hoerby	10.0
FINLAND											
*221	1,355	Helsingfors	0.9	575	521.7	Freiburg	0.35	270	1,112	Trollhattan	0.45
*1,793	167	Lahti	40.0	*1,635	183.5	Zeesen	30.0	*322	937	Goeteborg	10.0
FRANCE											
31.65	9,479	Radio Experimental (Paris)	1.0	2,100	142	Norddeich	10.0	332	905	Falun	0.5
175	1,714	S. Quentin	0.1	2,290	131			*436	689	Stockholm	1.5
214	1,400	Fécamp (Radio Normandie)	0.5	GRAND DUCHY							
220	1,364	Beziere	0.1	223	1,346	Luxembourg	3.0	270	1,112	Trollhattan	0.45
238	1,260	Bordeaux (Radio Sud-Ouest)	1.0	HOLLAND							
23	1,256	Radio Nimes	0.25	31.4	9,554	Eindhoven (PCJ)	25.0	332	905	Falun	0.5
241	1,229	Juan-les-Pins	0.3	*298	1,004	Hilversum (until 5.40 p.m. G.M.T.)	6.5	*542	554	Sundsvall	0.6
*255	1,175	Toulouse (PTT)	1.5	*1,071	280	Hilversum (5.40 p.m. G.M.T.)	6.5	*770	389	Ostersund	0.6
*265	1,130	Lille (PTT)	0.7	*1,071	280	Scheveningen-Haven	5.0	1,200	250	Boden	0.6
268	1,121	Strasbourg	0.3	(from 10.30 a.m. to 5.40 p.m. B.S.T.)				*1,348	222.5	Motala	30.0
*272	1,103	Rennes (PTT)	0.5	*1,875	160	Huizen (after 5.40 p.m. G.M.T.)	0.5	SWITZERLAND			
HUNGARY											
				550	545	Budapest	20.0	403	743	Berne	1.0
ICELAND											
				*1,200	250	Reykjavik	1.0	*453	653	Zurich	0.63
IRISH FREE STATE											
				*225	1,337	Cork (IFS)	1.0	466	644	Zurich (during afternoon)	0.63
				*413	725	Dublin (2KN)	1.0	680	442	Lausanne	0.6
ITALY											
				291	1,031	Turin (Torino)	7.0	760	395	Geneva	0.25
				*330.3	908	Naples (Napoli)	1.5	1,010	297	Basle	0.25
				*385	779	Genoa (IGE)	1.0	TURKEY			
								*1,200	250	Stamboul	5.0

All wavelengths marked with an asterisk have been allotted according to the Plan de Prague.

CHIEF EVENTS OF THE WEEK

- LONDON AND DAVENTRY (5XX)**
- Dec. 9 *Tales of Hoffman*, Carl Rosa Opera Company, relayed from Lewisham Hippodrome.
- " 10 Vaudeville programme.
- " 11 Symphony concert relayed from Queen's Hall.
- DAVENTRY EXPERIMENTAL (5GB)**
- Dec. 10 Running commentary on Oxford v. Cambridge Rugby football match, relayed from Twickenham.
- " 12 Wagner concert relayed from Town Hall, Birmingham.
- " 14 Symphony concert.
- MANCHESTER**
- Dec. 14 Eye-witness account of Association football match between Burnley and Middlesbrough, by Mr. F. Stacey Lintott.

- CARDIFF**
- Dec. 12 *Smooth Crossing*, a play by Fromm Tyler, relayed from the Little Theatre, Bristol.
- GLASGOW**
- Dec. 14 Eye-witness account of Queen's Park v. Aberdeen football match, by Mr. Alexander Adamson.
- "Light and Bright" is being made the watchword for the talks which are being put on in the Saturday evening period for all Scottish stations. A serial story in instalments is now to be followed by a "laughter period."

"PRACTICAL SUGGESTIONS FOR PRESENTS"

(Continued from page 933)

a moderate price. A third and even less expensive alternative is to buy the unit and a parchment-paper cone ready mounted on a small baffle board. If your friend is handy at making things you can give him these parts, and with the aid of one or two strips of wood or metal and some screws he can rig up a thoroughly efficient cone speaker in a few minutes.

If you are in search of something less elaborate than a complete set or speaker, you should have no difficulty in choosing some thoroughly useful gifts from among the innumerable gadgets of all kinds that can be seen at any wireless dealer's! Before giving components or small accessories of any sort, however, it is best to have a look at your friend's receiving outfits so as to find out just what sort of things are most needed. Progress and improvement in the design of wireless apparatus is so rapid that components soon become obsolescent, and you are pretty sure to come across some parts in a set which could with advantage be replaced by more up-to-date counterparts that would improve the results.

You may notice, for instance, that the set is fitted with rather antiquated variable condensers and direct-motion dials; in such a case the owner would be pleased with a set of up-to-date condensers and slow-motion vernier dials to fit them. Again, the set may be equipped with old-fashioned tuners that might well be replaced with more modern coils. Or, if the set is one in which a swinging reaction coil is still in use, why not give its owner the necessary condensers, etc., to change over to a modern capacity-controlled arrangement?

A set of short-wave coils capable of covering wavelengths of about 15 to 100 metres would be the means of opening up a new field of reception for anyone who has not yet attempted to explore the "wavelets." But be careful to choose coils of a type that will fit the holders in the set, and make sure that the receiver itself is of a type that will work well and be easy to handle on the very short waves.

Instruments such as milliammeters, dual-range voltmeters, hydrometers for accumulator-testing, etc., make really useful gifts, enabling the recipient to keep an accurate check on the performance of his set and the condition of his batteries.

An accumulator of suitable voltage, to be used as a stand-by, would be an acceptable gift for anyone who at present has only one L.T. battery.

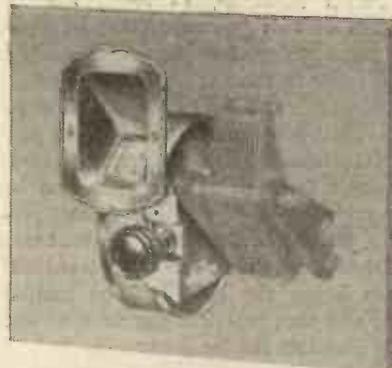
And last, but by no means least, what about the "Amateur Wireless Notebook and Diary," or a year's prepaid subscription to AMATEUR WIRELESS, so that your friends will find their favourite wireless paper awaiting them when they come down to breakfast every Thursday morning?

KEYSTONE
COMPONENTS SPECIFIED
FOR THE
"1930 ETHER SEARCHER"

Described in this issue by J. Sieger and Alan S. Hunter.

KEYSTONE DRUMDRIVE

A delightfully smooth slow-motion drive, gives a reduction of 9 to 1. A clearly engraved scale appears on a drum revolving immediately behind the escutcheon and, as the latter is fitted with a pointer on either side, accurate tuning, with a minimum of trouble, is ensured. The escutcheon plate is beautifully made and specially finished to match the panel.



KEYSTONE ALUMINIUM PANEL

Exactly as described and drilled to specification. Finished in two tones of brown.

KEYSTONE ALUMINIUM CHASSIS AND SCREEN
Drilled and slotted to specification.

COMPLETE PRICE OF ABOVE Drum drive, Panel, and Chassis with escutcheon ready mounted on Panel. **21/-**

KEYSTONE S.G. H.F. CHOKE

The winding in this choke makes it especially suitable for all sets using a screened-grid valve. It has a negligible self-capacity and a very high inductance. Suitable for all wavelengths, from 20 to 2,000 metres.

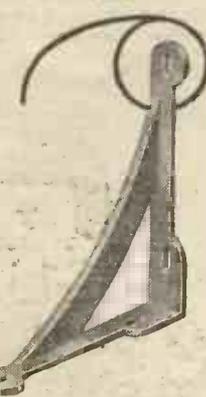


PRICE **5/-**

KEYSTONE PANEL BRACKETS

Note the slots for adjustable fixing.

A beautifully finished and accurate bracket, specified for the 1930 Ether Searcher and recommended for all other sets.



PRICE Per Pair **2/-**

Other Popular KEYSTONE Components:

H.F. COUPLING UNIT No. 1 for first stage **10/6**
No. 2 for second stage **10/6**

"POPULAR" MIDGET REACTION CONDENSER
.0001 mfd., 4/6 DE LUXE MODEL, .0001 mfd., 5/- ; .00005 mfd., 4/6

B.M. NEUTRALISING CONDENSER, PRICE 5/-

FOR BEST RESULTS BUY RECOMMENDED PARTS. ASK ALWAYS FOR KEYSTONE QUALITY COMPONENTS

Stocked by the best dealers everywhere. Descriptive folder sent on request to:

THE BRITISH RADIO GRAMOPHONE CO., LTD.
77, CITY ROAD, LONDON, E.C.1

Telephone: Clerkenwell 5884

"MY TELEVISION" by JOHN L. BAIRD (Continued from page 932)

in Germany. For six months our engineers transmitted television almost daily from the Witzleben station, and during the course of one or two night tests, engineers in the London laboratories were able to watch the movements of their colleagues in Berlin.

Television Abroad

At the British Association meeting held this year in South Africa, the Baird system of television was demonstrated daily by our engineers, and the enthusiastic reports in the Press of that country indicate that the South Africans, at least, are keen sponsors of this "broadcasting of sight." The same thing has happened in Australia, while in the U.S.A. great activity in this science is apparent. We find that they are predicting an early appeal to the public with television apparatus. In the States no automatic form of synchronism has been demonstrated by the American companies, the use of alternating-current mains to drive both receiver and transmitter motors being the only method available there, and this restricts the area of working to districts fed by a common A.C. supply. Our own American company, the Baird Corporation of U.S.A., is, however, arranging to place on the market there our self-synchronising television receiver.

Before commercial television could arrive some form of synchronism which was

automatic, simple, and cheap, had to be devised, and at the Radio Exhibition in 1928 we showed an apparatus incorporating a form of synchronism in which the image itself is used to keep the receiver in step with the transmitter. The details of this have already been published in *AMATEUR WIRELESS*, and its simple construction will be evident to everyone.

Some may ask whether the detail of the received images as seen on the Telesvisor screen has improved. The best answer is furnished in the illustrations on page 932.

Look at the untouched picture of the first image seen on the Telesvisor. Recognisable, yes, but compare it with the others which show the images as seen on the Telesvisor screen to-day. They also are untouched prints, taken from negatives having an exposure of 6 to 8 seconds, and yet there is quite a wealth of detail, while "movement" brought about by lack of synchronism is conspicuous by its absence.

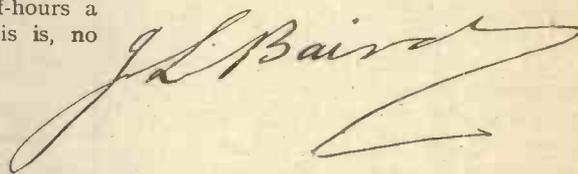
Amateur Assistance

The B.B.C. are now putting out test transmissions daily for five half-hours a week. The time chosen for this is, no doubt, awkward for many of you, and we are hoping that it will be changed in the near future. We want you to take the fullest advantage of those trans-

missions. There are many amateurs scattered up and down the country who have sent us reports as to the results they have obtained from apparatus entirely of their own construction. Their enthusiasm is infectious, for obviously now that television is on the air we are anxious to seek the co-operation of amateurs.

The pooling of amateur reports of their reception of the pictures, when sifted and sorted into various categories, would prove of great assistance to us. A great deal of information has been published in the Press as to the television system which the B.B.C. are now using, and I hope that very shortly apparatus will be available to the public, both in a complete form and in parts, for those who wish to give full rein to their constructive capabilities.

Yes, I feel I can say quite frankly that 1929 has been a good year and good progress has been made. We are not marking time, however, but redoubling our efforts to make "seeing-in" as popular as "listening-in."



FERRANTI

GUARANTEED COMPONENTS

specially designed by experts in mains work for

H.T. SUPPLY UNITS

TRANSFORMERS - CHOKES - CONDENSERS

ANODE FEED RESISTANCES

RECTIFYING UNITS

(Incorporating the Westinghouse Metal Rectifier)

SAFETY BOX

with Automatic Switch and Fuses.

High Tension Supply Units constructed in accordance with the charts and full-size diagrams prepared and published by Ferranti will be safe to use and entirely free from hum and "Motor-boating." Charts are available relating to a number of H.T. Supply Units and one will be sent post free on receipt of details of your requirements.

SIMPLE TO BUILD

SAFE TO USE

RELIABLE IN OPERATION

SAFETY AND SATISFACTION IN ONE WORD ——— FERRANTI

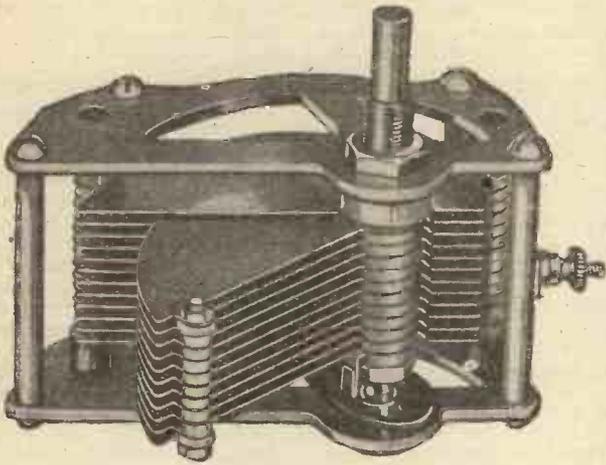
FERRANTI LTD.

HOLLINWOOD

LANCASHIRE

Lotus Logarithmic Condensers

pass the test



Technical writers, the press and the leading manufacturers of circuits are constantly recommending Lotus Logarithmic Condensers. Why not use these proved Condensers in your set?

The ball bearings and the chemically cleaned special brass vanes and end plates ensure a smooth firm movement and perfect conductivity and the ample spacing prevents any chance of short circuiting of the vanes.

Every Lotus Component from a Variable Condenser to a simple switch is the product of experience and experiment—a masterpiece of mechanical perfection. Make a point of building your set with Lotus Components.

PRICES

.0005	Condenser	-	-	5/9
.00035	Condenser	-	-	5/7
.0003	Condenser	-	-	5/6
.00025	Condenser	-	-	5/3
.00015	Condenser	-	-	5/-

From all Radio Dealers.

LOTUS VARIABLE CONDENSERS

You can get these Condensers fitted to the Lotus Dual and Single Drum Dials. Ask your Dealer.

Garnett, Whiteley & Co., Ltd., Liverpool

Made in one of the most modern radio factories in Great Britain.



Change **ONCE** and for all to

STANDARD

SAC LECLANCHE

PERMANENT H.T. BATTERY

NO NEED TO BUY ANOTHER BATTERY

You have often worried over the H.T. problem. You would not for one moment hesitate if you knew thoroughly the merits of the Standard Permanent Wet Battery. That is why you should send for the Standard H.T. Book now. It will pile fact on fact to convince you that the Standard H.T. Battery is in every way a sound and economical proposition, and in its present form

ABSOLUTELY OUTRIVALS THE DRY BATTERY

Think of its advantages. Steadier full-bodied current supply, that gives greater purity of reception than any dry battery current. It is self-regenerative. All the time it is out of use it is recuperating. It stands far heavier use over longer periods than dry batteries and

IT CAN BE REFILLED AT HOME

to register its original voltage, cheaply and simply, with the wonderful Cartridge Sac Refills, the new invention that has made Standard H.T. paramount. In short, it will give you at least four times the life of the average dry battery and then you merely refill again—that means, once installed, Standard solves the H.T. trouble for ever. We ask all listeners to think seriously about this money-saving H.T. —get the free book. Over 100,000 sold. Satisfaction guaranteed.

Write to-day to THE STANDARD BATTERY COMPANY, Dept. A.W., 184-188 Shaftesbury Avenue, London, W.C.2.

NO DEPOSIT. NO REFS.

Order on cash or deferred terms. Deferred orders are delivered 2 or 3 days from date of order.

POPULAR MODEL

No. 3 CARTRIDGE MODEL BATTERY. 96 volts (10,000 milliamps). Comprises two trays of 32 cells each, with 1 1/2 and necessary electrolyte chemical. Cash £2 13 10, or 9/5 down and 5 monthly payments of

9/5

Standard Batteries are British Made and Guaranteed.

Stocked by Halford's Stores, Curry's Stores, and all Radio Dealers, who also supply free descriptive literature.



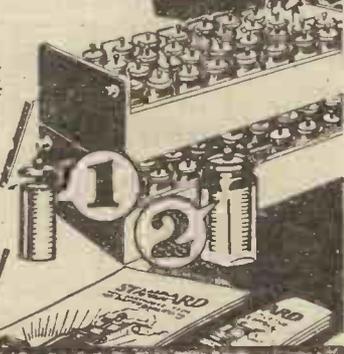
CABINETS

(see left) in Oak or Mahogany, supplied to hold batteries. Extra according to size. For prices see Booklet.

Any voltage or capacity supplied. Delivered in neat Unibloc Containers, occupying minimum space. You merely fill jars with chemical provided by us, and press home caps in mouth of same. Battery will then register correct voltage and is ready for the first twelve months' service.



Write to-day for free Battery Book!



OUR INFORMATION BUREAU



RULES.—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details. Ask one question at a time to ensure a prompt reply, and please put sketches, layouts, diagrams, etc., on separate sheets containing your name and address. See announcement below. Address Queries—AMATEUR WIRELESS Information Bureau, 58/61 Fetter Lane, London, E.C.4.

"Music Leader" Frame Aerial

Q.—I have attempted to construct the "Music Leader" and have got as far as building the set, and am now engaged in winding the frame. This is where I am in a fix, however, because I cannot trace how to arrange the connections to the various sections. Perhaps you will enlighten me in this respect?—G. H. (Worthing).

A.—We are of the opinion that you have not realised that the frame winding consists of one continuous length of wire. The wire should first of all be anchored to the framework and then nine turns should be wound on. When these have been completed, the wire should not be broken, but should be doubled back to form a "bight" and anchored off through two small holes close up to the end turn of the nine-turn section. The wire should then be continued in the same direction of winding for the first nineteen-turn section. Here, another "bight" should be formed and the wire anchored off as before. Now a further nineteen turns section should be wound, still in the same direction as the preceding sections, and a further "bight" made in the wire. Finally, the last nine-turns section should be wound and the wire finally cut and anchored

off to the framework. In each case, the "bight" in the wire should be made long enough to permit of an extension connection

close survey of the blueprint will serve to show the respective connecting points between the frame and the receiver proper.—A. L.

When Asking Technical Queries
PLEASE write briefly and to the point

A Fee of One Shilling (postal order or postage stamps) must accompany each question and also a stamped addressed envelope and the coupon which will be found on the last page. Rough sketches and circuit diagrams can be provided for the usual query fee. Any drawings submitted should be sent on a separate sheet of paper. Wiring plans and layouts cannot be supplied.

"Talisman Two-three"

Q.—I have constructed the "Talisman Two-three" receiver and, whilst I am satisfied that the receiver is capable of giving very good results, it seems to me that the reaction control is somewhat fierce on the medium waves. Is there a way of overcoming this difficulty?—J. D. (Wembley).

A.—The coil in question has a single reaction coil designed to be suitable for two entirely different wavelength tuning bands. In order that a satisfactory reaction effect will be obtained over the whole scale on the long waves, it was found necessary to embody rather a large reaction winding. This accounts for the somewhat fierce reaction on the medium waveband. There is no overlap in reaction, however, so that, provided a suitable reaction condenser is used, there will be little trouble with the obtaining of a proper reaction effect. Since the receiver was first designed and tested, we have found that it is a great advantage to use an air-dielectric reaction condenser, one having a slow-motion dial, for its operation.
C. A.

being made inside for the flexible wires going to the respective points in the receiver. A

Gift it with "Eko!"

There's a wonderful treat in store for those who receive "EKCO" this Christmas! There is an "EKCO" Power Supply Unit for every type of battery-operated set, whether the electric supply is from D.C. or A.C. Mains, guaranteeing you a continuous source of plentiful power at a negligible maintenance cost.

Battery sets are completely electrified with an "EKCO" All Power Unit, or H.T. and L.T. batteries are eliminated with an "EKCO" H.T. or L.T. Unit respectively, whilst an "EKCO-LECTRIC" Radio Receiver gives modern radio at its very best.

AN "EKCO" Power Supply Unit was placed FIRST by PUBLIC in the "Wireless World" NATIONAL BALLOT!

Ask your dealer, or write for Free Booklet on "All-Electric" Radio, to—
E. K. COLE, LTD., (Dept. K) "EKCO" WORKS, LEIGH-ON-SEA

H.T. UNIT
D.C. 1V. 20
Tappings for S.G.: 0-120; 120/150 at 20 m.a.
£2 : 10s

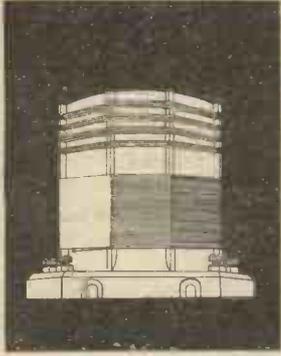
"EKCO"

H.T. UNIT
A.C. 2A. 10
Tappings of 60 and 120 volts at 10 m.a.
£3 : 10 : 0

H.T. UNIT
A.C. 3P. 20
Tappings for S.G.: 60 : 120/150 at 20 m.a.
£3 : 10 : 6

"Plug in—That's all!"

TRICKLE CHARGER
£2 : 12 : 6



**COLVERN
COMPONENTS
IN THE 1930
ETHER SEARCHER**

one

One Colvern
Drilled Alu-
minium Chassis
15" x 10"

two

One Colvern
Drilled Alumin-
ium Screen
Price
(with Chassis as
above) 8/6 pr.

three

Two Colvern
Dual Range
Coils, Type R2R
Price 8/6

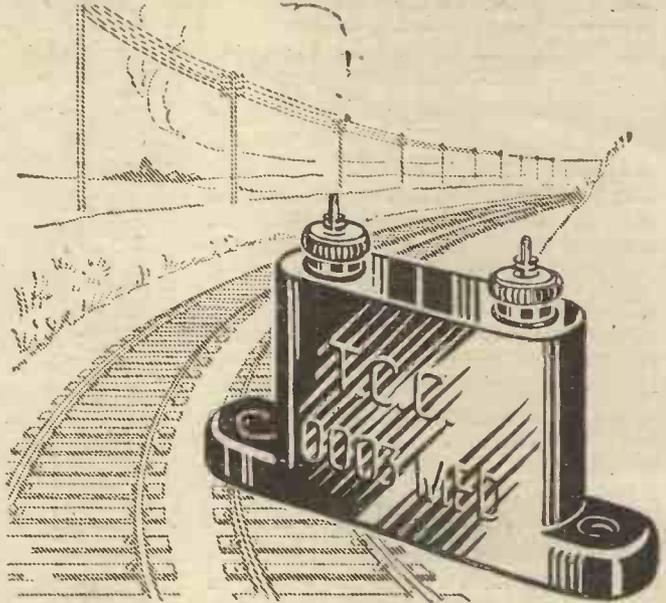
To ensure the re-
sults the design-
ers of the season's
master circuit
meant you to get
from them, make
sure you get the
specified Colvern
components when
you assemble
your kit.

COLVERN

Advt. of Colvern Ltd., Mawney's Road, Romford.

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

STANDARDS



**RAILWAY TRACKS
and T.C.C.**

ALL British railway tracks are of standard width or "gauge." To complete a journey without frequent changes—to run to schedule, to permit interlinking of the various groups, and to avoid chaos generally standardisation is essential.

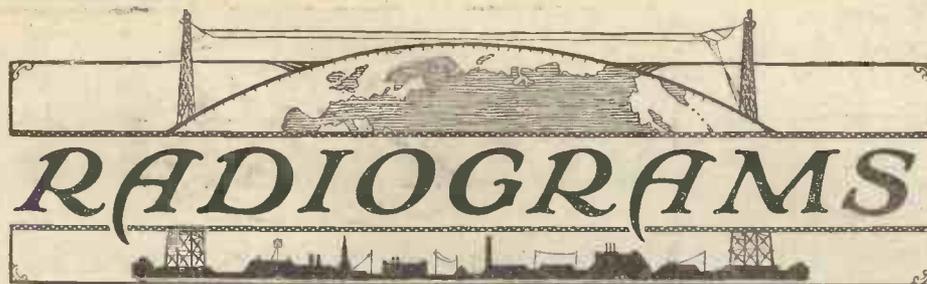
It's the same with condensers—only by adhering to a definite standard can perfect working be assured. There can, however, be only one standard, and where condensers are concerned that standard is T.C.C. Whenever you see a condenser marked T.C.C. you know that it is a condenser designed and built to a standard—with a degree of accuracy and dependability approached by no other. It is, in a word, the standard by which all other condensers are judged.

Illustrated above is a .0003 mfd. T.C.C. Upright Type Mica Condenser. Price 1/6 each. Other capacities in this type are made from .0001 mfd. to .25 mfd. Prices 1/6 to 18/-.



Advt. Te'graph Condenser Co. Ltd., Wales Farm Road, N. Acton, London, W.3.

2586



ON December 31, at intervals during the period 9.40 to 11.40 p.m., 2LO and other B.B.C. stations will relay the New Year programmes from various Continental stations. At 11.40 p.m. the B.B.C.'s own New Year's Eve programme will be given, and will continue until 12.10 a.m.

Three special programmes are to be interchanged between England, Germany, and Belgium, the first to take place on January 3, and the second and third at six-weekly intervals. The first entertainment is to consist of classical music, the second of light music, and the third variety items.

The London station will relay excerpts from *The Student Prince*, from the Piccadilly Theatre, at 8.20 and 10.45 p.m., on December 21.

The B.B.C. symphony concert at the Queen's Hall on December 11, will include a performance of *Omar Khayyam*, by Granville Bantock, to be conducted by

Sir Thomas Beecham. The soloists are Olga Haley, Parry Jones, and Dennis Noble, assisted by the National Chorus.

Mr. F. Anstey, the novelist, will make his microphone debut on December 16, when his best-known work, *The Brass Bottle*, is to be broadcast from the Belfast station. This novel has been adapted for broadcasting by John Watt.

The Beloved Vagabond is to be given from the London station on January 1.

On December 18, 2LO and 5XX will broadcast the fairy opera, *Königskinder*, by Humperdinck. The Wireless Symphony Orchestra, conducted by Percy Pitt, and the augmented Wireless Chorus, directed by Stanford Robinson, will assist at this performance.

Cinderella, by Ernest Longstaffe, will be the pantomime broadcast from 2LO and 5GB this year. It is to be given by the former station on Boxing Day and the latter on Christmas Day.

2LO and 5XX will broadcast Arnold Bennett's and Edward Knoblock's successful play, *Milestones*, on January 2.

All children who listen to the B.B.C. children's broadcasts are to be given an opportunity of voting for the six items they consider the best, given during the past six months. They are asked by the B.B.C. to send in their selection on a post card, and the Children's Hour during the week January 6 to 11, 1930, will be made up of the items receiving the highest votes.

On December 13 Mr. Winston Churchill will be installed as Chancellor of Bristol University. Arrangements are being made to broadcast his address through 5XX as well as through the Cardiff station.

Listeners to the Manchester programme on December 7 are to hear the first radio performance of *Cousin Sarah's Quilt*, a one-act play of Lancashire life by Florence Bone, a Yorkshire authoress.

The main features of the Christmas-week programmes include the relay of a People's Service from Liverpool Cathedral on December 22, and a performance of the Nativity Play on December 23, as annually presented at St. Hilary's Church, Marazion, Cornwall.

More than 1,700 miles of telephone lines are used to carry programmes from the National Broadcasting Company's San Francisco studios to six stations on the Pacific coast associated with it.



Simply fix Plug into Lamp Holder, then attach spade terminals to Accumulator and SWITCH ON.

For charging accumulators of
2 and 4 volts - - 29/6
2, 4 and 6 volts - - 38/6

If you have any difficulty in obtaining from your dealer, write to us for name of nearest stockists.

DOES IT COST YOU MORE THAN 1^d. TO CHARGE YOUR ACCUMULATOR?

IF this is the case, you should cut out the systematic waste of money and charge your accumulator at home. Procure from your local dealer a Dr. Nesper Trickle Charger without delay.

This Highly Efficient Accumulator Charger works noiselessly and economically, does not contain any fluid, or give off any smell, will not become heated when in use and is absolutely SAFE.

NO VALVES are used in the Dr. Nesper Trickle Charger, which is more economical to use than any other known make. A Selenium Rectifier is embodied in the charger and is designed to give a steady output of .25 amps.

The cost of charging a 4-volt 30-amps accumulator is about 1d., and the charging may take place at any time, ensuring always an accumulator ready for working, one accumulator doing the work where usually two are necessary.

Small and neat in appearance the Dr. Nesper Trickle Charger dimensions are only 6 in. x 3½ in. x 2½ in. overall.

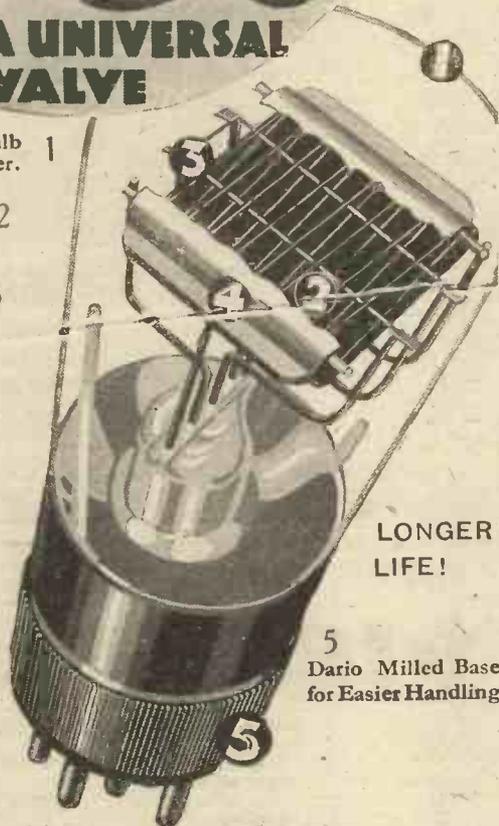
DR. NESPER, LTD., Colindale Ave., Hendon, London, N.W.9
Telephone: Colindale 6223 (4 lines).
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- 1 New Glass Bulb
Finer yet Tougher.
- 2 New Super
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with Special
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Easier Flow
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TWO VOLT	
Universal1 amp. 5/6
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From your
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Best way to all Stations

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538 HIGH ROAD, LEYTONSTONE, LONDON, E.11

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

ONE OR MORE



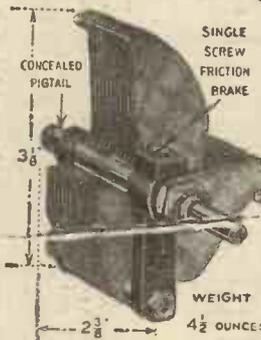
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In every NOTABLE CIRCUIT PUBLISHED during past year.

"1930" CONDENSERS

For COMPACTNESS, EFFICIENCY and RELIABILITY UNEQUALLED

"1930" LOG (mid-line) CONDENSER



In four Capacities

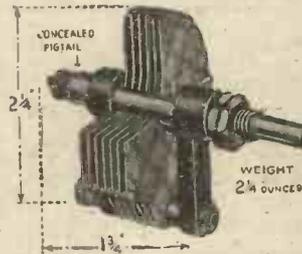
- .0005
- .00035
- .00025
- * .00015

4/6 each

* Double spacing of vanes
for Ultra Short-wave work.

"MIDGET" Reaction CONDENSER

Capacity: .0002 mfd.



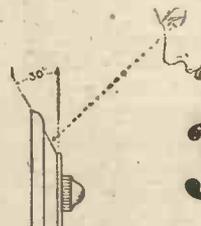
The FORMO "MIDGET" Reaction Condenser, like all other Formo Condensers has incorporated the patented Formo internal "PIGTAIL," undoubtedly the finest collector or "Pigtail" yet devised, and thereby is absolutely noiseless in operation.

2/9

The finest VERNIER DIAL obtainable

MECHANICALLY PERFECT. POSITIVE BRASS CONTACT drive on SOLID BRASS SCALE ensuring smooth movement, with absolutely NO BACK-LASH. ROBUST in Construction and Trouble Free. SMALL. EXTREMELY ELEGANT. EFFICIENT.

TUNING WITHOUT IRRITATING
UNCOMFORTABLE CROUCH OR STOOP.



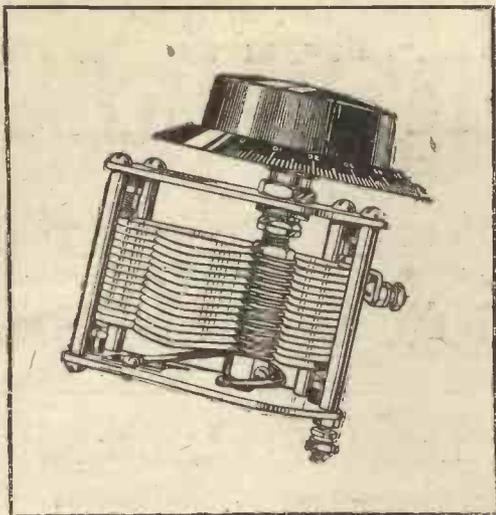
3/-



Black, Brown, Mahogany, Walnut (Black supplied unless otherwise stipulated). (Centre knob nickel plated). As pictorially shown, the scale and aperture are inclined at an angle of 30° from perpendicular thereby permitting convenient unobstructed view of scale without need to crouch or stoop.

Full Catalogue sent post free on receipt of postcard

THE FORMO CO., CROWN WORKS,
CRICKLEWOOD LANE, LONDON, N.W.2



POLAR No. 3 CONDENSERS

To the majority, Polar No. 3 Condensers need no introduction, but for the benefit of those who have not had the pleasure of using them, here are some details.

They are constructed entirely of chemically cleaned hard brass which assures perfect electrical contact at all points.

They are robustly built throughout.

Their smooth yet precise movement makes them almost equivalent to a Slow Motion Condenser.

Their silent action (which can be still further enhanced by the use of Phosphor-Bronze Ball-bearings) makes them adaptable for short wave working.

There are many other points about these condensers which make them superior. Write for the Polar Catalogue (A) and learn more about them. Also ask your dealer to show you a

PRICE OF THE POLAR No. 3
(without Knob-Dial)

.0005, 5/9; .00035, 5/7;
.0003, 5/6

The dial illustrated matches that used on the Polar "Ideal." 1/- extra.

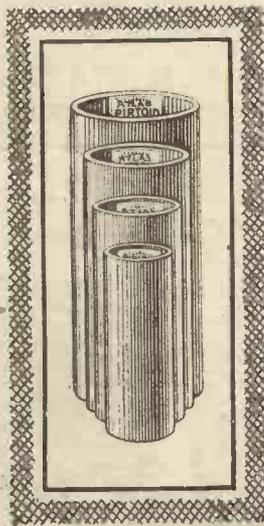
Phosphor-Bronze Balls 3d. extra.

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WINGROVE & ROGERS LTD., 188-9 STRAND, LONDON, W.C.2

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Hard and tough, almost unbreakable, "Atlas" Pirtoid Tubing is a unique and far superior material for High Frequency Transformers, Aerial Coils, etc. Drills and taps like hard wood or bone. "Atlas" Pirtoid Tubing can be obtained in any usual diameter, thickness of wall and length.

CLARKE'S
"ATLAS" PIRTOID TUBING

Write for full particulars to the Sole Makers:
H. CLARKE & CO. (M/C) Ltd.,
Atlas Works,
Old Trafford, Manchester.

THE BENJAMIN VIBROLDER

SPECIFIED for use in the "1030 Ether Searcher" and suitable for all types of radio receivers using four-pin valves. The spring and valve-leg socket are of novel design, being made in one piece of metal from valve-leg to soldering tags without any joints or soldered connections, thus ensuring positive contact and entire freedom from break-down or trouble and giving practically everlasting life.

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ROTARY SWITCH

A new alternative to the usual Push Pull type of switch, complete with indicating knob and dial.

PRICE 1/9

Write for Illustrated Leaflets on all Radio Products.

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THE BENJAMIN ELECTRIC LTD.
BRANTWOOD WORKS, N.17.

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FOR ELIMINATOR CIRCUITS

You cannot afford to use any but the best Condenser in an eliminator circuit.

HELSEBY CONDENSERS

are made and guaranteed by a firm with 30 years' experience in condenser making, from small telephone and radio condensers to Power Condensers weighing upwards of 2 tons.

Guaranteed working voltages :-

Type M	-	-	150 volts D.C.
Type 2A	-	-	350 volts D.C.
Type 3A	-	-	450 volts D.C.
Type 4A	-	-	600 volts D.C.

All Helsby Condensers are vacuum dried and impregnated with a special non-hygroscopic material which renders them moisture proof.

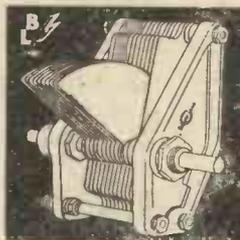
If unobtainable from your dealer write to us giving his name and address.



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Makers of PRESCOT and HELSEBY cables

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Universal Log Condenser

Built with the customary Bowyer-Lowe precision. Suitable either for panel mounting with dial control or for drum control, the extended spindle passing through the end plate, enables the condenser to be ganged very easily. Bakelite end plates, ball-bearings, one piece pigtail, single hole fixing.

List No. 366 .0003 without dial 5/9
" " 367 .0005 " " 6/-

Gramophone Pick-Up

A big advance in pick-up design and performance; this Bowyer-Lowe instrument reproduces faithfully the full musical range. Really amazing value. List No. 364 - 19/6
Special Track-arm designed for use with above—

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Write for free copy of the Bowyer-Lowe Component Folder "Put life into your Set."

A.C. Mains Transformers and Chokes

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HELSESEN DRY BATTERIES



Verb. Sap.

RIDLEY told me at the Club last Monday that he had been consulted regarding the purchase of a Portable for a friend. There had been sixteen makes of set on his original list, but he had whittled the choice down to three when I saw him.

What interested me, though, was that of the original sixteen, every one was fitted as standard with Hellesens H.T. Batteries. "Naturally," he replied when I remarked on this fact, "It's the first thing I look for. If a manufacturer standardises Hellesens, the odds are that the other components he fits will be up to the same high quality. And anyway an H.T. Battery that has to fit a small space and yet supply four or five valves with juice for months on end needs to be a Hellesens and nothing less."

"Verb. Sap." I thought.

PRICES

Standard Capacity.		
"Witzy" 9-volt	Grid	
Bias Type		2/-
"Wirin" 60-volt	H.T.	
Type		10/6
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Type		18/-
"Witel" 108-volt	H.T.	
Type		20/-
Treblic Capacity.		
"Kelin" 60-volt	H.T.	
Type		18/-
"Kclup" 99-volt	H.T.	
Type		32/6

HUNTS

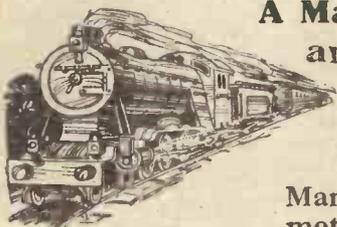
HELSESEN DRY BATTERIES,
ELECTRICAL MEASURING INSTRUMENTS,
POLYMET MICA AND PAPER CONDENSERS,
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A. H. HUNT, LTD., CROYDON, SURREY

Don't forget to say that you saw it in "A.W."

LET YOUR ACCUMULATOR SERVE A DUAL PURPOSE

A Marklin train by day and Father's Wireless at night.



Write for illustrated Handbook No. 2, enclosing 1½d. in stamps to cover postage etc. to Seelig Publicity Service (Dept. M.A.45), 23 White St., Moorfields, E.C. 2.

Marklin Low Current Locomotives and Train Sets can be driven by the same 4-6 volt accumulator which operates your wireless—your boy will be delighted with such a realistic toy. Marklin Model Railways are strongly built to last a lifetime, and will keep children amused for hours on end.

MARKLIN

MODEL

RAILWAYS

Better Toys

ON THE PANEL!



Why be a 'panel' patient when TROLITAX can cure your 'panel' ailments once and for all. Not only that but TROLITAX will bring fresh life and colour to your set.

Supplied in many handsome wood finishes, there is one to match your set or cabinet. TROLITAX, besides having perfect insulating properties is extremely workable. Ask your dealer all about this amazing new substance.

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204/6 Great Portland Street, London, W.1. Phone: Museum 8630 (4 lines)

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WEARITE COMPONENTS

Your friends will admire your choice

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RESISTANCE 200 ohms. PRICE
Self-capacity 3.5 M.M.F. 6/6
Effective Range 10-2,000 metres.

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Patent applied for. PRICE
Made under license. 7/6

NEW "Q" COILS

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118

The NEW Broadcasting Conditions necessitate "R.C." REGIONAL AERIALS

THE NEW R.C. REGIONAL AERIAL, Pat. No. 284571, ADMIRALTY PAT., for all purposes and any type of set. Made of special Rubber-covered flexible stranded wire. Weather proof and Non-Corrosive. Size 14 ft. x 4 in. Shortening device for smaller span. For indoor or outdoor use. Price 6/-

LATEST TYPES:

The R.C. Collapsible Aerial. Patent No. 284963. An ingenious aerial invention, containing one length of high conductive wire, 55 ft., spirally wound and made to run along support cords. This enables the user to erect and re-erect quickly. Adaptable to any space up to 16 ft. Capacity can be altered at a touch, thereby increasing selectivity. Price 2/-

The R.C. Standard Round. Patent No. 284571. An Admiralty pattern aerial for indoor use, very efficient and easily erected, size 12 ft. by 2½ in. Price 2/-

The R.C. Popular Super.

A very efficient indoor Aerial, made of special stranded tinsel wire in eight 12-ft. lengths threaded side by side to form a flat aerial. Price 4/-

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A flat type Aerial, 12 ft. by 4½ in., made of multi-stranded all-copper wire. Price 5/6

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For those requiring efficiency with beauty. In Old Gold, Silver Grey, Maroon, and Red. Price 8/-

All aerials supplied with insulators attached. Aerials made to customer's specifications.

Do not accept worthless imitations. Insist on getting the genuine R.C.



L & S

ORDER NOW!

RIDGED CONE CO., LTD., 1, York House, Southampton Row, London, W.C.1

“BITS AND PIECES”

JOTTINGS FROM MY LOG

By JAY COOTE

SOME evenings, I must admit, are not favourable, and on those occasions, apart from the local station—to which one must necessarily turn—it may be difficult to hold any individual foreign programme. But even then, providing you possess a modicum of patience, it is possible to find entertainment in your receiver. Take a rover's ticket and, without settling for any length of time in any particular spot, wander up and down the waveband in search of an interesting item.

It was on such an evening that, in the course of a run round, I struck the new 75-kilowatt Moscow transmitter on 938 metres. Apparently it had been brought into operation for the celebration of the October Festival in commemoration of the anniversary of the Bolshevik Revolution in Russia. Why October, when I heard it in the early days of November? A puzzle, until I remembered that the Russian calendar was some eleven days behind ours. Here was a transmission which, owing to its power, could not be missed; as a matter of fact, it appeared to be the cause of strong interference on Hilversum, and relayed to

Moscow Popoff on 1,100 metres, also rendered precarious my reception of Kalundborg. The fetes appear to have lasted three days and three nights, for at odd times during that period I picked up performances from theatres and concerts from studios in which I could hear the applause of a large audience. Announcements were made in both Russian and German, and violent revolutionary speeches were transmitted in many languages, including English.

New Stations Coming

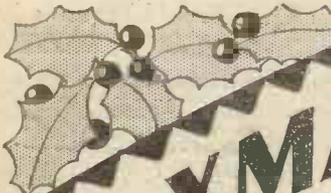
Then again, on another evening, after midnight, when the B.B.C. stations had closed down, I bagged the new Algiers transmitter testing at full power. I admit that I heard no call. Why this should have been omitted I cannot surmise, but the broadcast was on the correct wavelength, and the announcer's partiality for French poetry and prose left little doubt in my mind. It will be found where you usually pick up Bergen (364 metres) and not very far above Stuttgart; in fact, it may prove troublesome when the two

stations are working at the same time. Bear in mind that in the call you will not hear the name of Algiers, but its French equivalent, Alger—pronounced *Al-jay*.

During the next week or so it will pay you to have a final potter round before you retire for the night, for at any moment we may now expect test transmissions from the new Rome high-power station on 441 metres, and Oslo—another giant—is also overdue.

Rumours to the effect that the Oslo call has been heard on 345 metres led some friends to believe that the Norwegian station had changed its wavelength, but this is not so. Frederiksstad, one of its relays, which shared a seat with Bucharest, was compelled to move, and for the time being has taken the wavelength still unoccupied by Strasbourg.

The new Scottish regional station of the B.B.C. is to be erected at a point near Larbert, roughly midway between Glasgow and Edinburgh. It is hoped that the new station will be able to bring into its services practically 80 per cent. of the population of Scotland.

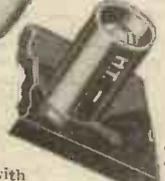


for XMAS

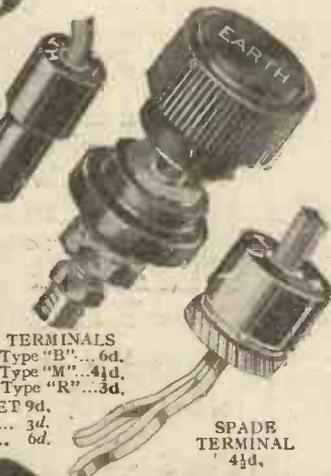
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Complete with
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PLUG & SOCKET 9d.
Panel portion ... 3d.
Flex Portion ... 6d.



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Type "B" ... 6d.
Type "M" ... 4d.
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**SPADE
TERMINAL**
4½d.



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FOR EVERY RADIO CONNECTION

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Overhaul your set for Xmas to make sure of good results. See that every connection is perfect. Replace old connections with the acknowledged best—Belling-Lee engraved Terminals, Wander Plugs, Spade Terminals, Plugs and Sockets, Anode Connectors, Twin Connectors, Fuses, etc.—all are the last word in safety and efficiency, and improve the appearance and convenience of any set.

Thousands give Belling-Lee "radio connections" as Xmas presents. Few such low-priced gifts are so acceptable. How about pleasing your friends this Xmas with these useful little products? Ask your Dealer, or send to us for Belling-Lee Handbook, "Radio Connections."

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DRILLED ALUMINIUM PANEL 7/-
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"EVERYBODY'S 3"

ALUM. SCREEN as specified 2/9

S.G. VALVE HOLDER "L" type 2/-

"WORLD-WIDE S.W. 3."

SPECIAL CABINET as specified 21/-

Order direct from

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10 FEATHERSTONE BUILDINGS,
HIGH HOLBORN, LONDON, W.C.1.

Phone: Chancery 7010.

"OUR READERS' WIRELESS TIT-BITS"

(Continued from page 924)

A WAR EPISODE

During the war, maintaining the supply of charged accumulators for the wireless sets in the forward trenches was a difficult problem.

They were bulky and heavy things in those days, and had to be carried by hand, often at night, from the nearest point to which wheeled transport could bring them, this distance varying to as much as four or five miles, according to locality and observation powers of "Jerry."

With only two operators at times on a set to keep continuous watch in six-hour shifts, and owing to the regulation forbidding men to go about singly in the forward areas, we often had to get the assistance of other units to bring the fresh accumulators up.

One day, when our only battery was showing signs of running down, a fed-up voice belonging to one of our assisting friends hailed us from the dug-out door.

"Hi, Wireless! Are these 'ere boxes for you?" indicating two accumulators. "I've humped 'em about four miles, and they're blooming heavy. I saw a lot of water in them; so I emptied it out."

C. F. GILBERT (Brighton).

THAT DISTANT TRANSMISSION

About five or six years ago I shared "digs" with a "DX hound." Every new circuit was made up and no set lasted more than a week. Our bedroom was littered with components, ebonite dust, and solder blobs covered everything, and our landlady had long since given up trying to keep it tidy.

After a succession of crystal and valve sets my friend launched out and built a four-

valve set, determined to get a real distant transmission. After spending about an hour watching him straining to catch a whisper in the phones, I had a brain-wave.

Downstairs, in the drawing-room, I had fixed up a crystal set, and its aerial ran very near to and parallel with the one upstairs.

Seating our landlady at the piano, I placed the phones from the crystal set inside the instrument and told her to keep playing whilst I crept upstairs.

The scene will always remain fixed in my memory. My friend was crouching over his set, his chair had fallen over backwards, and his face was beaming with satisfaction. The plot had worked, and from where I stood at the door I could hear our landlady's best rendering of "I Passed by Your Window" simply leaping from his earphones.

We gave him about an hour of entertainment, then, taking the phones from the piano, I announced in a loud voice: "You silly ass, S——!" A moment's silence, then the sound of boots thundering downstairs; but I was already through the front door.

E. H. HITCHENOR (London, W.6).

The B.B.C. denies that football is to disappear altogether from Scottish broadcast programmes. Running commentaries, it is stated, will be broadcast on several important matches, both Association and Rugby, by courtesy of the clubs concerned, and many other games will be covered by eye-witness accounts broadcast very shortly after the conclusion of the play.

**HERE IS THE
OAK WIRELESS CABINET
YOU ARE LOOKING FOR**

Do not put a fine piece of
work into a fourth-rate box

Install a "LANGMORE"
and be proud of your set.



These cabinets are made in the following sizes:—

No. 1. Panel, 16 in. x 7 in.
Cabinet, 2 ft. 6 in. high, 1 ft. 8 in. wide, 12 in. deep.

No. 2. Panel, 18 in. x 7 in.
Cabinet, 2 ft. 6 in. high, 1 ft. 10 in. wide, 12 in. deep.

No. 3. Panel, 21 in. x 7 in.
Cabinet, 2 ft. 6 in. high, 2 ft. 1 in. wide, 12 in. deep.

No. 4. Panel, 18 in. x 8 in.
Cabinet, 3 ft. high, 1 ft. 10 in. wide, 12 in. deep.

Nos. 1 & 2
37/6
Each

Nos. 3 & 4
42/6
Each

These Cabinets can also be supplied with battery compartment open (Tray only). Price 10/- less.

PACKED and SENT CARRIAGE PAID to ANY ADDRESS in GREAT BRITAIN

All are fitted with hinged top, heavy baseboard, etc., and a tray underneath gives accommodation for batteries. London made. Highly finished in Jacobean style.

Please note this price does not include Panel. Trade enquiries invited.

Other sizes and styles, prices on application.

THE MISCELLANEOUS TRADING CO. LTD.
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NEW SETS FOR OLD



BRING or SEND that old Set, DON'T WASTE MONEY on it. I will make you good ALLOWANCE in exchange for a PHILIPS-ALL - ELECTRIC - RECEIVER—The no-trouble receiver. From £12 : 10 : 0 or 23/- per month; other Makers' Receivers supplied.

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"MAJOR" CABINET
for your
RADIO-GRAM.

Especially suitable for
MULLARD ORGOLA, OSRAM MUSIC MAGNET, and for panels up to 18" x 8" Loud Speaker compartment 18" x 18" x 16 1/2"

OAK £7:10:0 MAHOGANY £7:15:0

Call and see full range of Camco cabinets at new London showrooms.
Carrington Manufacturing Co., Ltd.
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Complete with 16" baseboard and removable baffle board.

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

DANCE TO IT



Let the Loewe Pick-up give your records volume, clarity and more lifelike reproduction.

Fitted with cords and tags so that any type of adapter can be used. All Loewe Radio products amounting to an aggregate sum of not less than £5 can be obtained on attractive hire purchasing terms.

Please ask your dealer for full particulars. Price shown is Retail. Ask for free Literature.

NOTE: We now supply a special separate adapter which allows the LOEWE RADIO PICK-UP to be used with H.M.V. machines. This is included in the price of 18/6, there being no extra charge whatsoever.

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The Loewe Radio Co., Ltd.
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18/6

Fit the DUBILIER BATTERY

Fitted with the long-life Dubilier Battery, your Set will give better quality performance over 66 volts a longer period. And it costs less! **7/9**
Other Voltages Available.



Ask your dealer for a copy of the Dubilier Booklet—"A Bit about a Battery."

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

***—it is Cheaper than others—has longer life, and is British Made.**

Cleaver B22

THE NEW GOLDEN P.R. VALVE

ABNORMAL SELECTIVITY AND VOLUME

By a special process employing an extremely rare element in minute and precise quantities, in the coating of our Golden Series, we have been able to turn out a valve of extraordinary efficiency. Although the L.T. Filament consumption has been kept more or less to our standard to secure robustness, the emission has been increased BY OVER 50 PER CENT.

INSIST ON THE GOLDEN P-R.

For selectivity and volume we believe a better valve cannot be obtained anywhere with such a low consumption of H.T. and L.T. The glass bulbs are of a distinctive golden colour and each valve has a golden guarantee band.

GUARANTEE. All valves despatched Money Back in Full if not satisfied and returned within 7 days. All valves are carefully packed and breakages replaced.



Sent C.O.D. if desired.

Ask your dealer for them. Accept no other.

THE ONLY BRITISH VALVE WITH A WRITTEN GUARANTEE AS TO PERFORMANCE AND LIFE.

Tel. City 3788.

LIST OF P.R. SUPER GOLDEN SERIES.

	Type	Fil. volts.	Amp.	Imp. ohms.	Amp. fac.	
4/6	GPR 2	2	.095	24,000	13.5	H.F. Det.
	GPR 3	2	.095	12,000	9	L.F.
	GPR 4	2	.095	40,000	32	R.G.
	GPR 9	3.5-4	.09	22,000	14.5	H.F. Det.
POWER	GPR 10	3.5-4	.09	10,000	9	L.F.
	GPR 11	3.5-4	.09	44,000	41	R.G.
	GPR 17	5-6	.14	20,000	17.5	H.F. Det.
7/6	GPR 18	5-6	.14	11,000	9.5	L.F.
	GPR 19	5-6	.14	75,000	41	R.G.
SUPER-POWER	GPR 20	2	.15	6,000	7	Power
	GPR 40	4	.15	6,000	7	"
	GPR 60	6	.15	6,000	7	"
12/6	GPR 120	2	.3	3,000	4.5	Super Power
	GPR 140	4	.2	3,500	4.5	"
Screened Grid	15/- Each Post 4d.					
	SG 25	2	.2	220,000	150	S.G.

2 Valves or more sent POST FREE. Matched Valves 1/- extra per set

P.R. PRODUCTS, 24, P.R. HOUSE, NEWGATE STREET, LONDON, E.C.4 (Opposite G.P.O. Tube Station)

The type H.T.3



METAL RECTIFIER

21/-

Output 120 volts. — 20 milliamps.

Suitable for incorporation in eliminators to work sets of the popular 3-valve types such as Cossor Melody Makers, Mullard Master-Three, etc., etc.

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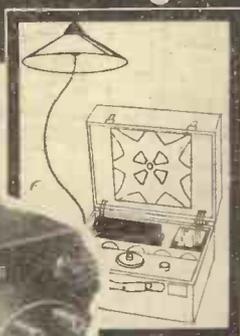
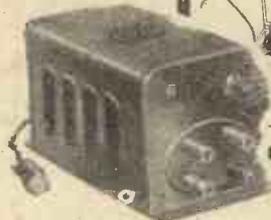
Our 32-page booklet "The All-Metal Way, 1930," shows how to make any type of eliminator or charger for A.C. Mains—Full description, circuits and components required.

Send 2d. stamp with your name and address, for a copy.

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

Now you can run your Portable off the electric light!

Fits Inside ANY Portable



A.C. Model £4.5.0
D.C. Model £2.15.0

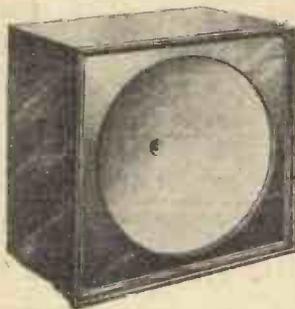
Write today for particulars of this new model, also for our free Art Booklet "Radio from the Mains," which contains full details of all Regentone products—Mains Receivers, Mains Units, Trickle Chargers, and Mains Components—and includes particulars of our Hire Purchase Terms



For Radio from the Mains

REGENT RADIO SUPPLY CO. 21, Bartlett's Bldgs
Holborn Circus, London, E.C.4. Telephone CENTRAL 929.

5/- BRINGS THIS DOWN SPEAKER TO YOU
SEND FOR ONE TO-DAY—
FOR ONE WEEK'S TRIAL



Test it at your leisure against ANY speaker at ANY price. We know it is the equal of any.

Talking won't convince you, but hearing it on your set will. If you are not fully satisfied, pack it up and return it to us within a week, and your money and postage will be refunded.

If you decide to keep it—remember your judgment is final—remit the balance, 30/-, or if you prefer it, 2/6 a week for fourteen weeks. C.O.D. 5/6.

35/- for 19/6

POST 9d.

For a limited time to introduce our P.R. Speaker we have arranged to supply the complete KIT to make up this wonderfully powerful speaker for 19/6.

The KIT consists of our Balanced Armature P.R. Speaker Unit, the Special P.R. Fabric Cone, 3-ply oak-front baffle.

4 heavy natural oak, cabinet-finished slides cut ready for assembly, 4 pieces oak front moulding, 4 rubber feet.

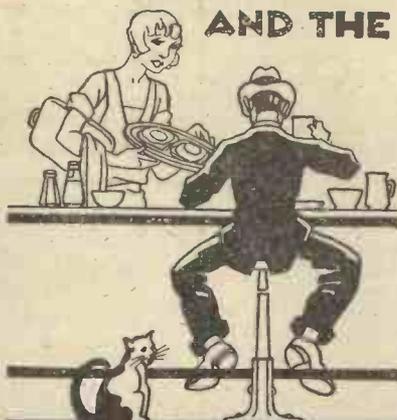
3-ply unit cradle, screws, etc. The whole sent safely packed by return of post ready for you to assemble, with full instructions.

Please note that the above consists only of a complete kit **READY TO ASSEMBLE** and is **UNPOLISHED**.

SPECIFICATION.— Full balanced electro-magnetic armature and powerful cobalt steel permanent magnets. The special P.R. paper Cone is perfectly free to move and floats against the baffle; the cabinet is of oak heavily reinforced by a special frame designed to prevent sympathetic resonance. The whole is finished in highly french-polished natural oak, and measures 13 1/2 by 13 by 6 in., with 11-in. cone.

Sent C.O.D. if desired. Telephone: City 3788.
P.R. PRODUCTS, (Dept. S22) P.R. House, Newgate Street, London, E.C.4. Opposite Post Office Tube.

EGGS!
AND THE



CLAROSTAT

At that "Tuppenny dive" round the corner, one can get "Adam and Eve on a Raft" for 9d.—Where sensible fellows like you and I forgather for Dominoes, etc., we willingly pay 1/-.

Now one might say off-hand, "Why!—That's threepence 'gone west'!" But that's not so really, for it has assured us a pair of strictly fresh, clean eggs.

So it is with "Clarostat" Variable Resistances. There are now many imitations at a little less money—make sure that by saving a few coppers you don't purchase "a bad egg"!

REDUCED PRICES

- STANDARD, 18 WATTS, for Eliminators ... Was 10/6 NOW 9/6
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- SUPER-POWER CLAROSTAT, 250 WATTS ... (A New Model) 30/-
- TABLE TYPE (Distant Volume Control) ... Was 13/6 NOW 12/-

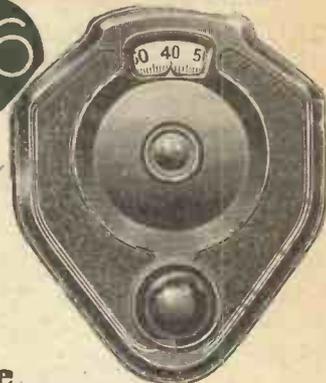
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the **'DOMINION'**
Slow Motion Dial

A Vernier Dial at 2/6! Bring your set up-to-date by fitting this slow motion dial. The mechanism is of special non-back-lash construction which makes very fine tuning easy. Finished in smooth black or beautifully grained mahogany bakelite, this unique dial gives high-class finish to every set in which it is included.

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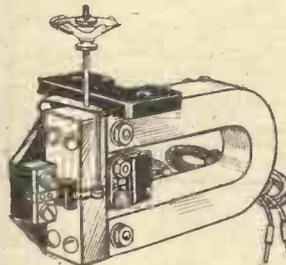
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THE **"GRAWOR"**

4-POLE BALANCED ARMATURE UNIT

This Grawor Unit does credit to your set. It has a crispness about it that commends itself to the ear. It handles strong signals perfectly and is quite sensitive to weak ones.



21/-

From all Dealers.

Design Notes:—Stoutly built. All "delicate" parts are protected. Permanent bar magnet; 8 in. horseshoe shape. Cross section is large enough to ensure large magnetic force across gap in which is set the "balanced armature."

Every atom of energy fed to this Grawor Unit is handled in a masterly manner. You will be more than pleased with the volume and quality of reproduction it produces.

Made by the manufacturers of the famous "GRAWOR" Loud-speakers.

Write for Free illustrated list A/W of all "Grawor" products—Speakers, Units, Pick-ups, etc.

HENRY JOSEPH
11 Red Lion Sq., Holborn, London, W.C.2
(Phone: Chancery, 8770)

WIRELESS IN PARLIAMENT

(From our own Correspondent)

THE Postmaster-General, in reply to Mr. N. Maclean, said that the total expenditure of the B.B.C. during last year was £879,324 6s. 2d., and their total income was £1,002,505 10s. 3d., of which £871,763 16s. 9d. was in respect of wireless licences.

A number of interesting questions were put to the Postmaster-General in the House of Commons on Tuesday evening with regard to broadcasting, and particularly as to the system of issuing licences and alleged evasion by owners of portable sets.

Mr. Lees-Smith, in reply, said that he had no proposals to make regarding alterations in the system of issuing licences. As to evasions, these were being gradually reduced. The method employed for the detection of evasion was naturally secret, but that method enabled the Post Office to form some measure of the degree of evasion that was taking place, and there was evidence that it was being gradually reduced in a satisfactory manner.

After stating that the proposed International Wireless Conference at Madrid was the natural successor of the Prague Conference in wavelengths, Mr. Lees-Smith referred to the Baird television system. He recalled the fact that an agreement had now been arrived at whereby the Baird Television Company were to have the use of the B.B.C. stations for half an hour a day on five days of the week out of broadcasting hours. The Fultograph experiment had now come to an end and the pictures were no longer transmitted.

Mr. Lees-Smith also stated that the correct number of broadcasting licences issued was now 2,869,000. The number was increasing, and might be expected soon to reach the 3,000,000 mark, after which the Treasury would get a larger proportion of the revenue. With regard to the Brookmans Park experiment, the double wavelength would be initiated in a few weeks' time, but not all at once. It would be gradually increased as the public educated themselves to the new development.

OUR CHRISTMAS ISSUE

Owing to the fact that this is a special issue, and there are exceptional demands upon our space, we have been obliged to curtail certain regular features, namely "My Wireless Den" and "A.W. Tests of Apparatus." Also it has been necessary to delay publication until next week of an article by our Technical Editor, Mr. J. H. Reyner, B.Sc., A.M.I.E.E., entitled, "How Much Will Your Detector Stand?" and the feature "Letters to the Editor."

H & B

BRING THE WORLD'S XMAS GREETINGS TO YOUR HOME

**BUILD THE 1930 ETHER SEARCHER
H. & B. KIT ASSURES SUCCESS**

	s. d.
1—Drilled aluminium panel, 15 by 8 in. (H. & B.)	3 6
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1—Slow motion drum dial (Peto)	5 0
1—6 ohms rheostat (Varley)	3 0
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2—Push-pull switches (Bulgin)	3 0
3—Antimicrophonic valve holders (Benjamin)	4 6
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1—Grid leak holder (Bulgin)	2 6
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2—T-mfd. fixed condensers (Dubilier)	5 0
2—Ebonite strips, 2 by 2 in. (Trelleborgs)	8
4—Marked terminals: A, E, L.S. + L.S.—(Elex)	1 6
1—S/G connector (Bulgin)	1 0
7—Marked wander plugs (Belling-Lee)	2 0
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Cash Price	£5 7 0

Included in this kit are all necessary Wire, Screws, and Full-size Blueprint.

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3 Mullard or Cossor Valves, 45/- extra.
Hand-polished Cabinet, 17/6 extra.
The above kit supplied on our famous gradual payment system, 15/- down and 10 monthly payments of 10/-.

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- Wearite 1930 Brookmans 2 Dual-range Coil 17/-.
- Wearite Talisman 2 and 3 Coils, 7/6.
- Wearite A.B.C.2 Coils, 5/-.
- Wearite 1930 QAT Coils, 15/-.
- Wearite QSG Coils, 15/-.
- Western Electric Light-weight Headphones. Were 20/-. Our price 6/6.
- Brown's Famous H3Q Speakers. New, in original cartons. Maker's price £3 5 0. Our special price 30/-.

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Sent on approval anywhere against cash, or supplied on the H. & B. way, £3 down and 12 monthly payments of 30/9.

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No References. Strictly Confidential.
Climax All-electric A.C. Cheluset. One-dial tuning, dual wave, amazingly selective. In walnut cabinet. Cash price, £9 17 6. Valves included, or £2 down and 10 monthly payments of 17/6.
Cossor 1930 Battery Kit, complete with Cabinet, Valves, and full instructions. Cash price, £8 15 0, or 16/- down and 11 monthly payments of 15/10.
Pye Popular Two. Remarkably efficient two; one-dial tuning, dual range. Cash price, £4 17 0, or 15/- down and 10 monthly payments of 9/-.
Amplion A.C.4. Oak Cabinet Speaker. Splendid tone, handsome appearance. Cash price, £3, or 15/- down and 5 monthly payments of 10/-.
M.P.A. Popular Cabinet Speaker. Oak Cabinet. Cash price 45/-, or 5/- down and 9 monthly payments of 5/-.

Ekco A.C. Eliminator. 3.F20, S.G., 60-120, 120/150. 10/- down and 8 monthly payments of 9/8.

Ultra Air Chrome Speakers. 14 by 14. Cash price 52/-, or 11/- down and 4 monthly payments of 11/-.

Climax Eliminator, D.C. Suitable for any set up to five valves. Has 9 voltage tappings. Cash price 34/-, or 7/- down and 5 monthly payments of 6/-.

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Phillips 1930 Cone Speaker. Cash price 50/-, or 10/- down and 6 monthly payments of 7/6.

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Moving Coil Speakers. B.T.H. Junior RK Model, Cash price £6 6 0, or 12/10 down and 9 monthly payments of 12/10.

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Ready Radio Selectivity Unit. The perfect station separator. Cash price 20/-, or 5/- down and 2 monthly payments of 8/-.

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Complete kit, with 3 Valves and Oak Cabinet. Full instructions included.

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Ever Ready 120-volt Super Power High-tension Battery. Cash price 25/- (carriage 2/-), or 5/- down and 4 monthly payments of 6/-.

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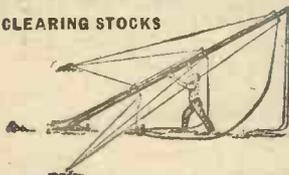
400 ohm Potentiometer for the "Magic Three," the "Magic Two," and the "Magic Four."

The Sovereign Dual Range Coil is a wonderful component—extremely efficient—highly selective and beautifully made bakelite former, panel mounting and one-hole wiring. Complete with wiring instructions. **8/6**

Described by "Popular Wireless" is a very popular component... smooth action, bakelite former terminal connections, baseboard mounting. Selling in thousands throughout the country for these splendid receivers... **2/-**
 "Sovereign" Baseboard Mounting Rheostat (6, 15 or 50 ohms), **2/-**; "Sovereign" Panel Mounting 400 ohms Potentiometer **2/6**; "Sovereign" Panel Mounting Rheostat (6, 15 or 50 ohms), **2/6**.

From all Dealers or from **J. R. WIRELESS CO.,**
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At below prices to clear.

- 26ft.** STEEL MAST, tapering 1 1/2" to 1". Carriage: London, 1/6; Midlands, 2/6; Elsewhere, 3/6. Weighs 28 lbs. **8/-**
- 34ft.** Tapering 1 1/2" to 1". Carriage: London, 2/-; Midlands, 3/-; Elsewhere, 4/-. Weighs 40 lbs. **11/-**
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OUTFIT with MAST.—Mast rings, ample galvanised wire (cut to lengths), Pulley, Cleat, Solid Metal foot rest and strong galvanised stay fasteners. **Note.**—Our Masts are stayed at 4 ground points (not 3) which ensures safety.
ACCESSORIES.—Best Manila Rope Halyards (will not rot), 60 ft. 1/6, 100 ft. 2/6. Special Anti-rust paint (sufficient for mast) 1/6. Coppered earthing tube 1/3. Special Aerial. Has 14 strands of No. 28 gauge Enamelled high conductivity pure copper wire, 100 ft. 3/9.
 Money refunded if mast returned intact and carriage paid within 7 days.

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THE BRITISH WIRELESS BATTERY BOX
 H.T. in the form of Flash-Lamp Batteries in a properly constructed Wooden Battery Box is far more satisfactory and economical than any form of H.T., either accumulator, H.T. Block Battery or H.T. Eliminator. Your H.T. cannot suddenly lose its efficiency and spoil your evening's entertainment, as a faulty unit can be replaced immediately. Keep one or two spare flash-lamp batteries handy and avoid further H.T. trouble.
 Buying Agents Wanted for All Counties.
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ALL BOXES LTD.
 117 Central Street, London, E.C.1.

- 63 Volt 2/10**
- 103 Volt 4/6**
- 126 Volt 5/-**

On Christmas Eve two carol programmes will be heard, namely, from King's College, Cambridge, in the afternoon, and at the beginning of the main evening entertainment, from St. Mary's, Whitechapel. Following an orchestral concert in the 2LO studio, a carol symphony will also be broadcast.

Paris wireless listeners are energetically protesting against the picture transmissions carried out in the French capital. It would appear that they are being carried out on broadcast band wavelengths, and thus interfere with the reception of the concert programmes.

A special programme of the music of the counties of Ross and Sutherland has been arranged for broadcast from the Glasgow and Aberdeen stations. A particularly interesting feature which has been discovered is that certain of the folk songs of the two counties bear a very close resemblance to English and Irish folk songs in words, though their melodies are entirely different.

WIRELESS MAGAZINE

The Big British Wireless Monthly

1/-

TANNOY

WORK YOUR SET FROM THE A.C. MAINS FOR £2 : 7 : 6

Don't worry about an all mains receiver, but make use of the mighty power. A.C. mains units can be built into your PRESENT set at a cost of H.T. from £2 : 7 : 6. Combined units from £6 : 12 : 6. Fit one for Christmas.

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Three selections from our December List:—

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135 v., 70 ma.
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HEAYBERD Power Transformers refuse to break down, give constant and exact voltage, are made in every conceivable variety, give no trouble, and are **WORTH THEIR WEIGHT IN GOLD.**

Full lists Free.

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USE THE ELBETTO INSULATED TEST PRODS WHEN TESTING ELECTRICAL APPARATUS THEY ENSURE QUICK & ACCURATE READINGS

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 A PAIR **ELBETTO**
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DON'T WASTE CURRENT

FIT A BULGIN SIGNAL LAMP

PRICE 2/3, 2/6 or 2/9
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You will be delighted with the improvement, and the bright ruby lens indicates clearly when the set is switched on. Our special "Competa" Low Consumption Bulbs only use a fraction of current.

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A New Whiteley Boneham Loud Speaker

This is the new model which proved so popular at Olympia. The Mellow Tone and Full Volume of this Speaker are things to marvel at. It brings out the low and the high notes to exceptional advantage without overloading. The case is beautifully made and finished in mottled bakelite. At 42/- this new Whiteley Boneham Speaker is one of the big things in present-day speaker value.

42/-

Ask to hear it at your Dealer's.

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Nottingham Road, Mansfield, Notts.

Telephone: Mansfield 702. Telegrams: Whitebon, Mansfield.
London Office: 21, Bartlett's Buildings, Holborn Circus, E.C.4.
Telephones: Central 6669.

The B.B.C. will not give confirmation of the recent statement by Captain Eckersley in Edinburgh to the effect that the new Scottish regional station was to be erected near Larbert. According to the B.B.C., no site has yet been selected. Larbert has certainly been considered, and landowners in the vicinity tentatively approached, but no field-strength experiments have yet been carried out there.

Twelve stations in the United States have received permission from the Federal Radio Commission to broadcast on 50,000 watts. Eight of them—KDKA (Pittsburgh), WBAP (Fort Worth), WEAJ (New York), WENR (Chicago), WGY (Schenectady), WLW (Cincinnati), WFAA (Dallas), and WTIC (Hartford)—are already using this power regularly. Four others—WTAM (Cleveland), WBBM and KNX (Los Angeles)—are making arrangements to do so. Others, including WABC (New York) and WFBM (Indianapolis) have petitioned the Commission to use this power.

THE MIDGETPHONE

(2,000 or 4,000 OHMS)



A wonderful miniature Wireless Receiver which equals in volume and purity of reproduction the best Wireless Headphones known. Fits every Ear, large or small, perfectly, and does away altogether with the discomforts of large Earphones and Headbands.

NO Headband. NO Headaches.
NO Hot and Painful Ears.

Splendid volume of sound from any Crystal Set. Wonderful reproduction from Valve Sets. A little scientific instrument. Held to ear by a neat wire loop. Also made in 10 ohms resistance for use with the SUPER-MICROPHONE as a highly efficient DEAF AID.

The Midgetphone weighs 1 ounce, including 14/6 POST FREE a thin 6-ft. silk connecting cord

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New, highly sensitive, made on the latest principle, a vast improvement over all other types; will pick up whispered words from a distance of several yards, also strongly amplify and transmit speech and music over a distance, through Loud-speaker or Headphones. Splendid instruments for making Detectaphone, Deaf-aid, Loud-speaking, Telephone, Announcements through Loud-speaker, Amplifier for Crystal or Valve Sets. *Radio Record Detector Experiment.* NO OTHER MICROPHONE OF EQUAL SENSITIVENESS KNOWN; each instrument finely made enameled and fitted with a 3-ft. silk connecting cord. Despatched by return post. 8/6

SPECIAL MICROPHONE TRANSFORMER for connecting Super-microphone to Radio Headphones, Loud-speaker, Valve Set, or Valve Amplifier. 6/-

SMALL 10 OHMS EARPIECE for use with Super-Microphone as a very efficient DEAF AID, 8/- or De ectaphone, etc.; thin 3-ft. silk connecting cord fitted, inclusive light detachable headband.

Full Directions for use of Super-microphone for many purposes, Diagrams of connections, and Illustrated List of SUPER DEAF AIDS Free.
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There are 21 Varieties of contact in the Clix range and each one is designed to solve a contact problem. They will solve yours!

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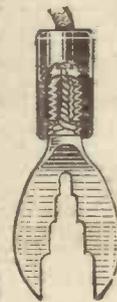


No. 15.

No. 15. CLIX ALL-IN-PLUG AND SOCKET TERMINAL

The only complete panel terminal entirely insulated from the panel as well as when connected or disconnected. With it you will obtain safer, speedier and better contact. Price complete 8d.

Panel portion 4d. Flex portion 4d. (Supplies immediately obtainable through all Dealers).



No. 3.

No. 3. CLIX "FIT-ALL" SPADE TERMINAL

Fits all sizes of screw terminals. Lead-coated for L.T., Nickel-plated for H.T. Red and Black. 2d.



No. 1. CLIX COIL PIN. 2d. A boon to home constructors

Write for the Clix Folder containing full details of the 21 Varieties.

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Our newly designed and provisionally patented DUAL RANGE COILS set a new standard of efficiency.

The leading Scandinavian Wireless Technical Journal "Hallo, Hallo" is full of praise. They have even gone so far as to print a special paragraph in English (issue No. 27, June 28, 1929). Mr. S. W. Flood, their chief technical expert, writes as follows:—

"They are without doubt and by far the best Dual Range Coils I have ever tested. They are altogether wonder coils and I have immediately specified them for my receivers to be published."

Praise from such a quarter is praise indeed. It is your guarantee of super efficiency. Coils for the following popular sets are in stock at most dealers:

Dominion 4, Cossor S.G.3,	PRICE, each
Mullard S.G.P.3, Clarion	10/6
S.G.P.3, Broadcast Picture 4	Aerial or Anode
Mullard Master 3, Bantam 3,	7/9
Favourite 3, etc. Dual Coils:	each

Always fit our H.F. Choke on above circuits to ensure success. Price 5/9

2-pin coils, all types, from 1/6
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Separate pins for converting Panel mounting coils to six-pin base type, 1/- per doz.

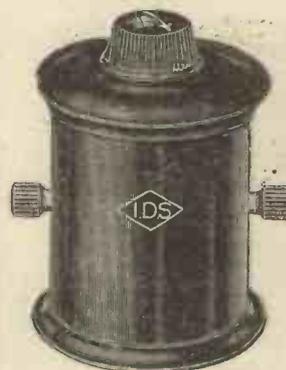
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Cuts out your Local or Regional Station and brings in distant, weak and foreign Stations 25% louder and clearer.



PRICE **10/6**
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Brookman's Park—5GB— or Local Station cut out in 2 degrees (but not everything or anything else).

Fitted in 30 seconds.

NO ALTERATIONS TO YOUR SET.

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CONDENSERS. New Sterling, 2 mfd., genuine Mansbridge Condensers to 440 volts, at reduced price of 2/10 only. Bass Loud-speaker Condensers, .05, with 5 taps, 5/-; Mains Smoothing, 2 mfd., 1/9. Ironclad Chokes, 1/6. H.F. Chokes, Silk Wound, 1/-; Ebonite Case Condensers, any from .0001 to .001, 8d. each.

TELEPHONES. Brown's, headband and cord, 1,500 ohm, 30/-; 120 ohm ditto, 25/-; Sullivan L.R., 3/- pair. Single Brown A Receivers, 60 or 750 ohms, 7/6. 2,000 ohms, 12/-; Western or Ericsson Receivers for Pick-ups, 1/6. Wrist Micros, 12/6. Public Address Stand Microphones, 15/-; Speech Buttons, 1/-; Carbon Micro, Insets, 9d. Skinderviken, 2/-.

HOUSE TELEPHONES, 12/6 set of two complete stations.

LOUD-SPEAKERS. R.K. Cones, fitted B.T.H. Moving Coil, 100 surplus, at only 7/6 each. Marconi L.S. Magnet Pots, 6 v., for Moving Coil Cones, 20/-.

THE VIOLINA CABINET LOUD-SPEAKER DE LUXE. Wonderful reproduction, complete tonal range. Beautifully polished mahogany. List, £5. Sale price, 22/6. Moving-coil Loud-speakers, £3 10s.

TRANSMITTERS. With A.T.I. and all fittings in case, cost £15. 2-valve Aircraft with Osram Valves, Speech or Morse, 40/-; Tapping Keys, No. 1, with massive contacts, 6/- each. Transmitting No. 51KD, with aluminium cover, double contact, fine work, 7/6 each. Morse Practice Sets, with Buzzer and Key, on mahogany panel, 8/6 each. Morse Recorder Mechanisms, for making picture receivers, 15/- each. Spark Gaps, 2/-.

3-VALVE POWER AMPLIFIERS, D.C. Mains Panatrop model, 65/-; 3-valve Receivers, 27/6.

WESTON MICRO GRID-BIAS METERS. One should be on every wireless set. Sensitive Moving-coil, Bush Panel Model 375, with 24-in. dial; indicates 30-millionths of an ampere per division, for use in grid-bias circuits, for adjustment to the zero G.B. current. Excellent as Millivoltmeter, Bridge Galvo. Micro-ammeter, or Heterodyne Wavemeter Indicator with needle centre zero. These fine meters are listed 65/-, but are offered during sale at 35/-.

FOCUSING ARC LAMPS, 60/-. Indoor Projectors, with lenses fitted 100-watt focus lamp, 39/6. Xmas 14 lamp Festoons, 220 v., 12/6. Torpedo Spring-driven Gyroscopes, 15/-; Neon Tubes, 2/6. Holders, 8d. Osram B.E. Power Valves, for Eliminators, 4/6. Selenium Cells up to 200 v., ratio 30-1, 15/-; Double Scale Taylor-Hobson Protractors, double arm, 5/6. Radio Picture 2-valve Amplifiers, 40/-; A.C. or D.C. Motors for Drive, 35/-; Wonderful 200-watt Alternators, Watford A.C., self-exciting, cost £30; great bargain, £3. Porcelain encls. 250-v. Fuses, 3a, to protect mains sets, 3d. each.

WHEATSTONE BRIDGES, G.P.O. and Dial types, £7 10s. Mirror Galvos Reflecting Beam, by Paul Gambrell, Sullivan and Tinsley, £3. Standard Resistance Boxes and Universal Shunts, 35/-; Electrostatic Voltmeters, £4. Capacity Bridges, £8.

ACCUMULATORS. If you are tired of your dry battery being always dry, try an H.T. Accumulator, Monobloc, new, ebonite case, 1,000 m/a hours, 60 v., 19/-; 90 v., 28/-.

L.T. Celluloid, 4 volt, 10/20 amp., 6/3; 4 volt, 20/40 amp., 11/-; 4 volt, 30/60 amp., 12/6. 3-volt Inert Dura, 1/3. Cell Fillers, 1/6. Hydrometers, 1/-; Petrol Testers, 2/6.

DYNAMOS. L.T. Charging, Aero, 12 volts 250 watts, with auto cutout, 25/-; W.W., 20 volts, 5 amps., 50/-; L., 12 volts 8 amps., 45/-; Ct., 18 volts 8 amps., 65/-; 50 volts 25 amps., £7 10s.; 80 volts 20 amps., £8 10s., and few 100-volt motors, 10/-. High-tension Charging Motor Generators: 230 volts A.C. to 100 volts, 100 m/a, B.C., 70/-; Dynamos: 100 volts 2 amps., 25/-; 250 volts 4 amp., £3 10s. H.T. Anode Motor Generators: 100 volts D.C. to 250 volts, 250 m/a, £10; 220 volts D.C. to 400 volts D.C., 200 m/a, £12. G.E.C. and B.T.H. 2-com. Aircraft Generators: 950 volts 60 m/a., and 8 volts 5 amps., £10; 600 volts 100 m/a., and 8 volts 3 amps., 55/-; Armatures, 30/-; Fields, 10/- pair. Fine Newton H.T. Generators, 1 kw., 2,000 volt, £30; Slow Speed Motor Generator, 1 kw., 2,000 volts, £24; 2 kw., 2,000 and 4,000 volts, £52. Large E.V. Messger Hand Generators: 600 volts, £5. Hand Magnets, 80 volts 50 m/a., 6/-; H.T., 4,000 volts, 1/2 mfd. Mica Condensers, 10/-; 2,000 volt Varia, 15/-.

Final Edition of our Surplus Bargains in Radio and Electrical Goods ready. Send stamped addressed envelope for large sale list.

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Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of all these sets can be obtained at ls. 3d. and 4d. respectively, post free, to "Amateur Wireless" sets and "W.M." sets.

All Post Free

CRYSTAL SET (6d. each)

B.B.C. Brookmans Park Set AW206

ONE-VALVE SETS (1s. each)

B.B.C. Official One AW208
Reinartz One WM127
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TWO-VALVE SETS (1s. each)

Loud-speaker America Two AW190
Talisman Two (D, Trans) AW194
Hyper-selective Two (D, Pentode) AW198
Clipper Two (D, Trans) WM135
Continental Two (D, Trans) WM143
Stay-up Two (All AC, D, Trans) WM155
Ether Ranger (D, Trans) WM156
ABC Two (D, Trans) with copy "WM" WM160
Brookmans Two (D, Trans) WM168

THREE-VALVE SETS (1s. each)

All-Britain Three (H.F., D, Trans) AW158
The Binowave Three (D, RC, Trans) AW172
Clarion Three (SG, D, Trans) AW175
Broadcast Three (SG, D, Trans) AW192
James dual-range Three (HF, D, Trans) AW196
All-wave High-mag. Three (D, 2 Trans) AW199
Knife-edge Three (D, RC, Trans) AW201
Talisman Two-three (D, RC, Trans) AW203a
Wide World Short-wave Three (HF, D, Trans) AW207
Everybody's Three (SG, D, Trans) AW209
1930 Ether Searcher (SG, D, Trans) AW211
Standard Coil Three (HF, D, Trans) WM117
Wide-world Short-waver (SG, D, Trans) WM120
New Year Three (SG, D, Pentode) WM123
Lodestone Three (HF, D, Trans) WM129
Simple Screen Three (HF, D, Trans) WM131
Dynamic Three (AC-SG, D, Trans) WM136
At Home Three (D, 2RC) WM141
Short-Wave Link (D, RC, Trans) WM142
Binowave S.G. Three (SG, D, Trans) WM152
Fanfare (D, 2 Trans) WM157
Brookmans Three (SG, D, Trans) WM161
Community Three (D, RC, Trans) WM164
New Q3 (SG, D, Pentode) WM167
Brookmans Push-pull Three (HF, D, Trans) 1/6 WM170

FOUR-VALVE SETS (1s. 6d. each)

Overseas Short-waver (HF, D, 2 Trans) AW133
Clarion All-electric Three (SG, D, Trans, AC Rectifier) AW200
*Music-lover's Gramo-radio (SG, D, RC, Trans—1s. 6d.) AW202a
*Music-lover's Gramo-radio (Loud-speaker—1s.) AW202b
*Music-lover's Gramo-radio (Motor-board—9d.) AW202c
Binowave Four (SG, D, RC Trans) WM119
Standard-coil Four (HF, D, 2RC) WM122
Dominions Four (2SG, D, Trans) WM134
Short-wave Adaptor for Dominions Four WM140
Music Player (HF, D, RC, Trans) WM144
Arrow (SG, HF, D, Trans) WM154
1930 Monodial (2SG, D, Trans) WM158
Electric Four (All AC—SG, D, RC, Trans) WM162
Outpost Four (SG, D, 2 Trans) WM165

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H.T. Unit for A.C. Mains WM125
Lodestone Loud-speaker WM126
James H.T. Unit for D.C. Mains WM133
Two Ampere Low-tension Unit WM147
A.C. Mains Amplifier WM149
A.C. Mains Unit for All-wave Lodestone Five WM151
H.T. Unit for A.C. Mains WM150
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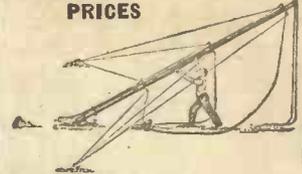
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26ft. STEEL MAST, tapering 1 1/2" to 1". Carriage: London, 1/6; Midlands, 2/6; Elsewhere, 3/6. Weighs 28 lbs. 8/-

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34ft. Tapering 1 1/2" to 1". Carriage: London, 2/-; Midlands, 3/-; Elsewhere, 4/-. Weighs 40 lbs. 11/-

40ft. Tapering 1 1/2" to 1". Carriage: London, 2/6; Midlands, 3/6; Elsewhere, 4/6. Weighs 50 lbs. A super mast. 16/6

OUTFIT with MAST.—Mast rings, ample galvanised wire (cut to lengths), Pulley, Cleat, Solid Metal foot rest and strong galvanised stay fasteners. Note.—Our Masts are stayed at 4 round points (not 3) which ensures safety.

ACCESSORIES.—Best Manila Rope Halyards (will not rot), 60 ft. 1/6, 100 ft. 2/6. Special Anti-rust paint (sufficient for mast) 1/6. Coppered earthing tube 1/9. Special Aerial. Has 14 strands of No. 23 gauge Enamelled high conductivity pure copper wire, 100 ft. 3/9.

Money refunded if mast returned intact and carriage paid within 7 days.

C.P. MAST CO.,
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Try a PIFCO they last longer

450 Hours capacity on 10 Milliamps discharge. Made by patent process. Give clearer tone and finer reception.

60 Volt. 7/-

REFUSE SUBSTITUTES

Trade only, Pifco House, Manchester.

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Tinsel specially metallised for loud-speakers 12 in. by 12 in. 1/-	EARTH CLIPS 3d.
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Panel, Strip, .0005 var S.M. Dial, .0002 Reaction, 2 Sprung V.H. .0002 Series Clip, 2-meg. Leak, Wearite Talisman Coil, 7/6. H.F. Choke, Formodensator "J", P.P. Switch, 8 Terminals, Wire, Plugs, G.B. Clips.

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Any other Condenser, H.F. Choke, or L.F. Supplied (add balance). 2 Variable .0005, 5/9 each; Reaction 4/-; 2 Clarion Dual-range Tunewell Aerial and Anode, 10/6 each; 3 Sprung Valve H. at 1/3; "J" Formo, 2/-; 1-mfd., 2/6; .01, 1/8; 3-meg., 1/-; S.G. H.F. Choke, 5/-; H.F. Choke, 5/6; Telsen Radiogrand L.F., 12/6 (or Lotus, 12/6); .0002 and Series Clip, 14 x 7 Ebonite Panel, Screen 8 1/2 x 6; 8 Engraved Terminals, Push-pull Switch, Flex, Plugs, 18g. Wire, 2 S.M. Dials.

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Quoted for at a special cash price where possible on receipt of detailed list.

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All Post Orders in rotation.

TUNEWELL DUAL RANGE 6 PIN COIL 7/9

Post 6d. 200-2,000 Metres

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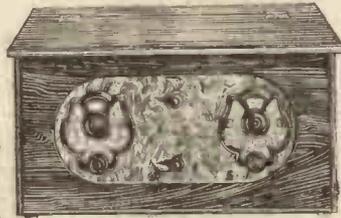
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READY TO USE
In Handsome Cabinet.
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NO COILS TO CHANGE

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This new and wonderful set must appeal to Young and Old, amateur and experimenter—in fact, EVERYBODY!

COMPLETE as shown IN CABINET (Hinged lid) ALL PARTS Enclosed.

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GRID BIAS, 4-way Leads

2 SLOW MOTION DIALS

READY TO USE.

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Cone on baffle board, Aluminium chassis, complete with unit:

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The above prices are for the cabinet, chassis, cone and unit

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UNSOLICITED TESTIMONIALS £50 TO ANY CHARITY IF NOT GENUINE

From Mr. A. Wall, of Sparkhill, Birmingham, 7/11/29:—
Sir,—Thank you for set, etc., for which I am very proud: it is all it claims. I was extremely astonished; its merits are unequalled.
Wishing your sets every future success, and thanking you again, I remain,
Yours sincerely,
(Signed) A. Wall.

From Francis Shaw, of Otley, Yorkshire, 9/11/29:—
We have received the wireless set in good condition. We are very satisfied with it, and thank you for the courtesy shown to us.
I am, yours faithfully,
(Signed) Francis Shaw.

From A. C. Morton, of Hartley Wintney, 3/10/29:—
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Yours truly,
(Signed) A. C. Morton.

And many OTHERS. Above refer to De Luxe model.

QAT COILS 15/- Wearite

TALISMAN DUAL COIL 7/6 (Wearite) Magnetic Reaction

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DARIO VALVES Radio Micro 2 volt or 4 volt

Universal, R.C., or Super H.F. each 5/6

Super Power ... 7/6

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RADIOGRAND 12/6

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Set of 4 SHORT-WAVE COILS 7/6

2, 4, 6, 9

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SPEAKERS, etc.

Blue Spot Unit, 66K, 25/-; Chassis, 12/6; Do. Major, 15/-; B.T.H. Chassis, 12/-; Unit, 15/-; Brown's Ver Unit, 25/-; Chassis, 15/-; Amplion Cone, 21/-; A.C.40. £3; A.R.9 Horn, 27/6; Celestion C10, 75/-; Marconi Octagon, 30/-; B.T.H. C.2, 37/6; Blue Spot 40, £2 2s.

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The Climax improved 34/- H.T. Unit, D.C. Model

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Readings: 0-150 volts: 0-4 volts; 0-30 milliamps. 8/6 Res. 5,000 ohms.

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A MARVELLOUS VALVE Output 7 m/a. 17/3 100-v. H.T. only Personally recommended

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1/-; 2 Post (20/- free) SIEMENS 60-v., 8/-; 100-v., 12/-; Power, 60-v., 13/6; 100-v., 22/6. EVER-READY—60-v., 7/-; 90-v., 7/6; 90-v., 11/3; 120-v., 14/-; Pop. Power, 60-v., 13/6; 100-v., 14/-; 120-v., 14/-; P. 27/6. Recommended—60-v., 5/6; 100-v., 9/4. Fully guaranteed. HELLESEN—60-v., 10/6; 90-v., 16/-.

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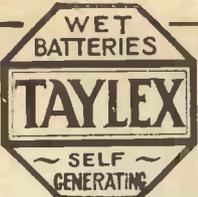
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Special sizes for Pentodes.



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Double the life of your cells! Avoid being let down by a run-out accumulator. Sinquers tell you the exact state of your battery and warn you when it needs recharging. Just drop them in and leave them to it.

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Two or three years ago I read an article in the *Wireless Magazine* in which a rather novel use of a crystal set was described, the *modus operandi* being as follows.

A gentleman gives a pair of phones to a lady and connects one tag to a phone terminal of the set, asking her to hold the other tag in her hand. He takes another pair of phones himself, connects one tag to the remaining phone terminal, and holds the free tag in his hand. Then, when gently but firmly he impresses a kiss upon the lady's lips, the rapturous music of the B.B.C. adds enchantment to an already romantic situation.

I showed the article to a wireless friend of mine who seemed rather more than normally interested. He told me all about it afterwards; the stuff she had on her lips was insulating.—G. C. C. (Aberdeen).

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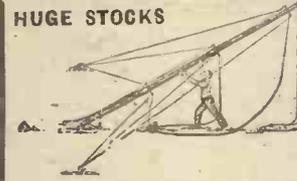
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HUGE STOCKS AMAZING BARGAINS in Efficient STEEL MASTS



26ft.	STEEL MAST, tapering 1 1/2" to 1". Carriage: London, 1/6; Midlands, 3/-; Elsewhere, 3/6. W. ighs 28 lbs.	8/-
34ft.	Tapering 1 3/4" to 1". Carriage: London, 2/-; Midlands, 3/-; Elsewhere, 4/-. Weights 40 lbs.	11/-
40ft.	Tapering 1 7/8" to 1". Carriage: London, 2/6; Midlands, 3/6; Elsewhere, 4/6. Weights 50 lbs. A super mast.	16/6

OUTFIT WITH MAST.—Mast rings, ample galvanised wire (cut to lengths), Pulley, Cleat, Solid Metal foot rest and strong galvanised stay fasteners. Note.—Our Masts are stayed at 4 ground points (not 3) which ensures safety.

ACCESSORIES.—Best Manila Rope Halyards (will not rot), 60 ft. 1/6, 100 ft. 2/6. Special Anti-rust paint (sufficient for mast) 1/6. Coppered earthing tube 1/9. Special Aerial. Has 14 strands of No. 28 gauge Enamelled high conductivity pure copper wire, 100 ft. 3/9.

Money refunded if mast returned intact and carriage paid within 7 days.

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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.

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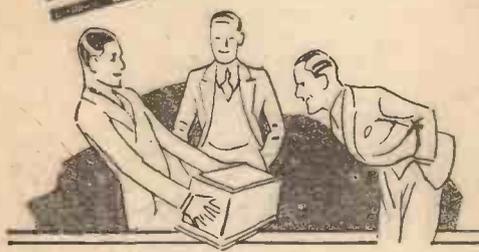
Vol. XV. No. 392

Saturday, December 14, 1929



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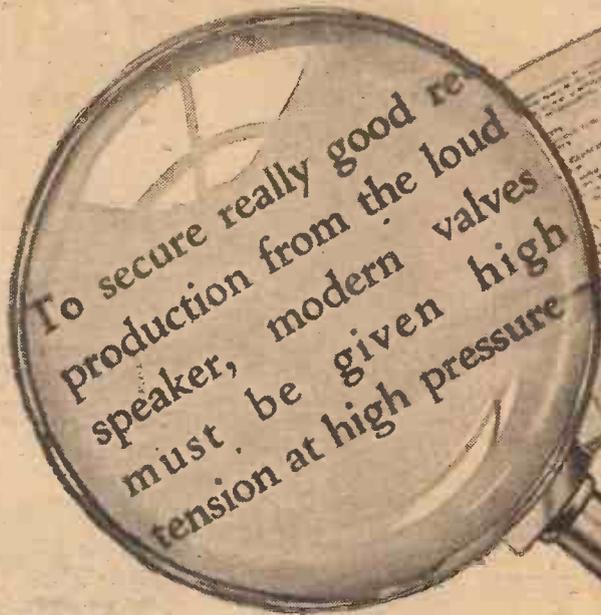
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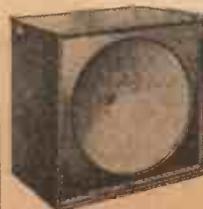
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2 Valves or more sent POST FREE. Matched Valves 1/- extra per set.

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The Leading Radio Weekly for the Constructor, Listener and Experimenter

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Our Friend "R.P."—An Organ O.B.—and Another—A U.S. Compliment— Radio from the Jungle—That Broadcast English!

Our Friend "R.P."—Some of our readers have been complaining recently about the programmes which our Continental friend Radio Paris has been putting out. It is interesting to note that a prominent British record firm, The Decca Record Co., Ltd., has now arranged for a series of weekly recitals to be given on Sundays from Radio Paris. Each of these recitals will last for about half an hour and will consist of varied popular music and dance music. In view of the present "dull Sunday" campaign of the B.B.C. it is to be hoped that other well-received foreigners will make an effort to give England something worth listening to on the weekly day of rest.

An Organ O.B.—The outside broadcast department of the B.B.C. is being called upon to work overtime these days! For instance, in a play shortly to be broadcast from London and 5GB, there occurs a certain amount of organ music. Despite the fact that in one of the Savoy Hill studios there is a powerful electric organ, an outside broadcast is to be made from the famous church of St. Mary-le-Bow. There is, of course, a convenient line between this church and Savoy Hill, and listeners may remember that services and the famous Bow bells, are often broadcast.

—and Another—A further outside broadcast which will take some doing is that of a tour through a newspaper office, to be broadcast on December 16. The layout of the microphones for this event has already been arranged, and the wiring plan looks like a spider's web! The editor's room, the news room, the composing department, the foundry, and the machine room, are included in the microphone tour. Listeners should now have a good opportunity of knowing what the noises of Fleet Street are like, and the AMATEUR WIRELESS man writes with feeling!



A striking impression of a giant German "sender"—Muenster, on 234 metres. Listen for him to-night—his power is 3 kilowatts.

A U.S. Compliment—A gigantic compliment was paid to England during the recently - celebrated Thanksgiving Day. Last year American gramophone engineers came to this country and made re-

ports of performances by famous bands such as the Irish and Scots Guards and R.A.F. On Thanksgiving Day a two hours' programme of these records was broadcast from one end of America to the other over a chain of nearly forty stations.

Radio from the Jungle—Short-wave messages transmitted for the British explorer, Major C. Court-Treath, from a portable Marconi equipment in the wilds of Sudan, have been received as far afield as the United States. Pitching their camps in Western Sudan, the explorers were able to maintain communication with Sudan Government wireless stations throughout their twelve months' travels in the jungle, where they were making a British instructional film. They were in regular touch with London and their transmissions, on a wavelength of 30 metres, were heard at a distance of more than 5,000 miles in Detroit, Michigan, and Boston

(Massachusetts). And they used a hand generator!

That Broadcast English!—Some pungent and forceful remarks have been made to an AMATEUR WIRELESS correspondent by Madame Sandra, the well-known singer, who is an experienced broadcaster. She says: "We are not taught to speak on the vowels, slurring them and fastening the emphasis on the hard consonants; and also we throw the accent back to the end of each word so that words become like wriggling tadpoles, all head and a long, indefinite tail.

"The fault is that we gabble our words and are encouraged to do this at school. I am convinced that if we want to become clearer speakers we must either do less reading or read aloud. We cannot speak at the rate we read and as we try to do so, the result is just gabble, with the tongue tripping up over the task of joining sense and sound.

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IT is generally assumed that in order properly to receive broadcast speech and music, the tuning circuits must be so proportioned that a band of frequencies is received. This is because existing theories recognise the presence of side frequencies in addition to the carrier or central frequency.

Thus, if the carrier frequency is of 1,000,000 cycles, the corresponding wavelength being 300 metres, and a pure note of 1,000 cycles is produced before the microphone, the carrier is modulated and two side waves appear. One would have the frequency of 1,001,000 cycles and the other 999,000 cycles. When speech or music is being broadcast, the audio frequencies may range from, say, 20 to 10,000 cycles, and therefore the receiver should pass a band of frequencies to include this range.

We know that then the tuning is too sharp—as for example, when an amount of reaction is being used, the low notes sound proportionally louder than the high ones. Similarly, when there are several tuned circuits, each being of the low-loss type, the higher notes are considerably reduced from their true value.

Side Bands and Quality

Such sharply tuned circuits are said to cut the side bands and are responsible for much bad quality. According to inventions of Dr. James Robinson, however, it is possible to tune very sharply indeed and yet to have perfect quality. Full technical details are not yet available, but I have attended a demonstration and actually handled the apparatus.

The apparatus employed was a portable set, a powerful oscillator and a super-heterodyne receiver suitably modified by the inventor. In parallel with the oscillator of the super-heterodyne was a very small



The photograph shows Dr. Robinson with his Stenode Radiostat

An account of the new system of reception, invented by Dr. Robinson, late Chief of Research of the Royal Air Force, for which remarkable claims are made

adjustable condenser, having two small plates about 1 in. in diameter.

In the illustration above will be seen, on the left, the frame aerial and modified super-heterodyne set, whilst on the right is a cabinet containing a copper box, inside of which is the "Stenode Radiostat" apparatus (stenode means "narrow path" in Greek). First, the oscillator was connected and set to interfere with Brookmans Park and the portable set tuned to Brookmans Park. A loud howl was, of course, heard with the broadcast, and its pitch was lowered to a point where it completely spoiled the reception. Then the super-heterodyne was connected and by careful tuning it was possible to receive without a trace of interference. The frequency of the note produced by the oscillator interfering with Brookmans Park means about 200 cycles.

By upsetting the adjustment of the new device it was possible to use the super-heterodyne in the ordinary manner and,

as one would expect, the interference heard.

The demonstration was successful, in that it showed that a very sharply-tuned circuit may be used for the reception of broadcast. Actually, the H.F. circuits of the receiver passed a band of frequencies only about 20 cycles wide. The extreme selectivity was obtained by using a piezo-electric device, but the inventor has devised methods in which no device of this class is used.

It is possible to provide circuits having various degrees of selectivity. Thus, it might be decided that the circuits shall

respond only to frequencies lying within the band 5,000 cycles in width. This degree of selectivity would be of assistance in receiving broadcasts. The inventions are applicable to radio communication of many kinds. They are obviously of value in television where normally a wide band of frequencies is occupied whilst transmitting.

A Special Set

It should be understood that it is not possible to add a device to an existing set—the receiver must be designed according to the inventions as a whole. The resulting set will, of course, be a little more expensive than normal sets, because of the special apparatus that must be included. I understand that probably two further valves are needed with their circuits. How the operation will be affected remains to be seen, as it is not fair to judge by the behaviour of the special super-heterodyne receiver used in the tests. Further comments must therefore be reserved until such technical details are made available and a first-hand acquaintance with the system may be obtained. The demonstrations are attracting considerable attention and it is to be hoped they will lead to really practical receivers.

MEASURING H.F. CURRENTS

IT is by no means a simple matter to measure the value of currents oscillating at radio frequencies. The variation of the "skin effect" with different frequencies, for instance, is still an uncertain quantity. In practice, this difficulty can be overcome by using conductors so thin that the skin effect is negligible. On the other hand, this seriously limits the magnitude of the currents which can be so measured.

The Radio Research Board is at present experimenting with a high-frequency meter for heavy currents consisting of a column of mercury contained in a glass tube having a capillary extension. The current is passed through the mercury, and the time taken for the latter to expand through a given length of the capillary tube is taken with a stop-watch. The rate of expansion is found to give an accurate measure of the amperage of the current under test. M. B.

LET A.W. SOLVE YOUR PROBLEMS

A ROME SHORT-WAVER

WORK on the Rome short-wave broadcasting station is progressing rapidly. The transmitter, installed at Cecchignoletta, at a short distance from the Italian capital, will be capable of radiating a power of some 12 kilowatts in the aerial. It will relay the advertised Rome programmes for the benefit of Italians resident in the African and other colonies. Although the wavelengths have not been made known officially, it is stated that 25 metres and 80 metres may be the ones adopted.

The Brookman's

Separator

If you are troubled with interference, then you really will get knife-edge tuning by the addition of this unit—all other types of station rejector result in a loss of signal strength. This unit is a Signal Booster as well as a Local-station Rejector

IT is, perhaps, not generally realised that the great advantage nowadays of using a screen-grid valve—or, indeed, of using

The cost of this unit will meet with your pocket, and were it not so it might be cheaper entirely to rebuild your set and to include the unit rather than to add it in the manner here described.

Ebonite or bakelite panel, 9 in. by 6 in., and strip, 8½ in. by 2 in. (Becol, Raymond, Trolitax).

.0005-microfarad variable condenser, with slow-motion movement (J.B., Lissen, Igranic, Dubilier, Ormond).

Dual-range tuner (Bulgin, type A).

7-ohm panel-mounting rheostat (Wearite, Lissen, Igranic, Varley).

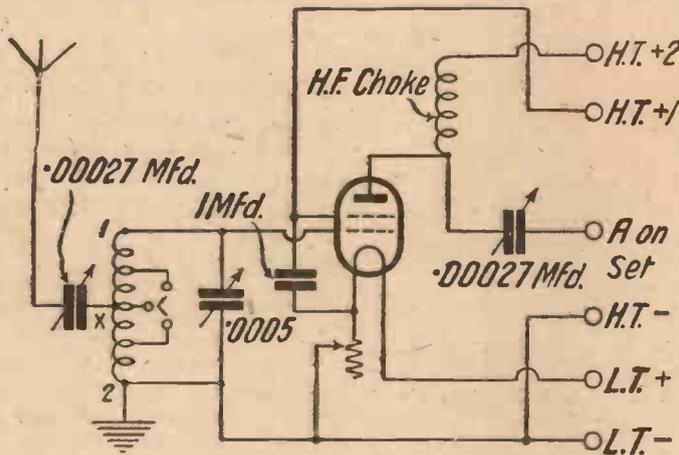
Valve holder (W.B., Lissen, Lotus, Benjamin, Igranic).

1-microfarad fixed condenser (Lissen, T.C.C., Dubilier).

High-frequency choke (Lissen, Wearite, Lewcos, Bulgin).

Two pre-set condensers, maximum

A second point is that the unit will cover both the medium and the long waves, using some simple form of dual-range coil. Obviously it is no use adding a single-range unit to a dual-range set, because this would mean disconnecting the H.F. stage when you want 5XX or our Con-



The Brookman's Separator circuit

any high-frequency stage at all—is that it gives sharper tuning. On the broadcast band, at any rate, the increased amplification is not of such great importance as the increased selectivity.

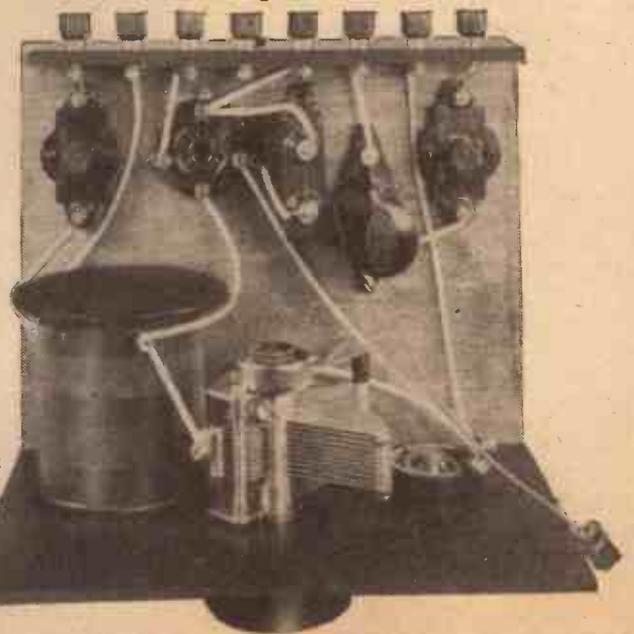
What this means in simple language is that if you are troubled by interference, and your set is a straightforward one, having no high-frequency stage, then you really will get that knife-edged tuning by the addition of a little unit such as this "Brookman's Separator."

This unit is a signal booster as well as a local-station rejector, and the advantage of this is that if you want to cut out Brookmans Park and bring in an infinitely weaker foreigner, then with this unit you have sharper tuning and greater signal strength.

tinental friend Radio Paris in place of Brookmans Park or 5GB.

A third and most important point is that the unit should be easily adaptable to almost any kind of straightforward set. The AMATEUR WIRELESS technical staff has been at great pains to devise a means of coupling which shall not raise "snags" when the unit is added to any ordinary set.

The accompanying list of components for this unit and the cost will satisfy you that for cutting out the local station—this unit is a winner.



The unit is quite simple to build and few parts are required

“THE BROOKMANS SEPARATOR” (Continued from preceding page)

capacity, .00027 microfarad each (Igranic, preset, Formo).

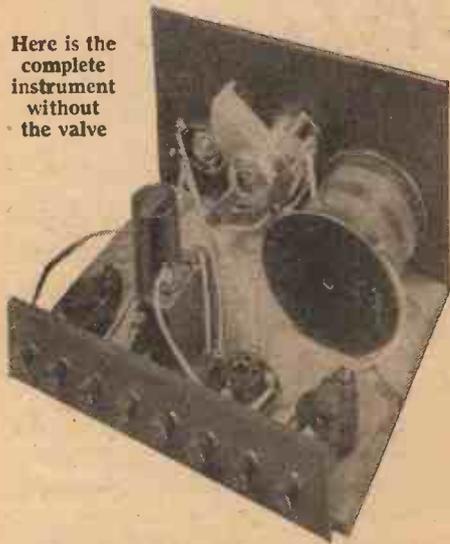
Eight terminals marked: Aerial 1, Earth, L.T.+ , H.T.- , H.T.+1, H.T.+2, L.T.- , Aerial 2 (Belling-Lee).

Baseboard, 9 in. by 7 in. (Pickett, Raymond).

9 ft. of Systoflex and about 10½ ft. of 20 s.w.g. tinned copper wire (Keystone).

Apart from the cost of the components, there is one further expense to which you should go, and this is only one shilling. It is for the blueprint which has been prepared describing this unit, and is of great value,

Here is the complete instrument without the valve



because it is full size, shows all the components in their exact positions, and gives all the wiring in a simplified manner. No correspondence is needed; simply ask for blueprint No. 212.

Construction

The construction is quite straightforward and you should commence by drilling the panel and the terminal strip. The components used are of the one-hole fixing variety, so that there will be only three holes to drill—and don't forget the three holes along the bottom edge of the panel.

You can mark the centres on the back of the panel, all dimensions for the drilling centres being given on the blueprint. Alternatively, you can make use of the blueprint as a template. This is done by attaching the blueprint to the panel (on the reverse side, of course) and punching through the drilling centres where indicated. It is always advisable to make small punchmarks, so that the drill can get started properly and will make clean holes.

The terminal strip should next be drilled, not forgetting that this also is to have three small holes along the bottom edge for fixing.

There are only five components to be mounted on the baseboard, these being the two pre-set condensers, the screen-grid valve holder, 1-microfarad fixed condenser, and high-frequency choke.

In a unit of this kind it is not really necessary to use “square” wiring, although this can, of course, be done if desired. For simplicity in the present unit the wiring has been carried out with tinned wire encased in a flexible covering such as Systoflex. This does not make quite such a neat job as the usual square method, but for the beginner, at any rate, it is simpler to carry out. There is one short flex lead to which a socket is attached, connected to the anode of the screen-grid valve.

Operation

And now for operating the unit. There are two things which first must be considered, the valve to use and the H.T. supply.

Any screen-grid valve is suitable 2, 4, or 6 volts, according to the other valves you have in the set. The impedance of a normal screen-grid valve is in the neighbourhood of 250,000 ohms, although valves of different makes vary a little in this respect.

The current consumed by the anode and screen-grid circuits is very small, totalling usually not more than 3 milliamps. If your receiver, say a three-valver, is already well within the capabilities of the H.T. battery or mains unit employed, then it will be safe to connect the terminals H.T.1 and H.T.2 to the correct tappings on the supply. But if the H.T. supply is already in danger of being overloaded, it might be a wise plan to use a separate battery for the H.T. unit; a single-capacity small 120-volt H.T. battery will suffice. An H.T. battery can be used for the stage, even though an eliminator is supplying the rest of the receiver.

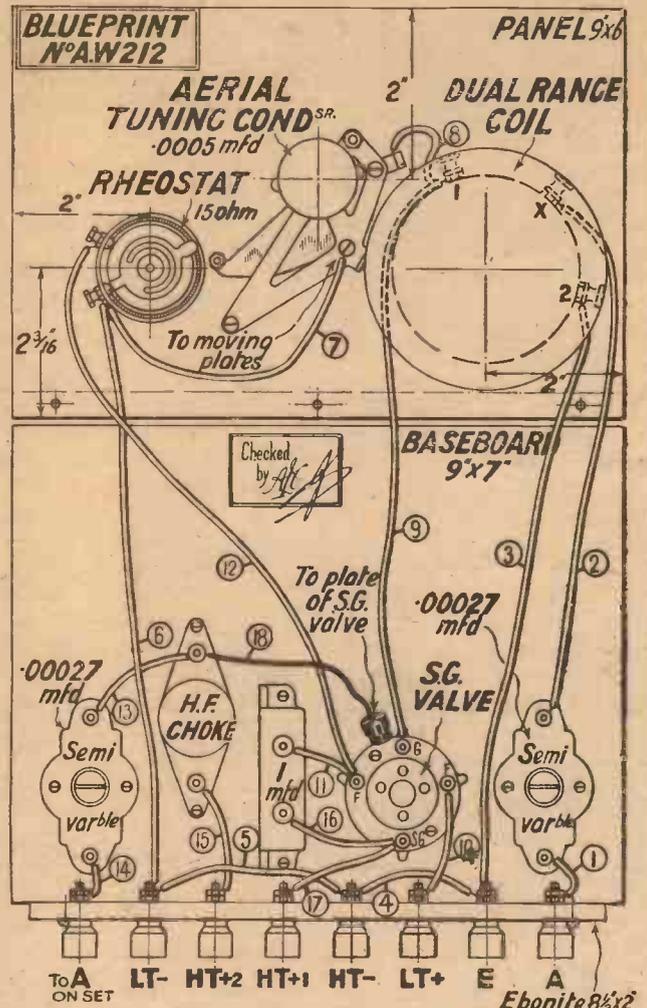
There is only one point to note, and that is that in this unit H.T. negative is connected to L.T. negative. This is the normal and correct practice, but just make a check and see that the H.T. and L.T. negative connections of your set are similarly wired before adding the unit. If they are not so wired, then change the wires over.

Connecting up the unit is simplicity itself. Remove the aerial from the aerial terminal on the set and place it on the right-hand aerial terminal of the unit, looking at the terminal strip from the back. Connect the earth lead to the terminal on

the unit and join a wire between the left-hand aerial terminal and the aerial terminal on the set. Connect up the L.T. terminals and plug in the H.T.2 tapping to about 120 volts and the H.T.1 to 70-90 volts, according to the value recommended by the makers for the screening grid.

Place a screen-grid valve in the socket, turn the rheostat full on (that is, clockwise), and pull out the coil switch so that the unit is working on the medium waves.

During a preliminary test the two pre-



The wiring diagram. A full-size Blueprint is available, price 1/-

set condensers should be screwed right in, but when you have got the hang of the controls a little you can greatly improve selectivity by individual adjustment of each. Also try experimenting with the voltage supply to the H.T.1 tapping. At first a little difficulty may be found, particularly by those unaccustomed to working an H.F. valve, in tuning the unit and the receiver simultaneously. A little practice will soon overcome this snag. The tuning of the condenser on the unit will not be very sharp unless the knob of the right-hand pre-set condenser (looking from the back) is slacked right off.

MY IMPRESSIONS OF AMERICAN BROADCASTING—II

ADVERTISING "ON THE AIR"

Lessons from
American
Broadcasting

By
CAPT.
ROUND



The WGY Studios are situated in this building

AS is well known, there is no wireless licence in the States, the main revenue of the broadcasting stations being obtained by selling "time"; and I am informed that at least the N.B.C. group, which was the only one I visited, is on a paying basis. The time is sold to different commercial organisations, and the only advertising that is permitted is a mere statement at the beginning and end of the programme of the name of the firm supplying the programme. I doubt if the total time taken in giving out any remarks about the advertiser occupy more than twenty seconds. It has been found that any more advertising than this does not pay because the broadcasting station has to sell its time at a high price, and just as in newspaper advertising the highest price is paid to the journal with the greatest circulation, the endeavour is made to hold the largest public, which could not be done if the advertising was boring.

The Effort to Please

This attempt to hold the largest public has a big effect on the production of programmes, and it is absolutely essential to keep them up to a very high entertainment standard. The general practice is for the broadcasting company to provide the programme for the advertiser and I understand that very often the advertiser and his entire family listen in the studio. I saw special seats railed off for this purpose in several studios. In certain cases bands are provided by the advertiser, but I think that usually the broadcasting people select the programmes.

While listening, at no time was I annoyed by the advertising, as one is on a Friday night when listening to the B.B.C.'s literary advertising.

There are at the present moment, forty clear wavelength channels in the United States. I am not quite sure whether these channels are all full, but a clear channel means that a station

allotted that wavelength can broadcast at any time. The other channels are divided into time between different stations, and two stations on the same channel, provided the distance between them is great enough, are allowed to broadcast at the same time.

A good many of the smaller stations are not too scrupulous (as are the important stations) in the matter of advertising, and one finds peculiarly atrocious advertising being done under disguise of health talks and such like titles. One Sunday morning, sandwiched in between a sermon and an organ recital from a cathedral, I found a New York station reading testimonials for some quack cure-all and this reading of the testimonial punctuated with many statements as to where the cure-all could be bought, lasted for three-quarters of an hour, but this sort of thing reduces the value of the station as a holder of the public to such a small point that it kills itself very quickly, and I am told that if the Radio Control Board actually heard such a bad case as the one I have mentioned, they would take serious action.

There are at the moment eight 50-k.w. stations working in the United States and altogether fourteen licensed, the remaining six being nearly ready for action. Two of the eight stations have experimental licences permitting them to go up to 100 k.w. on occasions. KDKA and WGY are these two stations, and I found that their engineers were not thinking small. The 100 k.w. is actually in existence and this is 100 k.w. to the aerial and not overall power. Figures of 500 k.w. are already planned and I heard one group of engineers discussing how 5,000 k.w. to the aerial could be best obtained.

Progress Essential

The spirit of both the commercial and the engineering people of broadcasting is—that at all costs they have got to maintain the public interest and only by rapid development can they do this. The general idea seems to be to cover the United States with a vast chain of giant stations, practically all of which could be received at any place.

The main object in the rapid development of broadcasting (of which the advertising is merely the means of obtaining the money) is that of promoting the great radio trade in the States. Interest must be kept up so that this trade can be maintained and increased, and with the advancement in transmission, and increased power and

number of stations, the receiving art has also had to advance very rapidly. America has had its troubles similar to our Brookmans Park troubles and the interference with the local man, but staffs of engineers are kept and sent out into the districts when big stations are opened up, to instruct everyone who complains how to get over their troubles; generally speaking, attacks have ceased, because the American public recognises the big thing that is being given to it.

(Continued overleaf)

A WEEK-DAY PROGRAMME FROM WEAF

- 6.45-7.00-7.20-7.45 a.m. Exercises.
- 8.00 a.m. Children's programme.
- 8.15 a.m. Morning devotions; Cheerio.
- 9.00 a.m. Milt Coleman, songs.
- 9.15 a.m. Melodies; Classic Trio.
- 10.30 a.m. Refrigeration period, Mary Norris.
- 11.00 a.m. Little Maids' Trio.
- 11.15 a.m. Radio Household Institute.
- 12.00 noon Aviation weather; Twelve o'Clock Trio.
- 12.45 p.m. Palais d'Or Orchestra.
- 1.15 p.m. Chicago—Philadelphia world series game.
- 4.15 p.m. Sky Sketches.
- 4.45 p.m. "Wealth," Irving Fisher.
- 5.00 p.m. Bob Fallon's Orchestra.
- 5.30 p.m. Lady Next Door.
- 5.55 p.m. Summary of programmes.
- 6.00 p.m. Black and Gold Room Orchestra.
- 7.00 p.m. Buck and Wing, vaudeville team.
- 7.30 p.m. Piano Twins.
- 7.45 p.m. Back of the News in Washington, William Hard.
- 8.00 p.m. Voice of Firestone.
- 8.30 p.m. A. and P. Gypsies, sextet; orchestra.
- 9.30 p.m. General Motors Family Party.
- 10.30 p.m. Floyd Gibbons, Headline Hunter.
- 11.00 p.m. New Yorker Orchestra.
- 12.00 mdt. Ted Florio's Orchestra.

A SUNDAY PROGRAMME FROM WABC

- 8.00 a.m. Church heroes, religious service.
- 9.00 a.m. Musicales, ensemble and soloists.
- 10.00 a.m. Children's hour.
- 11.00 a.m. West End Presbyterian Church.
- 12.30 p.m. Jewish day programme.
- 1.30 p.m. Littmann's Entertainers.
- 2.00 p.m. Three Little Sacks.
- 2.30 p.m. Herbert's Entertainers.
- 3.00 p.m. Symphonic hour.
- 4.00 p.m. Cathedral hour.
- 5.00 p.m. McKesson Robbins's news reel.
- 5.30 p.m. Sermon by Rev. Donald Grey Barnhouse.
- 6.00 p.m. Fox Fur Trappers Orchestra.
- 6.30 p.m. I. T. Scalers.
- 6.58 p.m. Correct time; Littmann's Entertainers.
- 7.30 p.m. French Trio.
- 7.45 p.m. "World's Business," Dr. Julius Klein.
- 8.00 p.m. La Palina Rhapsodizers.
- 8.30 p.m. King's Sonatrons.
- 9.00 p.m. Majestic Air Theatre.
- 10.00 p.m. Arabesque, Modern Thousand and One Nights.
- 10.30 p.m. Around the Samovar.
- 11.00 p.m. "Back Home," hour.
- 12.00 mdt. Correct time.
- 12.01 a.m. Brokenshire's Coral Islanders.
- 12.30 a.m. Choral Reverie

A study of these typical American programmes will show to what extent advertising forms a part

Capt. Round's Impressions of American Broadcasting (Continued from preceding page)

My general impressions of wireless in the United States and Canada can be summarised as follows:

Conditions over there, except for about three months of the year when atmospherics are very bad, are definitely better by a long way than over here.

Uniformity of language all over the country is a great aid to the interest in the game.

One Wavelength Range

The absence of two ranges of wavelengths and the almost standard characteristic of the power supply have rendered possible standardisation of receivers and consequently much cheaper production.

The fierce development at the transmitting end, in which one might almost say there is something new every day, has maintained the interest of the people and reacted on the trade in giving them sales and profits, and this, of course, must react back on the transmitting side, again, to urge the companies concerned and which are, of course, allied to the trade, to still greater development.

We are sadly handicapped in England on some of the technical points, and in addition are terribly handicapped by one thing which I think is the cause of a lot of trouble—that is, that there is nothing like enough money being spent on actual broadcasting. Programmes are not numerous enough, stations do not work at all times during the day, and the growth on the engineering side is far too slow. One can imagine the fillip that radio would have had in England this year, if, instead of Brookmans Park alone being started up—

a change which has really only affected a comparatively small number of people—the remainder of the chain at Manchester, Glasgow, Cardiff (or wherever the additional stations are supposed to be) had got going. Instead of being limited to London and 5GB, plus a variety of second-rate continental stations, we should then have had conditions in miniature like those prevailing in the States.

Advertising and Finance

By reason of the basis on which the B.B.C. is formed, the finances obtained from licence fees is nothing like sufficient, and I am sure it would only require a visit of some of our Commissioners to the United States and a few days listening over there, to convince them that the addition of advertising to the already existing source of revenue from licences, would not be in the slightest degree objectionable, although of course it is problematical how much this advertising revenue would be at first.

Of course, one can foresee strenuous opposition from existing advertising media, but I think such opposition would be very short-sighted, as no broadcast advertising can be detailed advertising, otherwise it defeats its own object. Consequently, detailed advertising could still be done in the usual way.

Short-wave Transmissions

Americans asked me many times why we do not concentrate much more on the short waves. They expressed great interest in 5SW and asked why the programmes could not be more continuous, and on two or three wavelengths, so that there was

more reliability in the reception. I pointed out the difficulty, that our broadcasting corporation had not really the right to spend licence money on broadcasting outside Great Britain, and I bewailed the fact that America with her short-wave stations, and Holland and Germany with their short-wave stations, could be doing world advertising while we were not in it. Of course, the reply came from the Americans, why not advertise through 5SW your British goods and make the station pay that way? This suggestion is not new, but there is a definite prejudice in this country against advertising, which prejudice I am sure is all wrong after my observations in America.

The talk over here, of course, has been Empire broadcasting; but I do think that the localising of our short-wave broadcasting to the Empire is all wrong. Britain depends on selling her goods all over the world, and we should broaden our ideas and build our stations to put the British position before the world.

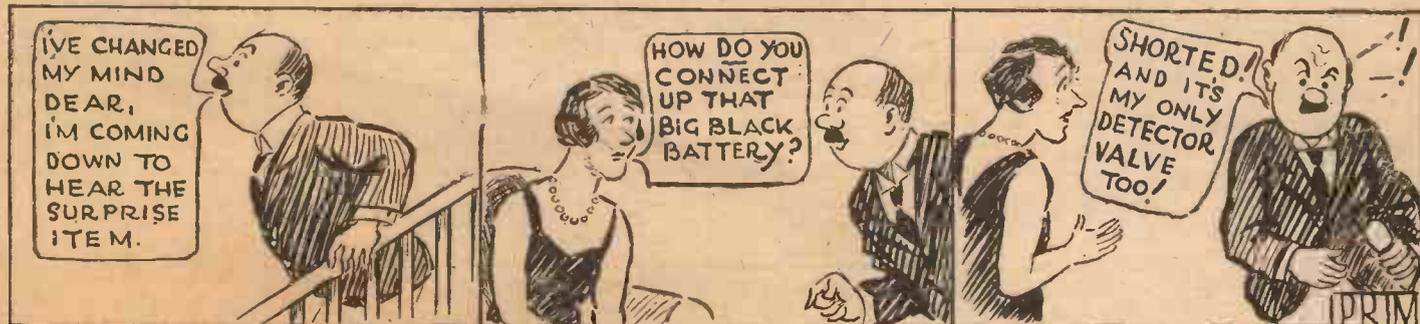
At the Thalerhof aerodrome, in the neighbourhood of Graz (Austria), a new transmitting and receiving station has been installed for the supply of weather forecasts to aeroplanes working on the main Continental air routes. Short waves from 30 to 70 metres are used for this purpose.

So soon as the new Rome high-power station has been officially brought into operation the Italian broadcasting authorities will put in hand the construction of the stations destined to Trieste and Palermo. It is also proposed to install a broadcasting transmitter in the neighbourhood of Florence.

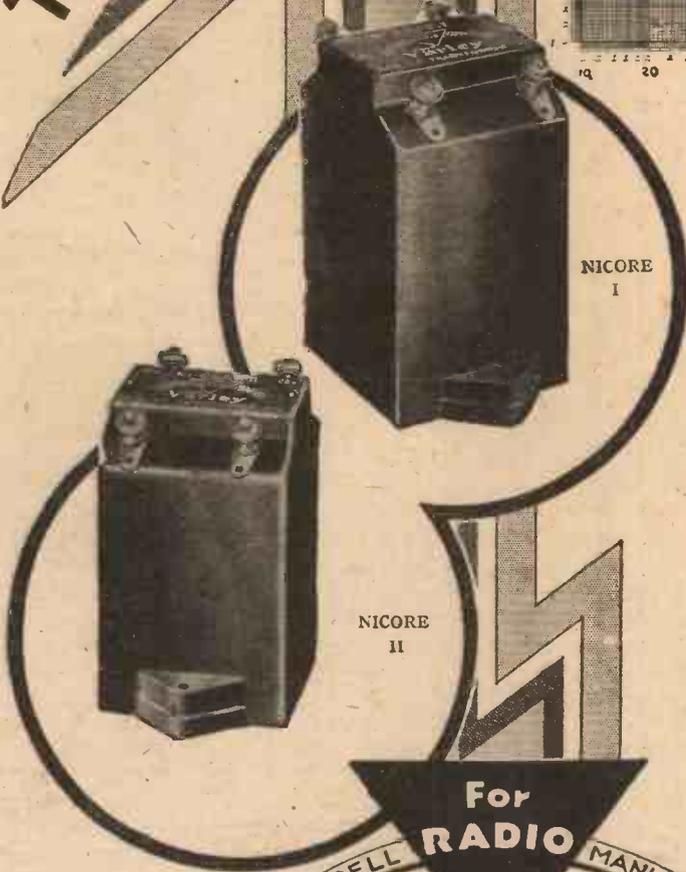
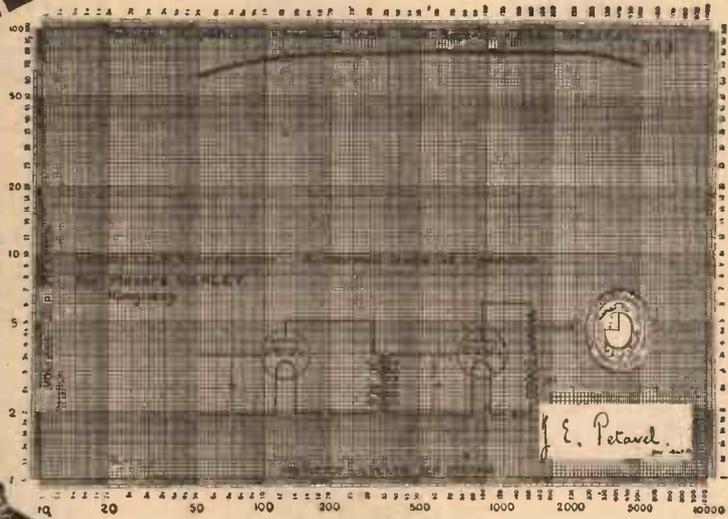
MR. FLEX HAS A WEAKNESS FOR SURPRISE ITEMS—



—BUT PREFERS THE BROADCAST VARIETY.



THE CURVE TELLS THE STORY!



An amplification curve of almost 80—and a frequency response curve practically uniform over the whole audible frequency range—that's the story told by the National Physical Laboratory curve—the story of a really good L.F. Intervalve Transformer—the VARLEY Nicore I.

And this story is practically as true in the case of Nicore II—almost the same constant amplification over the whole range of musical frequencies—results infinitely better than many higher priced transformers of other makes.

The use of a nickel iron alloy core coupled with long and varied experience in the winding of Transformer Coils enables VARLEY to produce Transformers of exceptional performance.

Remember that more than 30 years' research is behind a VARLEY product. That's why quality is assured when you specify VARLEY.

EXTRACT FROM TEST REPORT
 ("Modern Wireless," December).

"In any set where it is used the L.F. Transformer is a critically 'key' component.
 "By no means all nickel-iron core Transformers have proved successful, and it is greatly to the credit of the Varley people—although in view of their reputation it is only what we suppose would be expected from them—that they have been able to produce such a component as Varley Nicore Transformer."

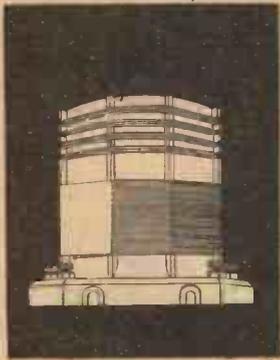
For
RADIO
 OLIVER PELL MANUFACTURE
Varley

Nicore I (List No. D.P.1) Ratio 4 : 1 - £1
 Nicore II (List No. D.P.2) Ratio 4 : 1 - 15s.

Write for Section D of the Varley Catalogue.

Advertisement of Oliver Pell Control Ltd., Kingsway House, 103 Kingsway, London, W.C.2. Telephone : Holborn 5303

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



COLVERN COMPONENTS IN THE 1930 ETHER SEARCHER

one

One Colvern Drilled Aluminium Chassis 15" x 10"

two

One Colvern Drilled Aluminium Screen Price (with Chassis as above) 8/6 pr.

three

Two Colvern Dual Range Coils, Type R2R Rotor 60 Price 8/6

To ensure the results the designers of the season's master circuit meant you to get from them, make sure you get the specified Colvern components when you assemble your kit.

COLVERN

Advt. of Colvern Ltd., Mawney's Road, Romford.

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

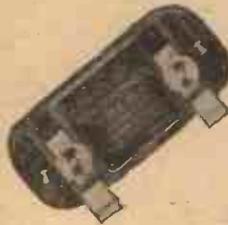
DUBILIER FOR DURABILITY



PAPER CONDENSERS
 .01 to .1 ... each 2/-
 .125 and .2 ... each 2/3
 .25 and .3 ... each 2/5
 .4 and .5 ... each 2/6
 1.0 each 2/6 2.0 each 3/6
 Prices of higher values on application.

MICA CONDENSER Type C20

.0005 to .0009 ... 2/6
 .001 to .006 ... 3/-
 .007 to .009 ... 3/6



MICA CONDENSER Type 610

.00005 to .0009 ... 2/6
 .001 to .006 ... 3/-
 .007 to .009 ... 3/6



MICA CONDENSER Type B775

.01 - 4/- .1 - 8/6
 .5 - 37/6
 Intermediate capacities at proportionate prices.

If unobtainable from your dealer, write direct to us, giving his name and address.

DUBILIER FIXED CONDENSERS

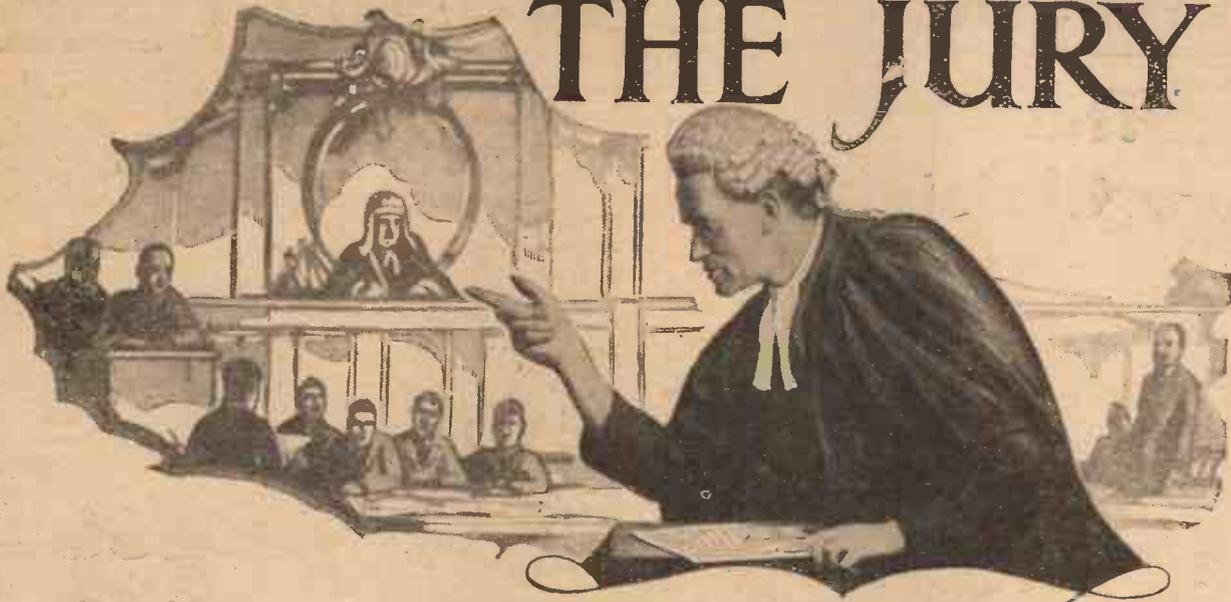
Free for the asking—"A Bit about a Battery." There's a copy for you at your dealers.



Dubilier Condenser Co. (1925) Ltd., Ducon Works, Victoria Road, N. Acton, London, W.3.

BC 244/F

GENTLEMEN OF THE JURY



**THE FIRM'S CLAIM
OF "MELODY OUT
OF THE MEDLEY"
IS MORE THAN
JUSTIFIED**

and Gentlemen I would urge you and your friends to always use Telsen Transformers in preference to others if you desire to obtain the utmost performance and the acme of perfection. In my opinion I consider their claim justified—so writes an enthusiastic user of Telsen Transformers. Fit Telsen Transformers now and avoid those costly errors of judgment.

**A GOOD JUDGE ALWAYS
FITS TELSEN TRANSFORMERS**



RADIOGRAND
12/6
Ratios 5-1 or 3-1

TELSEN

TRANSFORMERS

TELSEN ELECTRIC CO., LTD., MILLER STREET, BIRMINGHAM

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

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

**"The
 Christmas
 Spirit"**



**Treat
 yourself
 and
 your
 friends
 to a
 set of**

MADE IN ENGLAND
Sold by all Wireless Dealers.

**Osrām
 Valves**

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

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

On Your Wavelength!

"A.W." Leads Again

I WAS one of those who were privileged to attend the demonstration of the new Stenode Radiostat method of reception. I have known for some time something about the system, but as I was pledged to secrecy I could say nothing about it. Readers may, however, have noticed that a week or two ago I suggested in a "Wavelength" paragraph that a solution of the overcrowding problem in the ether might be found before long by a method which would revolutionise some of our ideas about wireless. AMATEUR WIRELESS, therefore, can claim, as has so often been the case in the past, to have given its readers the first hint that a new invention of vital importance was nearing perfection.

What Does It Mean?

Readers will grasp at once just what the coming of this new system may mean to wireless. On the medium-wave broadcast band, for instance, there are only about a hundred individual channels available, for a 9- or 10-kilocycle separation between stations is regarded as the minimum. If Stenode reception is adopted the number of individual channels might become 5,000 or more. This means that every existing station and every station likely to be built within the next fifty years can have a wavelength of its own and that it can broadcast as hard as it likes without any fear of causing interference with anybody else. The system is also applicable to commercial telephony and telegraphy. It would enable thousands of words a minute to be telegraphed over a single cable. It may make telephoning to the other side of the world almost as cheap as putting through a call from London to York. One of the most pressing problems of television may also be solved, for the Stenode method may provide a means of dealing with one of the greatest difficulties of the present moment—that of the wide channel required for the transmission of large images. The Stenode method of reception should be watched with interest.

Do You Hear America?

Are readers having any success in picking up American stations on the medium-wave band? I cannot say that I have tried very often myself, though on one or two nights when conditions have been exceptionally good for the reception of Continental stations I have tried for WGY and some of the other transatlantic giants. From them I have heard up to date either nothing at all or sometimes just faint sounds and nothing more. It is rather curious that when distant European stations are coming in so well one should not

be able to hear something of the big Americans. In former years a good European night nearly always meant that one could pick up America. This winter it does not seem to mean anything of the kind. Transatlantic reception was, if I remember aright, at its best towards the end of 1923, but in all other winters until the present one I have heard a fair number of American stations at times.

What is the Reason?

I suppose that there must be some explanation of this rather curious business, though, personally, I cannot understand it. Possibly the sun-spots which are playing such havoc with short-wave reception are also having an adverse influence upon the medium waves at long ranges. Or, again, it may be that I have just been unlucky in my nights and that others have heard U.S.A. stations quite well. Readers' experiences in transatlantic reception this autumn and winter would be most interesting.

Europe Hears B.P.

If American stations are not getting across to this country, the big transmitter at Brookmans Park is making its voice heard all over the Continent. In fact, in many localities he seems to have ousted 5XX for pride of place amongst the British stations. As is so often the case with high-power transmissions, he has a rather considerable fading area, so that reception is often better at long than at medium ranges. Reports reach me that he is very well heard in the South of France, in Switzerland, in Italy, in many parts of Germany, and in Scandinavia. It seems, though, that he fades badly in some of the nearer Continental countries, such as Holland, Belgium, and northern France. One of the mysteries amongst high-power stations has always been Langenberg, who has never been really well received in this country except for brief periods. When the station first opened he was using about 25 kilowatts, and the fading produced over here was simply astonishing, the signal rising to enormous strength and falling away to nothing after a few moments. His rating is now 13 kilowatts, but he comes through with nothing like the strength or steadiness of much less powerful stations on the Continent. He is seldom, for example, so good as Breslau or Milan and never so strong as Toulouse, Nurnberg, or Budapest when the last station is at its best.

A Tip Worth Trying

If you use anode-bend detection and possess or can beg, borrow, or steal a milliammeter reading from 0 to 2 or 0 to 3,

try the experiment of wiring the instrument into the output circuit of your detector valve. The normal reading when no transmission is coming through may be about half a milliamper, but just watch the needle whilst you tune in a fairly strong transmission. You will see that as you approach resonance the reading increases, the amount of the increase depending upon the strength of the transmission. Some idea of the terrific strength of Brookmans Park at fifteen miles can be gained from the behaviour of the milliammeter in my set if I tune him in to full strength. If I apply so much grid bias that the normal detector current is only .2 milliamper, Brookmans Park when tuned in causes more current to flow than the instrument can record! A pretty powerful transmission like Nurnberg, which gives full loud-speaker strength without any use of reaction, would raise the reading from .2 to about .4 milliamper.

Another Use

The milliammeter in this position, besides being very helpful when one has to keep several tuned circuits in resonance, has also another use. The anode-bend detector, though it may deal with much more powerful incoming signals than the grid-leak-and-condenser rectifier, can be overloaded, and whenever overloading occurs pretty bad distortion is produced. Overloading by the detector means mutilation of wave forms, and these mutilations are passed on to the note-mags., by which they are amplified and made infinitely worse. If, therefore, we are in search of quality, the first thing that we should do is to make quite sure that our rectification is beyond blame. When you tune in a powerful transmission, watch the milliammeter in the circuit of the rectifying valve. You will find that the current recorded can be increased quite considerably by bringing the tuned circuits nearer and nearer to resonance without causing any wobble on the part of the needle. When a certain point is passed the needle begins to make little jumps as sibilant sounds in speech or loud passages or very deep notes in music come through. These little kicks show that the detector is being overloaded. For good reproduction you must use a volume control or detune until it remains absolutely steady at all times.

Dealing with Powerful Signals

In the past it has been customary to apply 100 volts or so to the plate of an anode-bend detector, adjusting the grid bias so as to bring the working point to somewhere about the top of the lower

On Your Wavelength! (continued)

bend. For dealing with high-power transmissions at short range a plate voltage of this kind may be found insufficient to avoid overloading. Myself, I find it advisable to use about 150 volts on the plate of the detector with a very considerable amount of grid bias. This allows quite powerful signals to be handled without a sign of overloading, and very much improves reception from stations such as the new 2LO and 5GB. Actually, increasing the detector voltage to this amount simplifies the construction of receiving sets containing screen-grid and pentode valves. One no longer requires three high-tension positive leads. Two fill the bill, one at 150 volts for the plates of all valves and one at 75 volts for the screen of the H.F. amplifier.

Valve Coupling

Apart from its use as an output "filter," the low-frequency choke seems to have achieved a certain amount of unpopularity recently. Chokes have improved in design as well as transformers, though the former do not give the voltage amplification and "kick" of the latter. Thanks to the improved characteristics of the special R.C. valves, resistance-capacity amplification retains quite a large amount of "support." The festive season fast approaches, and the radio gramophone becomes quite as important a provider of music as the radio proper, especially at parties and dances. This focuses attention particularly on the low-frequency side of receivers.

This Year's "Nap"

The ordinary couple of stages of amplification may not give sufficient "binge" from a gramophone pick-up to fill a large room full of chattering people. It may therefore be worth while to modify slightly the low-frequency amplifier in order to obtain more volume without undue distortion or blasting. In the case of an amplifier with an output-choke circuit, it is quite a simple and inexpensive expedient to "hitch on" an additional output valve of greater power. The existing output choke and condenser will form the actual coupling between the old output valve and the new one, and the only additional components required will be a grid leak (say, .1), a new valve holder, a super-power valve, and extra grid bias. If the "job" is to be quite a temporary affair, the extra amplification stage may be wired up on a breadboard and the loud-speaker actually put in series with the valve and the H.T. supply, after taking note that it is connected the right way round for preventing demagnetisation. Better still, an additional choke and output condenser may be included for this extra amplification stage, thus securing full safety against burn-outs, demagnetisation, and possible electric shock

when lighting mains are used for H.T. current.

The Ideal

I think the ideal combination for radio-gramophone amplification is a three-stage amplifier, with push-pull output stage. The detector, of the anode-bend variety, would be coupled in the R.C. fashion to the first L.F. valve, in the grid circuit of which would be a volume-control potentiometer. The first L.F. valve would be resistance coupled to the primary of a push-pull input transformer. This push-pull stage, with its two output valves, could have either an output transformer or a specially tapped output choke. Theoretically speaking, there should be no direct current going through a loud-speaker directly connected to push-pull output-choke tapplings, but for purposes of insulation, particularly when the house mains are used, it is desirable to include the usual output condensers of 2 microfarads or so in each "leg."

Is the Prague Plan Doomed?

From the very outset it was clear that the Prague Plan could exist only if everyone concerned abided strictly not merely by the spirit, but also by the letter, of the agreement reached last spring. My own belief is that if all countries had honestly endeavoured to compel their stations to work on their assigned wavelengths we should now be knowing such a peace in the ether as we have never experienced since the days when all Europe began to broadcast. Unluckily, two things are happening which are likely to upset the working of the plan. The first is the wavelength wandering to which I have referred before, and which seems to be on the increase. In some countries the authorities appear to be doing little or nothing to check it. The other thing is the battle of the kilowatts, which is now developing on much the same lines as the old nightmare race in armaments. Broadcasting has now become so important that it seems to me that the League of Nations might very well take a hand in the matter, for here is a business that should be well within its scope.

A Wonderful Set

I spent the evening recently with a friend who has just installed one of the most remarkable sets that I have yet come across. He wanted something that would

enable him to bring in practically everything that was going and gave a skilled designer pretty well *carte blanche* in the matter of cost. The result is a wonderful seven-valve super-heterodyne, which certainly does deliver the goods in a way that I would hardly have believed. I cannot tell you exactly what the cost of this set was, but I know that it ran a good long way into three figures. But it is certainly not a receiver for the man in the street, for it has about a dozen controls, each of which really does something. When you have a super-het. plus a wavetraps plus loose coupling you really can get something in the way of selectivity. I should hardly have thought it possible to bring in Stuttgart with Brookmans Park in full swing at a range of a dozen miles, but the feat was performed before my wondering eyes.

My objection to the majority of super-hets. is that they have a tendency to bring in a good deal of mush and other background noises. This particular one, however, is quite free from any such drawbacks and the quality is astonishing. It can be used not only upon the medium- and long-wave bands, but also for short-wave reception, and here it is just as good. Altogether the kind of receiving equipment that makes one's mouth water.

Artificial Atmosphericics

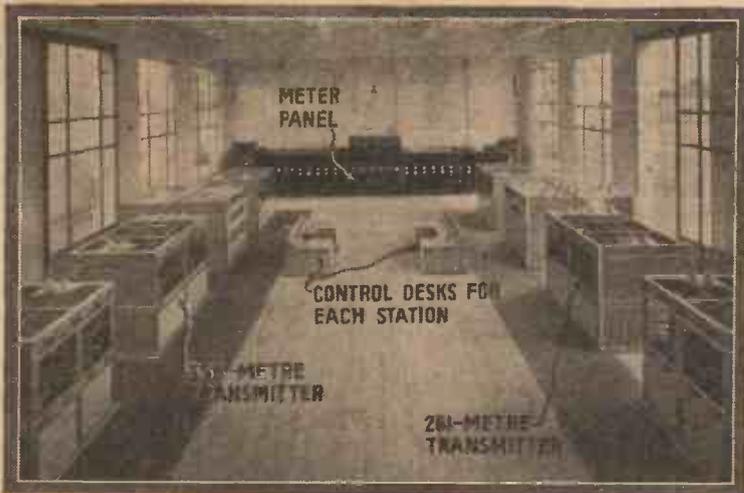
Besides those which Nature provides, there are many forms of "atmosphericics" for which man is responsible. Flashing signs, vacuum cleaners, trams, electric trains, and generating plants may all be responsible, whilst every short-wave man who lives near a main road has had bitter experience of what the magnetos of some cars and motor-cycles can do. In many cases a filter condenser in the apparatus, which is causing the trouble is all that is needed to bring peace, and, no doubt, we shall in time have a regulation which will forbid the use of machinery that is capable of broadcasting crackles and fizzes. There are, however, other sources of noisiness which affect those particularly who use eliminators or all-from-the-mains receiving sets. Recent experiments have shown that a defective electric-light bulb or one that is not quite tight in its socket may cause quite an outburst of noisiness from the set. Other similar crackle-producers are defective switches and faulty connections to radiators, and so on. In some houses where the wiring has not been renewed for many years the insulation resistance may be surprisingly poor owing to deterioration of the materials covering the leads. It is a good plan if you find that your apparatus is noisy to get an expert to test out the insulation of the house wiring with a megger.

THERMION.

**Have You Let Us
Know What Is
Your Ideal Set?**

(See page 1000)

LISTEN TO THE TWO B.P.'s



A peep into the main transmitter room at Brookmans Park

TIMES OF THE TESTS: THE NEW WAVELENGTHS: PROBLEMS OF INTERFERENCE

BY the time this appears in print listeners should have had three or four days' experience of Brookmans Park reception under the new condition when both the alternative programmes are being given from the same source.

Tests are being made at present and will continue to be given for the next few weeks, so that, as a B.B.C. official said in conversation with an AMATEUR WIRELESS Special Correspondent, listeners can adapt their sets during the change-over. As there is to be a certain amount of reshuffling of programme arrangements during these tests, AMATEUR WIRELESS hastens to make the position quite clear.

261 and 356 Metres

The programmes are being put out on two separate wavelengths, namely, the present 356-metre one and also the new 261-metre length. The two giant transmitters are housed in the same building, as shown in the heading photograph above. London (356 metres) and Daventry 5XX (1,554 metres) at present give the same programme, Daventry 5GB being the high-power alternative. Now, this is all to be changed.

The new 261-metre transmitter and Daventry 5XX will be used for the national or general-interest programme, while the 356-metre transmitter will be the alternative. The reason for this is simply because the B.B.C. engineers anticipate that 356- and 261-metre transmissions will not both have the same penetrating power. It is anticipated that the longer-wave Brookmans Park will operate without fading, and without any "snags" whatsoever in a figure approximating to that of a circle and having a diameter of 160 miles, the centre being roughly at Brookmans Park. It is not anticipated, however, that the 261-metre transmitter will give full strength transmission over a similar figure having a diameter greater than 120 miles.

Just whether this will be so in practice remains to be seen. It is the opinion of many experts that the 261-metre transmission will have a greater penetrating power, and recently our contributor "Thermion" stated that in all probability the shorter wavelength will be more

favourable to the distance-getting properties of the transmission.

All these points will be cleared up during the tests, however. Listeners are asked to make the utmost of the extensive tests which have been arranged. The schedule, as we go to press, has been arranged as follows:—

MORNING

11.30 a.m. to 12 noon 5XX programme on (Monday to Friday inclusive) 261-metre wavelength.

12.30 p.m. to 1 p.m. Special programme on (Saturday only) the 261-metre wavelength and 5XX.

12 noon to 1 p.m. The normal scheduled (Monday to Friday inclusive) programme on the 261-metre wavelength.

Special programme on the 356-metre wavelength.

1 p.m. to 2 p.m. Special programme (Saturdays only) on the 356-metre wavelength.

1 p.m. onwards (Monday to Friday inclusive) The 356-metre wavelength returns to the normal scheduled programme.

2 p.m. onwards (Saturday only)

EVENING

First half-hour of Scheduled dance music (Monday to Friday inclusive) on the 261-metre wavelength only.

Remainder of dance-music period. Scheduled dance music on the 261-metre wavelength and special programme on the 356-metre wavelength.

There will be no test transmissions on Sundays, it should be noted, nor on Christmas Day or Boxing Day.

There are two points which arise immediately in connection with this dual transmission. First, there is the possibility that a certain number of receivers will not be

able to tune down to 261 metres, and, secondly, it is probable that interference may be experienced between the two.

With those who have difficulty in tuning down, one can have little sympathy in these days of dual-range coils, the minimum wavelength of which should in all cases be well below 250 metres. This will give a useful margin for tuning in the 261-metre transmission. No set can be considered modern which is incapable of being tuned down to below 250 metres, and owners of sets which are defective in this respect cannot grumble at being compelled to modify them.

Interference

Whether mutual interference will be a difficulty with a number of listeners remains to be seen. It is inevitable that for listeners close to Brookmans Park the number of foreign stations receivable will be reduced.

AMATEUR WIRELESS is participating in the tests, and if any special precautions are necessary to ensure interference-free reception from the two Brookmans Parks, and from a reasonable number of foreigners, then the AMATEUR WIRELESS laboratory will be the first to produce them.

KENNETH ULLYETT.

TELEVISION: AN AMERICAN DEFINITION

A SPECIAL committee of the American Electrical Manufacturers' Association has framed the following definition of what television should be:—

"Commercial television is the radio transmission and reception of visual images of moving subjects, comprising a sufficient proportion of the field of view of the human eye to include large and small objects, persons and groups of persons, the reproduction of which at the receiving point is of such size and fidelity as to possess genuine educational and entertainment value. It should be accomplished so as to give a smooth picture by an instrument requiring no special skill in operation, having simple means for framing the picture, and requiring no manual control to maintain the 'framing'." B. A. R.

NEXT WEEK:

**A TWO-VALVER WITH
PENTODE DETECTOR!**

HOW MUCH WILL YOUR DETECTOR STAND?

By J. H. REYNER, B.Sc., A.M.I.E.E.

Here is an article of unusual interest. Our Technical Editor has made tests to find the voltage input which may safely be applied to various valves acting as leaky-grid detectors. He draws some rather startling conclusions from his results.

IN my recent article dealing with the problem of overloading the detector by a heavy signal, such as is obtained from the Brookman's Park transmission, I promised to give details in a future article regarding the voltages which could be handled by detectors of various types. Some experiments at the Furzehill Laboratories have since borne fruit and I am able to give the results herewith.

The information desired is not particularly easy to obtain. We apply to our detector high-frequency energy in the form of a carrier wave, which is modulated in accordance with low-frequency variations impressed upon it by the microphone at the

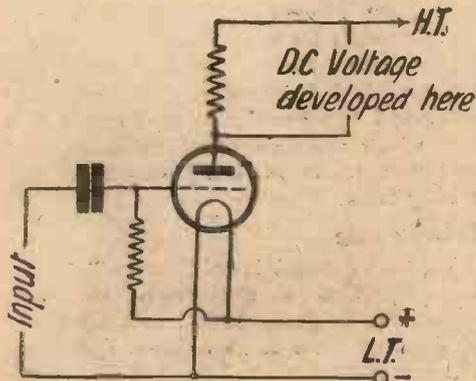


Fig. 1. Circuit used in making tests

transmitting end. What we are interested in is the actual low-frequency voltage produced in the anode circuit of the detector valve by a given high-frequency voltage applied to the grid circuit. It is possible, of course, to measure this directly by utilising a high-frequency modulated oscillator, but experiments conducted at these very high frequencies are not only difficult to do, but are subject to sources of error owing to the leakage which is liable to take place through capacity effects and the like.

In the present instance, a corresponding test was carried out at a frequency of 50 cycles. The constants of the circuit were worked out to present the same impedance to a 50-cycle frequency as the normal constants would present to a frequency of 750 kilocycles (400 metres). This being so, it was possible to conduct the measurements with much greater reliability, although approaching the problem in this indirect manner involved a somewhat larger amount of calculation.

The first test was to measure the rectified voltage produced in the anode circuit by varying inputs. This curve, incidentally, is a gradually rising curve sloping fairly steeply at first and subsequently tailing off in a form of saturation effect. In practice,

however, we are not really interested in the voltage produced by the carrier which may itself be quite large but only in the variations in the voltage produced by the modulations, and it is necessary to derive from the simple curve the sensitivity of the valve to such changes in voltage.

Output

Having obtained this sensitivity curve, which is similar in shape to that shown in my previous article we can deduce the actual alternating low-frequency voltage set up in the anode circuit by a given high-frequency modulated input, assuming some definite modulation, which, in this instance, has been taken as 20 per cent. It is this low-frequency output in which we are interested, for it is here that the overloading is quite clearly shown. I shall explain the curves in detail in a few moments, but if the reader will refer to the curves (Fig. 2) he will see that as we increase the H.F. input, so the L.F. output increases rapidly up to a point, but beyond this point saturation is reached and a definite decrease in the output takes place. This is what causes the overloading, which in severe cases results in the most execrable quality. Readers may have observed that if they are tuning in a strong station, such as the local station, the reaction control appears to have no effect whatever. It may, indeed, cause a decrease in signal strength. This is due to the fact that the detector is already being fully loaded without the application of reaction and that further increase in the signal strength simply causes the L.F. output to decrease instead of increase.

Some Actual Tests

Now to return to the actual experiments. Three valves were used, during the tests. The first of these was an Osram HL210, a good detector for average purposes. The second was a PM1LF, a valve which most people would use in the first L.F. stage and not as a detector, while the third valve was a PM2, which, I venture to assume, few people would use as a detector in the ordinary course of events. The valves were connected up in a circuit as shown in Fig. 1, having a resistance in the anode circuit and the customary condenser and leak in the grid circuit. The leak was in all cases connected to L.T.+. The anode resistance was adjusted to suit the individual valves, being made as nearly as possible three times the internal resistance of the valve itself. Gradually increasing alternating voltages were then applied across the

input to the valve and the rectified voltage developed across the resistance in the anode circuit was measured by a very high resistance voltmeter (actually it had a resistance of a little over 1 megohm, and yet gave a full-scale deflection with 15 volts). The H.T. applied to the circuit was 100 volts.

From the results obtained, the curves shown in Fig. 2 were derived in the manner already described and the results are illuminating in the extreme. Let us take first of all the standard type of detector valve, the HL210. Similar results would, of course, be obtained with any valve having the same order of internal resistance and amplification factor. This valve, therefore,

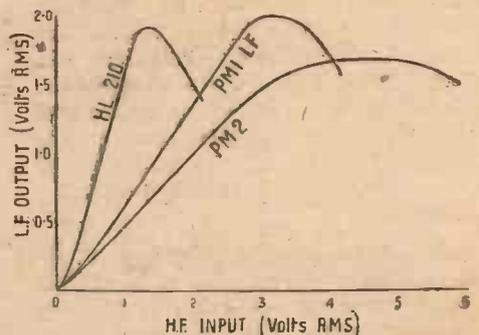


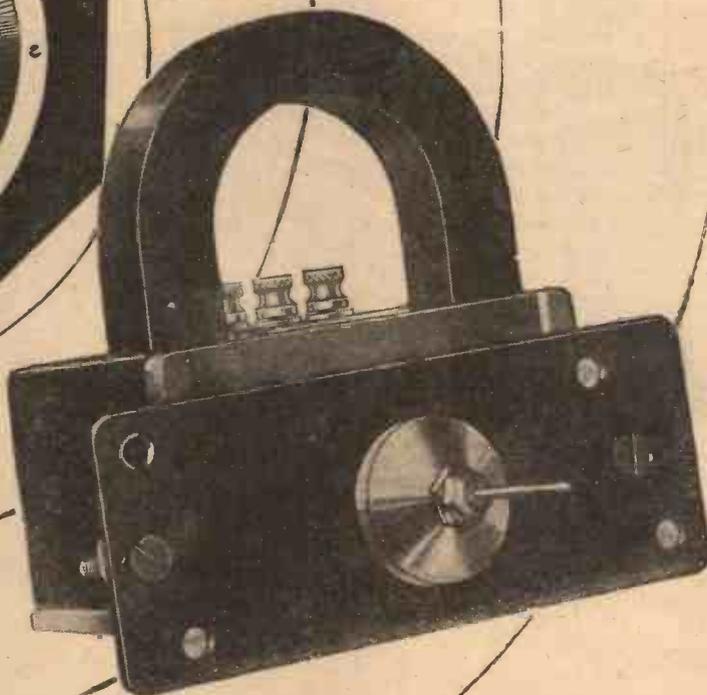
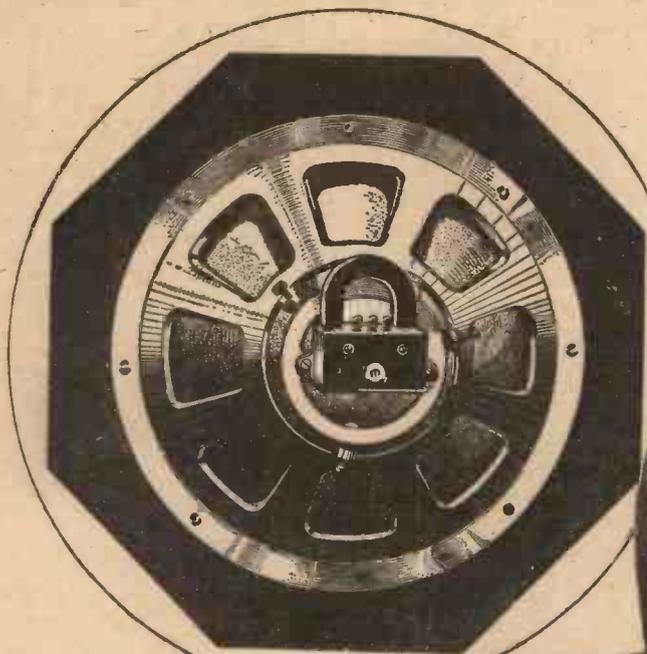
Fig. 2. Curves showing L.F. output obtained by various detector valves

represents average conditions fairly well, and it will be seen that the L.F. output increases more or less in direct proportion to the H.F. input until the latter has reached 1.1 volts. At this point, the curve turns over sharply and then begins to descend again, so that if we exceed 1 volt input with this valve, we shall immediately run into serious overloading.

Now let us consider the case of the L.F. valve. Enlightened readers have been using a valve of this sort for rectification for some time. It will be remembered that I recommended the use of an L.F. valve in the "Knife Edge Three," published in the Second Exhibition number of AMATEUR WIRELESS. It will be seen that we have here an exactly similar form of curve except that the valve does not commence to overload until a voltage of 2.7 is reached. Thus it will handle twice the input that can be taken by the H.F. valve, while its maximum undistorted output is, if anything, slightly greater than with the H.F. valve. For weak signals, of course, the sensitivity is distinctly less. Thus, for example, at the point where the H.F. valve is just overloading and giving 1.8 volts output, the L.F. valve is only giving 0.6 volts.

(Continued in third column on page 989)

21/



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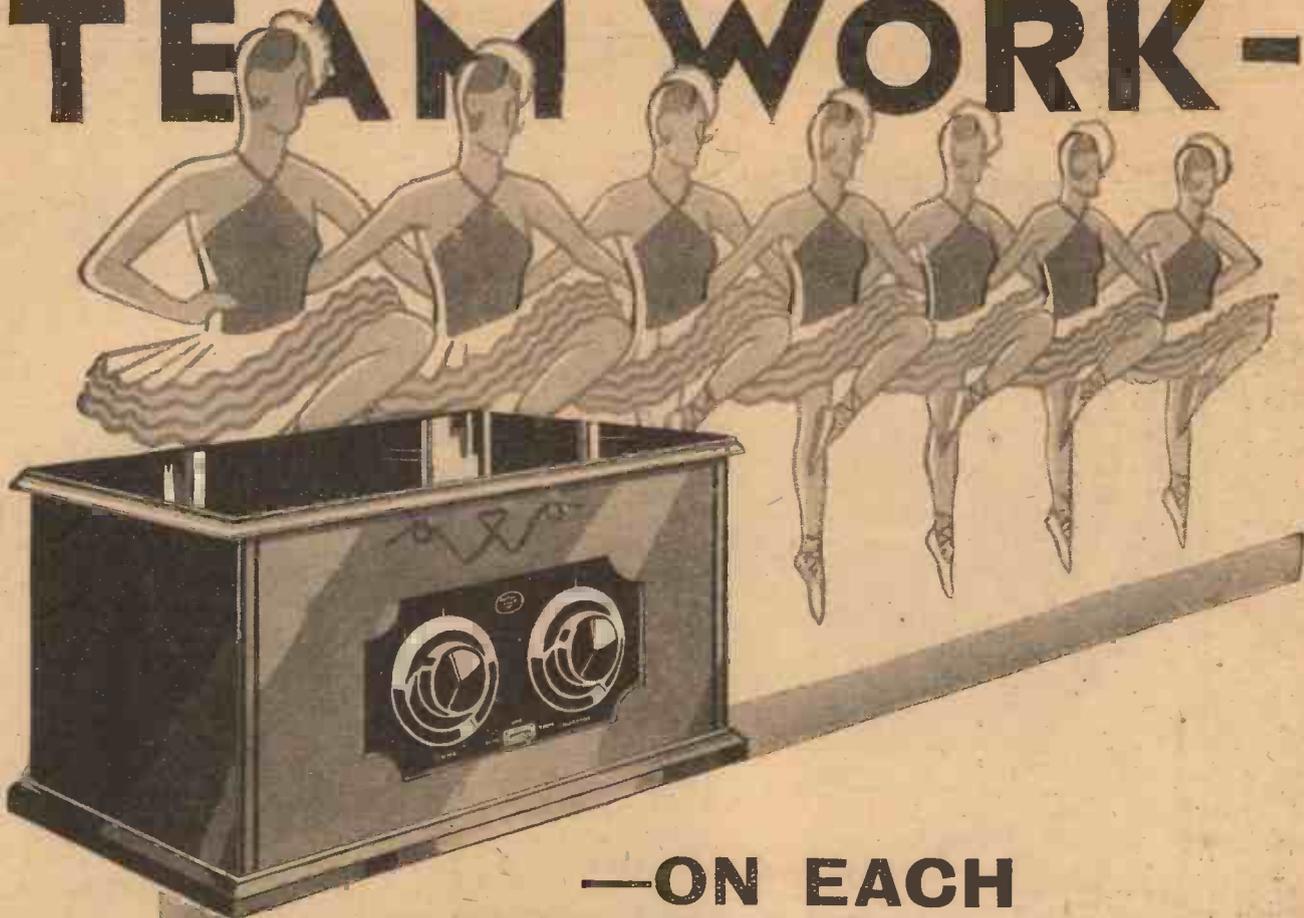
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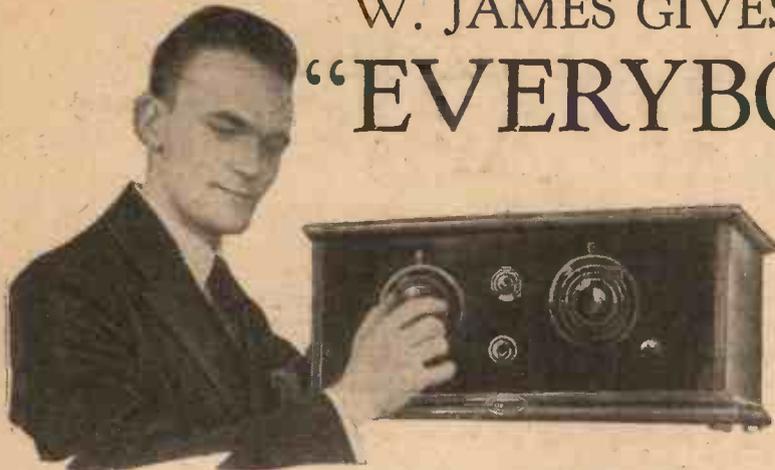
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W. JAMES GIVES SOME HINTS ON USING "EVERYBODY'S THREE"

The Construction of this Set was given in No. 389



THE best aerial circuit is obviously dependent to an extent upon the size and shape of the aerial. If it is a short one, for instance, a larger aerial coil may be used than when the aerial is a long high one.

A short aerial may be quite suitable for reception over the medium wavelength range but it will be a poor collector of long-wavelength signals. To get the finest

wavelengths, with terminal AI for long wavelengths. A wire should therefore be taken from terminal A to terminal AE on the coil base, wires numbers 2 and 3 being taken away. One side of the fixed condenser is then joined to terminal G.

Aerial terminal AI will then be connected through the .0001-microfarad condenser to the terminal G. By experimenting in this way it is possible to obtain the very best from the set, for not only is the size and shape of the aerial a factor of importance, but so is its position with respect to the local station. In a relatively out of the way place, there is no need to provide exceptional selectivity—volume is all that matters. Those living near a powerful station, however, must take steps to provide so much selectivity that this station may be tuned out without difficulty.

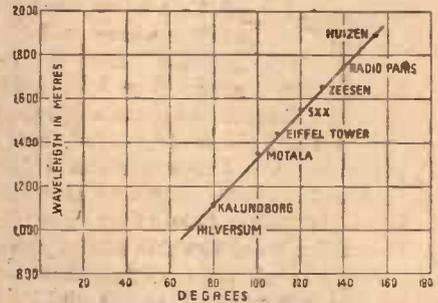
A fairly short aerial would suit an amateur who normally finds the local station interfering, but the long wavelength stations will suffer unless the circuit is suitably adjusted. The best plan is to try the different arrangements suggested and finally to adopt the most suitable.

Hints on Tuning

The tuning charts show the dial readings of the right-hand condenser to tune to various stations and others may be found from the dial reading or wavelength, whichever is known. Naturally the setting of the

aerial tuning condenser for a particular wavelength will depend to an extent upon the aerial connections finally adopted and upon the size of the aerial. The tuning is easy, however, as the two circuits may be kept in step whilst searching.

An important point to remember is that the aerial circuit does not oscillate when the reaction is used. When a squeak is heard,



Tuning graph of long-wave stations

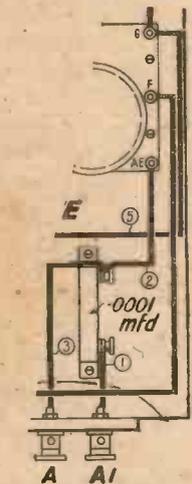
therefore, the aerial tuning condenser should be adjusted to the loudest point. Then, when the reaction is reduced, the circuits will be exactly in tune. The tuning curves are correct only when the particular condensers used in the set illustrated are employed.

"HOW MUCH WILL YOUR DETECTOR STAND?"

(Continued from page 986)

Finally, let us consider the PM2. This valve, under the conditions of the test, is no better than the L.F. valve. It will handle 3 volts H.F. input before any overloading sets in, but its maximum sensitivity is not as great as the L.F. valve, for it will only give 1.5 volts undistorted output. The sensitivity to weaker signals is again less than with the other valves, and the slight extra gain in input voltage is not worth while. Further tests, however, show that with high H.T. voltages the benefit of a PM2 on really strong signals is more apparent.

A point which is of particular interest in all the curves and shows more especially in the case of the L.F. valve is that the L.F. output is almost directly proportional to the H.F. input. The curves depart very little from the straight line over the full working range—that is to say, until they commence to overload. Now, this is exactly what we want for a good detector, for it means that we shall obtain distortionless working. The old bogey that a grid detector is incapable of giving distortionless rectification is thus exploded, for as a matter of fact, a curve of the type shown will give better rectification than can be obtained with an anode-bend detecto.



This reproduction of the wiring of the aerial circuit of "Everybody's 3" will make clear the suggested different methods of aerial connection

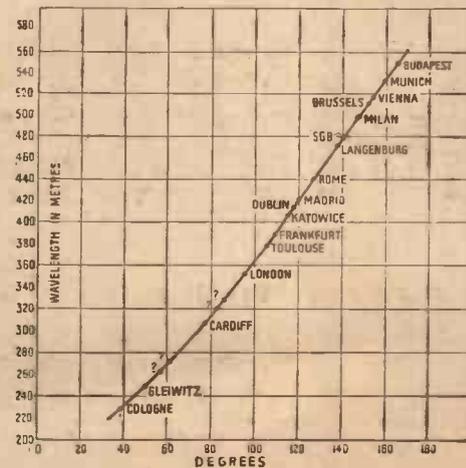
results from a set, then, the aerial circuit should be adapted to the particular aerial in use.

Aerial Connections

Above is a reproduction of the aerial wiring of "Everybody's 3." There are two aerial terminals, and one or the other will usually be found satisfactory where the aerial is a large one. More volume will be obtained with a short aerial, however, when wire No 2 is taken from the condenser to the terminal G of the coil instead of to the AE terminal. The improvement will be particularly noticeable on the long waves as a short aerial is a very poor collector of long-wavelength signals.

With this method of connecting the aerial the whole of the grid coil is included in the circuit on both medium and long waves. The connection may easily be tried before altering the wiring, for all that is necessary is that the aerial be temporarily fitted to terminal G.

For medium aerials terminal A as it stands may be the best for the medium

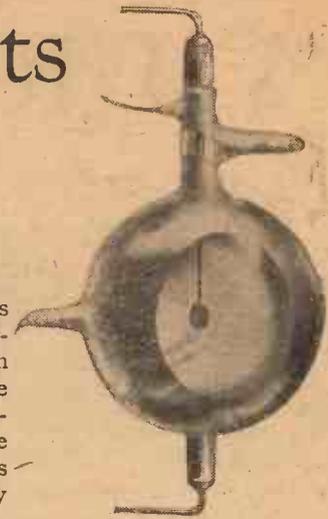


Tuning graph of the medium-band stations

Amateur Experiments with Photo Cells

By T. THORNE BAKER, F.Inst.P.

(The first part of this article appeared in last week's issue)



THE photo-electric cell proper consists essentially of a bulb which is evacuated to an almost perfect vacuum. The bulb is often made of pyrex glass, and sometimes of lime glass, and of quartz where it is to measure ultra-violet rays. The lead wires

are first fused through the glass, and during evacuation the bulb is degassed, much the same as an ordinary wireless valve. The inside of the bulb, except for the plain "window," is made conductive by exploding magnesium inside, and on this infinitely thin layer is deposited sodium, potassium, or one of the other alkali metals (lithium, rubidium, caesium). The anode is a plain wire ring in the middle of the bulb, and the cathode is the potassium layer.

If the cell is completely evacuated, current is carried by the electrons liberated

cells are used by the Bell Telephone Company in Dr. Ives' process of television, where the light reflected from the face falls on as big a surface as possible. The cells used by Mr. Baird are specially made for his work, and comprise some unique features.

Yet another type is employed by Dr. Karolus in his system of picture telegraphy. This is seen in Fig. 1. Rays of light from an electric lamp are enabled to pass through the cell owing to the potassium deposit being formed like a ring, with a clear space in the centre. The rays pass through the aperture to the picture below, and the light is reflected back from the surface of the picture on to the photo-sensitive surface. As the picture travels along under the cell, light and dark parts pass it, and different amounts of light are therefore reflected back on to the potassium coating, giving rise to varying currents which are transmitted to the receiver.

In Fig. 2 is seen the basic circuit for the use of a photo cell with valve amplification. The few micro-amperes given on illumination by the cell may be amplified sufficiently by this means to work a Post Office relay requiring 10 to 15 milliamperes.

The current generated by the cell passes through the resistance, and the potential difference between the ends of this resistance is applied to the valve grid. The current in the anode circuit goes to the relay or measuring instrument. There are various modifications of this circuit, needless to say, some of which are especially suited to a certain purpose. The General Electric Company, who make Osram photo cells for both delicate photometry and industrial purposes where greatly amplified currents are needed, have designed several interesting circuits, including those allowing the experimenter to make use of the mains supply, either D.C. or A.C.

In Fig. 3 is seen the circuit used in movietone talking pictures, where the currents generated by the cell are, after amplification, put into the loudspeakers.

The photograph shown last week is of an experimental apparatus in which the light from a half-watt lamp falling upon the photo cell is controlled by a rotating sector, so that flashes of any desired frequency can be cast on the cell. The amplified currents are passed into a telephone, where they produce a musical note, or into a recording oscillograph, where the frequency is recorded on a moving photographic film. The "figure of merit" of the oscillograph, as adapted for different

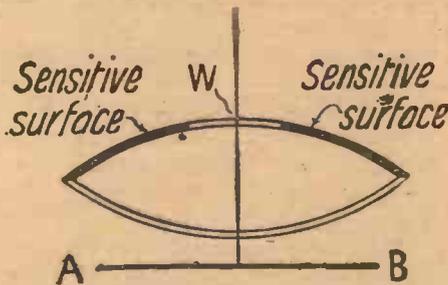


Fig. 1. The Karolus type of cell, where light passes through the circular gap or window W in the potassium, falls on the photograph A B, and is reflected back on to the photo-sensitive surface

from the potassium on exposure to light to the anode. Cells are frequently filled with rarefied argon or other inert gas, when the primary current is greatly increased in magnitude by secondary electrons produced during the passage of the primary electrons through the argon. The gas-filled cells are more sensitive, but rather less accurate for light measurement.

The General Electric Company make the two types of cell, and there are, of course, other makes to be obtained, and other patterns, such as the special cadmium photo cell supplied by Watsons of Sunic House, W.C., for the measurement of ultra-violet rays for medical treatment. The Cambridge Instrument Company also supply cells. Some of the talking picture people make their own, such as the thalofide cell of Case, for instance. Very large cylindrical

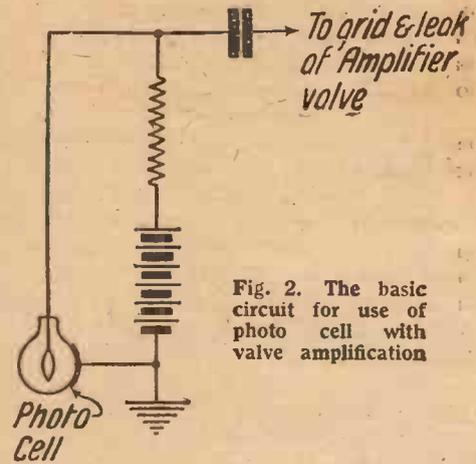


Fig. 2. The basic circuit for use of photo cell with valve amplification

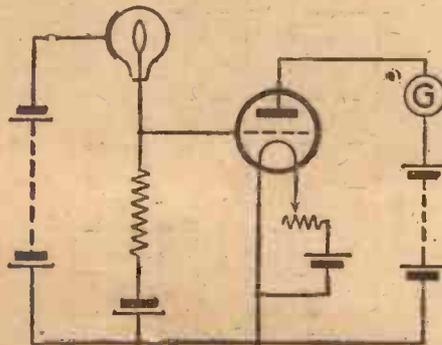


Fig. 3. The circuit used for movietone talking films

requirements, can be ascertained in this way.

For simple experiments, such as firing miniature bombs, ringing alarm bells, and so on, the cell must be used with sufficient amplification to include a relay in the circuit. Really for such purposes as these, selenium cells are much easier to handle. One of the primary qualities of the vacuum cell is its instantaneous response to light, and lack of lag and inertia. These properties do not matter for many experiments, where the selenium cell will be found much cheaper and capable of working a relay direct without any amplification. Some experiments with home-made selenium cells will follow in a subsequent article in an early issue.

WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

WELL, we were—or *had to be*—all Scotch on a recent Sunday; at any rate, those of us who had been in the habit of switching on at three o'clock.

You see, the Annual Scottish Festival Service was in progress, and if you were heathenish enough not to want it—you got nix! A delightful alternative, *n'est ce pas?*

Since I usually listen-in to one service on Sunday—Granny likes it—I spent the hour in heavy slumber and woke up a better man—if that is possible.

The military band concert, which many German stations shared with us, was not of our best; the contralto inclined to *tremula*, which nowadays is *verboten*.

Well, having exhausted my vocabulary of foreign words, I ought to warn you that I am down for a jaw soon; so gather the soapsuds while ye may. But I promise not to make it frothy. Last time I spoke I received seventy-five letters from nice people, and one anonymous post card from someone not quite so nice—but *firm*.

Would you like to turn the tables on me and criticise the talk? There's nothing like good, wholesome criticism. I'll send an autographed copy of one of my books to the most helpful half a dozen AMATEUR WIRELESS critics.

I often wonder whether the majority of listeners enjoy the afternoon concerts as much as I do. There is nothing so soothing as a nicely balanced orchestra with a nicely balanced programme. Many thanks to David Wise, the violinist, for his three charming pieces.

Oh, fellow-sufferers, I have come to the unalterable conviction that my ear and brain will not reach out to chamber music! Believe me, I started young trying to assimilate the sounds, but it's no go. I'm musically illiterate, low low-brow, and thoroughly unnerved about it. Geraldine, switch over to the People's Palace for a bit o' all sorts.

True, the crafty programme organisers are mixing a little jam with *non troppo e molto cantabiles* and things. They booked Anne Thrusfield, for instance, to sing a

half-dozen little vocal gems—including "Who is Sylvia?" and "Hark, Hark the Lark"—in the last chamber concert to which I didn't listen.

Will the Wireless Orchestra please play the appealing "The Merchant of Venice" suite? I've had to buy the two records—price 9s.—nearly the price of a full year's broadcasting, mark you!

You're Through, a revue in ten wrong numbers, was good of its sort, the best item being the switch-over to foreign stations. More might have been made of this.

Just a note of protest at the surprise item in which Leonard Henry took part. This was a feeble, unworthy effort, and it would have been far better to have announced that no "surprise" had been prepared.

The idea was an old one, but instead of using the word "untruth," "surprise" was substituted. There were twelve or thirteen of these which were perpetrated, not one, in my view, being of any use.

I should like to have had a peep at Mr. E. A. B. Barnard on "Preserving History," for that, no doubt, would have helped to have increased the interest in the talk which, as it was, was of a limited character.

And one would like to have seen Lord Robert Cecil when he delivered that clear,

scholarly, and interesting talk on Clemenceau.

Lord Robert is a practised speaker, and it would have been a good thing if Mr. Barnard had listened to him, for the latter has an irritating habit of dropping his voice to a whisper at the end of every sentence; which was, no doubt, meant for a dramatic effort, but it was entirely lost.

Have you been listening to some of the television announcers? I started the ball rolling and there was no protest. Sometimes the engineers tried their hands (or should I say their voices?), and now, at last, we have the perfect announcer in General Russell. There will, no doubt, be a rush for his services!

An "Hour of Request" from Birmingham was a good idea, and I liked the rendering of the old English ballads. "Oh, who will o'er the downs with me" is a little gem not heard often enough in these days of jazz.

Query: Couldn't the Daventry Shipping Forecast be given during a more convenient hour—and the Fat Stock Prices? Yes, perhaps.

A Smethwick correspondent asks me if I have listened to Hadyn Heard and Orchestra from the Grange Super Cinema, Birmingham, "because you have a-taste for light orchestral music with programme 'tactfully tastey,' as Leonard Henry might say. I ask you this because some little while ago you surprised me by writing favourably about Norris Stanley and Orchestra, and I feel that Hadyn Heard deserves your attention, too."

While on the subject of light orchestral music, my correspondent seems to think that the B.B.C. are not giving us their best in this direction. "They spend a lot of money on academy music"—whatever he means by that—"at the expense of the light and more popular music."

He compares our methods with those of the Continent and asserts that they do things much better on the other side. "The Continental orchestras are responsible for the greater portion of the work of each station, and therefore have to 'keep up to scratch.'"

What do you say?



Miss Gipsy Ellis as Lissenden sees her

SUFFICIENT details were given in last week's AMATEUR WIRELESS to enable constructors to start work on the "1930 Ether Searcher." Let us briefly examine the chief points of interest in this new set. The "1930 Ether Searcher" is made up of ideals—simple tuning with selectivity, volume with purity, and efficient construction at low cost; these are the characteristics of the set. Three valves are used, consisting of a screened-grid high-frequency amplifier, a detector, and a low-frequency amplifier.

To retain the simplicity of one-dial tuning, the two variable condensers associated with the tuning coils of the screened-grid and detector valves are simultaneously rotated on one shaft. In other words, the condensers are "ganged."

Simple Construction

The construction of the "1930 Ether Searcher" is a breakaway from convention. Instead of using an ebonite panel to support the controls and a baseboard to accommodate the components, we have used a metal chassis. There are no wood screws in the construction of the set. Like the assembly of a car, the building up of an "Ether Searcher" has been reduced to

a bolting-together process, within the capability of the least technical reader.

Those who have not yet started on the construction of the "1930 Ether Searcher" will find the simplified wiring key accompanying this article of special interest. As

Building The "1930 ETHER SEARCHER"

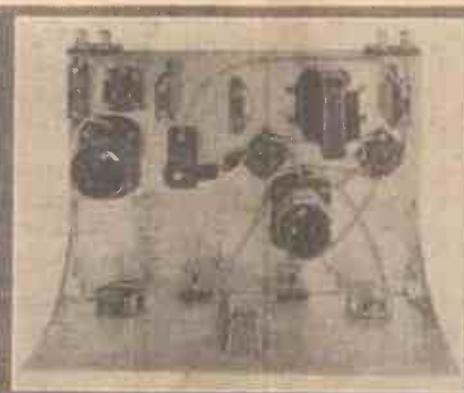
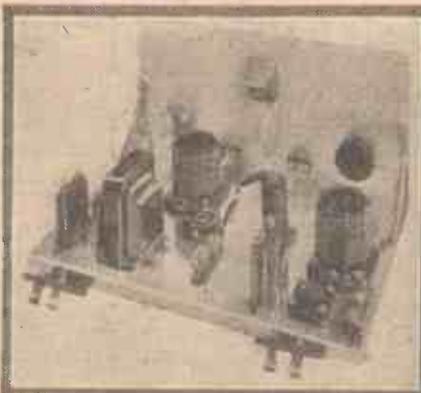
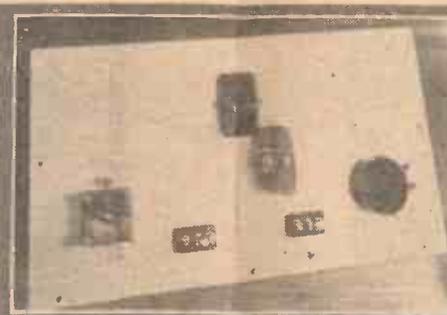
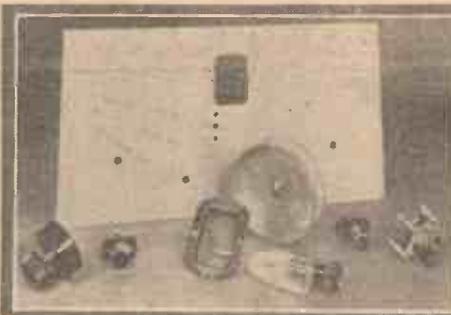
THE 44- STATION THREE- VALVER

Stations Received in North London on November 20, 1929 with the "1930 ETHER SEARCHER"

Station	Dial Reading	Wavelength in Metres
Budapest*	180	550
Munich	178	533
Riga	177	525
Vienna*	173	516.3
Brussels	171	509
Milan*	169	501
Oslo	167	493
GB*	164	479
Langenberg*	159	473
Lyons P.T.T.	155	466
Paris P.T.T.	151	447
Rome*	149	441
Madrid	149	428
Dublin	136	413
Katowitz*	134	408
Frankfurt	132	390
Toulouse*	131	381
ZLO*	120	356
Brunn	110	342
Göteborg	103	322
Turin*	87	294
Montpellier	84	286
Copenhagen	81	281
Bratislava*	80	279
Königsberg	77	276
Rennes*	71	272
Kaiserslautern*	69	270
Moravska-Ostrava	65	263
Hörby*	59	257
Nürnberg*	43	239
Cologne*	34	227
Kovno	154	1,935
Huizen*	145	1,875
Lahfi	139	1,796
Radio Paris*	133	1,725
Zeesen	125	1,635
XX*	116	1,554
Eiffel Tower*	102	1,458
Warsaw	99	1,411
Stockholm*	91	1,348
Kalundborg*	62	1,153
Moscow	53	1,100
Hilversum*	50	1,071
Leningrad	47	1,000

* Denotes very loud reception on loud-speaker.
All stations logged were clearly heard on loud-speaker

ALAN S. HUNTER
J. SIEGER
J. GODCHAUX ABRAHAMS



These and the pictures above show the simple stage-by-stage construction. Note how easy are the various operations.

Designed by J. SIEGER and ALAN S. HUNTER

explained last week, the wiring has been simplified by lettering each complete length of wire and numbering the points of contact along each length. The detailed instructions given in the wiring key form a useful adjunct to the full-size blueprint. They can be used as a useful check as the wiring proceeds.

The stage photographs accompanying this article also help to simplify what is, in any case, an extremely simple process. We strongly advise intending constructors to obtain the full-size blueprint and to use it in conjunction with this article and that given last week.

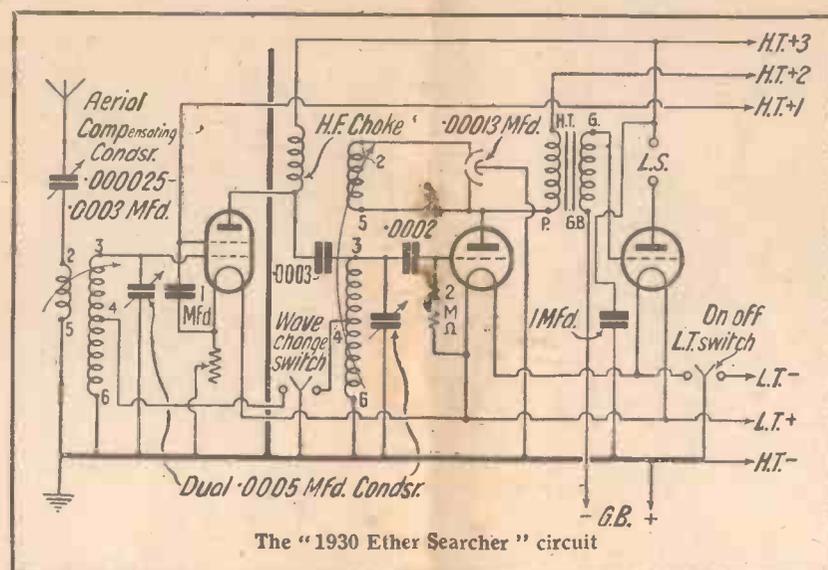
Suitable Valves

Constructors will want to know what external accessories we used in testing the original "1930 Ether Searcher." By the way, no less than six of these sets have been made for demonstrations, the details of which are given later. Different makes of valves tested and found satisfactory for use with the "1930 Ether Searcher" are the following. For the screened-grid stage a Mazda SG215, an Osram or Marconi S215, a Cossor 220SG or a Lissen SG215. For the detector stage we recommend a Mazda HL210, an Osram

HL210, a Marconi HL210, a Cossor 210HF, or a Lissen HL210. For the power stage we advise a Mazda P220, an Osram P215, a Marconi P215, a Cossor 220P or a Lissen P220.

The batteries used throughout our tests

were two Lissen 60-volt units (giving a total of 120 volts), a Lissen grid-bias battery, and a C.A.V. 2-volt accumulator. This power supply can be relied upon to work the "1930 Ether Searcher" at its maximum efficiency.



The "1930 Ether Searcher" circuit



The operation of the "1930 Ether Searcher" is different from usual, but not difficult. First of all, the valves and batteries must be connected up. There are three H.T.+ leads, connected to the high-tension battery as follows: H.T.+1 to

SEARCHER



THE SUPER SET FOR 1930

connections

78 volts, H.T.+2 to 114 volts, H.T.+3 to the maximum 120 volts. With any of the small power valves specified the grid bias should be 9 volts or thereabouts. We find that the average anode-current consumption of the set is 9 milliamperes, assuming that proper use is made of the volume control, as explained later. The set is being demonstrated at Selfridge and Co., Ltd., in London, and is on show at the Birmingham, Liverpool and Manchester branches of Lewis's, Ltd.

The "1930 Ether Searcher" has been designed to give approximately equal results on widely differing types of aerial. To do this an aerial compensating condenser has been included.

Operation

Assuming that an aerial of average efficiency and a good earth have been connected to the appropriate terminals, and that everything is ready for reception, the correct sequence of operation is as follows:

(a) Pull out both panel switch knobs. In doing so, the filament current is switched on and the medium-wave sections of the two tuning coils are brought into play.

(b) Turn the volume-control knob on the extreme left as far as possible in a

clockwise direction.

(c) Turn the reaction-condenser knob on the extreme right as far as possible in an anti-clockwise direction.

(The last two operations have the effect of giving maximum volume with minimum reaction.)

(d) Screw the small knob on the top of the aerial compensating condenser almost right in.

(e) Adjust the small rotatable winding inside the aerial coil to an angle of 45 degrees.

(f) Turn the reaction-condenser knob in a clockwise direction until oscillation is produced. If this cannot be done, reverse the direction of the rotor inside the anode coil—the tuning coil in the larger compartment.

(g) Slowly rotate the tuning knob below the escutcheon plate until a station is heard on a wavelength between 2LO and 5GB; that is to say, at about the middle of the tuning range.

(h) Adjust the aerial compensating condenser to the point where the station being received is heard at maximum strength.

The "1930 Ether Searcher" is now ready to receive stations on the long and (These instructions are continued on page 996)

COMPONENTS REQUIRED

1 Drilled aluminium panel, 15 in. by 8 in. (Keystone, Colvern, Parex)	7 0
1 Pair panel brackets (Keystone)	2 0
1 Drilled aluminium chassis and screen (Colvern, Keystone, Parex)	8 6
1 Slow-motion drum dial with special bush (Keystone)	5 6
1 30-ohm rheostat (Varley, Lissen, Igranic, Wearite)	3 0
1 .00013-mfd. differential reaction condenser (Lotus, Utility, Parex)	7 0
2 Push-pull switches (Bulgin, Lissen, Benjamin)	3 0
3 Anti-microphonic valve holders (Benjamin "Vibrolders," Lissen, W.B., Lotus, Igranic)	4 6
1 .0005-mfd. gang condenser (Formo)	15 6
1 Pair special gang condenser supports (Formo)	9
2 Dual range coils (Colvern type R.2.R., Rotor No. 60)	17 0
1 .0003-mfd. fixed condenser (Ormond)	7
1 .0002-mfd. fixed condenser (Ormond)	7
1 High-frequency choke (Lewcos, Lissen, Wearite, Keystone)	7 9
1 Low-frequency transformer (Lissen "Super," Ferranti, Marconiphone, Varley)	19 0
1 Grid-leak holder (Bulgin, Lissen)	9
1 2-megohm grid-leak (Dubilier, Lissen, Ediswan)	2 6
2 1-mfd. fixed condensers (Dubilier, Lissen, T.C.C., Ferranti)	5 0
2 Drilled ebonite terminal strips 2 in. by 2 in. (Peto Scott)	8
4 Terminals, type M, marked A, E, L.S.—, L.S.+ (Belling-Lee, Eelex)	1 6
1 Pre-set condenser .00025-.0003-mfd. (Formo, type J)	2 0
4 Red wander plugs, marked H.T.+3, H.T.+2, H.T.+1, G.B.+ (Belling-Lee, Eelex)	1 2
2 Black wander plugs marked, H.T.—, G.B.— (Belling-Lee, Eelex)	7
1 Screen-grid connector (Belling-Lee)	6
2 Spade tags, marked L.T.—, L.T.+ (Belling-Lee, Eelex)	9
4 doz. 6B.A. 3-in. round-head screws and nuts (Keystone)	1 9
10 ft. 6 in. tinned copper wire and 9 ft. insulated sleeving (Keystone)	9
8 yds. rubber-covered flex (Keystone)	8

N.B.—The prices quoted are for the components specified first. If the alternatives are used, the drillings for the panel and base-plate will have to be modified.

WIRING KEY FOR THE "1930 ETHER SEARCHER"

Starting at Stage 4 of the construction, as explained last week, connect A1, filament of the detector-valve holder, to A2, filament of low-frequency valve holder, to A3, one side of filament switch.

B4, filament of low-frequency valve holder, to B5, filament of detector-valve holder, to B6, one side of grid-leak holder.

C7, grid of low-frequency valve holder, to C8, grid terminal of low-frequency transformer.

D9, "plate" on low-frequency transformer, to D10, anode of detector-valve holder, to D11, which is terminal No. 5 on high-frequency coil, to D12, one side of reaction condenser.

E13, other side of reaction condenser to E14, which is No. 2 on high-frequency coil.

F15, fixing bolt on low-frequency valve holder, to F16, which is No. 6 on high-frequency coil.

G17, loud-speaker negative terminal, to G18, anode of low-frequency valve holder.

H19, wave-change switch on panel, to H20, which is No. 4 on high-frequency coil.

I.21, wave-change switch on panel, to I.22, which is No. 4 on aerial coil.

J23, volume control on panel, to J24, filament of screened-grid valve holder.

K25, high-frequency choke, to K26, loud-speaker positive terminal, to K27, r-microfarad condenser.

L28, fixing bolt of r-microfarad condenser, to L29, other terminal of r-microfarad condenser.

M30, grid of detector-valve holder, to M31, one side of grid-leak holder.

N32, fixing bolt of r-microfarad condenser, to N33, r-microfarad condenser.

O34, fixing bolt of screen-grid valve holder, to O35, earth terminal of terminal strip.

P36, aerial terminal on terminal strip, to P37, one side of compensating aerial condenser.

Q38, which is No. 2 on aerial coil, to Q39, other side of compensating aerial condenser.

At this point the gang condenser is fitted to the base plate, as explained in Stage 5.

R40, which is No. 5 on aerial coil, to R41, which is No. 6 on aerial coil, to R42, moving plates of gang condenser.

S43, fixed plates of gang condenser, to S44, which is No. 3 on aerial coil, to S45, grid of screened-grid valve holder.

At this point the side screen is fitted, as explained in Stage 7. The remaining wiring, in Stage 8, follows.

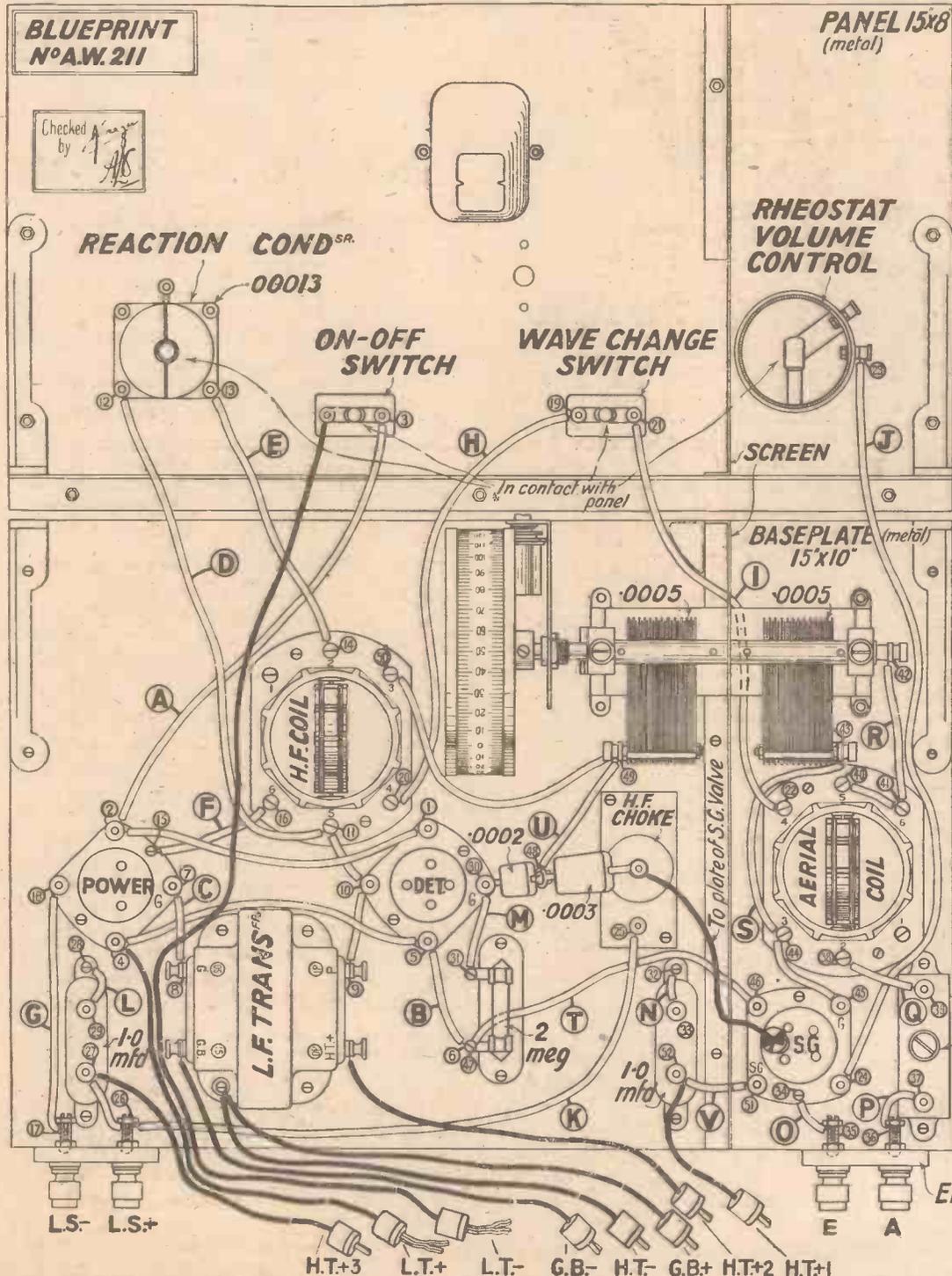
T46, filament of screened-grid valve holder, through hole in side screen, to T47, grid-leak holder. (T47 is the same point of contact as B6, already done.)

U48, bolt joining together the .0003-microfarad coupling condenser and .0002-microfarad grid condenser, to U49, fixed plates of gang condenser, to U50, which is No. 3 on high-frequency coil.

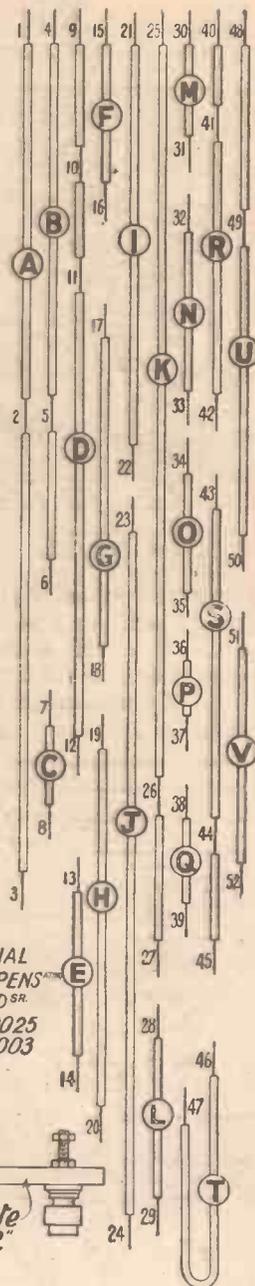
V51, anode of screened-grid valve holder, through hole in side screen, to V52, r-microfarad condenser.

At this point the set connections are completed. It only remains to attach to the components concerned suitable lengths of flexible wire for battery leads.

(Continued on page 995)



LENGTHS OF WIRE



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

Detailed wiring instructions are given at the top of the page. A full-size blueprint of this wiring diagram may be had, price 1/-.

A BATTERY DRIVEN POWER PENTODE

for

ANY SET WITH
ONE STAGE
OF L.F.

Now that Lissen have produced this new battery-driven Power Pentode Valve, you can get fine loud-speaker volume from any set with one stage of L.F. amplification. In any 2-valve set this new Power Pentode gives double volume; in a 3-valve set—H.F., Detector, and L.F.—it gives abundant power on distant stations that before were but a whisper.

The Lissen Power Pentode consumes only 7 milliamps of H.T. current. You can therefore run it economically off ordinary H.T. batteries—the only power pentode valve with anything like such a low consumption.

There is no rewiring of your set—just a piece of flex and a wander plug from the pentode terminal of the valve to the highest H.T. tapping on your set (or + 100 volts, whichever is lower)—no alterations necessary at all, and no extra batteries.

LISSEN 2 VOLT POWER PENTODE (P.T. 225) 17/6

LISSEN

NEW PROCESS

VALVES

AND A LIVELY
DETECTOR
VALVE

The Lissen Detector Valve is lively because of the Extended Grid, which controls every electron emitted from the filament. Every fraction of energy is utilised, every impulse definitely passed on. And the liveliness LASTS because the emissive surface of the filament is actually amalgamated to it and therefore does not disintegrate.

H.L.210. Price 10/6

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX (Managing Director : T. N. COLE)

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

“ THE ‘1930 ETHER SEARCHER’ ” (Continued from page 994)

Two 2-ft. lengths, with plugs marked G.B.+ and H.T.—, are clamped under fixing bolt of low-frequency transformer.

A 3-ft. length, with plug marked L.T.—, is connected to the “free” terminal of panel filament switch.

A 2-ft. length, with tag marked L.T.+, is connected to B4 (see wiring diagram).

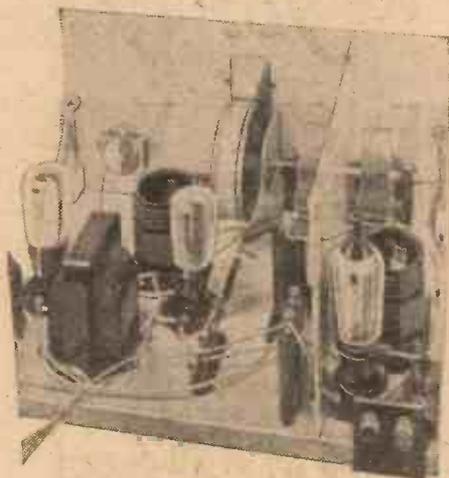
A 2-ft. length, with plug marked H.T.+1, is connected to V52 (see wiring diagram).

A 2-ft. length, with plug marked H.T.+2, is connected to terminal marked “H.T.+,” on low-frequency transformer.

A 2-ft. length, with plug marked H.T.+3, is connected to K27 (see wiring diagram).

A 2-ft. length, with plug marked G.B.—, is connected to terminal marked “G.B.” on low-frequency transformer.

A 6-in. length, with Belling-Lee screen-grid valve connector, is passed through hole in side screen to the terminal on top of the high-frequency choke.



Tried out with Lissen valves the “1930 Ether Searcher” put up an excellent performance

medium waves, with the set adjusted to the maximum efficiency for the aerial in use. By pushing in the wave-change switch on the left the long waves can be received without any other adjustment whatsoever. We must emphasise the fact that the “ganging” of the two tuning condensers holds good for the medium and long waves without any alteration, once the initial adjustments have been made.

On no account should the two sections of the gang condenser be interfered with. They are sent out from the factory exactly matched, and the set has been designed in such a way that the usual trimming of each half of the condenser is avoided. The one-knob tuning claim is a real thing; there is only one tuning adjustment in the set.

The function of the volume control must be explained. It is connected to the screened-grid valve so that the sensitivity of this valve can be varied to suit the varying degrees of strength of the signals received. The control should always be set at the lowest position compatible with adequate signal strength.

By reducing the filament voltage of the screen-grid valve, the volume control increases the selectivity of the set and also economises the anode-current consumption. When the signal is initially strong the tremendous amplification imparted to it by the screen-grid valve tends to cause overloading of the detector, with consequent distortion. Under such a condition the volume control should always be used. A very short experience of this control will reveal to the operator how useful it is.

Sensitive and Selective

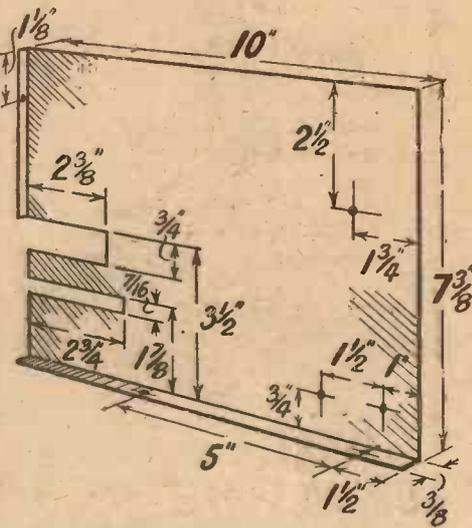
The sensitivity of the “1930 Ether Searcher” is so great that stations will be received at practically every degree of the tuning scale. The selectivity of the set enables each of these stations to be received perfectly free from its neighbours. Remember to turn the tuning knob very slowly, otherwise quite a number of stations will be missed. Use the reaction control sparingly. Adjust it so that oscillation is only just produced.

The log of stations given with this article was obtained during a recent evening at the dial, between the hours of 8 and 10 p.m. There are forty-four stations logged; we shall not be surprised to hear of readers exceeding this number by at least ten stations. As the aerial has no effect whatever on the tuning adjustment, the log we have compiled should serve as a useful means of identifying many of the stations received. They should come in at the same dial reading on the reader's set as they came in on the original set during our test, provided wavelengths do not change!

Before leaving the reader to carry on the good work of assembling a “1930 Ether Searcher,” we must give a reminder that the Collinson type R2R coils, when

ordered, must be specified with 60-turn rotors. The original coils were designed by Collinson's, but for the “1930 Ether Searcher” we found it necessary to cooperate with the makers in modifying the number of turns on the rotors.

Where at all possible, we strongly urge constructors to utilise the components actually used in the original set, because the panel and baseplate specified in the list of components are drilled to accommo-



Here are the details of the side screen

date the original components. In any case, the coils and gang condenser must be as specified. The Camco cabinet specified for the set is good value for money and forms a fitting complement to the metal chassis. We have carefully worked out the total cost of making a “1930 Ether Searcher,” and as this is only £6 without the cabinet, we believe large numbers of AMATEUR WIRELESS readers will be immensely interested in the construction. Although it has become the fashion for set-designers to impress their readers with references to the many months of experiment preceding their final design, perhaps we may be pardoned for stating that the “1930 Ether Searcher” really has entailed a tremendous amount of work since its original conception several months ago.

CHRISTMAS morning will open with a service from York Minster relayed to all the main stations. Several special features will help to make up an interesting evening entertainment. At 9.20 p.m. Bransby Williams will visit the studio to give his famous impersonation of *Scrooge*; at 9.45 p.m. the Ceremony of the Keys will again be relayed from the Tower of London, and the popular operetta, *Cox and Box*, first produced in 1866, will provide the lighter side of the programme. Dance music will be broadcast until midnight.

For Boxing Day a specially written pantomime by Ernest Longstaffe is being prepared, and December 28 will see a production of Anthony Hope's play, *Rupert of Hentzau*, the sequel to the *Prisoner of Zenda*.

In view of the fact that the recent Hague Conference permits a power of 100 kilowatts in the broadcasting band, Germany has decided to increase the output of most of her transmitters.

A new station is to be erected in Bavaria;

and in order to find the most favourable site almost nightly, when the Munich studio closes down, experiments are carried out by a transmitter situated on the summit of the Herzogenstand. The broadcasts are made on 535 metres, with a power of slightly under 1 kilowatt in the aerial.

The French P.T.T. station at Grenoble is to be transferred to a more favourable site outside the city limits and to be equipped with a transmitter of greater output power.

**A PORTABLE
GRAMOPHONE WITH
PEDESTAL TONE**



**LITERALLY
ORGAN-VOICED**

The fun you can get, the pleasure you can give, with this Lissen Portable Gramophone. You can use it any time, anywhere; it will fill in odd moments splendidly, and because its tone is so deep and mellow, you can give a concert of the classic records that will delight the critical ear.

Lissen have found a way to put a horn of really great length into this portable gramophone—a horn longer than that of many full-sized cabinet models. The Lissen sound-box is extremely sensitive and in perfect track alignment, so that there is tonal truth from every record. Finely adjustable dial speed regulator enables you to play every record at exact recording-room speed.

Have this fine Lissen Portable Gramophone on 7 days' approval. Try it at home; let your friends hear it. If you are not entirely satisfied, Lissen will refund every penny you have paid—you simply send the machine back to the factory within 7 days. Order to-day—send cash with order—or fill in Coupon below for extended credit.

**LISSEN'S NEW
NEEDLE ARMATURE
PICK-UP**



**HOW THE NEEDLE
IS SUSPENDED**

Held in position by magnetic attraction without

restrictions by mechanical contacts.

**LESS WEAR ON
RECORDS THAN
WITH AN ORDINARY
SOUNDBOX**

Use this Lissen Pick-up with any gramophone and any radio set. Use it with old records or with the latest masterpiece of electrical recording—you will hear again the living voice of the artist, and every note of every instrument re-created for you.

Because the Lissen Pick-up responds faithfully to the most minute indentation on the record—the needle armature is so light that the needle-point actually feels its way along the record groove. And you'll find your records almost everlasting when you use this new Lissen Pick-up, because the needle follows the groove and does not plough its way along.

If you want every single record to sound much better than those you hear at demonstrations—if you want radio-gramophone reproduction that comes so near to reality that in a darkened room you would suspect the presence of the artist—get this new Lissen Pick-up and learn what perfection means. Any Lissen radio dealer will demonstrate it for you.

**CARRIER SUPPLIED
FREE**



**LISSEN
L.T. ACCUMULATOR**

One more triumph of Lissen organisation—one more example of Lissen value for money—the Lissen L.T. accumulator. Here is a complete range of highly efficient accumulators, sturdily built by Lissen to give absolute satisfaction in use and long life. These accumulators are designed to give absolutely trouble-free service. The plates are all very thick, the containers are strongly made, and the general appearance and finish of the Lissen accumulators is far in advance of usual standards.

All the Lissen accumulators listed below are supplied with strong carrier, free.

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Multiple plate type, glass containers.
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L.N.557 2-volt, 48 actual amp. hours 14/6
L.N.559 2-volt, 72 actual amp. hours 18/6

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or 5/- deposit and
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**COUPON FOR EXTENDED
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Worples Road, Isleworth, Middlesex.

I enclose 5/- deposit for one Lissenola Portable Gramophone, Model No. 4, as illustrated, and agree to pay the balance in eight consecutive monthly payments of 8/8, to you at your Isleworth address.

Signed (full name).....

Address

Are you a Householder?.....

Date

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LISSEN

**NEEDLE ARMATURE
PICK-UP 30/-**

LISSEN LIMITED
WORPLE ROAD, ISLEWORTH, MIDD.

(Managing Director: T. N. COLE.)

The MODERN RADIO SLEUTH

(Continued from last week)



As Visualised by JAY COOTE

Though written in lighter vein, the "experience" below will be found to contain many really helpful points in station identification for the long-distance enthusiast.

"I DON'T quite follow you when you say that the actual identification of a transmitter depends upon language and its position in the waveband, Coames."

"Shall we put it this way? You have at your disposal in AMATEUR WIRELESS a full list of wavelengths adopted by the European transmitters. You may or may not memorise them—no matter—but the list should be within reach as you pick up the various transmissions. Surely, my dear Botson, you must have found by now that some method is necessary in any work undertaken by man? It is essential that you should know approximately to what wavelength or frequency your receiver is tuned. Unless you are actually told by a studio announcer in a language you understand, to what station you are listening, you cannot, except with considerable difficulty, identify the transmitter."

"But, then, how can I—"

"Some indispensable data is essential; it may be approximate wavelength, type of or actually recognised language."

"Surely, Coames, this is a very onerous way of securing the information."

"It is the last method to which I resort. Language and wavelength should give you all the clues required."

"I might agree with you but for the fact that to me, as well as to thousands of other equally unfortunate listeners, all languages but our own are merely classed as foreign. I might say that a talk sounded to me like French or Italian, or that an announcement was guttural, but I could not definitely state what language I had heard."

"Admittedly," replied Coames, "this is a difficulty which to the tyro appears insurmountable, but you will be surprised to find that after a short time, as I already said, you will have no hesitation in narrowing down the possibilities by stating that the words heard were, say, neither French, Italian, Spanish, nor German, in which case you are left to choose from a reduced number. By this time your search would be limited to the Scandinavian tongues or to those comprised by or akin to the Slavonic group. With this knowledge, and a rough idea of the wavelength, if the list be consulted, you will again limit your search to two or three transmitters. A little patience, a little knowledge, a

methodical process of elimination, and you have attained your aim, that of correctly identifying the transmission picked up."

"It seems easy," said Botson pensively.

"My dear Botson, it is not so difficult as it appears at first sight, for the stations possess peculiarities apart from—in most instances—distinctive calls or interval signals, either of which must be picked up in the course of a broadcast. It is obvious that in the event of a doubtful case, some minutes may have to be sacrificed. Personally, where, in my mind, I am uncertain, and where, owing to the length of an item, I cannot immediately secure the information required, I make a note of my condenser readings, and return to this exact position at intervals. No time is actually lost, for in the meantime you may have found interesting items in other cities."

"This question of languages—" commenced Botson.

"Usually one can recognise them from the sounds picked up, even if actual words are not understood at the outset. The greater number of European transmissions you will hear at one sitting are German, Scandinavian, Dutch, French, or Spanish. Now, most of the German announcers precede their call by the word *Achtung-anglice*: Attention! Look out! It is a guttural language, with a big proportion of aches and words ending in *ung, ing, bt*, and so on. Bear in mind, though, that the Austrians and the Swiss stations of the German-speaking districts say *Hallo!* Dutch, Swedish, Danish, and Norwegian are not so guttural; they are a cross between English and German. A peculiarity to note in the Swedish studios is the inclination of the announcers and speakers to adopt a sing-song intonation, more usually associated with French stage artistes. The majority of Italian words end in vowels, such as O, A, and I; they have an open sound and every syllable is clearly pronounced. Spanish, on the other hand, is somewhat more guttural and contains many lisped words; also, as a rule, you will find that French, Italian, and Spanish speakers are more vehement than other nationalities, even in the ordinary educational talks. If you listen to Moscow or Leningrad, you cannot fail to observe that the language contains a large proportion of labial and dental sounds, such as

b, p, v, f, d, t, rolling r's, and a slight tendency towards the Italian endings. Polish is softer, perhaps, and in announcements you will pick up a goodly number of *ski's*. But Warsaw, Kattowitz, and Posen will considerably assist you, inasmuch as on many evenings the lady announcers in the studio will give you a French translation of statements previously given out in their native tongue."

"Well, I have made copious notes of all you have told me, but how should I recognise Czech or Magyar?"

"There is, perhaps, no need to worry so much in those cases, for, fortunately for all of us, the studios using those languages invariably make announcements in others as well, such as French, Italian, or even English, and the calls are put out so frequently that it would be impossible to fail to identify them."

"But then, Coames, you appear to have made a study of these peculiarities."

"Only to a certain degree; I possess a retentive memory, and consequently should I, by chance, tune in a new transmission, after listening for a few minutes, during which period I am dissecting probabilities, a process of elimination will nearly always provide me with the solution. It is not in every case necessary to hear a call, for a number of stations have adopted distinctive interval signals which are repeated frequently in the course of a programme. It would be impossible to confound the chimes, say, of Budapest (B, A, B, G sharp, G sharp) with those of Munich (E, F, G, A, B, C, followed by a hoot), or those of Cologne, imitation church bells, or with the sounds G, D, E, B, D, B put out by Huizen."

"As your chronicler, I have set these down; are there no other bells?"

"Yes," replied Coames. "For instance, the single stroke of Radio Toulouse, exactly thirty-four to the minute, or the silvery-toned C, E, G, G of Bratislava. Then, again, Copenhagen comes on the air with three sharp pongs on a gong; Radio Vitus, Paris, emits a carillon on two notes (F sharp, A sharp); and Radio Paris, Westminster chimes, imitative of Big Ben; add to these the C, E, G, G notes of Bratislava. Next, we have flute-like tones produced by oscillating valves, such as the three notes,

(Concluded on page 1016)

SUPER POWER

FROM
BIG CELLS



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This Lissen Battery yields the purest form of current known for radio. It keeps speech clear, gives definition to musical notes, and, by the very purity of its current, individual instruments seem "spot lighted" in the way they are made to stand out.

Next time ask firmly for a Lissen New Process Battery and take no other. Obtainable at 10,000 radio dealers.

PRICES:

60 volt (reads 66)	7/11	100 volt (super power)	22/-
100 volt (reads 108)	12/11	9 volt Grid Bias	1/6
120 volt	15/10	4½ volt Pocket Battery, 5d. each (4/6 a doz.)	
36 volt	4/6	Single Cell Torch Battery	4½d.
60 volt (super power)	13/6		

THE SECRET PROCESS THAT PUTS POWER INTO YOUR SET

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX. Factories also at Richmond (Surrey) and Edmonton. Managing Director: T. N. COLE.

My Wireless Den



Weekly Tips—Constructional and Theoretical—by W. JAMES

My H.T. Puzzle

A FEW days ago I was asked a question which may be of interest to numerous readers. The facts are that a mains high-tension unit was purchased in order to supply a three-valve set, which it did very well.

Later, however, a fourth valve was added to the set. This last valve was put in a push-pull circuit with the existing power valve. As a consequence, the anode current increased by more than 50 per cent.; at the same time, the anode voltage fell to about 100. The question is: Can a dry battery be used to supply the high-frequency and detector circuits, leaving the mains unit to supply the power valves?

This, clearly, is a solution of the difficulty, for the H.F. and detector valves take only 4 or 5 milliamperes, which is well within the capacity of an ordinary dry battery. The mains unit is relieved of a little load, and will therefore be able to supply the power valves without difficulty, particularly if they are well biased. This is, of course, a reasonable thing to do with valves working in push-pull.

Getting Sharper Tuning

It is a well-known fact that a leaky-grid detector broadens the tuning of a set, and it also reduces the voltages set up in the circuit to which it is connected. A point worth noting, therefore, is that the damping effect may be reduced by connecting the detector to a point on the grid coil instead of to the top of this coil.

If several taps are tried, a point may be found where the selectivity is much improved for an equal signal strength. The effect may not be so noticeable when the grid circuit coil is a poor one, but when the best possible results are desired from a set having the most efficient parts, it is worth while tapping the coil.

Anyhow, the experiment is an interesting one!

Tapped L.S. Units

I notice that certain loud-speakers are provided with three terminals in order that the winding best suited to the power valve may be used.

A resistance of 2,000 ohms is rather too high when a super-power valve is employed as the anode current is fairly heavy. It

would be better to use a lower-resistance loud-speaker, for then the voltage lost in the windings is reduced and the power output may be greater.

It is an easy matter to find the best arrangement by trial when alternative connecting terminals are provided, and it is surprising what an improvement can be sometimes effected.

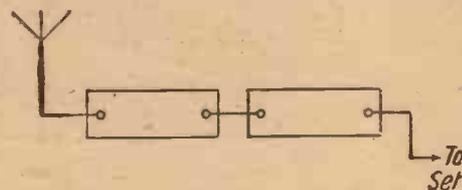
Naturally, when a tapped output transformer is used, the loud-speaker may be easily adapted to suit the power valve, and there is the further advantage that the steady anode current does not pass through the loud-speaker windings.

“... a Condenser in the Aerial”

The suggestion that a fixed condenser of .0001-microfarad be connected in the aerial wire to the set is often made with the object of improving the sharpness of tuning. This is all very well when a suitable condenser is to hand, but what is one to do when, amongst an assortment of various capacities, not one is suitable?

There may be one of .0002 and another of .0003 microfarad, for instance. Could not they be used?

The effect of connecting condensers in series, as indicated below, is, of course, to produce a value of capacity less than



Condensers in series for selectivity

that of either. Thus, when the two condensers are of .0002 microfarad, the effective capacity is .0001. In the above example, the capacity is rather more than this, being .00012 microfarad.

This value is obtained by calculation, being given by

$$\frac{C_1 \times C_2}{C_1 + C_2}$$

C_1 and C_2 being the capacities of the condensers. As a further example, let us assume the two condensers are of .0005 and .0002 microfarad. Then the effective capacity of the pair joined in series is .00014 microfarad.

An amateur having a number of different fixed condensers can obviously combine

two of them in order to produce a different net value of capacity. Connecting them in parallel increases the total capacity, the value being equal to the sum of the separate capacities.

Grid Condenser and Leak Values

The values of grid condenser and leak included in a detector circuit are usually .0003 microfarad and 2 megohms.

Personally, I prefer a little smaller grid condenser, and often use one of .0002 microfarad, as the quality of the reproduction is then rather better. It is possible with some sets, however, to depart still further from the usual values with beneficial results.

Thus I find a grid leak of as little as 0.5 megohm is sometimes to be preferred to one of 2 megohms. Strong signals seem to be dealt with better when the lower value of grid leak is used. The tone seems rounder and more natural, partly, no doubt, because the detector is not choked by the strong signals.

Naturally, one valve is different from another when used for detection, and it is, therefore, a good plan to try a few different grid leaks in order to obtain the best average results. Sensitivity, as well as quality, may be varied by adjusting the grid leak.

Choosing a Choke

Have you noticed that the ordinary high-frequency choking coil is not always the best to use in a choke-coupled screened-grid stage?

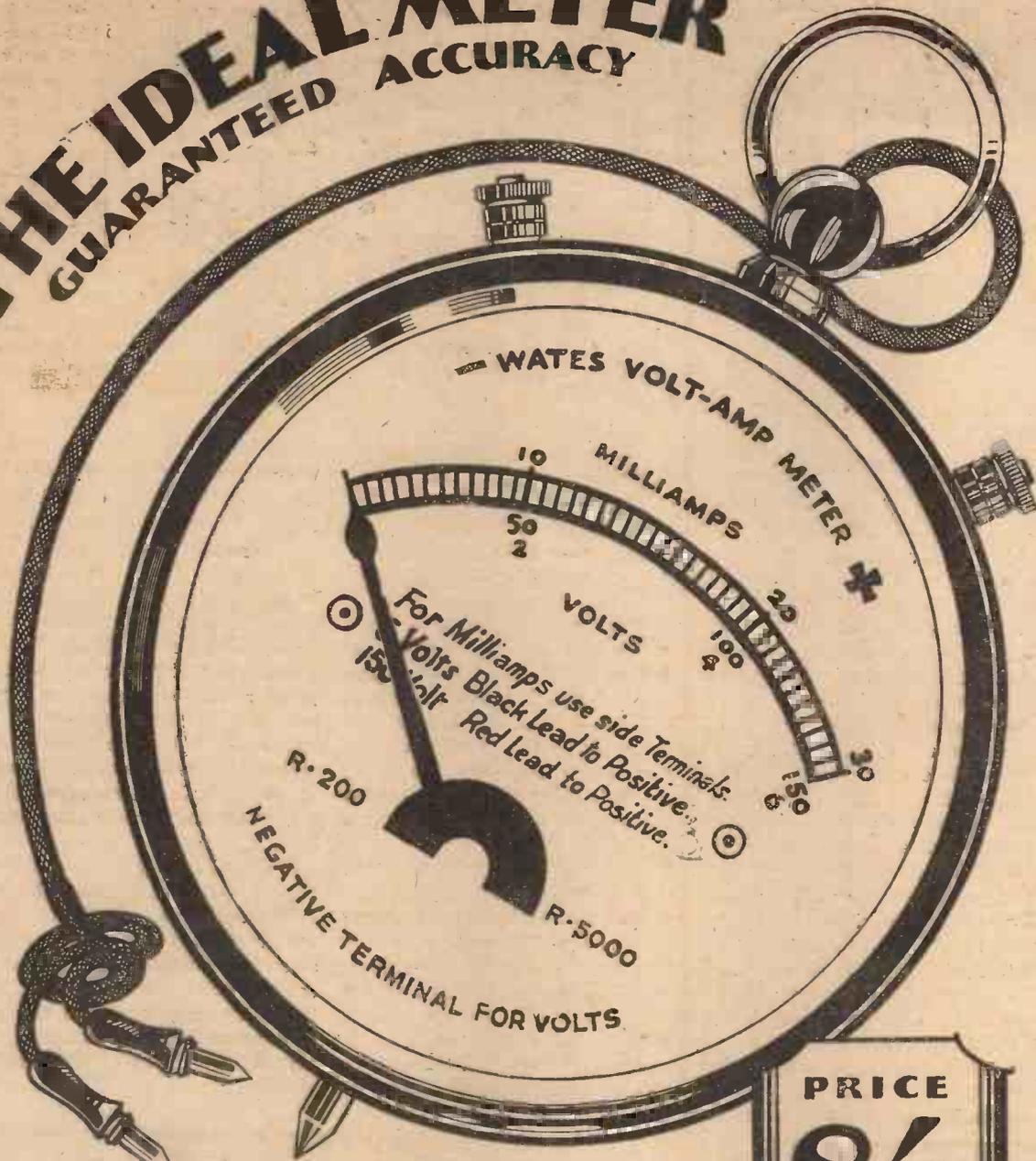
My tests show that the standard H.F. choke is not productive of as much magnification as one of the special types which have been developed for the purpose. The magnification is, of course, not so much as when a tuned stage is used, but when the set has two stages of high frequency, one may very well be of the choke-coupled type.

This stage provides just that extra amount of magnification which is sometimes needed, and does not add to the difficulty of tuning.

Be careful not to place the choke too near other parts in the set. As it carries high-frequency currents, it may produce instability by coupling with another part in the set, but there is usually no need to shield it.

THE IDEAL METER

GUARANTEED ACCURACY



PRICE
8'6

PANEL MODEL

Three readings, H.T., L.T. volts and milliamps, with plug switch.

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MILLIAMP METERS

0-25 or 0-50 M.A.

916

READINGS

0 - 150 VOLTS

0 - 6 VOLTS

0 - 30 MILLIAMPS

Resistance 5,000 ohms.

Wates VOLT-AMP METER

"three in one"

The outstanding meter in Radio. Provides greatest usefulness and accuracy. The three readings are; volts on the H.T., L.T. scales and milliamps, all on one clearly calibrated dial. Sold by all Radio Dealers, Halford's Stores, and Curry's Stores.

Descriptive literature sent free on request.

THE STANDARD BATTERY CO. (Dept. A.W.), 184/188 SHAFTESBURY AVENUE, LONDON, W.C.2.

M.B.

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

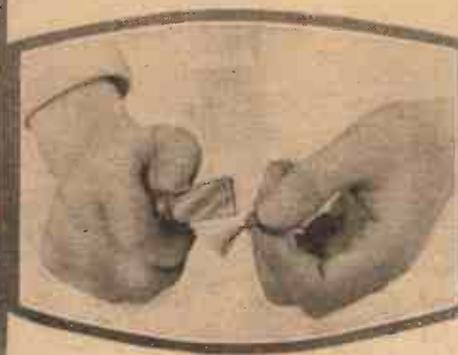
THE solder, the flux, and the wire must all be considered.

Perhaps I had better explain the use of flux, since quite a number of constructors try to solder without it! The flux is required to dissolve the oxides present on the surface of the metal, and to assist the solder to run freely into the minute pores of the metal. There are several very efficient flux pastes on the market, under various proprietary names. Be sure that you get a good-quality flux since this has a lot to do with the success of soldering.

The solder itself, which is used to bind together the wires or connections of the set, is also available in several varieties; for our work blow-pipe solder is the best. It is made in conveniently thin sticks. It possesses a low melting point and has the advantage of hardening very quickly after the iron is removed from the joint. The most convenient way to buy wire is in 2-foot straight lengths of No. 16 gauge square or round tinned-copper wire.

There is a knack in baring the insulation of this type of wire. The method is illustrated in one of the pictures. The knife is held with the forefingers of the right hand whilst the wire is rolled up and down the thumb with the cutting edge of the blade.

In wiring up a set the procedure I adopt



Three useful hints—the first picture shows the best method of straightening wire and the two others practical tips on the soldering of flex.

is roughly as follows. First of all the soldering iron is placed on a lighted gas-ring or in the red-hot glowing coals of the domestic fire. Whilst waiting for the iron to heat up, all the soldering tags and other points of contact are smeared very lightly with flux.

the solder will immediately run and form small blobs. At this point always take care to wipe away any excess of flux. It is possible that you will experience a little difficulty at first in the process of tinning, but a little practice soon makes easy what

pliers in the right hand bend the wire against the side of the jaws with the thumb of the left hand to make a right angle.

Replace the wire in position, decide which way it must bend next, again hold

(Continued on page 1004)

The Gentle Art of Wiring



By
JOHN B. CROFTS

II.—More practical suggestions by the winner of the highest award in an All-Britain Set-building Competition

Great care must be taken not to use too much flux. A match stick is handy for applying flux to the joints. The next part of the process often bothers constructors as they do not know when the iron is just the right temperature. One way of judging this is to see whether a small green flame is burning round the copper bit. On no account let the iron get red hot.

Draw the iron from its source of heat and quickly clean the copper bit with the file. Then place the copper bit in some flux, when it should sizzle if it is hot enough; withdraw it and apply some solder. If the iron is really clean, the solder will run on to the bit and form a bright surface. Dirt accounts for most soldering troubles.

The prepared tip of the iron should now be rubbed lightly on each of the soldering tags or points of contact; if they are clean

find the wire perfectly straight. This process should be repeated for each wire length. The shaping of the various wires involves fairly accurate guessing or approximate measuring of small runs of wire. The next step is to decide the order in which the wires are to be connected. If you are using an AMATEUR WIRELESS blueprint, the wires are, of course, already numbered in their correct sequence.

If possible every bend should be a right-angle. Decide upon the wire which you intend to connect up and fix in your mind the directions you will have to take. Select a straight length of wire and hold it above the first point of contact; mark off the distance this wire can make in a straight line. At some point it will be necessary to bend the wire to avoid some component or other; grip the wire with the long-nosed pliers and lift it clear of the set; then holding the

is really a very simple job.

In the actual wiring of the set I can give you a very useful tip, which is perhaps one of the least-known secrets of neat wiring. Everyone knows how difficult it is to straighten a wire with the fingers. Here is a much better way; take one of the 2-ft. lengths of wire and, if this is insulated, bare the two ends as already explained.

Insert one end of the wire in a vice and firmly grip the other end with long-nosed pliers. Exert a gentle pull on the wire until you feel a slight "give"; you will then

LISSEN TRANSFORMER



**SILENT
BACKGROUND**
in which a whisper
is amplified to a
great degree of
loudness

The Lissen 8/6 Transformer gained fame in a single season because it gave to constructors exactly what was required of a transformer—a coupling device of almost universal utility at a moderate price. The extraordinary efficiency of this Lissen Transformer has been proved since then in hundreds of thousands of sets—in published circuits of all descriptions.

You cannot buy a transformer that offers you better value for money. And if you consider it by the results you get when you use it, you will find that there is hardly any circuit in which this transformer cannot be used with the most gratifying results.

Turns Ratio 3 to 1
Resistance Ratio 4 to 1

PRICE
8/6

THE LISSEN SUPER TRANSFORMER

—with which you get almost perfect amplification—

The laboratory curves taken of the Lissen Super Transformer prove that there is exceptionally even amplification over the whole band of audible frequencies, and it should be noted that these curves have been taken with ordinary standard valves. Two ratios, $3\frac{1}{2}$ to 1 and $2\frac{1}{2}$ to 1.

Each **19/-**



H.T. ELIMINATORS YOU CAN USE WITH YOUR SET LIKE A BATTERY

The current you get from Lissen Batteries is the greatest power you can get for the 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, 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.

Then you only have to take your battery out and put the Lissen Eliminator in its place. No need for special wiring. These Lissen Eliminators are cased in insulating material and the lead is heavily insulated cab-tyre flex.

TYPES AND PRICES

D.C. MODEL "A" Employs 3 H.T. + tapping: 1 H.T. + 1 giving 80 volts for S.G. valves; H.T. + 2 giving 60 volts at approx. 2 mA for detector valves; H.T. + 3 giving 120/150 volts at 12 mA. PRICE .. 27/6	D.C. MODEL "B" Employs 3 H.T. + tapping: 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 12 mA. for power valves. PRICE .. 39/6
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Models working on 100/110 Mains Voltage give output voltages of approximately 60 per cent. of above values.

A.C. MODEL "A"	
Tappings as in D.C. Model A,	
LN 576 for A.C. Mains voltage ..	200-201
" 577 " " " " ..	220-230
" 578 " " " " ..	240-250
" 639 " " " " ..	100-110
PRICE ..	13 : 0 : 0

A.C. MODEL "B"	
Tappings as in D.C. Model B,	
LN 579 for A.C. Mains voltage ..	200-210
" 580 " " " " ..	220-230
" 641 " " " " ..	240-250
" 640 " " " " ..	100-110
PRICE ..	13 : 15 : 0

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LISSEN LTD., Worpole Road, ISLEWORTH, Middlesex
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12/6
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The **LISSEN**
FOUR-POLE

ADJUSTABLE BALANCED ARMATURE UNIT

The Lissen 4-Pole Balanced Armature Unit brings something approaching loud-speaker perfection within the reach of everybody who owns a radio set. You can build any type of cone loud-speaker with it; you can use it with a big baffle board, or put it in a cabinet. You can build a linen diaphragm loud-speaker with it, or you can buy it completely assembled and ready to connect up to your set. It has a fine adjustment, and you therefore get the utmost volume from it without chatter.

In brown moulded case with attachment for fitting to any type of cone **PRICE 12/6**

Cast aluminium Chassis, specially designed to give the best results from the Unit **PRICE 7/6**
13-in. cone for use with the above **2/6**

COMPLETE ASSEMBLY

with which you get the nearest possible approach to moving-coil tone, and fine full volume without chatter. Ready for use or to mount in a cabinet, price

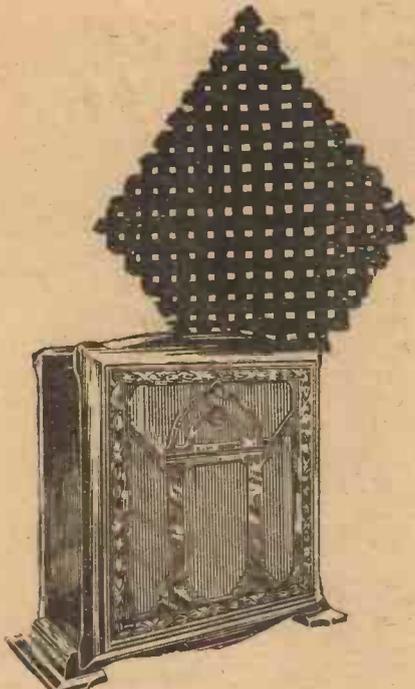


22/6

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 (SSW)	15.0	286	1,049	Montpellier (PTT)	0.2	411	680	Rome (Roma)	3.0
*200	1,500	Leeds (2LS) ...	0.13	288.5	1,040	Mont de Marsan ...	0.3	453	662	Bolzano (IBZ)	0.3
*242	1,238	Belfast (2BE) ...	1.0	291.4	1,029.3	Radio Lyons ...	0.5	*501	599	Milan (Milano)	7.0
*61	1,748	London (2) tests		*294	1,020	Limoges (PTT) ...	0.5	YUGOSLAVIA			
*288.5	1,040	Newcastle (5NO)	1.0	304	986	Bordeaux (PTT) ...	1.0	308	973	Zagreb (Agram)	2.5
288.5	1,040	Swansea (5SX) ...	0.13	305.3	981.7	Agen ...	0.25	429	698	Belgrade	0.7
288.5	1,040	Stoke-on-Trent (8ST)	0.13	309	970	Radio Vitus ...	1.0	574	523	Ljubljana	2.5
288.5	1,040	Sheffield (6LF) ...	0.13	*316	970	Marseilles (PTT) ...	0.5	LATVIA			
288.5	1,040	Plymouth (5PY) ...	0.13	329	914	Grenoble (PTT) ...	0.5	*525	572	Riga	3.0
288.5	1,040	Liverpool (6LV) ...	0.13	364	824	Algiers	12.0	LITHUANIA			
288.5	1,040	Hull (6KH) ...	0.13	368	825	Radio LL (Paris)	0.5	*1,935	155	Kovno	7.0
288.5	1,040	Edinburgh (2EH)	0.35	414	724	Radio Maroc (Rabat)	2.0	NORWAY			
288.5	1,040	Dundee (2DE) ...	0.13	447	671	Paris (Ecole Sup. PTT)	3.0	240	1,250	Rjukan	0.13
288.5	1,040	Bournemouth (6BM)	1.0	468	640	Lyons (PTT) ...	5.0	*283	1,058	Notodden	0.05
288.5	1,040	Bradford (2LS) ...	0.13	1,441	207.5	Eiffel Tower ...	12.0	345	869	Frederiksstad	0.7
*301	995	Aberdeen (2BD)	1.0	*1,725	174	Radio Paris ...	12.0	364	824	Bergen	1.0
*310	968	Cardiff (5WA) ...	1.0	GERMANY				453	662	Tromsø	0.1
350	843	Brookman's Park 30		*218	1,373	Flensburg	0.5	453	662	Aalesund	0.3
*377	797	Manchester (2ZY)	1.0	*227	1,319	Cologne	4.0	453	662	Porsgrund	0.7
*303	753	Glasgow (5SC)	1.0	*234	1,283	Münster	3.0	*493	603	Oslo	1.5
*479	626	Daventry (5GB)	25.0	*230	1,256	Nurnberg	2.0	POLAND			
1,554	193	Daventry (5XX)	25.0	*246	1,220	Kiel	0.35	*313	959	Cracow	0.5
AUSTRIA				*246	1,220	Cassel	0.25	*335	896	Posen	1.2
*240	1,220	Linz	0.5	*253	1,184	Gleiwitz	2.0	885	779	Wlino	0.5
*283	1,058	Innsbruck	0.5	*259	1,157	Leipzig	1.5	*408	734	Kattowitz	10.0
*352	851	Graz	7.0	*270	1,112	Kaiserslautern	0.25	*1,411	212.5	Warsaw	8.0
*453	666	Klagenfurt	0.5	*276	1,085	Königsberg	2.5	ROUMANIA			
*517	581	Vienna	15.0	*283	1,058	Magdeburg	0.5	*301	761	Bucharest	12.0
BELGIUM				*283	1,058	Berlin (E.)	0.5	RUSSIA			
208	1,440	Radio Conference, Brussels		*283	1,058	Stettin	0.5	933	320	Moscow	20.0
235.5	1,273.5	Charleroy (LL)	0.25	*319	941	Dresden	0.25	(C.C.S.P.) 75.0			
240	1,220	Schaerbeek-Brussels	0.25	*319	941	Bremen	0.35	1,000	300	Leningrad	20.0
244	1,229	Ghent	0.5	*325	923	Breslau	1.5	1,000	283	Tiflis	10.0
294	1,020	Liege	0.1	*360	833	Stuttgart	1.5	1,100	272.7	Moscow Popoff	40.0
312	961.4	Arlon	0.25	*372	806	Hamburg	1.5	*1,301	230	Kharkov	4.0
336.9	890	Velthem	8.0	*390	770	Frankfurt	1.5	1,481	222.5	Moscow (Kom)	40.0
*509	590	Brussels	1.0	*418	716	Berlin	1.5	SPAIN			
CZECHO-SLOVAKIA				*453	662	Danzig	0.25	251	1,193	Almeria (EAJ18)	1.0
*263	1,139	Morava-Ostrava	10.0	*456	657	Aachen	0.35	208	1,121	Barcelona	10.0
*279	1,076	Bratislava	12.5	*473	635	Langenberg	13.0	(EAJ13) 10.0			
*293	1,022	Kosice	2.0	533	593	Herzogstand (Bavaria)	0.5	311	956	Oviedo (EAJ19)	0.5
*342	878	Brunn (Brno)	2.4	*533	593	Münch	1.5	*349	860	Barcelona	8.0
*487	677	Prague (Praba)	5.0	*500	536	Hanover	0.35	(EAJ1) 8.0			
DENMARK				568	529.8	Augsburg	0.25	*388	815	Seville (EAJ5)	1.5
*281	1,067	Copenhagen (Kjbenhavn)	7.5	566	529.8	Freiburg	0.35	416	721	San Sebastian	0.5
1,153	260	Kalundborg	7.5	*1,035	183.5	Zeesen	30.0	424	707	Madrid (EAJ8)	0.5
ESTHONIA				2,100	142	Norddeich	10.0	453	662	Salamanca (EAJ22)	1.0
*297	1,010	Reval (Tallinn)	0.7	2,290	131			SWEDEN			
FINLAND				GRAND DUCHY							
*221	1,355	Helsingfors	0.9	223	1,346	Luxembourg	3.0	231	1,301	Malmo	0.6
*1,796	167	Lathi	40.0	HOLLAND							
FRANCE				31.4	9,554	Eindhoven	25.0	*257	1,160	Hörby	10.0
31.65	9,479	Radio Experimental (Paris)	1.0	(PCJ) 25.0							
175	1,714	S. Quentin	0.1	*208	1,004	Hilversum (until 5.40 p.m. G.M.T.)	0.5	270	1,112	Trollhattan	0.45
214	1,400	Pécamp (Radio Normandie)	0.5	*1,071	280	Hilversum	0.5	*322	932	Göteborg	10.0
220	1,364	Beziers	0.1	*1,071	280	Scheveningen-Haven	5.0	332	905	Falun	0.5
238	1,260	Bordeaux (Radio Sud-Ouest)	1.0	(from 10.30 a.m. to 5.40 p.m. B.S.T.)							
239	1,256	Radio Nimes	0.25	*1,875	160	Huizen (after 5.40 p.m. G.M.T.)	0.5	436	689	Stockholm	1.5
244	1,229	Juan-les-Pins	0.3	HUNGARY							
*255	1,175	Toulouse (PTT)	1.5	550	515	Budapest	20.0	*542	554	Sundsvall	0.6
*265	1,130	Lille (PTT)	0.7	ICELAND							
268	1,121	Strasbourg	0.3	*1,200	250	Reykjavik	1.0	*770	389	Ostersund	0.6
*272	1,103	Rennes (PTT)	0.5	IRISH FREE STATE							
				*225	1,337	Cork (IFS)	1.0	1,200	250	Boden	0.6
				*413	725	Dublin (2RN)	1.0	*1,348	222.5	Motala	30.0
				ITALY							
				291	1,031	Turin (Torino)	7.0	SWITZERLAND			
				*330.3	908	Naples (Napoli)	1.5	*403	743	Berne	1.0
				*385	779	Genoa (IGE)	1.0	*459	653	Zurich	0.63
				All wavelengths marked with an asterisk have been allotted according to the Plan de Prague.							



The Christmas Tonic for your Radio Set!



However long ago you constructed or bought your radio receiver, the Ultra Air Chrome will give it new life, increased brilliance, and realistic virility. Last season's sets become transformed by the amazing tone sensitivity of this wonderful double-diaphragm linen speaker (Patent No. 295,625), which, since its introduction, has taken musicians, technicians, dealers, radio enthusiasts, and ordinary listeners by storm. Give your radio receiver this magic tonic—it will respond magically. No other speaker will reveal such glorious tone quality, such faithful reproduction of the high notes, and such realistic response to the very low notes in the receiver that for many months past has served you so well. Remember the name at your dealers—the Ultra Air Chrome.

Manufactured in cabinet style at U12, £3 19 6; U14, £5 5 0; and upwards; and in chassis form for home assembly at 12" x 10", £2 2 0; 14" x 14", £2 12 0; 18" x 23", £4 4 0; and 24" x 24", £5 5 0.

The factory-made double linen diaphragm speaker gives new life to radio receivers—old and new. Hear it at your dealer's to-night.

ULTRA AIR CHROME SPEAKER

Fitted with the double linen diaphragm

Manufactured by Ultra Electric Limited, 661-663 Harrow Road, London, N.W.10



Baldry Ad. U115

"THE GENTLE ART OF WIRING"

(Continued from page 1002)

with pliers and repeat the bending process. Continue until the wire has completed its run and then cut off the shaped portion from the total, leaving about an inch to spare. This will allow for any slight inaccuracy.

Now place both the bared ends in position and complete the operation by soldering the wire to its connections. I find a set-square very useful for checking the accuracy of angles; one faulty angle throws out the whole appearance. Each

succeeding wire length is treated as before and with a little patience the result will be a neat and efficient set that you will be justifiably proud in showing your friends. Set-building really does take on an added fascination when the wires are properly shaped and soldered.

Since the original Vienna transmitter has been installed at Graz, thus allowing the programmes to be picked up at greater distances, the latter's broadcasting plant has been temporarily installed at Salzburg. Tests will be carried out within the next few days.

THE NEW MARCONI LICENCE

Its Salient Points

SOME months ago we reported the outline of an agreement which had been reached between the Marconi Company and the wireless manufacturers with regard to the licence payable on wireless sets incorporating Marconi patents. Some time has inevitably elapsed in putting that agreement into definite shape, but there has now been issued the form of licence which in itself embodies the agreement reached months ago and now completed in detail. No manufacturer is compelled to take this licence, but the Radio Manufacturers' Association, which negotiated the agreement, recommends the trade to adopt it.

The Grantors of the licence are Marconi's Wireless Telegraph Co., Ltd., and the Gramophone Co., Ltd., while the Licensees are the manufacturers of apparatus embodying certain patents, the property of the Marconi Company, the Radio Company of America, the British Thomson-Houston Company, and the Gramophone Company, as set forth in the schedule accompanying the licence.

We cannot afford space to publish the licence in detail, nor would such a course serve any general advantage. We propose merely to give a brief summary, in order that the reader may see at a glance the position existing between the Grantors and the Licensees.

Firstly, the licences cover the period August 28, 1928, to August 28, 1933, and are for the purpose of manufacturing broadcast-receiving apparatus for the reception of sound (note the restriction) broadcast by wireless, but only for private or domestic use, or for charitable, educational, and similar purposes. The licence does not cover valves or loud-speakers.

Apparatus manufactured under the licence may not be exported, neither may apparatus constructed in accordance with the patents be imported.

Apparatus manufactured under the licence will bear a plate supplied by the Marconi Company.

It is a condition of every sale or hire that the Licensee makes the conditions of the licence binding upon and observable by every purchaser or hirer.

The Licensees will pay a royalty of 5s. in respect of each and every valve employed in the broadcast-receiving apparatus manufactured under the licence. This 5s. per valve must be paid whether or not the apparatus embodies or utilises any invention which is the subject of any of the patents shown in the schedule to the licence; a royalty of 5s. per valve is also payable on "kit" sets, but only, in this case, if the sets embody the inventions covered by the patents in the schedule.

On battery eliminators coming within the scheduled patents and on each set of

(Continued on next page)



for Radio on Easy Terms with Service after Sales

Here is a small selection of lines in popular demand.

EVERYBODY'S THREE. Complete kit, including drilled Panel, Cabinet, and Valves. Cash £9 19s., or 12 monthly payments of 18/3. Free Blueprint included.
THE WORLD-WIDE SHORT-WAVE THREE (see Nov. 9 issue). Complete kit, including Metal Cabinet and Valves. Cash £9 0s. 9d., or 12 monthly payments of 16/7. Free Blueprint with complete kit.
OSRAM MUSIC MAGNET. Cash £9, or 12 monthly payments of 16/6. Valves included.
COSSOR 1930 THREE-VALVE KIT. Cash £8 15s., or 12 monthly payments of 16/-.

THE MUSIC LEADER (described in Oct. 26 and Nov. 2 issues). Complete kit, including Cabinet, Valves, Batteries, and all requisite accessories. Cash £12 15s. 6d. or send only 25/-; balance in 11 monthly instalments of 23/-.

MUSIC LOVER'S GRAMO-RADIO (described in Sep. 28 and Oct. 5 issues). Complete kit contains exact parts as specified and drilled Panel. Full-size Blueprint free with complete kits. Cash £10, or 12 monthly payments of 18/4. Valves, cabinet, gramophone motor and accessories, extra.

THIS WEEK'S SPECIAL FEATURES!

THE 1930 ETHER SEARCHER (described in last week's issue)
 Complete kit of components, including drilled panel, drilled chassis and valves **£8 : 2 : 1**
 or 12 monthly payments of 14/10. Any parts sold separately.

THE BROOKMAN'S SEPARATOR. (Described in this issue.) Complete kit of components less cabinet and valve. £2 13s. 6d., or 6 monthly payments of 9/9.

1930 MULLARD "ORGOLA" KIT, including Cabinet and Valves. Cash £10 15s. 11d., or 12 monthly payments of 20/-.

REGENTONE W.I.B. S.G. (A.C. Mains). For S.G. and Pentode Sets. Cash £4 19s. 6d., or 12 monthly payments of 9/2.

ALL LEADING MAKES OF ELIMINATORS from 4/7 first payment.

EXIDE 120-VOLT H.T. ACCUMULATOR, Type W.J., 2,500 m/a. In Crates. Cash £3 15s., or 12 monthly payments of 10/9.

EASY PAYMENT ORDERS DELIVERED TO APPROVED ACCOUNTS ON RECEIPT OF FIRST INSTALMENT. All goods sent Carriage Paid.

payments of 6/11. Type W.H., 120 volts, 5,000 m/a. In Crates. Cash £4 13s., or 12 monthly payments of 8/6.

CELESTION C.12 LOUD-SPEAKER, in Oak. Cash £5 12s. 6d., or 12 monthly payments of 10/4; in Mahogany, £5 17s. 6d., or 12 monthly payments of 10/9.

ULTRA AIR CHROME U.12 Cabinet Model Loud-speaker. Cash £3 19s. 6d., or 12 monthly payments of 7/4. All Chassis and Cabinet Models also available.

PHILIPS CONE SPEAKER, type 2016. Cash £2 10s., or 9 monthly payments of 6/-.

BLUE SPOT 66K UNIT, with SQUIRE MODEL 101 CONE KIT. Cash £3 4s. 6d., or 12 monthly payments of 5/11.

STILL TIME BEFORE CHRISTMAS, IF YOU ORDER NOW

IF IT'S NOT HERE

WRITE - WE HAVE IT!

Free Demonstrations and Advice by Qualified Engineers at our Shops:
 77 CITY ROAD, LONDON, E.C.1. Telephone: Clerkenwell 9406-7-8
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Please send me your 48-page Illustrated Catalogue, describing the 1929-30 products of all the leading makers,

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A.W.14/12





CLIMAX

ALL-ELECTRIC RADIO



Climax H.T. Mains Units this Xmas. For your own set and to give to your friends. The best you can get—the best you can give. Popular prices. Every modern improvement. A.C. models have new metal rectifying units eliminating all valve trouble. Negligible upkeep costs. **Ten Voltage Tappings.** For all Mains voltages 40/100 cycles. A.C. Model U.20, Price £4/5/0, up to 120-v. H.T., up to 20 milliamperes. A.C. Model U.50, Price £5/15/0, up to 200-v. H.T., up to 50 milliamperes.

Improved D.C. Model H.T. Unit—the most popular D.C. Mains Unit on the market—has **Ten Voltage Tappings.** Output 50 m/a total, 10 m/a at tappings. Price complete, 34/-.



CLIMAX CHELLOSET

AN AMAZINGLY SELECTIVE LONG RANGE 2-VALVE ALL-ELECTRIC RECEIVER

Many important features, one dial tuning, dual wave switch to eliminate coil changing, Westinghouse metal rectifier, volume control. No batteries whatever. Operates entirely from A.C. Mains. Walnut finished cabinet. Price only £9/17/6 complete with valves, royalties and full mains equipment. The finest value yet offered in all-electric receivers.

Obtainable from all Radio Dealers.



CLIMAX RADIO ELECTRIC LTD.,
Haverstock Works,
Parkhill Road, Hampstead, London, N.W.3
Telephone: Primrose 1171-2

component parts thereof the royalty will be 10 per cent. of the net selling price in the case of separate units, and in other cases the sum of 5s.

Should the Grantors themselves have to pay royalty to a third party, such additional royalty must also be paid by the Licencees.

The sum of £50 is payable on the execution of the agreement.

The term "broadcast-receiving apparatus" includes battery eliminators but excludes: (1) Gramophone and wireless receiving apparatus; (2) apparatus employing multiple-stage valves, but a screen-grid or pentode valve is not deemed to come within this category.

A most interesting point is that the Licencees themselves agree to grant to the Grantors licences to make and use any of their inventions applicable to broadcast-receiving apparatus other than valves or loud-speakers, but should a Licencee's invention not be an improvement or development of one of the patented inventions included in the schedule, then the Grantors must pay the Licencees a royalty (generally 10 per cent. of the net selling price).

CONSTANT-COUPLING CIRCUITS

WHEN using ordinary magnetic reaction, the coupling factor between the plate and grid coils tends to increase with the frequency to which the receiver is tuned, thus making it difficult to keep the set from oscillating when it is adjusted to receive a short-wave programme. There are several ways in which this difficulty can be overcome, one of the best being the well-known Loftin-White constant-coupling circuit.

Another simple expedient has recently been protected by the British Thomson-Houston Co. It consists in shunting the plate reaction coil with a resistance and condenser in series. The shunt circuit automatically diverts a larger proportion of the current from the reaction coil at high frequencies than at low, thus maintaining constant the effective flux linking the two coils for all settings of the tuning condenser B. R.

The group of short-wave commercial transmitters at Kootwijk (Holland) will, it is understood, be augmented by the addition of three new transmitters-equipped for working in C.W. and radio-telephony, which are now under construction. These will use the call-signs PCO, PCS, and PDM, and have been allotted wavelengths of 15.686, 16.60, and 16.182 metres respectively.

A recent appointment of interest, is that of Mr. R. Hope to the post of Sales Manager of Messrs. Graham-Farish, Ltd., the well-known firm of wireless manufacturers. Mr. Hope comes from the Midlands, and has been connected with the wireless trade since the early days of broadcasting.

'POPULAR' TRANSFORMER

Make your new set a better set with the Brownie POPULAR Transformer. Although it costs only 9/6, its purity of amplification gives a more vivid clarity of reproduction throughout the musical scale, while its sturdy British build ensures that once it is fitted the words "transformer troubles" can be eliminated from your list of worries.



BROWNIE WIRELESS CO. (G.B.) LTD.,
Nelson St. Works,
London, N.W.1.

BROWNIE WIRELESS

PATENT STEEL WIRELESS MAST

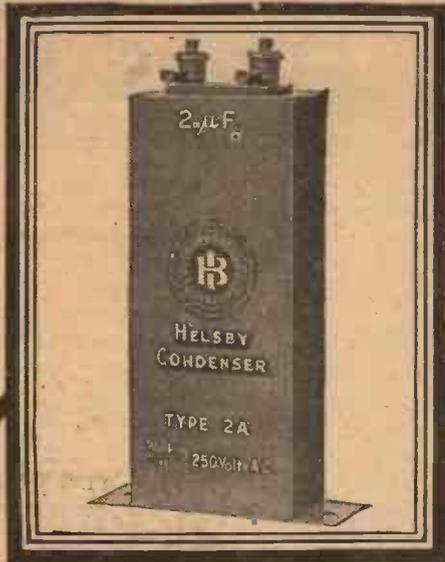
DAMP PROOF! ROT PROOF!!

	<p>26 Feet high. In 3 sections of 1 1/2 in. Steel tube tapering to 1 in. Carriage, London 1/6; Midlands 2/6; elsewhere 3/6. Weight 24 lbs.</p>	<p>15/-</p>
	<p>34 Feet high. In 4 sections of 1 3/4 in. Steel tube tapering to 1 in. Carriage, London 2/-; Midlands 3/-; elsewhere 4/- . Weight 34 lbs.</p>	<p>21/6</p>
	<p>The "SUPER" MAST 42 Feet high. In 5 sections of heavy 1 1/2 in. Steel tube tapering to 1 in. A real bargain. Carriage, London 2/6; Midlands 3/6; elsewhere 4/6. Weight 46 lbs.</p>	<p>29/6</p>
	<p>P.R. are made of British Steel in 9 ft. lengths, from 1 1/2 in., tapering to 1 in., and are supplied with cast-iron bed plate, steel ground pegs, stay rings, galvanised steel flexible wire stays cut to lengths, pulleys, bolts, and fullest erecting instructions. No further outlay necessary.</p>	

Pay C.O.D.

P.R. PRODUCTS, M17., P.R. HOUSE, NEWGATE STREET, LONDON, E.C.4

Opposite G.P.O. Tube Station.



FOR ELIMINATOR CIRCUITS

You cannot afford to use any but the best Condenser in an eliminator circuit.

HELSEBY CONDENSERS

are made and guaranteed by a firm with 30 years' experience in condenser making, from small telephone and radio condensers to Power Condensers weighing upwards of 2 1/2 tons. Guaranteed working voltages :-

Type M	-	-	150 volts D.C.
Type 2A	-	-	350 volts D.C.
Type 3A	-	-	450 volts D.C.
Type 4A	-	-	600 volts D.C.

All Helsby Condensers are vacuum dried and impregnated with a special non-hygroscopic material which renders them moisture proof.

If unobtainable from your dealer write to us giving his name and address.



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Makers of PRESCOT and HELSEBY cables



With Indicating Floats
P.G.F. 5 11/9
 20 a.h. zv.
 (as illustrated)
P.G.F. 7
 30 a.h. zv. 13/9
P.G.F. 9
 40 a.h. zv. 15/9

Non-Indicating.
P.G. 5 9/-
 20 a.h. zv.
P.G. 7
 30 a.h. zv. 11/-
P.G. 9
 40 a.h. zv. 13/-
P.G. 11
 50 a.h. zv. 15/-

Oh for an L.T. I can depend on!

You need never again experience the disappointment of missing part or all of a much-looked-forward-to programme through your L.T. suddenly giving out.

Get a Peto & Radford P.G.F. accumulator which gives you warning that its energy is low.

The P.G.F.'s indicating floats ensure that you always have a sufficiency of current to carry you through the programme. A single glance at these tells you whether the accumulator is

charged, half-charged, or running out

It embodies these further special features. The plates are sturdy. Paste is held by interlocking grids. The lid is of crack-proof, acid-proof Dagenite, hermetically sealed at the edges. Terminals have acid-proof glands, and, because of their different diameters, they cannot be reversed. There is ample acid-room, and plates are held in place by glass key-ways in the box.

Like every other P & R Battery, the P.G.F. is guaranteed for six months.

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PETO & RADFORD

ACCUMULATORS

The beginning and the end in

POWER

W.R.3

This announcement is issued by

THE NATIONAL ACCUMULATOR CO., LTD.

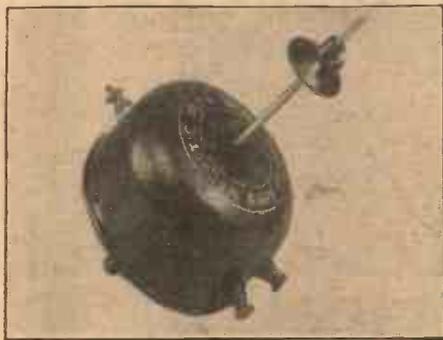
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"A.W." TESTS OF APPARATUS

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

M.P.A. Speaker Unit

THE M.P.A. speakers have enjoyed a large amount of popularity, due in some part to the efficiency of M.P.A. cone units. This unit is an extremely compact article having a depth behind the baffle board of $1\frac{3}{4}$ in. only and a maximum diameter of $2\frac{1}{2}$ in.; it may, therefore, be used with all types of cone whether concave or convex. The magnet system is made up of a vibration reed which rests near two electro-magnets converging together in the form of a V. A small horseshoe magnet completes the circuit. The electro-magnet can be moved towards or



The M.P.A. cone loud-speaker unit

away from the reed by adjustment of a knurled knob.

The unit is completely enclosed in a metal case with extra earth terminal. It has always been our experience, particularly with portable receivers that the efficient screening of a loud-speaker unit aids considerably in stabilising a low-frequency amplifier due to the liability for coupling to occur between the electro-magnet and other low-frequency apparatus. This feature, therefore, of enclosing the magnet winding in a complete metal case is commendable from every aspect.

We tested a number of speakers employing the unit, including the standard plaque and other cabinet models. In every case the reproduction was entirely satisfactory.

This unit can be recommended for driving all types of cone diaphragm. The makers are M.P.A. Wireless, 62 Conduit Street, W.1.

Carrington Unit Chassis

THOSE who make up their own loud-speakers often adopt the practice of mounting them in cabinets. For this purpose, it is necessary to have a chassis or other device for holding the unit in position. A practical and inexpensive device for mounting the unit is marketed by the Carrington Manufacturing Co., Ltd., of Camco Works, 24 Hatton Garden, E.C.

It comprises a wood bracket drilled to hold such popular units as the Ormond, Blue Spot, and Brown Vee and is made in two sizes for 12 in. and 15 in. cones. This, of course, assumes that the edge of the cone is on the same level as the base of the bracket.

When mounting the bracket in a cabinet, it is only necessary to drill a single hole in the base of the cabinet through which a bolt with wing nut may be placed. By loosening the wing nut, the bracket can be moved backwards or forwards in a slot to an extent of 2 in.; this gives a reasonable adjustment of the unit.

The unit itself can be mounted without any difficulty.

This is a practical device and sells at 1s. or 1s. 3d., according to the size.

In a recent report on the Yep crystal it was stated that the price is 2s. 6d. It should be noted that the price of the crystal, complete with a suitable cat-whisker, is only 6d.

Climax A.C. Unit

THE name Climax has been associated for many years with apparatus for obtaining supply from the mains. Both H.T. and L.T. eliminators can be obtained suitable for A.C. and D.C. supply mains. It was with interest, therefore, that we tested one of the latest pattern Climax A.C. mains units.

This unit has been provided with ten tappings, marked in graduated voltages from 50 to 200, and in every case we found on test that the voltages were within a few per cent. of their rated values when a total load of 25 milliamps was being taken from the unit.

The unit was tested on a standard three-



A very efficient A.C. H.T. unit—the Climax

valve set incorporating a screen-grid H.F., detector, and pentode. The unit delivered the necessary power silently and with every satisfaction.

It is neat in appearance and may be recommended to readers. The address of the makers, of course, is Climax Radio Electric, Ltd., Haverstock Works, Park-hill Road, N.W.3.

In view of the large increase in the number of licensed listeners in Denmark, the Copenhagen Broadcasting Co. has reduced the tax to 5s. 6d. per annum.

DOUBLE THE VOLUME of your LOUD-SPEAKER

Fit a P.R. Moulded Paper Cone to your speaker and you will be positively amazed at the difference. Double the volume and much greater purity in tone. All the notes come out in their correct value. No resonance—no "drumming"—just pure and real music.

3/6

Post 4d.

THE PAPER WHICH HAS IMPROVED SPEAKERS ALL OVER THE WORLD

The P.R. Cone is the only one which correctly reproduces the human voice as well as instrumental music. That is why it will improve any cone speaker, no matter the make or price. 11 in. diameter, correctly proportioned, ready to fit, complete with washers and screws. Can be adjusted instantly. No cutting, sticking or wash leather required.

Sent C.O.D. if desired.

Telephone City 3788.

P.R. PRODUCTS, (Dept. C.5), P.R. House, Newgate Street, London, E.C.4. Opposite Post Office Tube.



FOR... ELECTRIC REPRODUCTION

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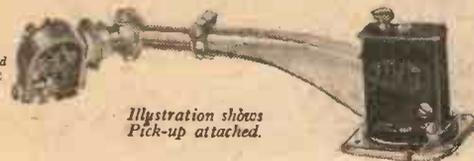


Illustration shows Pick-up attached.

PICK-UP ARM 15/6

Obtainable through all factors and dealers, or write

EACH

LIMIT RADIO LIMITED, ALBION ST., LONDON, N.1



FURTHER facilities have been granted by the B.B.C. for Baird television transmissions. From September 30 experiments were carried out five mornings a week at 11 a.m. In future, two further thirty-minute transmissions will be made weekly at the end of the evening programmes.

In the production of the microphone version of Anthony Hope's *The Prisoner of Zenda*, to be broadcast from 5GB on December 17, and from 2LO and 5XX on December 20, the organ music for the cathedral scene will be relayed from St. Mary le Bow, the City church of Bow Bells fame.

An interesting relay promised by the B.B.C. is that which is to take place on January 11, when a microphone will be installed on a launch at night and a running commentary on the Pool of London broadcast as the vessel steers its way through the shipping down the Thames.

In order to effect a comparison with *Journey's End*, a new specimen of war play from the German point of view, will be broadcast from 2LO soon after the Christmas holidays. The action in this instance does not take place in a dug-out, but in a brigade headquarters' telephone exchange.

On December 16 listeners are to make a tour of a newspaper office. Via microphone they will visit the editor's sanctum, the news room, and the composing department; they will also hear the whirr of the great rotary machines as the late edition is being turned out.

Three excerpts from *Dear Love*, the musical comedy now running at the Palace Theatre, London, will be relayed to 2LO and 5XX on January 4. The relay will be taken at 8.30, 9.35, and 10.35 p.m.

Ian Hay, the author of "The First Hundred Thousand," will visit the London
(Continued on page 1011)

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ONE OR MORE



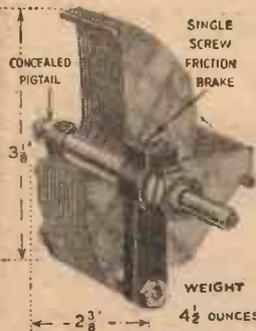
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In four Capacities

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- .0025
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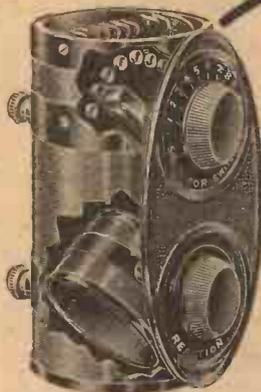
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AN EASY PRIZE COMPETITION FOR EVERY READER

WHAT IS YOUR IDEAL SET

WE are giving here a series of questions which we should like every reader to answer. Will you, both to please us and to assist your fellow-readers, take up your pen now, while the matter is fresh in your mind, and insert your answers? Then cut out the form and post it to us at once.

The competition definitely closes on Monday, December 16, 1929.

With all your votes before us we shall be able to decide which is the set that our readers collectively regard as their ideal. Our Technical Staff will enjoy themselves in digesting the information and in due course will be able to give all of you the benefit.

Readers whose replies agree, or most nearly agree, with the majority result will win the prizes. We bind ourselves to present prizes to the value of at least £26 15s. 6d.

CASH PRIZES.

- | | |
|-------------------------|-----------------------|
| 1st Prize, £10 : 10 : 0 | |
| 2nd Prize, £5 : 5 : 0 | 5th Prize, £2 : 2 : 0 |
| 3rd Prize, £4 : 4 : 0 | 6th Prize, £1 : 1 : 0 |
| 4th Prize, £3 : 3 : 0 | 7th Prize, 10 : 6 |

RULES:

Every competitor agrees to accept the Editor's decision as final and legally binding.

The list here printed must be used and the replies inserted **IN INK.**

A competitor may submit more than one coupon, but cannot gain more than one prize.

Should two or more competitors tie for place, the Editor will decide the next step.

We shall not be responsible for entries lost or mislaid.

No employee of Bernard Jones Publications, Limited (the proprietors of **AMATEUR WIRELESS**) may compete.

The names and addresses of prize-winners will be announced (if possible) in the issue of **AMATEUR WIRELESS** published just before Christmas.

Address Your Envelopes: "Ideal Set," Amateur Wireless, 58-61 Fetter Lane, London E.C.4.

LIST OF 12 QUESTIONS

- | | |
|------|--|
| (1) | How many valves would you have in your ideal set? |
| (2) | What sequence do you prefer—(H) H.F., detector, and L.F. stages, or (D) the detector valve followed only by L.F. stages? |
| (3) | If an H.F. stage is used, do you want single-dial tuning of the whole set? Say "Yes" or "No" |
| (4) | Do you prefer a screen-grid valve in the H.F. stage? Say "Yes" or "No" |
| (5) | In L.F. stages, do you prefer (R) resistance-capacity coupling or (P) push-pull transformer, or (O) ordinary transformer? |
| (6) | Do you prefer (C) output choke or (T) transformer output? If neither, leave blank ... |
| (7) | Would your ideal set act also as an amplifier for gramophone records? Say "Yes" or "No" ... |
| (8) | In wiring, do you prefer (N) nut-and-screw or (S) soldered joints?... .. |
| (9) | For tuning-in both medium and long waves, do you prefer (Ic) interchangeable coils or (Sw) panel switching? |
| (10) | Do you prefer (E) ebonite panel with wooden baseboard or (M) metal panel with metal base-plate? |
| (11) | Should the volume control be (A) after the detector or (B) before the detector? |
| (12) | Which suits your convenience—(Ba) battery operation or (Ma) mains operation? |

I agree to abide by the printed rules governing this competition.

NAME.....

ADDRESS.....

14/12/29

ONLY A FEW COPIES LEFT

The "WIRELESS MAGAZINE" for December has met with such a good reception that there are only a very few copies left in news-agents' hands. Here are some of the contents of this splendid issue.

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Simple to construct; gives superb results.

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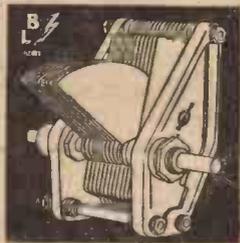
Player's please



N.C.C. 763A

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Special Track-arm designed for use with above—
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A.C. Mains Transformers and Chokes

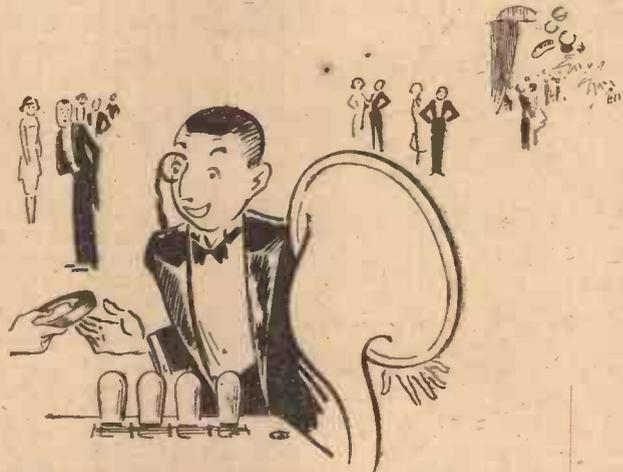
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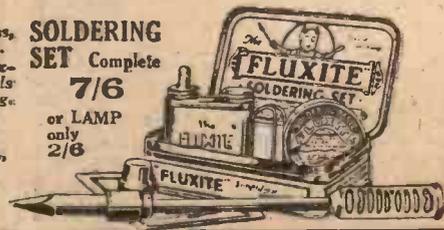
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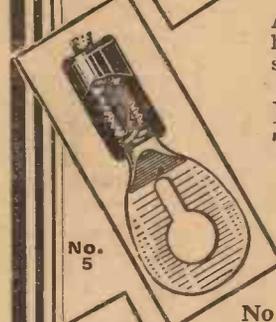
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(Supplies immediately obtainable through all Dealers)

Write for the Clix Folder

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LETTERS TO THE EDITOR

(Continued from page 1012)

what struck me as strange was that the Königswusterhausen programme was received at greater strength than the one from Holland, though the latter is rated at 25 kilowatts, whereas the German is apparently 8 kilowatts.

Another thing that puzzles me is that I have only once been able to tune in 5SW (Chelmsford), although it is rated at 15 kilowatts; yet the German station comes in (though fading sometimes) at full loud-speaker strength. The set is a detector and two L.F. (one R.C. and one transformer).

I had a curious experience the other day when I lighted on the transatlantic telephone service, of which I could only receive the speech from the American side faintly on the loud-speaker. I don't know the wavelength, but it was about 6 degrees on a .0005 condenser above the German, using a 7-turn secondary in the aerial circuit and a 3-turn primary (untuned). I suppose it was the beam service; but I had thought the transatlantic telephony was conducted on long wavelengths—of the order of 2,000 or 3,000 metres.

F. W. S. (Glasgow).

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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. Queries should be addressed to the Editor, and the conditions printed at the head of "Our Information Bureau" should be closely observed. 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.

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The first plug and socket in which both parts are engraved and entirely insulated when connected or disconnected



Plug and Socket, 9d.
Panel Portion, 3d.
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The Sovereign Dual Range Coil—widely used, extremely efficient, selective, smooth reaction, wide tuning range, switch incorporated, panel mounting, one hole fixing. Wiring instructions. **8/6**

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Mullard Master 3, Bantam 3, Favourite 3, etc., DUAL COILS. Each **7/9**

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From Francis Shaw, of Otley, Yorkshire, 9/11/29:— We have received the wireless set in good condition. We are very satisfied with it, and thank you for the courtesy shown to us. I am, yours faithfully, (Signed) Francis Shaw. From A. C. Morton, of Hartley Wintney, 3/10/29:— Dear Sir,—Have received wireless set, etc. (yesterday). I am more than pleased with same. It has surpassed my expectations, and you can be sure I shall recommend your firm in future to my friends. Yours truly, (Signed) A. C. Morton.

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Solves all H.T. Troubles.

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JARS (waxed), 2½ in. x 1½ in. sq., 1/3 doz.

ZINCS, new type, 10d. doz. SACS, 1/2 doz.

Sample doz. (18 volts), complete with bands and electrolyte, 4/1 post 9d. Sample unit 6d.

Illus. booklet free. Bargain list free.

AMPLIFIERS, 30/- . 3-VALVE SET, £5.

A. TAYLOR, 57, Studley Road, STOCKWELL, LONDON.



"THE MODERN RADIO SLEUTH"
(Continued from page 998)

C, D, G, adopted by Stuttgart, and the A flat and D flat of Koenigsberg, the three pizzicato notes, F, D, A flat, as from a violin, of Cracow, or the long dash —, the morse letter T —, used by Milan."

"Are morse signals also used?" asked Botson.

"Too many of them, as a matter of fact, to make your task easy, although, in some instances, they help, by the letter or combination of letters sent. Warsaw may be recognised by the W (. — —), Hamburg by its HA (. . . . —), Bremen, BMN (— —), Graz K, (— . —), Hanover, HR (. . . . —), and Kiel, KL (— . — . . .).

Many studios have kept to the metronome, which was introduced some two or three years ago by Breslau, and here again a small amount of observation may assist in identifying the transmitter, as the beats per minute vary greatly. Count those of Berlin through Koenigswusterhausen; you will register roughly two hundred and ten in one minute. Take these down, they may prove useful"

Those "Beats"

"Belgrade, 120 beats; Breslau, 240; Bucharest, 125; Frankfurt, 100; Vienna and its relays, 150; Kattowitz, 60 double beats, as of a hammer hitting a wooden slat; Kosice, 80; Leipzig, 240; Lyons, 190; Radio Maroc (Rabat), 60; Posen, 240; Stamboul, 120; and Zagreb, 106. I may have omitted some, but these will do to go on with."

"In those instances in which a call can be heard, I admit, the task is facilitated, but on occasions I have not understood the name of the city mentioned by the announcer."

"For the sole reason, my dear Botson, that the native name was used, and did not necessarily correspond with that to which we are accustomed in the English language. You would hear Belgrade as Beograd, Bucharest as Boo-koo-recht, and Budapest as Boo-da-pesch, Huizen as Hoyzen. The Italians call their stations Torino, Roma, Napoli, Genova; the Poles, when announcing, would mention Warsaw (Varschavva), Kat-o-wit-see, Posnan (Posen), and Cracooft (Cracow); Wilno retains its name, but the word Uwaga is substituted in the call for Hallo. As a matter of fact, many native names are used. I may mention Moskva (Moscow), Wien (Vienna), and Kaunas (Kovo), not forgetting Dublin and Cork calling under the disguise, *Se Seo Radio ath Cliath agus Radio Corcaighe*. And now, my dear Botson—"



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Or buy Cabinets for Wireless. At a quarter shop prices. Order Set as shown. British double spring motor 12in. velvet turntable, swan arm, metal soundbox, amplifier, needle cups, for £1. 18 .6 p.p. and build your own Cabinet. Machines sold by others at £10-£20 do not contain better things. Motors from 8/6. Repair parts. Lists free. 64 pp. 1930 Catalogue drawing and how to make Gramos 3d.

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Amateur Wireless

COUPON

Available until Saturday
DECEMBER 21, 1929

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Amps — Hours — Pence!

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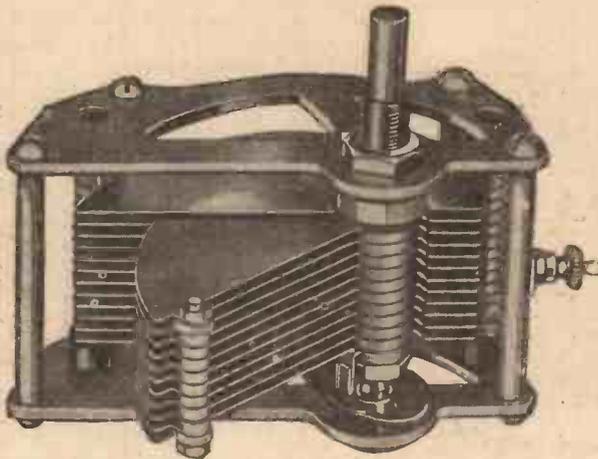
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Technical writers, the press and the leading manufacturers of circuits are constantly recommending Lotus Logarithmic Condensers. Why not use these proved Condensers in your set?

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From all Radio Dealers.

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You can get these Condensers fitted to the Lotus Dual and Single Drum Dials. Ask your Dealer.

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Self-capacity 3.5 M.M.F.

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6°
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For Triodes and screened-grid valves. Wavelength range: 235-550 and 1,000-2,000 metres.

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SEND FOR THESE DESCRIPTIVE LEAFLETS

- R.33 H.F. Choke
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- R.35 "Q" Coils
- R.36 Standard 6-pin Coils
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- R.51 Short-wave Coils
- R.58 3 Valve Kit

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In accordance with your offer in the December 14th issue of "Amateur Wireless"

please send leaflet(s) No.(s)

NAME

ADDRESS

DATE

8-16

THE "PENTECTOR TWO" — SELECTIVITY AND QUALITY

Amateur Wireless

Every Thursday 3^d

and Radiovision

Vol. XV. No. 393

Saturday, December 21, 1929

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DIFFERENTIAL REACTION

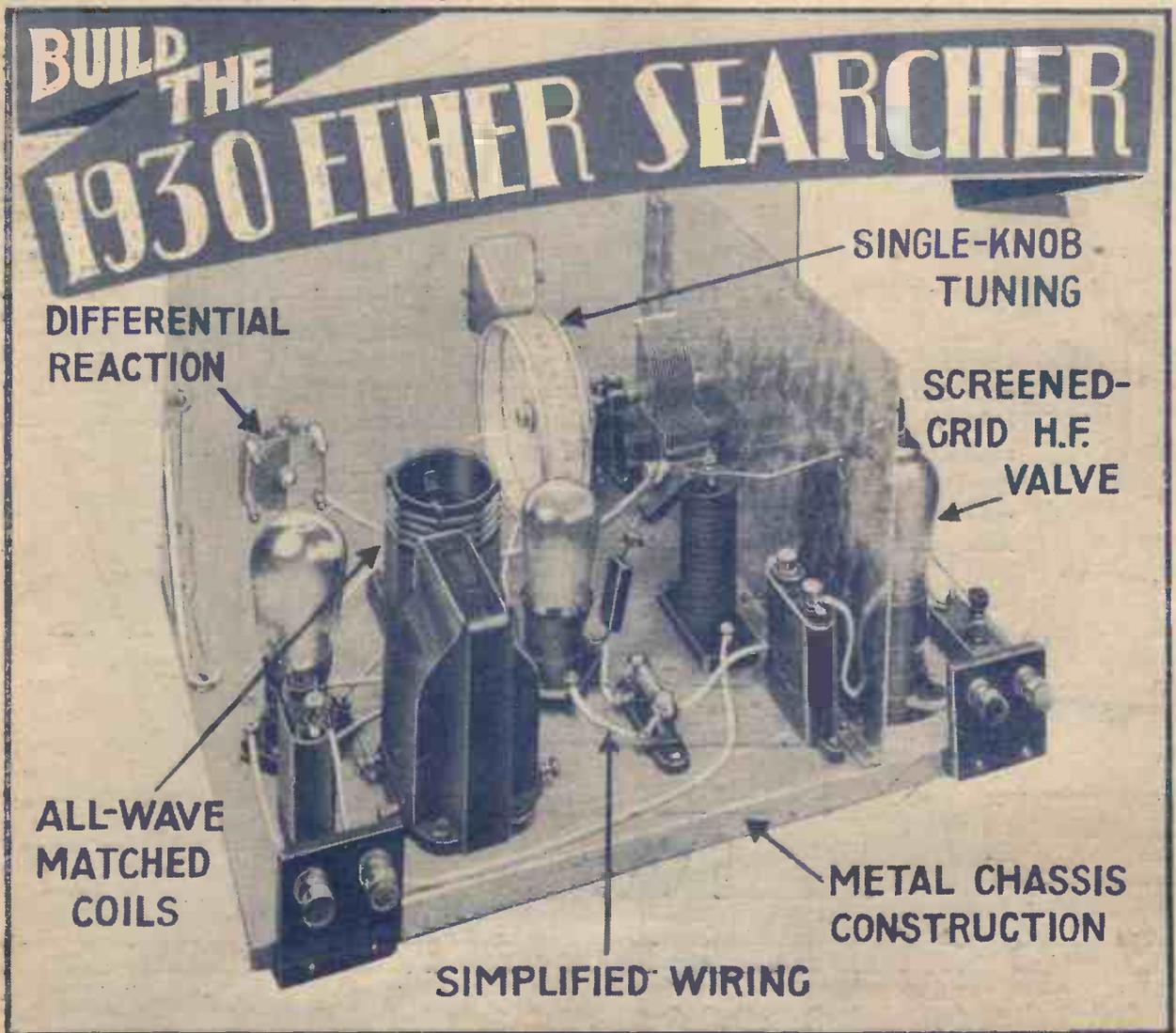
SINGLE-KNOB TUNING

SCREENED-GRID H.F. VALVE

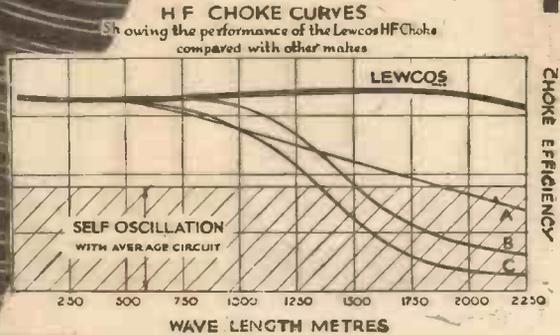
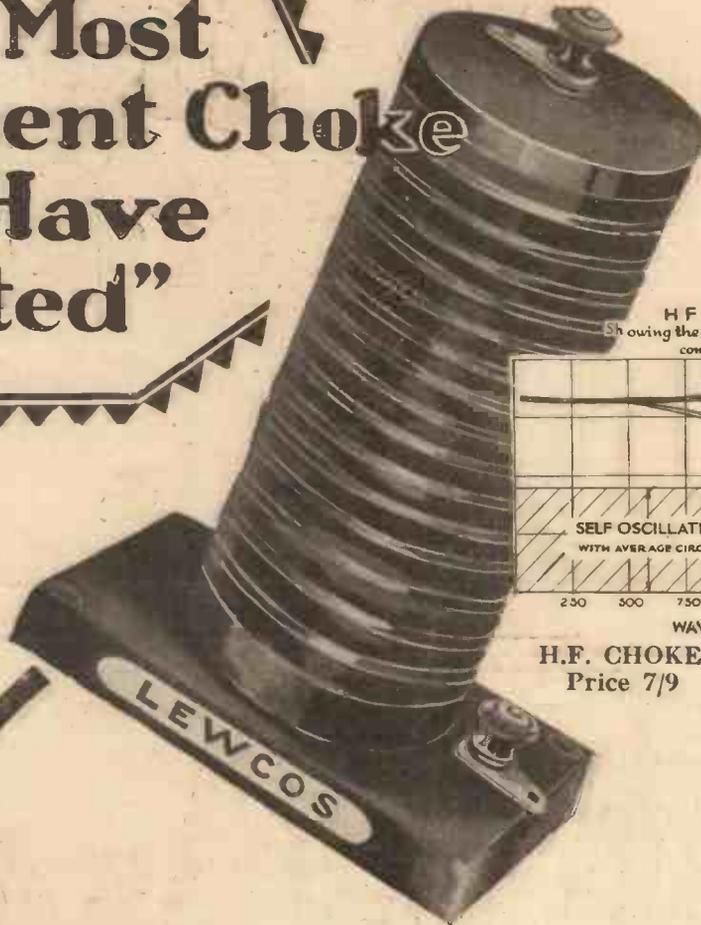
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H.F. CHOKE
Price 7/9

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An appreciation from Industrial Progress (International), Ltd., Bristol

The above letter is a further appreciation of the unique qualities of the Lewcos H.F. Choke. The fine materials and the high-class workmanship used in its manufacture make it supreme. The terminals are arranged one at the top and the other at the base of the Coil, to eliminate the risk of additional self-capacity in the wiring of the receiver.

The H.F. Choke curves illustrated above show the astonishing performance and advantages of the Lewcos Choke over other makes. A fully descriptive leaflet will be sent on request.

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6d.
Per 10 ft. Coil

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Church Road, Leyton
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Regd.

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Both in Ratios 5 to 1 & 3 to 1

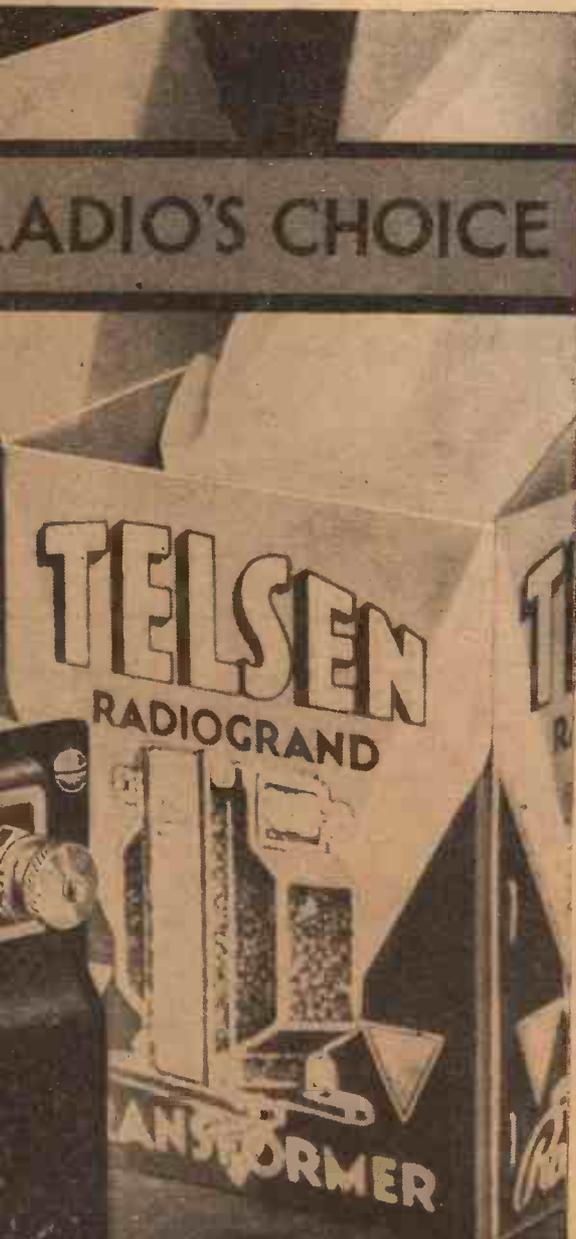
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TELSEN

RADIOGRAND

TRANSFORMER



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NOISE-PROOF!

VALVE WITH INTERLOCKED

BREAK-PROOF!

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2 volt type now available
 The NEW Cossor 230 P.T.
 (2 volts, .5 amp) Impedance
 20,000. Amplification Factor
 40. Anode volts 100 to
 180. Price 25/-

Cossor 4 volt Pentodes are
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2866 

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Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

Editor: BERNARD E. JONES

Technical Editor: J. H. REYNER, B.Sc., A.M.I.E.E.

Research Consultant: W. JAMES

Assistant Editor: H. CORBISHLEY

The New 2LO—Good Tuning—Enter Adrian Boulton—The "Palace" Concerts— Skating to Radio Music!—The New "All Britain Three"

The New 2LO—Readers will now have had ample opportunity to see for themselves the new conditions brought about by the opening of the new 261.3 metre regional transmitter. Not a very grand opening, was it? A gramophone record of *Samson and Delilah*! There is little excuse for those who get mutual interference. The separation is 306 kilocycles as against the 214 kilocycles previously obtaining between 2LO and 5GB. The B.B.C. says that no complaints were phoned through on the opening day.

Good Tuning—No valuable information has yet come to hand regarding the respective ranges of the two transmitters. We await it with interest. As you know, the present arrangement is that the lower-wave Regional and Daventry 5XX put out the same programme—the reason being that it is anticipated that the higher-wave Regional will have the greater range and will provide a better alternative. If this doesn't turn out to be so, this rather upsets the apple-cart! Most sets work better lower down.

Enter Adrian Boulton—As was forecast in *AMATEUR WIRELESS* a long while ago,

Mr. Adrian Boulton is to be the B.B.C.'s new musical director. He will assume the post on May 15 next year. He has been the director of the Birmingham City Orchestra since 1924. He was educated at Westminster and Christ Church, Oxford, being president of the Oxford University Musical Club in 1910. Since 1918 he has conducted for the Royal Philharmonic Society, the Liverpool Philharmonic Society, and has also conducted the London Symphony, Queen's Hall, and Royal Albert Hall Orchestras, as well as a season of Russian ballet at the Empire Theatre and concerts in Vienna, Munich, Prague, Barcelona, and the United States. He succeeds Mr. Percy Pitt, of course.

The "Palace" Concerts—The series of popular concerts held by the B.B.C. at the People's Palace in the Mile End Road, London, E.1, are now in full swing. Despite the fact that the setting for these concerts is not very "high-brow," the gigantic hall is regularly packed—the reason being, frankly, that the fare provided is excellent, as witness the recently given programme conducted by Sir Landon Ronald, in which Solomon was the solo pianist. These concerts are well worth listening to, and if you are within easy reach of the "Palace," why not go and hear and see one actually being broadcast? The next is on January 9.

Skating to Radio Music!—A skating craze is now all the rage in Australia, and every day new rinks are making their

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appearance. In many cases cinemas have been converted to cater for the huge crowds who want to skate. Radio music is provided at a good many of these rinks, and apparatus such as the Philips gramophone amplifier is being used extensively for this work. A new use for radio!

The New "All-Britain Three"—Following the success of the "All-Britain Three" produced last Christmas-time by our Technical Editor, he has now evolved a new edition—the "New All-Britain Three." Technical changes during the past year have resulted in this necessity for revision, and in the new receiver we have a really "hot" set (and a really selective one) which will put up a genuinely satisfactory performance. At the same time, owners of existing "All Britain's" will be able to convert their receivers to the new edition with the minimum of trouble and expense. The new design still makes use of "neut." H.F. coupling, so new valves won't be needed. We have said that it is selective. Well, at our Elstree Laboratories it can easily separate the two "B.P.'s"—six miles away. And *that's* something by which to judge! Full-details will be given next week.



Two well-known Continental broadcasters, (left) Munich, and (right) Bucharest

BROADCAST ARTISTES IN PICTURE



DORIS GAMBELL.—This well-known soprano vocalist takes charge of a section in Liverpool's Children's Corner. She was responsible also for an important role in the play, "Hannele," when produced there.



DAVID WISE.—Most of the important concerts at 2LO have featured this fine violinist, and he also is not above being heard in the Children's Hour. He is a famous soloist and has been heard throughout the kingdom.



MURIEL CHILDE.—A famous concert vocalist, Miss Childe possesses a wide classical repertoire. She has been heard from most of the B.B.C. stations. Her diction is exceptionally clear.



JAMES CHING.—A fine scholarly pianist, Mr. Ching has been heard in several of the Foundations of Music series at 2LO. In addition, he is a soloist and gives many classical recitals.



GERTRUDE JOHNSON.—One of the best known of the late B.N.O.C. sopranos, Miss Johnson hails from Australia, and was advised in her career by Melba, who admired her early singing. She has played nearly every operatic role.



SIR HENRY WOOD.—World-wide fame has been won by Sir Henry Wood, though he is best known for his "promenade" concerts. Since joining the B.B.C., he has conducted nearly every important concert.



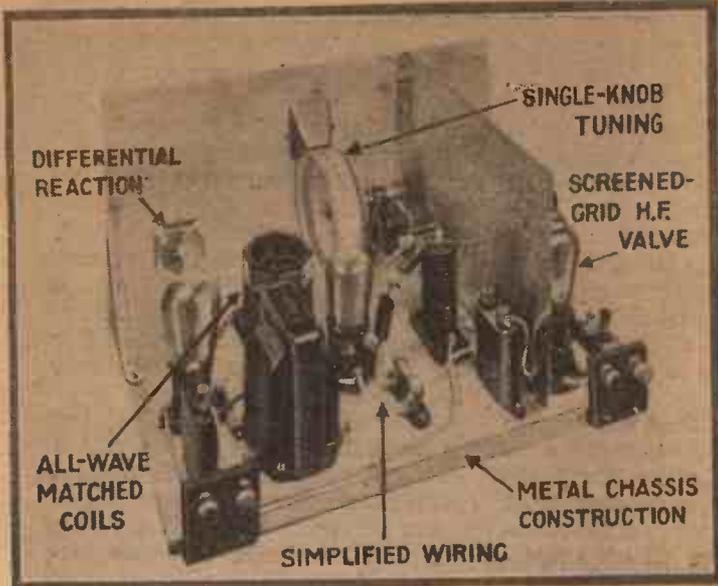
CATHERINE AULSEBROOK.—One of the earliest of broadcast stars, this artiste is a noted New Zealand contralto. She represented her country at the Royal Albert Hall, and has sung since at most of the big halls in this country.



LEONARD HIRSCH.—Now leader of his own quartet, this brilliant young violinist was the first violinist to play in the early Manchester station. He formed there the first radio trio. He is now a noted London soloist.



CLARA SERENA.—Another member of the late B.N.O.C., Miss Serena has enacted most of the important operatic roles. She sings again in the forthcoming symphony concerts.



The very special features of the "1930 Ether Searcher" are indicated above

The "1930 Ether Searcher"⁹⁹ Makes History

Sidelights on the remarkable three-valver described in the two preceding issues of "Amateur Wireless"

Until quite recently, the most popular set has included three valves, consisting of a detector valve

made highly efficient if a high-frequency valve is inserted between them. Distant stations, far from being cut down in strength by the selective properties of the tuning circuits, are actually increased in strength by the high-frequency valve.

A set with two tuned circuits has an over-all utility for present-day broadcast reception far in excess of anything that can be achieved with an old-fashioned three-valve set. Admittedly, one of the greatest attractions of the three-valve set

with only one tuning circuit is the simplicity of tuning. Because we believe that this simple tuning has a lot to do with the popularity of a type of set that is now becoming obsolete, we set ourselves the task of designing a receiver with two tuned circuits that could be varied by turning only one knob.

The idea of rotating two sets of moving condenser plates by a single knob appears to be extremely simple; but to put it into

practice is by no means simple. Assuming that both halves of the dual condenser are exactly matched, what of the coils associated with each half? These must also
(Continued on next page)

LOOKING through the past four issues of AMATEUR WIRELESS, I see that Mr. Sieger and I have contrived to show readers why a set for 1930 radio conditions is quite a different proposition from the type of set that has so far given satisfactory results. Long before we designed the "1930 Ether Searcher" we realised that the B.B.C.'s regional scheme was destined to change our previous notions of the essentials of a good set. The chief drawback of existing sets is lack of selectivity.

We know that thousands of listeners are quite content with the reception of their local station, but we do not think it is quite fully understood that the regional scheme aims to provide two local stations for every listener. When, as we hope, the second London regional station comes into regular operation, in February, listeners who have so far not been troubled by the lack of selectivity of their sets will have to take steps to separate the two London stations. We can easily visualise a state of affairs where thousands of listeners get both London stations mixed up.

To Tour the Continent

Quite apart from the local-station listener, there are many who are much more ambitious in their reception requirements. Many listeners like, on occasion, to be able to receive some of the interesting Continental programmes. As a rule, this type of listener is well aware of the need for selectivity and can appreciate a set embodying a good measure of selectivity.

with reaction, followed by two stages of low-frequency amplification. Because a great many listeners do not yet appreciate the imminent necessity for selectivity, it is by no means improbable that the popular

vote would still be in favour of such a set.

Mr. Sieger and I have often discussed the relative merits of high- and low-frequency amplification; it seems to us that in these days of high-power stations, two low-frequency amplifying stages are unnecessary. Moreover, the tremendous amplification imparted to powerful signals by such means makes it very difficult to cut out these signals in favour of weaker ones. To make a set consisting of a detector and two low-frequency amplifiers sufficiently selective to cut out powerful signals, it is necessary to reduce the efficiency of the detector circuit. In doing so, the weaker stations suffer.

Two tuned circuits can be

The List of Components with Prices. Note the low cost

	s.	d.		s.	d.
1 Drilled aluminium panel, 15 in. by 8 in. (Keystone, Colvern, Parex) ..	7	0	1 Grid-leak holder (Bulgin, Lissen) ..	1	9
1 Pair panel brackets (Keystone) ..	2	0	1 2-megohm grid-leak (Dubilier, Lissen, Ediswan) ..	2	6
1 Drilled aluminium chassis and screen (Colvern, Keystone, Parex) ..	8	6	2 1-mfd. fixed condensers (Dubilier, Lissen, T.C.C., Ferranti) ..	5	0
1 Slow-motion drum dial with special bush (Keystone) ..	5	6	2 Drilled ebonite terminal strips, 2 in. by 2 in. (Peto Scott) ..	8	
1 30-ohm rheostat (Varley, Lissen, Igranic, Wearite) ..	3	0	4 Terminals, type M, marked A, E, L.S., L.S.+ (Belling-Lee, Ealex) ..	1	6
1 .00013-mfd. differential reaction condenser (Lotus, Utility, Parex) ..	7	0	1 Pre-set condenser .00025-, .0003-mfd. (Formo, type J) ..	2	0
2 Push-pull switches (Bulgin, Lissen, Benjamin) ..	3	0	4 Red wander plugs, marked H.T.+3, H.T.+2, H.T.+1, G.B.+ (Belling-Lee, Ealex) ..	1	2
3 Anti-microphonic valve holders (Benjamin "Vibrolders," Lissen, W.B., Lotus, Igranic) ..	4	6	2 Black wander plugs marked, H.T., G.B.— (Belling-Lee, Ealex) ..	7	
1 .0005-mfd. gang condenser (Formo) ..	15	6	1 Screen-grid connector (Belling-Lee) ..	6	
1 Pair special gang condenser supports (Formo) ..	9		2 Spade tags, marked L.T.—, L.T.+ (Belling-Lee, Ealex) ..	9	
2 Dual range coils (Colvern type R.2.R., Rotor No. 60) ..	17	0	4 doz. 6B.A. 1/4-in. round-head screws and nuts (Keystone) ..	1	9
1 .0003-mfd. fixed condenser (Ormond) ..	7		10 ft. 6 in. tinned copper wire and 9 ft. insulated sleeving (Keystone) ..	8	
1 .0002-mfd. fixed condenser (Ormond) ..	7		8 yds. rubber-covered flex (Keystone) ..	8	
1 High-frequency choke (Lewcos, Lissen, Wearite, Keystone) ..	7	9	N.B.—The prices quoted are for the components specified first. If the alternatives are used, the drillings for the panel and base-plate will have to be modified.		
1 Low-frequency transformer (Lissen "Super," Ferranti, Marconiphone, Varley) ..	10	0			



The "Ether Searcher" is of very neat appearance

For the Newcomer to Wireless: WAVELENGTH AND RANGE

WHY is it that stations down near the bottom of the broadcast band seem to have so much greater ranges than those on higher wavelengths? I find sometimes that I can receive a Swedish relay rated at a quarter of a kilowatt and working on a little more than 200 metres quite as strongly as Rome, whose power is 2½ kilowatts.

Actually the ranges are not greater.

But surely they must be, for I can never hear a station like Augsburg, whose power is a quarter of a kilowatt and whose wavelength is 560 metres.

Really it isn't a question of range at all, but one of magnification.

How do you mean?

Well, your set amplifies much better down at the bottom of the band than at the top.

How can that be?

You use the same set of coils—don't you?—to cover the whole broadcast band.

Yes; and they do it quite easily with .0005 condensers in parallel.

When you are receiving a Swedish relay your condenser settings are probably round about the twenty mark, but when you are up at the top of the band the reading will probably be eighty or more on a hundred-degree dial.

That is so, but I don't quite see what difference it can make to the magnification.

Just this. On the short wavelengths the low reading means that you have only a tiny capacity in parallel with the coil; whilst at the upper end of the band you have almost the whole of the .0005-microfarad maximum. In other words the proportion of inductance to capacity is far greater on the lower waves than on the higher.

Yes, that is clear.

To put it in another way, when a Swedish relay is coming in you have in proportion to the wavelength a great

number of turns and a tiny condenser, whilst in proportion to a longer wavelength you have few turns and a big condenser.

I begin to see what you are driving at.

When the coil is big and the condenser small, magnification is high and just the opposite happens if the capacity is large with respect to the inductance. But you will, I think, observe another effect with your set.

You mean that it is more selective at the top of the band than down below?

Exactly, and the reason is that the greater the number of coil turns and the smaller the capacity in parallel, the less selective is the circuit. To obtain anything like equal magnification and equal selectivity at both ends of the band one should really use several sets of coils with different numbers of turns. This, however, will introduce quite an unnecessary complication and one can manage pretty well with things as they are.

"THE '1930 ETHER SEARCHER' MAKES HISTORY"

(Continued from page 1021)

be exactly matched. The Formo gang condenser specified has the double attraction of being a precision job and inexpensive. The Collinson coils, with the No. 60 rotors specified, are so well matched that in conjunction with the condenser, they provide a highly accurate variation of tuning on long and medium wavelengths.

The metal chassis system of construction employed for the "1930 Ether Searcher" introduces a new phase. A great simplifica-

tion of wiring is effected and the necessary stability between the screened-grid high-frequency amplifying valve and the detector valve is assured.

Simple Assembly

Every constructor of the "1930 Ether Searcher" will, we think, be impressed by the simplicity of the assembly and wiring. The use of a metal panel and baseplate imparts a precision to home construction that has not previously been possible.

Those who have read previous issues will have gathered the impression that the

"1930 Ether Searcher" is a great station-getter. One of the charms of the set is the good performance it puts up in the hands of a novice. Setting the reaction condenser at zero, the slow rotation of the single tuning knob is all that is necessary to bring in at least 20 stations on the long and medium wavelengths. In more expert hands the log of 44 stations given last week should not be difficult to exceed.

On the outside aerial of the Fetter Lane laboratories, Brookmans Park can be cut out within 5 degrees of its maximum tuning point.

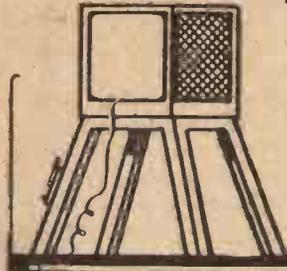
MR. FLEX HASN'T MUCH TO SAY, BUT HIS FRIEND—



Those Hi-Brow Programmes!

—AND HOW THEY ARE (SOMETIMES) RECEIVED

SEVEN SNAP-SHOTS
BY
JAY COOTE

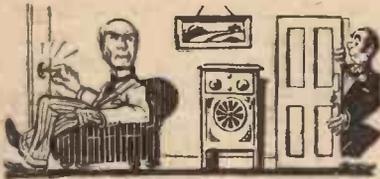


I

(Scene : A bachelor's flat—any flat. Time : 7.25 p.m. Preparatory to dressing for dinner. THE HON. GUY SOMETHING is resting. The door opens.)

THE IMMACULATE MORTIMER (his man) : You rang, my lord.

THE HON. G. S. : Oh—ah—yes. I say, Mortimer—just switch on the—er—oojah.



"You rang, my lord"

HIS MAN : Yes, my lord. (Walks to wireless receiver and switches on.)

THE—ER—OOJAH : The habits of these birds are peculiarly fascinating; at certain periods of the year, they—

THE HON. G. S. : I—er—I say, Mortimer—er—what birds?

HIS MAN (listening for a few seconds) : The peewit or lapwing, my lord.

THE HON G. S. (aghast) : Oh, my Sainted Aunt—er—I say, I thought— (gives it up as a bad job and feebly motions to HIS MAN to switch it off quickly—which the latter does, and makes his exit.)

II

(Scene : The Vicarage, Splifston-on-the-Slush. The REV. SKIGH-PYLOT enters the drawing room, washing his hands with invisible soap.)

To HIS WIFE (an elderly lady, seated by the fire : And now, my dear, for a well-



—washing his hands with invisible soap

earned rest. Let us turn for relaxation to our—ah—friend, the loud-speaker. What is the programme to-night?

HIS WIFE (reaching out to a small table near the fireplace, and picking up the paper) : I hope it's something light. Ah, here it is. 7.45, a concert of chamber music by the Binks Mediæval Quintette.

HE (switching on the set) : Delightful, exactly what I should have wished. Old composers, real music, how splendid. (He seats himself in an armchair, lies back, crosses his legs, and clasps his hands.)

(The old lady resumes her knitting, and no word is spoken. Some ten minutes elapse, and the Vicar has fallen fast asleep. Enter his eldest daughter, MARGARET.)

THE OLD LADY : Hush, Maggie, don't make a sound; your father was busy on his sermon late yesterday evening, and had but a poor night. He enjoys chamber music so much.

THE DAUGHTER (glancing at her father, smiles.)

THE OLD LADY : Yes, I know he finds it soothing. Let him sleep for a while.

(They do.)

The soporific treatment, as usual, having proved successful, they switch off the receiver to economise "juice."

III

(Scene : Time, 7 p.m. 239 Boardman's Rents, the home of W. J. BLONKS, plumber's mate. He has indulged in a very necessary wash, enjoyed his tea, and with pipe in mouth has settled down to scan the morning paper.)

MRS. BLONKS, having cleared the table, has picked up the headphones, attached to the home-made crystal set.

BLONKS (withdrawing pipe from his mouth and spitting in the grate) : Wot's on the wireless, Muvver?

MRS. BLONKS : "Dunno as I understands it, quite. 'Ush, this is wat 'e sez : . . . is generally applied to the members of the ge-genus vanellus, but sometimes restricted to one species, vanellus crist-cristatus, the British peewit—"

BLONKS : Wot langwidge! 'Ere, Muvver, you mustev gotonter some forrin station. Wot's London doin'?

MRS. BLONKS : Can't get no forrin stations, as you well knows. This is

London. There he goes, again—2LO calling.

BLONKS : Orf'right, Muvver. Cut it aht, let's have "Umpty Iddy" on the good old grammerphone.

IV

(Scene : The home of any GOVERNOR of the British Radio Transmitting Corporation. THE GOVERNOR is seen standing with his



"—you mustev gotonter some forrin station"

back to the fire; he is already dressed for dinner, and impatiently awaits the striking of the gong. Enter MRS. GOVERNOR.)

MRS. GOVERNOR : You were not back so early, Reginald. Busy as usual?

THE GOVERNOR : Yes, my dear—and then there was a board meeting at Radio House. We discussed a large agenda and made some excellent decisions. (Under the impression that he is still there). It would be difficult to over-estimate the benefits of education by wireless; it is a god-send for the masses. These lectures by eminent Professors must—

(Enter DICK and BILLIE, his son and daughter, rather boisterous, still full of the joy of living.)

BILLIE (kissing him) : "Hello, dad. (To her brother) : Any music, Dick?"

DICK switches on the set. The loud-speaker unexpectedly jerked into action, after a cough and a click : . . . times restricted to one species, vanellus cristatus, the British peewit—

DICK : Heavens, what was that?

BILLIE : Oh, Dick! (She puts her fingers to her ears).

THE GOVERNOR : As I was saying, these talks by eminent men on subjects of common interest—

The gong is heard in the hall.

MRS. GOVERNOR : Dinner, my dears. (She walks to the door, followed by her son and daughter).

DICK (sotto voce, to his sister) : Don't

worry, kid, I've brought back the latest record, "My Cutie's a Swell Soda-jerk in a Down-town Dive."

BILLIE: Some pep, what?

THE GOVERNOR: Oh—ah—yes. We'll hear that later. (*Walks to the set and pushes in the switch, thus side-tracking the learned Professor; then with a grunt of satisfaction, follows his family to the dining room.*)

V

(Scene: The SMITHS of The Limes, Peckham Heath, have invested in a three-valve wireless receiver. It is a new acquisition, and since its installation, the loud-speaker has been in action during many hours of the day. MRS. SMITH even listens to the children's hour, although her sons and daughters are well past their school age. MR. SMITH, returned from his office, after a high tea, has taken control of the wireless instrument; it is the only period of the day during which he is free to listen to a programme of his choice. He twirls the condensers vigorously, producing weird sounds, but finally tunes in—not without a howl or so—a concert of string instruments. Satisfied for the moment, he wipes his spectacles and sits back to enjoy the music.)

MRS. SMITH (*who suffers impatience*): And what station is that, dear?

SMITH (*doubtfully*): I'm not sure—but I expect its one of those German places by the sound of it. Give me the good old English—

LOUD-SPEAKER: This is London calling! the next item to be played by the Binks Mediaeval Quintette will be—

(*The LOUD-SPEAKER gives a squawk, for SMITH in his anxiety to secure greater volume has twiddled the reaction condenser.*)

MRS. SMITH: What was that he said, dear; it sounded English?

SMITH: It is. It's 2LO. Just look at the programme.

MRS. SMITH: Mm—m—ah, here we are, —mm—chamber music, a fug by Back.

SMITH (*sententiously*): My dear Agnes! You don't say aig for ague—now do you? Read it again. There you are, a few-gew by Back.

MRS. SMITH: Well, what is a—what you said?

SMITH: A kind of—er—chamber music. You never would improve your mind. (*Neither is it his intention, for again he twirls the condensers. Another howl from the speaker.*)

SMITH: Alternative programme, this is 5GB. Look it up.

MRS. SMITH: A poetry reading: Britwell's "The Loneliness of Solitude."

THE LOUD-SPEAKER:

Oh Miseree, Oh Miseree,

Oh Miseree, all black,

Down, down in the regions of—

MRS. SMITH: Couldn't we have something livelier than that, Albert?

SMITH (*who won't give in*): You never are satisfied, Agnes. However— (*Again the condenser dials are revolved; groans and ear-*

spluttering squeaks. Finally, the room echoes to the well-known strains of that Palestine lullaby, "Solly Boy.")

SMITH: That's Frankfurt—or Hamburg, or one of those foreign places.

MRS. SMITH: Isn't it wonderful how these people speak English, dear? A pretty tune, isn't it?

SMITH (*who does not appear to have heard it before, remains quiet until the end of the item*): Ah, (*with conviction*) I thought it was. It's a Spaniard! (*He logs the condenser readings of RADIO TOULOUSE, as one capable of giving him something to please his wife.*)

We leave them there.

VI

(Scene: A small wireless workshop. A newly home-constructed receiver is being tested.)

THE AMATEUR (*to his friend*): There you are, old man. Here's the last lead coupled up. Switch on the loud-speaker.

HIS FRIEND: Righto! (*Does so. Crisp sentences, with hissing esses are heard from the instrument*): What's the old chap talking about? Where is it?

THE AMATEUR: Don't know, don't care.



"Here's the last lead coupled up"

I expect it's some talk from 2LO, but it's as good as anything else to test on."

(*Some adjustments are made to increase volume of signals.*)

THE AMATEUR: Good work that. Come on, let's have some dance music.

(*He tunes in a Continental transmitter.*)

VII

(Scene: A flat in Bayswater. We are introduced to AUNT MARTHA, a somewhat deaf old lady, who has recently celebrated her seventieth birthday, on which occasion her nephews and nieces made her a present of a wireless set and speaker complete. Up to now, the old lady has vainly endeavoured to secure entertainment from it, and complains that all the good programmes are given either when she is having her afternoon nap, or when she is on the point of retiring to bed. A NIECE from the country resides with her, in order to study music in town. She has switched on the receiver; the loud-speaker emits a flow of words some sounds of which appear to have impinged on AUNT MARTHA'S ear-drums.)

AUNT MARTHA: What is he talking about?

HER NIECE: The peewit, Auntie.

AUNT MARTHA: The—what did you say?

HER NIECE (*bends over, puts her lips close to the old lady's ear*): The peewit.

AUNT MARTHA (*testily*): I wish you

wouldn't make those noises in my ear, but tell me what he is talking about.

HER NIECE (*giving up in despair*): Well, Aunt Martha, when he says anything funny, I'll repeat it to you.

(AUNT MARTHA nods. *By this time the talk is at an end, and the announcer informs British listeners that they are to be given a concert of chamber music.*)

AUNT MARTHA: What did he say, Dorothy?

HER NIECE: Chamber music, Auntie.

AUNT MARTHA: A change of music. I should think so indeed. Nowadays I never hear a song as I used to do. It's all a noisy trombone business. I remember when I was a girl—

(DOROTHY, in the meantime has seated herself near the loud-speaker; to all outward appearance she is enjoying the efforts of the Mediaeval Quintette to revive the beauties of a Bach fugue.)

AUNT MARTHA (*suddenly hearing the sounds of instruments*): What are they playing now? I don't seem to know it!

DOROTHY: Oh, do listen, Auntie, just hear this melody, isn't it exquisite?

AUNT MARTHA: Hear what, my dear?

DOROTHY: This melody. It's divine.

AUNT MARTHA: Well, if it wasn't for all that twiddly noise, I believe I could hear the tune. In my young days—

JAY COOTE.

SELECTIVITY AND TUNING

SO long as the product of capacity and inductance in a circuit is kept constant the circuit remains resonant to a given wavelength, irrespective of any particular ratio between the two components. In theory, however, the more inductance there is in the circuit (with a corresponding diminution of capacity) the more selective is the response. Such a circuit is said to be "heavily" tuned.

On the other hand, a high inductance necessarily brings more wire into the circuit and since this must have ohmic resistance it tends (beyond a certain stage) to introduce so much damping as to offset its theoretical advantage. Accordingly, some designers prefer to use a "lightly tuned" circuit, i.e., one where the capacity is large in comparison with the inductance.

M. B.

According to a message from Rome, contrary to rumours, no relays are to be made of religious services given at the Vatican Sistine Chapel, and the transmitter to be built in that city will not be used for that purpose.

It is stated that the German authorities have definitely decided to erect nine high-power stations to ensure an adequate broadcasting service throughout the country. It is proposed to install a 60-kilowatt transmitter on a high hill situated between the cities of Karlsruhe and Heidelberg.

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 Christmas
 Spirit”



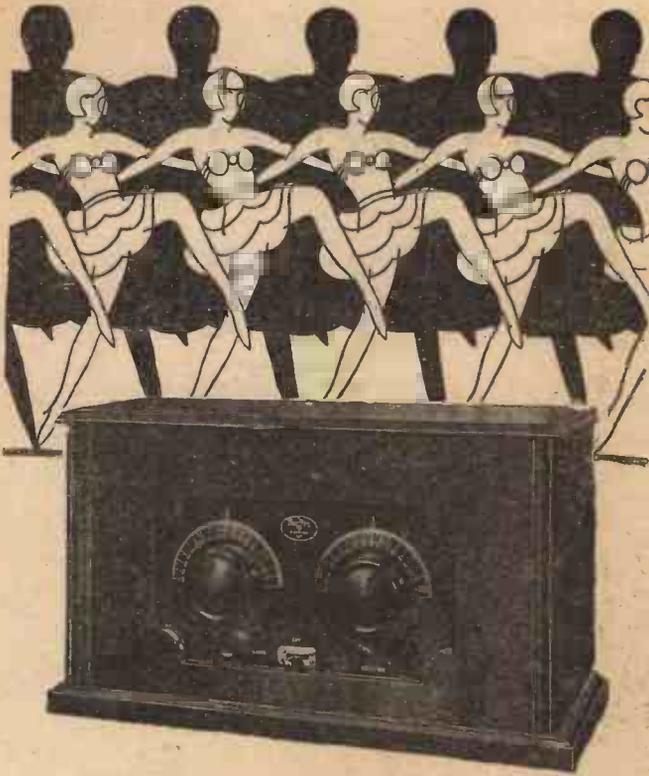
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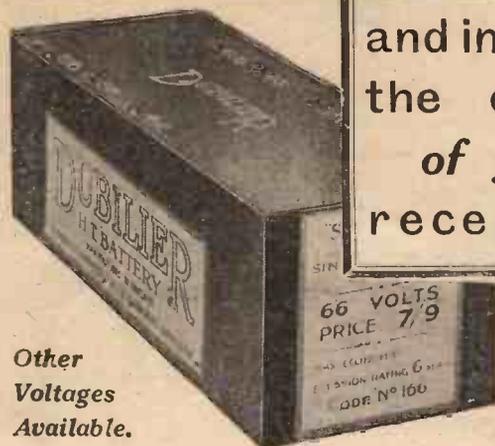
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The illustration above is of the 2 mfd. Paper Condenser (Licensed under Design Reg. No. 723,271) Price 3s. 10d.—Other capacities from .005 to 10 mfd. Prices 1s. 8d. to 13s. 6d.



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PRICES:			
60 volt (reads 66)	7/11		
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Don't Forget to Say That You Saw it in "A.W."

On Your Wavereck!

Record Reproduction

WHENEVER one takes a trip round European stations, one is pretty sure of coming across several which are sending out canned music. It is most interesting to notice the differences that exist between one station and another in the quality of the transmissions from gramophone records. My own opinion is that Radio-Paris deals with the matter best of all, though I don't always admire the records that he chooses for his programmes. What is noticeable is a complete absence of needle scratch, whilst the quality is so good that if one tunes in the middle of an item one is often surprised to hear, when it has finished, that it was from a record. Both the high and the low notes come through extraordinarily well. I have never cared very much about records from our home stations, for the anti-needle scratch device is very far from perfect. The needle can be heard scratching upon the disc before the music starts, and it is also distinctly audible at times during soft passages. Here is an opportunity for the development department of the B.B.C. to show what it can do.

From the Mains

All-from-the-mains receiving sets continue to increase in numbers, whilst the sale of H.T. battery eliminators grows and grows. This is not surprising, for the convenience of using household supplies for running the wireless set is very great. At the same time, though, I do believe that many of those who forsake the dry-cell high-tension battery in favour of the eliminator, saying that they are sick of batteries, make the change because they have never given batteries a proper chance of showing what they can do. It is not the slightest exaggeration to say that 80 per cent. of the battery-operated sets in this country are run off H.T. batteries of far too small capacity. Overwork your battery and you may expect poor quality in reception (especially towards the end of the evening), growing instability (when the battery is growing old), fierce reaction, and, last, but not least, frequent and expensive renewals of this part of the receiving equipment.

The Secret of Battery Success

Often I stay at a place in the country where there is no electric light in the house, and I am therefore forced to use batteries for both filament and plate current, whether I want to or not. My sets are in pretty constant operation and the average high-tension current drain is from 15 to 20 milliamperes. Further, though I make a

point of discarding batteries before they are down to 1 volt per cell, my batteries last me, on the average, nine months or more; and I have never yet had any trouble whatever with them or due to them. The whole secret lies in the use of quadruple or super-capacity batteries if the average H.T. consumption is much in excess of 10 milliamperes. By spending twice as much on your H.T. batteries initially you obtain at least four times the service from them.

What is a Super-power H.T.B.?

Unfortunately, the terms "super-capacity" and "super-power" are rather misleading nowadays, since some makers apply them to batteries of only moderate cell size. The accepted classification of batteries is this. Standard-capacity, cells measuring $\frac{3}{4}$ in. in diameter by $2\frac{1}{8}$ in. in height (these cells are the same size as those used in flashlamp refills); double-capacity cells, 1 in. in diameter by $2\frac{1}{4}$ in. in height; treble-capacity, cells $1\frac{1}{4}$ in. in diameter by $2\frac{1}{2}$ in. in height; super-capacity, cells $1\frac{1}{2}$ in. in diameter by $3\frac{1}{2}$ in. in height. The maximum economical load for standards, as I have proved over and over again by laboratory tests, is 5 milliamperes; that for doubles is 8 milliamperes; that for trebles 10 milliamperes; and that for supers from 15 to 20 milliamperes.

The wise man who is using anything from 5 to 10 milliamperes always installs a battery one size larger than that able to cope with his needs. Thus it is very sound economy where the average consumption is 8 milliamperes to use not a double, but a treble-capacity battery. Personally, I am not very fond of the double-capacity size, for in very few makes does it have the service life that one ought to expect from cells of this size if the load exceeds about 7 milliamperes.

The Importance of Quality

But please do not run away with the idea that any treble-capacity battery is as good as any other, or that a super bought at random will give as good service as one of first-rate make. This is most emphatically not the case. Luckily, most of the really bad batteries on the market are of standard capacity, for it does not pay the makers of cheap-jack articles to go in for higher priced stuff; they know that the man who wants a 66-volt battery for 3s. 11d. (!) is not going to part with an extra shilling or two for something made up of bigger cells. Most of the bigger capacity batteries, therefore, are of pretty good quality, though there are very con-

siderable differences in the performances of various makes. The purchaser, therefore, should assure himself that he is spending his money wisely. This he can do by paying attention to the test reports in AMATEUR WIRELESS and by making use of his own experiences in the past and those of his friends.

Big Differences

Here, for example, are the service hours given by super-capacity batteries of nine different makes. These batteries were subjected to what is known as an intermittent test; that is to say, each was run for four hours every weekday and rested for twenty hours. Each had the same initial load of 18 milliamperes; the current naturally declined as the E.M.F. fell off. The cut-off voltage in every case was 1 volt per cell. This means that a 45-volt unit was regarded as done for when its voltage under load had fallen to 30. I will call the batteries A, B, C, D, E, F, G, H, and I.

A 624 service hours	F 371 service hours
B 531 " " "	G 348 " "
C 480 " " "	H 320 " "
D 472 " " "	I 298 " "
E 399 " " "	

It should be mentioned that two batteries of each make were tested and that the figures given represent the average of the two. The average wireless set is probably not in use for more than three hours a day, which means that the battery has a twenty-one hours' rest. This means that, even with an 18-milliamper load, nearly a year's service life should be obtained from a first-rate super-capacity battery; for most people do not discard batteries until the E.M.F. is less than 1 volt per cell.

DX Conditions

The plentiful rain that we have had of late has certainly moistened the ground round our earths, and we are that much to the good, even if the accompanying gales have laid low our aerial masts or removed—as was my sad experience—considerable portions of our roofs. Conditions, however, have been all against good long-distance reception for some little time, owing to the very disturbed state of the atmosphere. We don't often get thunderstorms in December, but there have been several recently, and atmospherics have been distinctly bad. On good nights, when atmospherics were absent, all-round signal strength has been distinctly good, but on others there has been a very distinct reduction. Individual stations, too, are showing big variations in strength. Budapest, for example, may almost blow your head off

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On Your Wavelength! (continued)

on Monday and be a still small voice on Tuesday. For all that, there are at present many foreign stations which are extraordinarily reliable, and one has not had to twiddle the dials very far without finding something that could be received with excellent strength and quality. If only the sun could get rid of those spots on his countenance—of which, by the way, we have not seen very much of late—we should have a wonderful time, not only on the broadcast and upper wavebands, but also on the short waves.

Suggested Television Schemes

I spent a most interesting evening a few days ago when I attended a meeting of the Television Society held at the Engineers' Club, Coventry Street. If evidence of the healthy interest in the subject of television was wanted, the unbounded enthusiasm of the large number of members present furnished it. First of all, there was an informal discussion on the previous month's paper, which had dealt with low-frequency amplification as applied to television, and the chairman was unable to allow every prospective speaker to have his say owing to the number who wished to participate, and this undoubtedly is a good sign. With such an eminent authority as Sir Ambrose Fleming for its president, the society bids fair to make its presence felt, and in addition to meetings held in London there are group centres being formed up and down the country.

Ingenious Ideas

The lecture proper was delivered by Mr. E. G. Lewin, M.Sc., and during the time at his disposal he dealt with some most ingenious schemes. First of all, we heard about Rtcheouloff, who scanned an image of the object to be televised by a photoelectric point on the end of a compound spring, the image in the receiver being formed by a similarly vibrating fluorescent point. Then there was Whittier with a scanning mirror mechanically operated by the vibrations of piezo-electric crystals under applied alternating voltages. In the case of the former inventor, difficulties would appear to be encountered, first of all, in adequately covering the exploring field, owing to the movements of the photoelectric point resembling those wierd designs we used to remember in our schooldays as being brought about by motion in two directions at right angles. Then, of course, to propose using springs at transmitter and receiving ends with identical motions is surely expecting too much if we think of the adverse influence of temperature alone. With the piezo-electric crystal scheme the vibration of the crystal is not only extremely minute, but it is liable to be upset by pressure and temperature changes.

Von Bronk and Others

Then there was Von Bronk, who operates a multiplicity of Karolus-Kerr cells to analyse the object and synthesise the image, and then introduces a modification in which piezo-electric crystals are made to serve the same purpose. This was followed by Zworykia with his two prisms rotating at slightly different speeds to effect spiral scanning with an interesting optical system, and finally we heard of Mohr. This last-named inventor analyses mathematically the distortion of the image produced by apertures of finite size in the scanning disc and inserts filter circuits in the transmitter and receiver to compensate for the distortion.

Increased Complication

I could not help being particularly impressed with the divers means adopted in order to achieve the scanning or exploration of an object without resorting to an apertured disc. In every case, however, so many complications manifested themselves that while the proposals reflected credit on the individual exponents of the various systems they failed to display any possible development with a commercial project.

CHRISTMAS HOLIDAYS

Will readers kindly note that, owing to the Christmas Holidays, the issue of "Amateur Wireless" dated December 28 will be on sale on Tuesday, December 24, instead of Thursday as usual.

When one remembers the relatively simple scheme of, say, the Baird system it is a marvel that the other projects ever progressed farther than the proposal stage. In every case there was no thought given to a means for achieving automatic synchronising. But, in spite of that, one left the meeting with the impression that in every quarter of the globe the science of television has gripped the imagination of inventors, and as a result the patent offices, at least, will add to their coffers.

The Two "Brookmans"

I was fortunate enough to be listening when London's second transmitter commenced its first public test a few days ago.

What struck me immediately was the fact that many of those living in the London district will be unable to receive more than two or three stations between the wavelengths of 356 and 261 metres unless really selective apparatus is used, for both stations at Brookmans Park are received at considerable strength even when the aerial is quite a short one.

I was testing at a place about ten miles from the transmitters, and although they were easily separated, using a good two-valve set, little could have been received below 261 metres or between 261 and 356 metres. With a three-valve set having a stage of high-frequency there seemed much more chance of bringing in the usual distant stations, but it must be a really good set.

The quality of the reproduction obtained from the second transmitter seemed equivalent to that normally received from the 346-metre station, although it is hardly possible to be certain from so brief a test. Technically, one station should provide as good quality as the other.

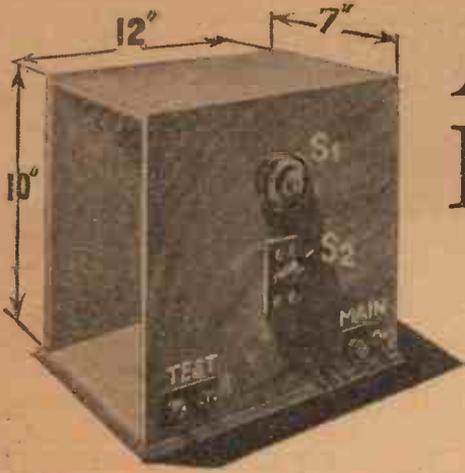
Owing to the fairly short wavelength used, it is possible that a number of sets will not tune the transmissions correctly. This difficulty can, very fortunately, be overcome in a number of instances by connecting a fixed condenser of .001 microfarad into the aerial circuit. Rarely will it be necessary to remove a few turns from the aerial coil—or the grid coil when a fixed aerial winding is used. The strength will naturally be reduced a little by the addition of the fixed condenser, but probably not to a serious extent.

The Balanced Armature

The more I experiment with balanced-armature units for driving loud-speakers, the more impressed I become with their possibilities. In fact, I should not be in the least surprised to see a development of this kind of drive eventually ousting the moving-coil loud-speaker. Use one of these units properly and you can obtain astonishing quality and volume from it. On the other hand, if you don't give it a fair chance you will probably be very much disappointed with the results. Myself, I think that many makers are wrong in recommending the use of a large and pretty heavy fixed cone with the driving units that they turn out. You see, one of the handicaps under which the balanced-armature unit must labour is this. To produce the same volume of sound at a very low frequency as at a high one, thousands of times more work may have to be done by the drive. In other words, to make the cone to which it is harnessed vibrate strongly enough to bring out a low note well, the armature must make much larger movements than are required for a high note. Its movement, however, is limited to a great extent by its own weight and that of the connecting rod fixed to it. Why hamper it still further by employing a big, heavy cone? And why fix the edge of the cone? What I do is to employ a small and very light cone like that used for moving-coil loud-speakers suspended very freely in a supporting ring.

THERMION.

A Reliable Test Instrument for 5/-



This picture gives a clear idea of the construction of the unit

THE time always arrives when the amateur is faced with one of those elusive faults in a wireless receiver that defies all efforts at tracing it: a pair of phones and a battery are generally brought to bear, followed by, perhaps, a milliammeter connected alternatively in each anode circuit. Result—everything apparently O.K., or a complete breakdown that the phones and battery fail to locate. Obviously some component is not doing its job and, unless an expensive "megger," or similar test apparatus is available, the amateur has to resort to a laborious system of replacing each suspected part in turn.

By the use of the simple and inexpensive instrument to be described, every component in the average set can be tested and finally passed or rejected in a matter of minutes; the cost of the required parts is in the neighbourhood of five shillings and the constructional work well within the capabilities of all.

A G.E.C. "Osglim" lamp is used as the fault detector and the only other apparatus required is a tumbler switch of the ordinary house-lighting type and a D.P.D.T. reversing switch.

The neon lamp must be shrouded in some way in order that it may be examined in comparative darkness; the necessity for this will be readily appreciated later when we discuss the actual testing of various components. In the actual model described, a wooden box, 12 in. by 7 in. by 10 in. was used for shrouding the lamp, the two switches being mounted on the side so that they can be manipulated while the lamp is being examined. These dimensions are given for guidance only, however, as the apparatus can be housed in any old discarded cabinet or box.

The wiring diagram is shown by Fig. 1. Insulated wire should be used throughout in order to remove the possibility of shock when the instrument is connected to D.C. mains.

The reversing switch *s2* serves to reverse any connections made with the testing tags *T1* and *T2*, and it must be emphasised that this switch must be of the best quality,

in order that good contact is made by both poles at once, otherwise many tests will reveal negative or false results.

The photograph shows the layout of the unit; if the parts are mounted on wood, as in the present case, care must be exercised to ensure that terminals at high potential are insulated from the case, as any leakage will be registered by the lamp and so considerably reduce the efficiency of the testing set.

Operation

The unit can be operated from D.C. mains or, alternatively, from H.T. batteries:

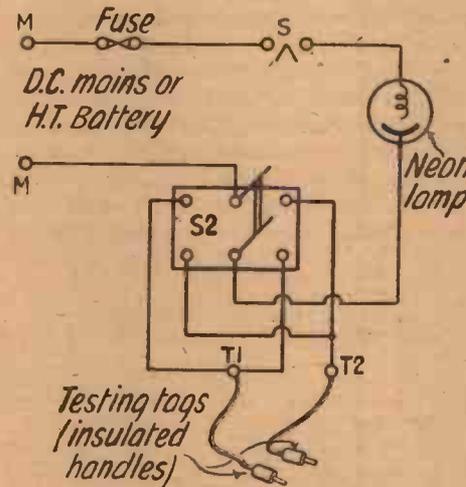


Fig. 1. The wiring diagram

in the latter case, the batteries should have a normally large capacity as the current passed by the lamp at 200 volts will be in the neighbourhood of 25 milliamps: the discharge will, however, be very intermittent, and it is quite an economical proposition to utilise ordinary H.T. dry cells.

When the wiring has been completed, connect the terminals *M* to a convenient source of D.C. supply and switch on by means of *s*; close *s2* into either position and touch the insulated tags *T1* and *T2* together. If the connections have been made correctly, the lamp will glow at full brilliancy.

The next test is to keep *T1* and *T2* shorted and open *s* and *s2* in turn; if there

is any glow from the lamp, the insulation of the test set is at fault and this should be checked before proceeding further. Incidentally, this test, should, if possible, be made in complete darkness as a very slight leakage will produce a glow that is invisible in daylight, but will, of course, upset matters when components, such as fixed condensers, are to be tested.

Testing out a Three-valve Set

Fig. 2 shows a typical *r-v-r* receiver; the crosses indicate where the tags *T1* and *T2* should be placed after removing the existing leads from the component.

To test the aerial tuning coil, for instance, the procedure is as follows. Remove all leads from the coil and attach the testing tags across its extremities. Switch on *s* and close *s2*. The neon lamp should glow at full brilliancy if the coil is O.K.: if only a small segment lights up or the glow is intermittent, a high resistance or partial break is present and the coil should be examined for physical defects.

Testing Each Component

The following are the results to be expected from various components. It is of course necessary to remove connecting leads.

Grid Leaks

A fairly bright steady glow, illuminating a small portion of the lamp, varying in intensity according to the resistance of the leak under test. The glow obtained should be compared with that from one which is known to be correct; after some experience, by the way, the value of any high resistance (Continued in third column of next page)

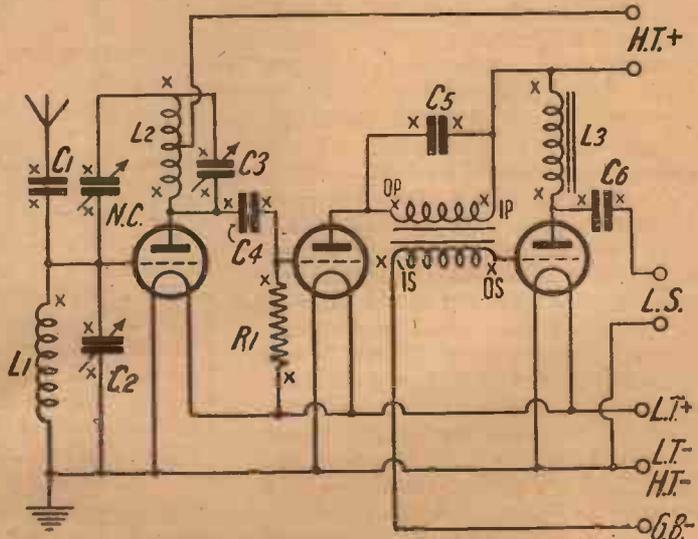
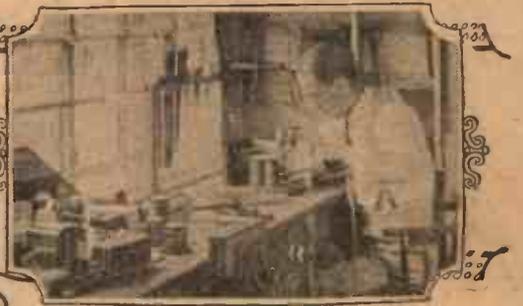


Fig. 2. Testing points in a typical circuit

My Wireless Den



Weekly Tips—Constructional and Theoretical—by W. JAMES

Why Not Pentodes for H.F.?

HAVE you ever tried a pentode in the high-frequency position of a balanced or neutrodyne set? I have, with excellent results. As a matter of fact, I experimented with one of these valves in a high-frequency amplifier about a year ago.

Great magnification could be obtained with complete stability, I found. The grid circuit was taken to negative 6 volts on the grid battery, and the high tension was 120 volts.

Anyone having a suitable set can soon try a pentode, but grid bias must be used. The valve must, in fact, be biased as for a low-frequency stage, or even be given a little more.

Do not forget to adapt the primary winding of the high-frequency transformer to the valve, or the full amplification will not be obtained. If you want some real fun, try using a pentode in all three positions of a set having high frequency, detector, and power stages! Filter the supply to each valve in order to avoid self-oscillations. The anode current will be fairly heavy, but signals of tremendous strength may be obtained.

Such a set is very sensitive. It magnifies very well. And the quality of the reproduction is good when the usual precautions are taken.

Stopping that Oscillation

A fault sometimes met with in a set having a shielded valve is that the aerial circuit oscillates continuously. This is noticed when tuning to a station as a whistle is produced, and it is therefore not possible clearly to receive the broadcast.

Apart from this, however, the set is causing oscillations to be radiated and will produce interference. How best to remove the fault depends upon several factors.

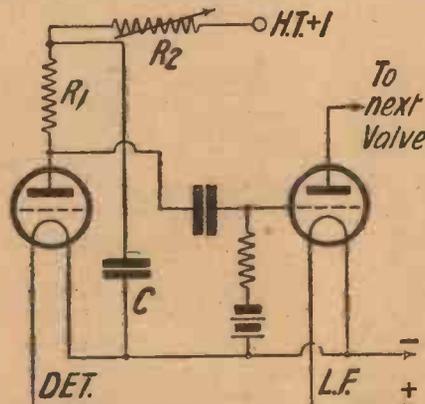
To what is it due? Perhaps there are couplings in the set which are causing the oscillations. Then, again, the coils may not be suitable or the circuit correct. A cure may sometimes be effected, however, by reducing the voltage applied to the screen. This increases the impedance of the valve, and therefore lowers the magnification. The same result is to be obtained by including a filament resistance in the circuit. Of course, the fault should be removed by altering the coils or their position in the set, or by modifying the wiring

if it is fundamentally due to any of these things. But this may involve practically re-designing the set.

Using Filters

When there are two low-frequency stages it is practically essential to employ anode circuit filters for the purpose of preventing motor-boating.

One of the filter circuits will be connected to the anode circuit of the detector, as illustrated in the accompanying figure. But when the slight extra expense is not objected to, the anode filter resistance R_2 may be of the adjustable pattern, for then the voltage of the detector may be accurately set to the most suitable value. This scheme is of particular value when the detector is of the anode-bend type, as the



Variable resistance in filter circuit

anode voltage must be correctly related to the grid bias for the best results.

Fixed condenser C should be of 2 microfarads. Resistance R_1 is, of course, the usual anode coupling resistance, and should not have too high a value.

For the best results the grid bias should be as much as possible, consistent with the high-tension available and R_2 should not be greater than about 20,000 ohms. The anti-oscillation effect may, of course, be improved by adding to the capacity of C ; sometimes 4 microfarads must be used. Resistance R_2 ought to be of a type that retains its value. Slight variations may result in noises being heard with the reproduction. A perfectly reliable component must therefore be used.

A Strange Fault

A few days ago I met with a fault which is rather rare in these days. The set had

a transformer-coupled low-frequency stage, and from time to time noises were heard.

By removing the aerial it was proved that the fault was in the set, and eventually it was traced to a low value of insulation between the two transformer windings.

"A RELIABLE TEST INSTRUMENT FOR 5/-"

(Continued from preceding page)

can be ascertained with a degree of accuracy by this method once the intensity of glow obtained from standard resistances has been memorised.

If the glow is unsteady, the grid leak can be immediately rejected as faulty.

Fixed Condensers

Attach T_1 and T_2 across the condenser; switch on S and S_2 whilst examining the lamp very closely; a regular intermittent flash indicates faulty dielectric or insulation. If no flash is seen, reverse S_2 quickly, still examining the lamp. A single flash indicates that the condenser has discharged and is O.K.; no flash indicates a faulty component.

Valve Sockets, Clips, etc.

Place the tags across the lead connected to the clip or socket and the socket itself. Any irregularity or departure from "full glow" indicates a poor conductor. Examine for dirty contact, poor connection, etc.

L.F. Transformers

Place tags across primary or secondary windings in turn; practically full glow will be found for the primary winding with a diminution for the secondary due to its higher resistance.

If the windings are shown to be continuous, connect primary terminals together and secondary terminals together; connect the tags across the primary and secondary windings to test for faulty insulation between the windings.

These tests, however, are only given as an illustration of the capabilities of this tester. Wherever insulation or conductivity are in doubt in any electrical circuit, the tester will be found invaluable. Any wireless component can be definitely tested and even calibrated within useful limits by careful comparison of the glow obtained from the neon lamp with that obtained from some known and similar standard, and a little experience with the instrument will soon prove it to be indispensable.

IS YOUR AERIAL THE RIGHT SHAPE?

It is true to say that most aerials are not of the best shape for efficiency. Perhaps yours comes in this category! A perusal of this article by our Technical Editor will show how an improvement can be effected

REFERRED in an article a short time ago to the desirability of reducing the length of one's aerial in order to obtain more selective results. It was pointed out in that article that as one increased the total length of wire, the greater was the natural wavelength of the aerial and, consequently, the better became the reception. On the other hand, with this state of affairs the aerial itself exercises a dominating control over the tuning, which becomes very broad, and for conditions of selectivity we must sacrifice some of the good reception properties of the aerial so that we can tune out unwanted stations.

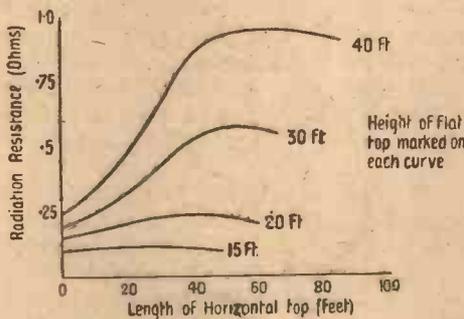
A particular and extreme example of this method of procedure is obtained in the frame aerial as used in portable receivers. The reception factor of a frame aerial is extremely poor, but its tuning properties are very good, added to which are the directional properties which are often of considerable value. In the case of the ordinary outside aerial, we do not sacrifice anything like as much as this, but it is desirable to surrender a certain amount of reception efficiency in order to make the tuning more easy.

Proportions of Top and Height

Another factor, however, which one must take into consideration is the question of the relative proportion of flat top to vertical height. In the majority of cases it is not possible to increase the length of the aerial other than by extending the horizontal portion. The height to which one can erect the aerial is limited by practical considerations, such as the height of the roof or the possibility of getting somewhere near the top of the house. A long horizontal portion, however, is not a desirable feature, and in the previous article I gave two extreme examples, one a simple vertical wire 20 ft. in height and the other a 100-ft. wire having a 20-ft. height and 50 ft. of horizontal top, and I stated that the former aerial was twice as good as the latter.

This may seem exceedingly curious to many people, and some further information

on this point will therefore be of interest. The factor which controls the relative reception of an aerial is what is known as its *radiation resistance*. It is an axiom that an aerial which is a good radiator is a good receiver, and therefore a system which is capable of converting a large proportion of the power put into it into radio waves is conversely a good aerial from the point of view of collecting energy from the ether. It is customary to consider the radiation from an aerial as being due to an imaginary radiation resistance which absorbs power in the same proportion as that which is actually radiated, and consequently this imaginary quantity is an immediate indication of the relative efficiency of any particular aerial system.



Efficiency Graph of Different Aerials

Now, G. W. Pierce showed some time ago, in his book "Electric Oscillations and Electric Waves," that the flat top of an aerial system was definitely harmful to the development of the best efficiency. Up to a point, the increased length due to the addition of a certain horizontal portion overcomes the disadvantages due to the other causes, but a condition is rapidly reached at which the addition of further horizontal top reduces the radiation resistance, so that one loses efficiency instead of gaining it. He works out a number of examples for single-wire aerials (it should be made quite clear that the whole of this discussion is confined to aerials of the single-wire type, which are in the great majority), and he shows how the radiation

resistance varies in terms of the relationship between the working wavelength and the natural wavelength of the aerial.

The meaning of this term "natural wavelength" was explained in the previous article. It is the wavelength to which the aerial tunes with its own self-inductance and self-capacity. In practice it is customary to work at a wavelength between five and ten times the natural wavelength.

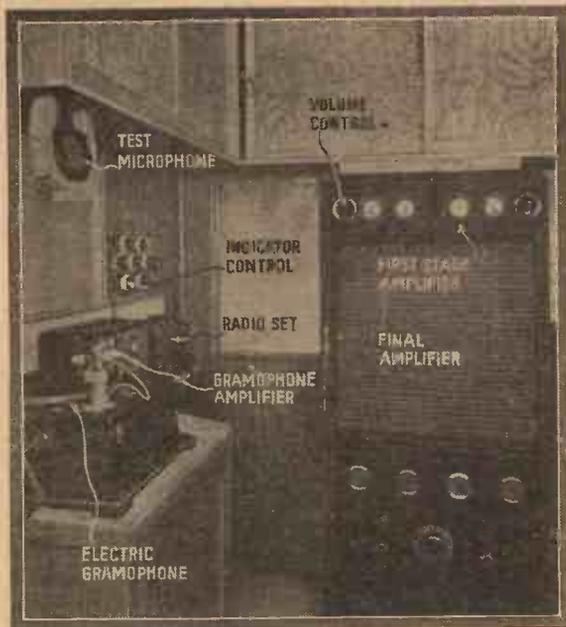
The Best Type

Based on Pierce's calculations, I have worked out data for a large number of aerials varying in length from 15 ft. to 100 ft., and having actual heights ranging from 15 ft. to 40 ft., so that the majority of practical aerials are included within the survey. Other things being equal, Pierce shows that the effect of a horizontal top is to cause a continuous decrease in the radiation resistance. For example, referring to an aerial working at its natural wavelength, if there is no horizontal top the radiation resistance is 36 ohms. If we have a horizontal top equal to the height, the radiation resistance is only 20 ohms—a reduction of nearly 50 per cent. For our purposes, however, the problem is not quite so simple as this, for in the first place we are not working near the natural wavelength, and therefore adding horizontal top tends to bring the aerial nearer to this ideal condition. Let us, for example, consider an aerial 30 ft. high.

If there is no horizontal top the ratio of the working wavelength to the natural wavelength is approximately 16, assuming a working wavelength of 400 metres. Under these conditions the radiation resistance will be .14 ohm. If we now add 20 ft. of horizontal top we have doubled the length of wire and the ratio of working to natural wavelength becomes only 8. This effect more than offsets the bad effect of the horizontal top, and the radiation resistance rises to .2 ohm. If we continue to add horizontal portion, however, we gradually find that the radiation resistance begins to fall again, indicating a loss of

(Continued on page 1044)

A MOBILE RE-BROADCASTER



Here are shown the "works" of the Philips re-broadcaster

A GIANT voice is at present touring the Midlands! It has already "done" London, though it will return there later.

Before this giant loud-speaker van started out on its travels, writes an AMATEUR WIRELESS special correspondent, I was enabled by the courtesy of the Philips organisation—to whom the van belongs—to take a short run in it and to hear some music put through the power amplifiers and bank of thirty-two loud-speakers on the roof. Technically speaking, the van is really marvellous, and the feeling one gets when speaking through the microphone in the little studio inside the van is that one has become possessed of the voice of a Camera!

Deafening Volume

A notice put near the B.B.C. microphones says, "If you sneeze you will deafen millions"; but you don't know it. With the Philips van you can prove it for yourself, and the effect is almost terrifying.

The photographs hardly do justice to the size of the van; it is nearly twice the length of a London bus. Inside are a generator room, a studio, and an apparatus and gramo-radio room. It is possible while the van is travelling at any speed up to its maximum—among the 40's or 50's—to put over speech, gramophone music, or a radio re-broadcast.

The van was designed primarily for publicity work, of course, and a window at each side, lit up at night, makes a pleasant display.

The engine-room is at the front, the studio in the centre and the apparatus room at the rear. The whole is mounted on a "super" Dennis chassis, and is more reminiscent of a battle-ship than a road vehicle! All

power is generated by an alternator in the engine-room, driven by a petrol engine of the type used for motor-boats. Enough "juice" is carried for four hours' continuous working. The alternator is rated at 4 kw., and half of this is used for window lighting. The remaining 2 kw., after passing through the main fuses and switchboards is passed to the control room, where it is fed to the main amplifier. It should be noted that the engine-room really is a "room" big enough to walk in, and is not just a generator compartment.

Amplifier Arrangements

The main amplifier is rated at 600 watts. It comprises a rectifying valve carrying a potential of 8,000 volts. The single transmitting valve has a filament as thick as a lead pencil and carries a voltage of 4,000 volts on its anode, which is, of course, necessary to provide the high anode dissipation.

To the left of the main amplifier is a gramophone turntable (clockwork-driven H.M.V.), and immediately to the right, another amplifier. This is the gramophone-microphone amplifier, which is auxiliary to the main one, and governs the microphone and the gramophone pick-up output when records are being given. It contains three transformer- and resistance-coupled valves, in an ordinary L.F. circuit, only two of which are used with the pick-up.

Further along is a standard Philips three-valve set with its lead-in from the outside aerial. When distant stations are being received, the output of this receiver is fed direct into the main amplifier, and then to the speakers on the roof of the van.

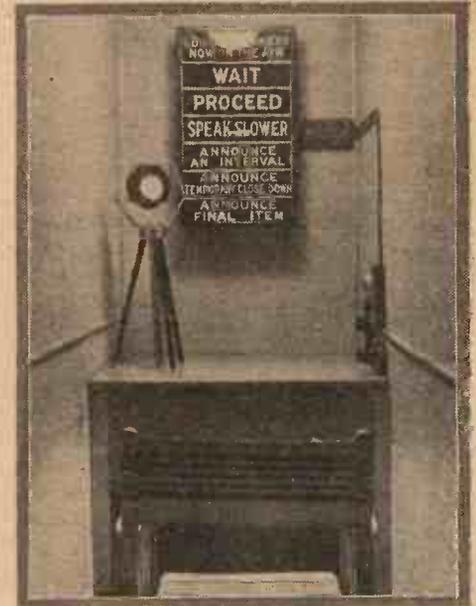
Two 20-ft. masts can be put up on the roof when required, but the sensitivity of the set is such that a length of wire trailed over the van suffices for all normal reception. The receiver incorporates an S.G.

valve and a pentode, and operates entirely from A.C.

The soundproof studio is in the centre of the van with a door leading to the control room. The walls are heavily lined with felt, to eliminate all echo. When the studio is in use a red light glows over the door.

Communication between the announcer and the engineer is by means of the indicator board, any panel of which can be illuminated, and when working the announcer is guided entirely by the board. An accompanying photograph shows this board with its "Wait," "Speak slower," and "Proceed" indications.

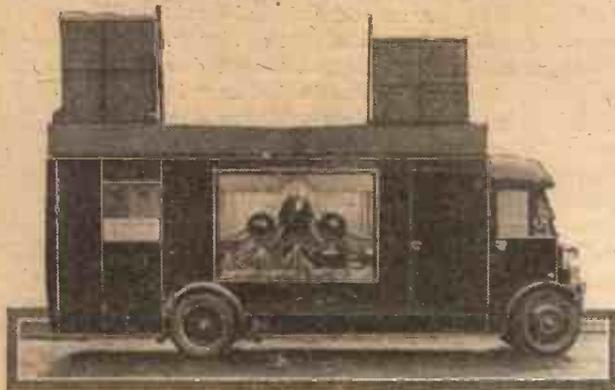
The "mike" is suspended on a tripod. If necessary, the tripod can be lengthened (it has telescopic legs) and taken outside a distance from the van, connections being made by cable. This arrangement is



The miniature studio

extremely useful for the relay of outside speeches when it might not be convenient to use the studio. The "mikes" used are of the carbon type, and are exactly as used in the Philips broadcasting station PCJ.

The loud-speakers are standard jobs, surprising as this may seem in view of the gigantic output. There are two speaker frames on the roof, each covered with fancy cloth. Inside each frame are sixteen perfectly standard Philips cone units! The great advantage of this is, first, that no field current is required; and, second, that the degree of purity is exactly the same as is obtained from these excellent cone speakers in broadcast use. KENNETH ULLYETT.



The Philips van with its loud-speaker equipment

WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

BOTH the B.B.C. concerts at the People's Palace and the symphony concerts at the Queen's Hall have been outstanding successes, and have justified an experiment at which many wisacres shook their heads. I went to the Queen's Hall to hear the Wagner concert under the baton of the famous German conductor, and the hall was as full as it was at any symphony concert before the advent of wireless.

So much for the suggestion that wireless keeps people at home.

The best thing is to do both—see and hear.

I don't quite know the general attitude, but wouldn't it have been better for the tenor, Nino Maudini, to have got somebody else to sing his compositions? Frankly, I do not like the tendency of vocalists and bandmasters to put over their own compositions.

This is not so much a criticism of Maudini's work as a criticism of the principle of self-advertising.

Should not the six-dot seconds really denote the hour? It is confusing to find that sometimes it signifies the quarter-hour. I suggest that Big Bén chime *quarters* and the six dots the *hour*. That will save misunderstanding.

We have been getting some good Saturday-night programmes lately. And do you notice the tendency to look back of late? "Do You Remember That?" was an example.

The most realistic item of this transmission was the plaintive "Beg pardon, sir," of "Mrs. Hurdy-Gurdy" in response, I suppose, to the announcer telling her that it was "time." The transmission was quite good, although the fade-out from one song to another *before* one song was finished was not well done; and I doubt whether the producer is a musician, otherwise he would not have faded "Drink to me only" into "Violets," a tune of such different character that the latter sounded as if it were out of tune.

It was nice, however, to hear the old songs: "Daisy Bell," "My Old Dutch," Schumann's "Serenade," "After the Ball," and "Home, Sweet Home." I do hope, if we are going to persevere with these

flash-back transmissions, that the producers will not confine themselves to Cockney items.

"In order to preserve the continuity of this scena no further announcing will be made until the conclusion."

This was the announcer's opening in a recent transmission. It seems to me that my recent criticism of too much announcing in this respect has been marked, learned, and inwardly digested. Splendid!

Bravo, B.B.C.! for arranging the transmissions of the speeches by Smuts and his old German adversary! A first-class speech, a first-class transmission, and—what is more—a first-class gathering. The only way to cement peace is to make friends with our late enemies. Some people do not seem to realise this.

I have been listening for some time to the morning and afternoon fare which is served up to the army of invalids, housewives, and unemployed. It occurred to me that few perhaps realise what a large audience listens in during the "early hours." I remember when I was abed lately being thoroughly entertained.



Tommy Handley, who is the chief comedian in the B.B.C. pantomime *Cinderella*

There is a daily concert from 12.30 to 1 p.m., which includes a singer or two and an instrumentalist, while the midday music is generally light and varied.

I am aware, however, that not everybody agrees with me in this respect. Here is one correspondent, for instance, who writes: "Although the artistes are people of ability, their programmes are usually dull."

"During the day (he adds) "I heard a broadcast of the Wurlitzer organ at Madame Tussauds, and was regaled for half an hour by marches played in a heavy, unimaginative style. I received a vivid impression of the mechanical 'music' which is pumped out by steam calliopes attached to roundabouts."

I listened attentively to a lot of the school broadcasts, and decided that Miss Rhoda Powell has a charming voice and is an excellent person for talking to the kiddies.

Jack Payne came on at 3.30 and livened things up considerably.

According to the printed programme, we were to be given an "interlude." I looked forward to some piano music, and instead was told that there would be nothing doing for ten minutes!

At 4.15 I listened to Alphonse du Clos and his orchestra. His programme was ordinary but the playing pleasing. I have not heard this orchestra before.

Stanellie, Edgar, and Douglas would do well to revise their turn. They started off with a little feeble back-chat and passed on to instrumental novelties which gave one the impression that they could be quite entertaining—and finished up by playing some hackneyed dance tunes. Perhaps the fact that there was a dance band sandwiched between this and other turns rather spoilt the effect of their own playing.

Wish Wynne's Cockney versions of the fairy stories with constant references to "beer" are not really funny. She is at her best in "studies"—especially the kind of thing we had last time, an impression of a charwoman.

HERE'S a set for the new conditions! The advent of Brookmans Park has brought about the need for different types of receiver from those to which amateurs have adhered during the last few years.

The change has come suddenly, with the start of the new station and the promise of yet more to come, and there are many who, having been content with conventional types of set have found themselves unprepared when the "snags," consequent upon these new conditions, arose.

New Requirements

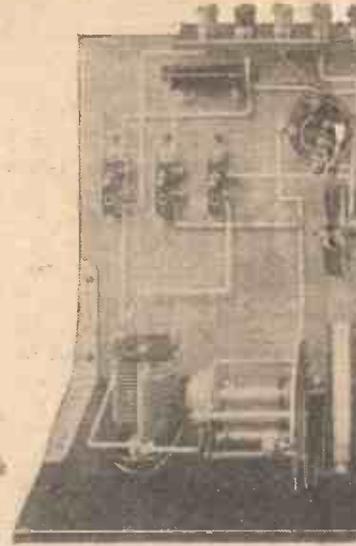
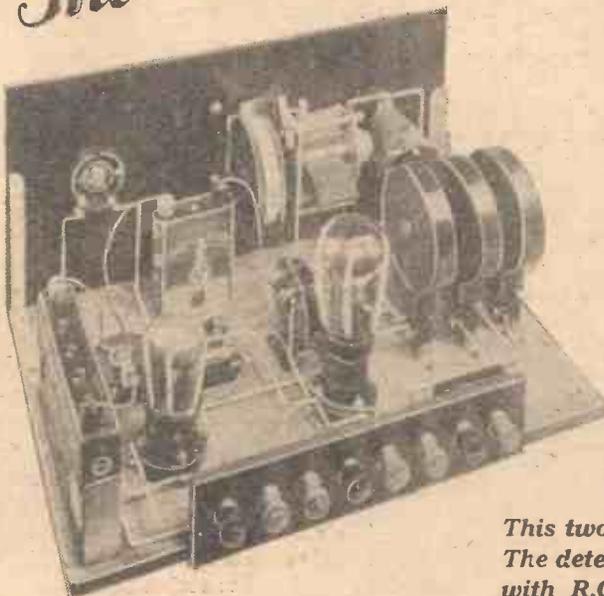
What are these "snags"?

To mention but a few, there is the need to-day for greater selectivity than has ever been needed before: some people are just waking up to this. Again, there is the need for simple wave-changing, so that the best advantage may be taken of both the medium and long wavebands. Thirdly, and most important, there is the danger that when an ordinary set is working on a very powerful local station it may be overloaded in the detector stage with consequent harm to the purity of reproduction.

This third point is so important that it has been dealt with at considerable length by our Technical Editor in articles which have been published recently in AMATEUR WIRELESS. There are many sets now operating in which quality is suffering because the detector stage is being overloaded by the powerful grid swings—and the cure is not easy.

Detuning obviously is impossible, for quality, again, may suffer, and local interference may be increased, because the

The PENTEC



This two-valver is unique in that it The detector stage will not be overloaded with R.C. coupling, the volume usually coupled stage. It uses plug-in coils, be worked on the u

SELECTIVITY

"fringe" of another station may be tuned in. With the two systems of detection previously available, one could not do very much to alleviate

matters because the leaky-grid detector is sensitive, but easily overloaded, and the anode-bend system is still liable to an overload, though at a larger grid swing, and is not nearly so sensitive.

In this new "Pentector" set, a pentode valve is used as a detector in the manner recommended by our Technical Editor. There are many advantages in so doing. One, to quote his own words, are that "the advantages . . . are that one

obtains the benefit of the increased amplification of the pentode so that the sensitivity is distinctly greater than with an ordinary anode-bend detector."

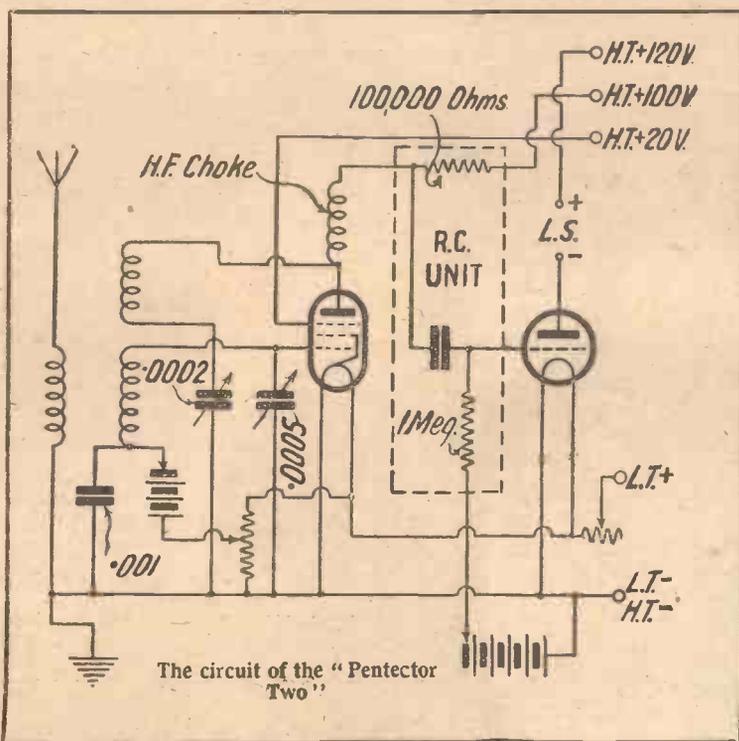
Roughly speaking, this pentode detector, which is resistance-capacity-coupled to the low-frequency stage, gives a trifle more than the strength normally given by an ordinary transformer-coupled stage: and, of course, you have the advantage of the superior quality evinced by the R.C. coupling.

Then, again, the selectivity of this arrangement is of a very high order, and the layout of the circuit is such that the utmost is made of this property; a very selective coil arrangement is employed.

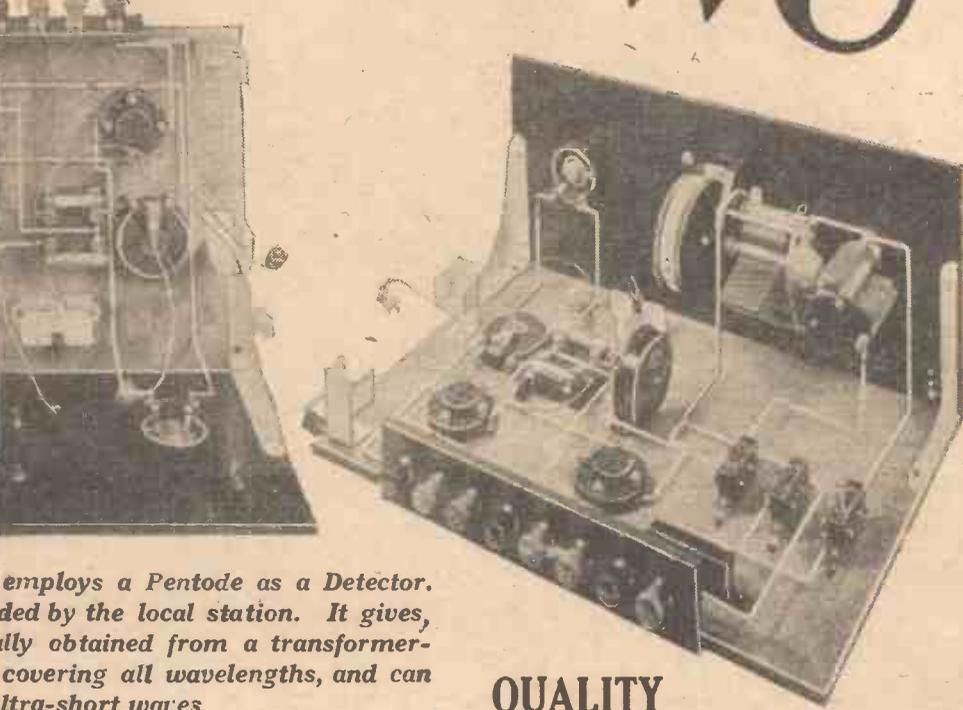
Simple Construction

There is nothing special to notice about the construction of the receiver, except that the layout is such as to produce a neat appearance (a drum-dial condenser is used) with simplicity of construction.

An accompanying panel shows the components needed. It is recommended that this list be rigidly adhered to. Any type of normal pentode valve can be used. Plug-in coils are employed for tuning. An advantage is gained thereby in that the coil characteristics can be changed more readily than with a fixed type of tuner, it is the



PENTECTOR TWO



employs a Pentode as a Detector. It gives, readily obtained from a transformer-covering all wavelengths, and can ultra-short waves

QUALITY

matter of but a few moments to change from the medium to the long waves, the coils are cheap, and, lastly, it is easily possible to plug in ultra-short-wave coils and to use the "Pentector Two" as an efficient short-waver.

It oscillates readily and smoothly on the "wavelets," is easily to control, the advantages of using the pentode valve are still manifest, and altogether this is a very nice little receiver to use for short-wave DX working.

Assembly Notes

When making up the set, advantage should be taken of the fact that a blueprint is available. It can be obtained, price 1s., post free, from the offices of AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. Simply address your inquiry to the Blueprint Department; no correspondence is necessary; send a postal order, and not stamps.

A full-size blueprint, No. 213, has been prepared for this set. You can make use of it as a drilling template for the panel and terminal strip; you can use it as a guide to the layout of the components, and as it shows each wire in its correct place it will greatly simplify the job of wiring.

Take care accurately to drill the rect-

angular hole in the panel for the dial of the drum condenser; a little latitude is possible should a slight error be made, for the fancy surround of the dial masks the actual orifice; but there is no reason why, using the blueprint as a guide, you should go wrong.

Take care, also, to get the positions of the three coil sockets correct. The distances between each are rather important, and, also, the three coils should not be placed nearer the H.F. choke than is indicated on the blueprint.

Wiring is quite straightforward. Use flexes where necessary for the grid-battery connections, but rigid

insulated wire is best used for all other connections. The grid batteries themselves are supported each in two small clips screwed to the baseboard.

You can wire up direct from the theoretical circuit or from the blueprint. If possible, it is best to make use of the circuit in conjunction with the print.

From the circuit it will be seen that of the three coils used, one is an aperiodic aerial coil, the second is the grid coil, and the third provides reaction. Looking from the back, the coil sockets are arranged in this order: Reaction, left; aperiodic, right; grid coil, centre.

Coil Sizes

The following coils will be sufficient for the medium waveband: Aperiodic, 40; grid coil, 60; reaction coil, 60; and for the long waves, aperiodic, 100; grid coil, 250; reaction, 150.

The coils used for the ultra-short waves will depend on the characteristics of the set and the aerial used, and it would hardly be possible to specify them here. They will, however, be found suitable in the same proportions as the three coils given for the medium and long waves.

Battery values are critical for best results. To the power-valve H.T. tapping at least 120 volts should be applied, and 150 volts is not too much with most valves. The detector H.T. tapping should be taken to the 100-volt tapping on the battery or eliminator, with most types of valve; the additional grid tapping should be given 20 volts.

The potentiometer setting is rather critical in order to get the best results and

COMPONENTS REQUIRED

Ebonite panel, 14 in. by 7 in., and strip, 8½ in. by 2 in. (Raymond, Trelleborg, Trolitax).

Baseboard, 14 in. by 9 in. (Pickett, Raymond, Camco).

Panel brackets (Lissen, Camco, Bulgin).

.0005-microfarad variable condenser, drum-control type (left hand) (Polar "Ideal," Lotus, Ormond).

.0002-microfarad reaction condenser (Bulgin, Lotus).

15-ohm panel-mounting rheostat (Wearite, Lissen, Igranic, Varley, Sovereign).

400-ohm baseboard potentiometer (Lissen, Igranic, Wearite, Sovereign).

Three baseboard-mounting single coil holders (Lotus, Lissen, Keystone).

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

.0001-microfarad fixed condenser (Lissen, Dubilier, T.C.C., Graham-Farish).

.001-microfarad fixed condenser (Lissen, Dubilier, T.C.C., Graham-Farish).

High-frequency choke (Igranic, Lissen, Wearite, Bulgin, Keystone, Sovereign).

Resistance-capacity coupling unit (Lissen, Dubilier, Graham-Farish).

Pair of grid-bias battery clips (Bulgin, No. 1).

Three-cell battery clip (Bulgin, No. 2).

Four wander plugs marked: G.B.+1, G.B.-1, G.B.+2, G.B.-2 (Belling-Lee, Ecelex, Clix, Burton).

Eight terminals marked: Aerial, Earth, H.T.+1, H.T.+2, L.T.-, L.T.+ , L.S.+ , L.S.- (Burton, Belling-Lee, Ecelex, Clix).

Connecting wire (Glazite).

Two feet of thin flex (Lewcoflex).

A complete set of coils (Lissen, Lewcos, Tunewell) should be obtained in order to get the utmost from this receiver. If, however, it is desired to receive only on the normal medium or long wavelengths, then the following coils only need be obtained: 40, two 60's, 100, 150, and 250 or 200. The other coils of the range will be found handy for getting the utmost selectivity (using a smaller coil in the aperiodic coil socket, for example) or for bridging the wavebands. A set of ultra-short-wave coils should also be obtained, for the "Pentector Two" works excellently on the short wavelengths.

“THE PENTECTOR TWO” (Continued from preceding page)

the most sensitive detection. Generally it will be found that with 20 volts on the priming grid about 3 volts will be needed for grid bias. It may be found possible to drop down to 10 volts on the priming grid, and in this case not more than 1½ volts grid bias will be needed.

Valve Selection

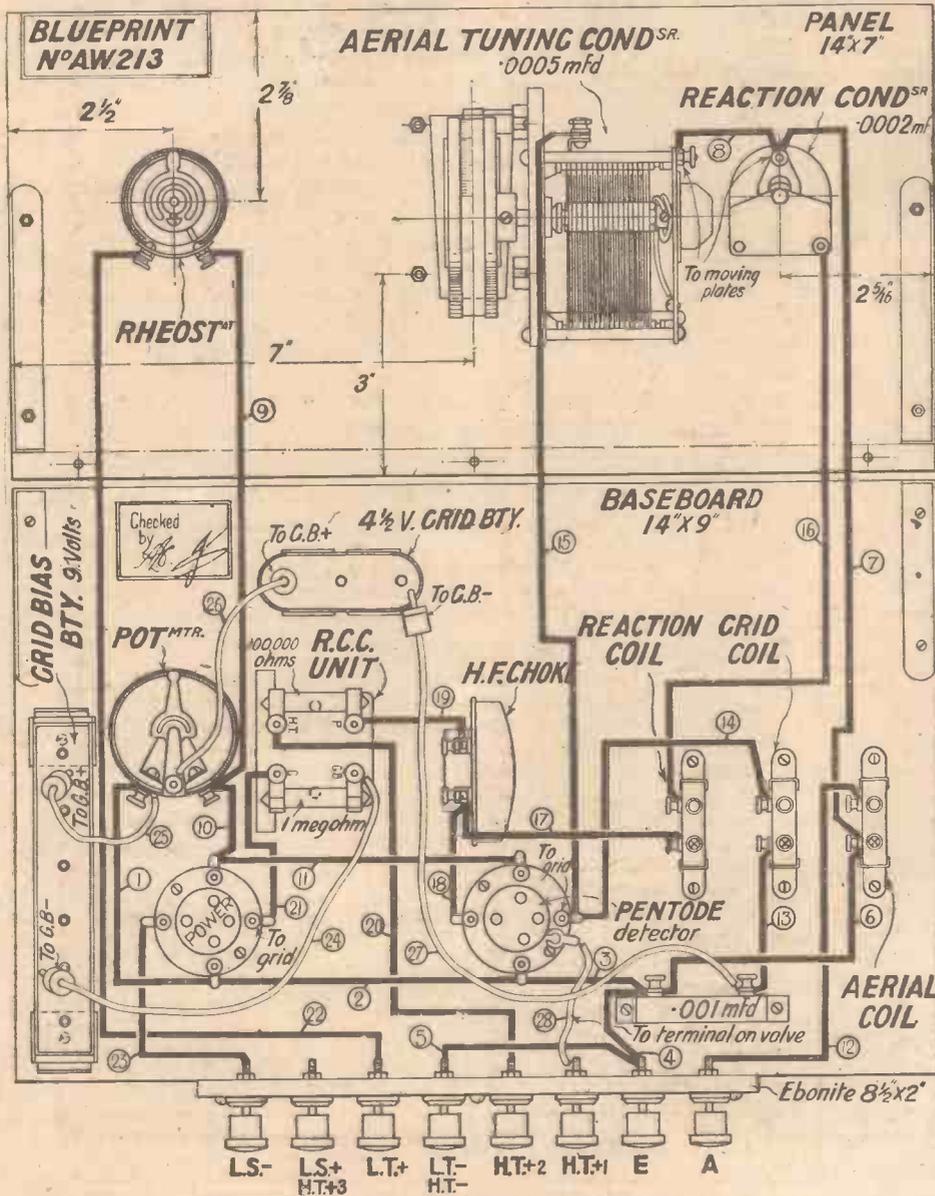
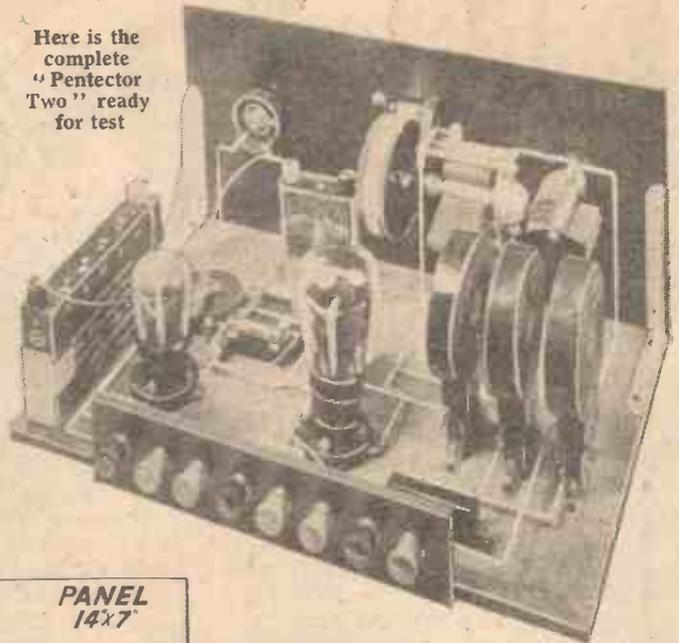
Pentodes vary slightly in their characteristics—even those selected from the same range of the same make. Therefore, readers are advised to experiment themselves with the grid bias, priming grid, and H.T. value applied to the detector.

These values will be found to have a considerable bearing upon the general operation of the pentode as a detector, and influence its selectivity and sensitivity. With a little experiment you will have no difficulty in getting the pentode working

properly, and then you will be able to see for yourself that its normal immunity from overloading, its selectivity, sensitivity, and great amplification are great advantages under the new reception conditions.

Those readers who would welcome the opportunity of seeing this new pentode-detector receiver should make a note of the fact that it is being displayed in the Radio Department windows of Messrs. Selfridge and Co., Ltd., in Somerset Street, just off

Here is the complete “Pentector Two” ready for test



The wiring diagram. A blueprint is obtainable, price 1/-

Oxford Street, London, W. It is an aid to construction to see a receiver before starting to make it up, and the opportunity to inspect it, therefore, should be grasped.

AT THE QUEEN'S HALL

WAGNER was in contrasting moods at the last but one of this year's B.B.C. concerts. First, the wild and angry seas from the overture to *The Flying Dutchman* and then the tranquil loveliness of the "Vorspiel und Liebestod," from *Tristan*, in which Miss Stiles-Allen took a part. I leave the "Kaisermarsch" for the Wagnerians and Wagnerites of whom we hear so often. I hope they liked the brass. The performance finished with Brahms' First Symphony—marred only by a return of the whispering nuisance, and even the talking nuisance. Listeners over the wireless had the advantage here. The audience cheated, and Franz von Hoesslin, who conducts Wagner at the Bayreuth festivals, was all smiles. L. R. J.

The Frankfurt-on-Main broadcasting authorities are planning an extension of their daily news service. To this end they have decided that the items are to be supplied direct by foreign correspondents abroad and that they shall not be limited to bulletins supplied by official agencies.

On the occasion of the twelfth anniversary of the Bolshevik Revolution, the Soviet authorities formally opened the new high-power transmitter erected in the neighbourhood of Moscow.

Next Week: The New "All-Britain Three"—A Reyner Set

CHRISTMAS GIFTS

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I enclose 5/- deposit for one Lissenola Portable Gramophone, Model No. 4, as illustrated, and agree to pay the balance in eight consecutive monthly payments of 8/8, to you at your Isleworth address.

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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"
Employs 3 H.T. + tapplings. 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 12 mA.
PRICE .. 27/6

D.C. MODEL "B"
Employs 3 H.T. + tapplings. 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 12 mA. for power valves .. 39/6
PRICE .. 39/6

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A.C. MODEL "A"
Tappings as in D.C. Model A.

LN 576 for A.C. Mains voltage ..	200-210
.. 577	220-230
.. 578	240-250
.. 639	100-110
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Tappings as in D.C. Model B.

LN 579 for A.C. Mains voltage ..	200-210
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.. 681	240-250
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PRICES

DULL EMITTER (TYPE G.M.)

L.N.503 2-volt, 20 amp. hours	4/6
L.N.504 2-volt, 45 amp. hours	8/6

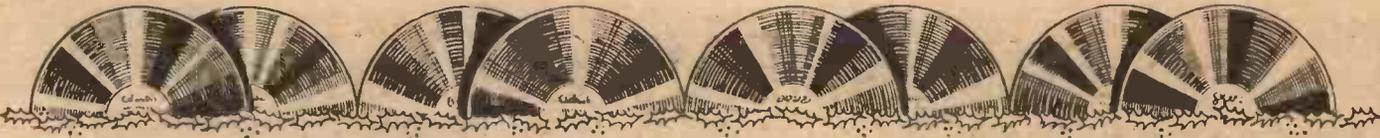
Multiple plate type, glass containers.

L.N.500 2-volt, 20 actual amp. hours	9/6
L.N.502 2-volt, 40 actual amp. hours	13/6
L.N.560 2-volt, 60 actual amp. hours	17/6

Extra Capacity

L.N.555 2-volt, 24 actual amp. hours	10/6
L.N.557 2-volt, 48 actual amp. hours	14/6
L.N.559 2-volt, 72 actual amp. hours	18/6

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



GRAMOPHONE RECORDS FOR CHRISTMAS

A selection of Records intended for Christmas should be bright and cheerful, and as far as possible be the best of their class. The following notes will be of assistance in making a choice

EVERY gramophone user has one record which he regards as the gem of his collection. In my own case, out of a very large collection of all types of records, I have no hesitation in stating that my favourite record is "A Vucchella," a Neopolitan song, sung by Caruso (H.M.V. DA103). This record was, of course, not electrically recorded; but, nevertheless, it reproduces magnificently both on a modern folded logarithmic horn gramophone and on a radio gramophone. The matchless timbre of Caruso's voice is better than that of any modern tenor, although the present-day artistes enjoy all the advantages of electric recording. I mention this record as opportunity is often taken to add to the collection of "star" records at Christmas.

Light Orchestral

Light orchestral music is easily the most popular and will therefore be considered first. Marek Weber and his orchestra are recording very clearly in their latest records, and in addition to the "Pagliacci" selection, their "Cavalleria Rusticana" selection (H.M.V. C1736) should be heard. This record has the same effective recording as the earlier record. The J. H. Squire Celeste Octet usually make records which prove popular. Their minuet and intermezzo from "L'Arlesienne Suite" (Col. 9835), and Gossamer Wings (Col. 5254) are both records in which the string tone is particularly good. The Dajos Bela Orchestra is another consistent recorder and of this series of records I think I would choose Viennese Waltz Medley (Parlo. E10900) and the accompanying record Viennese waltz Pot-pourri (Parlo. E10913) as being representative of Dajos Bela's superb style. An earlier successful record by the same orchestra is Carmen Selection (Parlo. E10875).

The foregoing records are all made by orchestras of the size and composition usually heard in restaurants. A series of records made by an orchestra of symphony proportion but dealing with musical subjects similar in character to the above, which are well worthy of note are those made by The New Symphony Orchestra

conducted by Dr. Malcolm Sargent. From the Canerake (Gardener) (H.M.V. B3043) is a lively record, the rhythm of which is as near that of a dance tune as a classical composer dare go. The Nell Gwynn dances on B2987 and B3036 and also the Henry VIII Dances on B2981 can be recommended as good recordings of well-known pieces. December records of light orchestral music which should be noted are Peter Pan selection played by the J. H. Squire Celeste Octet (Col. 9768) and Hungarian Dances Nos. 1 and 3 played by the Vienna Philharmonic Orchestra (H.M.V. B3145).

Musical-comedy Selections and Vocal Gems

Next in popularity to the series of records just dealt with comes the series of operatic and musical-comedy selections known as vocal gems. Usually all the well-known airs and choruses are epitomised and welded into a composition which forms a miniature rendering of the complete work. Of the musical comedy selections "Bitter Sweet" vocal gems recorded by the Columbia Light Opera Company (Col. 9900), Lionel Monkton "Memories" (Col. 9883) and "Whoopee" and the "New Moon" Selections recorded by the Light Opera Company

(H.M.V. C1734) are recent issues and good representatives of their class. In the operatic class "Il Trovatore" (H.M.V. C1692), "Maritana" (H.M.V. C1693), recorded by the Light Opera Company, and "Faust" (Col. 9555), and "Merrie England" (Col. 9893) (Miriam Licette and chorus) are noteworthy examples of this style of composition.

Humorous

As humour is a very personal quality, opinions may differ widely over individual records. However, judging from the reaction of many people of quite different tastes I think the following short list will provide the material from which suitable records may be selected. "A Bedtime Story," by Wish Wynne (H.M.V. B2780), though issued some time ago is still perhaps the best of its class. It is a Cockney study and has an almost universal appeal. Totally different in character yet also a masterpiece in its own particular class is Leslie Henson's "A Few Drinks" (Col. 9592). The recording of Henson's gurgles after sampling the prohibition cocktails is very effective. Another style of humour is to be heard in Mona Grey's "In the Pit" (Parlo. R247). In this the artiste uses her various voices to great advantage.

Of the issues special to Christmas I found "Our Village Concert," by Syd Howard, Vera Pearce and Company (H.M.V. C1782) extremely funny on its first playing. Whether it will stand repetition or not, the test is of a truly humorous work, I am unable to say. Two Columbia issues, the ever-popular Black Crows in "Foolishments" (5604) and "The Laughing Policeman Up-to-date" (Charles Penrose and Kaye Connor) (5532), should also be heard.

Community Vocal

From time to time records which fall under the above heading are issued, and in view of the fact that they are most likely to be appreciated at Christmas time, the names of one or two of the better known are given. "Songs of the Past," by the Light Opera Company (H.M.V. C1741) and "Savoy (Continued in third column of page 1042)



Our Cartoonist's impression of A. V. Judges

TWO VALVES THAT GIVE YOU 4-VALVE VOLUME



A Livelier DETECTOR VALVE

The Lissen Detector Valve HL210 is the liveliest detector valve you can use in any set, because the Lissen Extended Grid utilises the outer fringe of electron emission and you get both rectification and noticeable amplification in the one valve.

Couple this Lissen Detector Valve with the Lissen Power Pentode in a two-valve set and see what wonderful range and volume you can get. Lissen Valve HL210. PRICE 10/6

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4-valve volume from a 2-valve set—that's what Lissen's new battery-driven Power Pentode gives you. Use it in a 2-valve set—use it in any set with one stage only of L.F.—and it is like adding two more valves to your set. Yet you drive it off your ordinary H.T. Batteries because it only takes 7 milliamps of H.T. current.

It is more than a power valve . . . more than a pentode . . . it is a Power Pentode that amplifies weak and strong signals alike to a great degree of loudness. The amplification factor of this amazing valve is 90 . . . that of an ordinary power valve is merely 6 or 7. Imagine the difference in volume this Lissen Power Pentode will give you. Put a Lissen Power Pentode in your set to-day and learn what amazing power with economy it really brings you.

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"A.W." TESTS OF APPARATUS

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

Marconi A.C. Valve

WE have recently tested one of the new Marconi indirectly-heated valves, type MH₄. The heater enclosed within the cathode requires a current of 1 amp. at 4 volts. The anode is made of metal gauze with the object of obtaining better ventilation of the grid and therefore reducing the possibility of grid emission. The cathode is taken out to a separate terminal on the side of the base, allowing the valve to be placed in a normal 4-pin holder and therefore greatly simplifying the alteration required for changing over from battery valves to A.C. valves.

The characteristics taken on our laboratory bridge, differed little from those given by the makers. Actually the A.C. resistance in the samples tested was slightly lower than that specified with a corresponding



This new Marconi indirectly-heated valve has the cathode taken to a separate terminal. The usual four-socket holder is therefore suitable

reduction in the amplification factor; however, since the mutual conductance is well up to standard, this slight difference in the figures should make no alteration to the actual performance of the valves.

The figures obtained on test were as follows: A.C. resistance, 18,400; Amplification factor, 29.5; Mutual conductance, 1.6 milliamps. per volt.

These figures were obtained with a negative grid bias of 1½ volts. During the tests it was found that a time of three-quarters of a minute elapsed before the valve reached full efficiency.

These valves can undoubtedly be recommended for general use.

New Clix Plugs

MESSRS. LECTRO LINX LTD., 254 Vauxhall Bridge Road, S.W.1, who are well known as manufacturers of Clix plugs and sockets have submitted for test a new type of these useful gadgets possessing many advantages over the older types, particularly when used with high voltage supply. The sample tested consists of a plug and socket completely shrouded in

black polished insulating material; not only is the socket protected in this manner, but the point of the plug is also totally enclosed in a shroud and, when in position fits over the metal pin of the socket. In reality the plug is made in the form of a socket and vice-versa.

Efficient electrical contact is ensured by splitting the metal portion of the socket to form a reliable spring grip. The leads can be fitted to the plug simply by unscrewing the top and passing a wire through a hole in the metal spindle and finally binding the wire securely by screwing up the top again. The metal stem at the end of the socket is slit and fitted with a nut for clamping a connecting wire.

Highly finished and with the necessary lettering engraved in white, these components are most attractive in appearance and can be recommended.

Wearite L.F. Choke

THE inductance of a low-frequency choke designed to carry a D.C. polarising current is of little importance unless the value of this current is specified. Generally, the inductance decreases rapidly as the polarising current is increased, unless special precautions are taken in the design.

It seems, however, that the radio public are becoming educated to the importance of using L.F. chokes which will maintain their inductance at a constant value over a wide range of polarising currents. It is highly probable that the maintenance of a constant inductance under varying currents plays no small part in preventing distortion in low-frequency amplifiers.

In a number of sets published in AMATEUR WIRELESS, Wearite constant-inductance chokes, made by Messrs. Wright & Weaire, Ltd., of 740 High Road, Tottenham, N., have been employed; although these components are not unreasonably large in size or expensive in cost, there are cases where a more compact and cheaper article is desirable; Messrs. Wright & Weaire are therefore marketing a particularly compact type having overall dimensions of 2 in. by 2 in. by 3¼ in. high. It is made in two standard sizes. The H.T.5 has an inductance of 20 henries, remaining constant up to approximately 30 milliamps of polarising current, while the H.T.6 has an inductance of 60 henries, which remains approximately constant up to 15 milliamps D.C. current.

This choke is provided with a centre-tap and is useful for obtaining a 2-to-1 step-down in pentode output circuits.

In order to check these figures, the chokes were placed on our standard inductance

bridge whilst a small alternating current was passed through the windings in order to duplicate practical conditions. The figures given by the makers were found to be correct for both samples.



A very compact and efficient form of constant-inductance low-frequency choke—manufactured by Wright and Weaire

"GRAMOPHONE RECORDS FOR CHRISTMAS"

(Continued from page 1040)

Christmas Medley," by Debroy Somers' Band (Col. 5441), are examples of recent issues, but "Little Brown Jug" sung by Stuart Robertson and Chorus (H.M.V. B3082), "The Sailor Likes His Bottle-O," sung by John Goss (H.M.V. B2831), and the "Lincolnshire Poacher," sung by the Sheffield Orpheus Choir (Col. 4841), are all well recorded and are typical "community" songs.

Dance

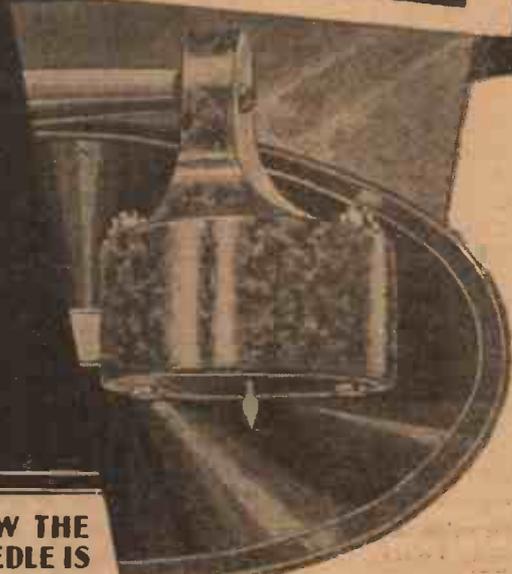
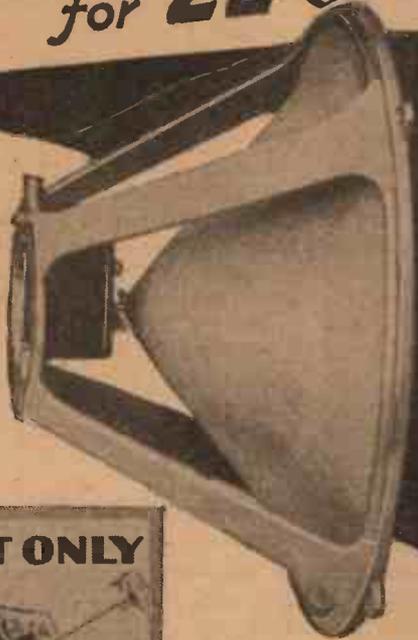
Debroy Somers' Band undoubtedly shows at its best in the medley type of dance record. "A Hunting Medley," on the reverse side of which is a "Community Medley" (Col. 9623) was issued in March, but it is really a Christmas record. Jack Hylton's "More Old Songs" (H.M.V. C1783) should prove as popular as his "Old Songs" effort of last year. "Lonesome Little Doll," complete with xylophone solo, by Jack Hylton and his Orchestra (H.M.V. B5727) is very similar in style to the other records of this popular "doll" series. Other selected dance records are "Terribly Fond of You," New Mayfair Dance Orchestra (H.M.V. B5717), "Love, Your Spell is Everywhere," Victor Arden-Phil Ohman and their orchestra (H.M.V. B5724), "Another Kiss," Charlie Kunz and his Chey Henri Club Band (Col. 5607), "I'm Bringing a Red, Red Rose," Paul Whiteman and his orchestra (Col. 5556), "West End Blues," Louis Armstrong's Hot Five (Parlo. R448) and "Nobody, But You," Frankie Trumbauer and his orchestra (Parlo. R434).

A. G. McD.

A HAPPY THOUGHT! GIVE LISSEN

**MOVING-COIL TONE
IN A LOUDSPEAKER
for 22/6**

**START NOW TO
REPRODUCE YOUR RECORDS
ELECTRICALLY**



UNIT ONLY



12/6

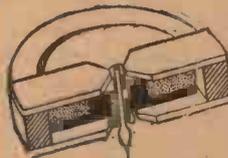
With the Lissen Four-Pole Adjustable Balanced Armature Unit you can build any type of cone loudspeaker; you can use it with a big baffle board or put it in a cabinet—you can build a linen diaphragm loudspeaker with it if you want to. **PRICE**
13-inch Lissen Cone .. 2/6
Cast Aluminium Chassis .. 7/6

12/6

The Lissen Four-Pole Adjustable Balanced Armature Loudspeaker, completely assembled as illustrated is very nearly as true in tone, as faithful in response, as an expensive moving-coil speaker. It brings something approaching loudspeaker perfection within the reach of everybody. It is ready to connect up to your set straight away or you can mount it in a cabinet. It has a fine adjustment, and you therefore get the utmost volume from it without chatter.

22/6

**HOW THE
NEEDLE IS
SUSPENDED**



**NEW REVOLUTIONARY
LISSEN NEEDLE
ARMATURE PICK-UP
BRINGS NEW LIFE
TO GRAMOPHONE
RECORDS**

"Better than 'Talking' Picture reproduction"—that is what everybody says who hears a gramophone record played by this new Lissen Pick-up. And actually the reproduction is better than the film experts have achieved—more natural, nearer to reality, because no longer are the high notes thinned out or the lower bass lost.

The Lissen Pick-up is so responsive that even the perfect electrical recordings of to-day can hardly do it justice. It responds to the most minute indentation on the record—the needle-armature is so light that the needle point actually feels its way along the record groove. And you'll find your records almost everlasting when you use this new Lissen Pick-up because the needle point trails lightly and does not plough its way along.

If you want every single record to sound much better than those you hear at demonstrations—if you want radio gramophone reproduction that comes so near to reality that in a darkened room you would suspect the presence of the artiste—get this new Lissen Pick-up and learn what perfection means. Any Lissen radio dealer will demonstrate it for you.

30/-

LISSEN

FOUR-POLE

ADJUSTABLE

BALANCED ARMATURE

LOUD-SPEAKER UNIT

Obtainable from all radio dealers; insist upon hearing Lissen before you buy.

LISSEN
POPULAR
MODEL
PICK-UP

The original Lissen Gramophone Pick-up which won popularity because of outstanding value for money.

PRICE 15/-

LISSEN

NEEDLE ARMATURE

PICK-UP

LISSEN LIMITED,

Worplesdon Road, Isleworth, Middlesex. Factories also at Richmond (Surrey) and Edmonton. (Managing Director: T. N. COLE)

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

TAKING POT LUCK

JOTTINGS FROM MY LOG

By JAY COOTE

ON some evenings you may feel lazy and you may wish to tour Europe without going to the trouble of tuning-in a number of transmissions. Even so, the Fates will prove kind, for with the advent of the winter season many studios have resumed their personally-conducted tours for the benefit of their local subscribers who are not equipped with receivers allowing them to collect on their own account broadcasts from more distant transmitters.

Although such relays of foreign programmes are not carried out by all studios at fixed dates, there exist a certain number who make it a weekly feature or who, as in the case of Bergen, offer more frequent doses of this kind of entertainment. Turn to this station on Sundays, Tuesdays, and Fridays at about 9.20 p.m., or so soon as their main evening programme permits, and you will pick up a series of "dips" of what Europe has to offer on those evenings.

Again, on Mondays, as a general rule,

Zagreb (Jugo-Slavia) on 308 metres will let you hear bits and pieces from its neighbours' wireless menus; and, should the conditions prove unfavourable, will make a further attempt on the following evening at the same time.

Hamburg's Relays

Hamburg, a station which last winter regularly included such transmissions in its weekly fare, up to the present has not carried out these experiments on fixed dates, but it would repay you to turn to that city on Tuesdays at 9.35 p.m., a time and day which it has chosen from time to time. Stockholm may be relied upon—with rare exceptions—at 8.40 p.m. on Wednesdays, and Stuttgart, the proud possessor of a fully equipped short-wave receiving station at Schloss Solitude, still searches the New Continent at least once weekly, after 10 p.m. Unless unforeseen circumstances arise, Wednesday is the day favoured for these excursions.

For some time past, Leningrad, on

Saturdays at 10 p.m. G.M.T. (midnight according to Eastern European Time), has picked up from the ether and broadcast excerpts from the programmes put out by the most prominent, European transmitters, including 5XX, and interspersed with these offerings will be found samples of what the Soviet stations present to their listeners.

Earlier in the evening also, at 8.30 p.m., you should have no difficulty in hearing the new 20-kilowatt Moscow experimental transmitter which, on 720 metres, will pilot you through the Soviet Union, picking up snippets here and there.

Finally, bear in mind that Turin every Saturday night at 11 p.m. invites you to a transatlantic trip, and successfully relays such popular U.S.A. stations as WGY (Schenectady), KDKA (East Pittsburg), WEA (New York), WIOD (Miami Beach), and WPG (Atlantic City). Milan on those nights may also be taken as an alternative channel.

"IS YOUR AERIAL THE RIGHT SHAPE?"

(Continued from page 1033)

efficiency, and there is a definite point beyond which it does not pay to increase the horizontal portion.

Calculations such as this have been made for a number of aerials, and the results have been tabulated as shown by the diagram. I have plotted the radiation resistance of the aerial as against the length of the horizontal top for various heights, ranging from 15 ft. to 40 ft. Where the length of horizontal top is shown as nothing, the aerial consists of a single vertical wire of the particular height marked on the curve; and the total length of wire is the length of top plus the height. The maximum effect referred to can definitely be seen in each of the curves occurring at 20 ft. for a 15-ft. aerial, 30 ft. for the 20-ft., a little over 50 ft. for the 30-ft. aerial, and at about 60 ft. for the 40-ft. aerial. Therefore, we can say quite definitely that there is, for this type of aerial, a definite point beyond which it does not pay to increase the horizontal top.

Let us now remember the object of these investigations, which is the obtaining of the most selective arrangement. The shorter we can make the aerial, the more selective the tuning. Let us examine these curves in the light of this idea. In the case of the first two curves for aerials having actual heights of 15 ft. or 20 ft. it is clear that we gain little by having a horizontal top. In the 20-ft. aerial, for example, the

radiation resistance at the maximum is .225 ohm as against .15 ohm with no horizontal top at all. The gain is so small in comparison with the advantages obtained by having so much shorter length of wire that it would pay to leave off the horizontal top altogether or to limit the length to 20 ft. or so.

Compromise Necessary

If one can afford to increase the height, however, a certain horizontal top becomes desirable, but even here it is not the best thing to carry this horizontal length to the maximum point. If, for example, on either the 30-ft. or 40-ft. aerial, one stops short at 40 ft. of horizontal top, we should still obtain a high proportion of the maximum radiation efficiency, while the total length of wire would be only 60 ft. or 80 ft. respectively, and the selectivity would be correspondingly better.

The general inference to be drawn from the curves is that the length of horizontal top should be approximately equal to the height above the ground. Where it is possible to obtain a large height, this enables us to utilise some 80 ft. of wire. Reception will be very good, but, even so, it may be found to be unselective and it may be necessary to revert to a vertical wire.

Where the height is only 15 ft. or 20 ft., nothing like the full 100 ft. of wire should be used. Increasing the horizontal top beyond an amount equal to the actual height can be seen from the curves to cause a very slight increase in the perform-

ance; and, indeed, after about 40 ft. or 50 ft. the performance definitely falls off. The horizontal top, therefore, is only making our aerial unselective, and is not giving us anything in return by way of increased signals; so that the general rule that the horizontal top should be approximately equal to the height is one which will give the best all-round results.

One final word of warning may be given. If any alteration is made to the aerial, do not forget that the capacity will change; particularly where the aerial is a long, low one, the reduction in capacity by reducing the horizontal top will be very considerable, and if the circuit is of such a nature as to respond readily to changes in the aerial capacity the tuning may conceivably be altered 30 or 40 degrees. It may even be found that 5GB cannot be received properly owing to the fact that it is no longer tuned in properly, and the use of a larger coil must be resorted to. This is an extreme case, but the possibility of such a happening must be borne in mind.

At Caen (Normandy), Radio Nord-Ouest, a French private broadcasting station, is being rebuilt and transmissions are to be made shortly on 375 metres.

Tannoy Mains Units—In the advertisement of the Tulsemere Mfg. Co. on page 964 of "A.W." No. 391 it was stated that combined mains units can be obtained from £6 12s. 6d. This should be £5 12s. 6d.

POWERFUL & ECONOMICAL



Standard Batteries provide a smooth, high capacity output of current, that produces a perfection of tone, unequalled by any other type. After a year or so of use this trouble-free battery is quickly and simply recharged as new, by replacing with Cartridge refills.

Years of daily service, without attention, have earned for the Standard Battery the popularity of all listeners who wish for the enjoyment of Radio without the annoyance of unreliable current supply.

Profusely illustrated Booklet, describing this Permanent Battery, sent free on request.

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Walter's STANDARD BATTERY

THE STANDARD BATTERY CO. (Dept. A.W.), 184/188 SHAFTESBURY AVENUE, LONDON, W.C.2.

M.B.

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

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.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)
GREAT BRITAIN															
25.53	11,751	Chelmsford (5SW)	15.0	330	887	Velthem	8.0	*246	1,220	Kiel	0.35	*385	779	Genoa (IGE)	1.0
*200	1,500	Leeds (2LS)	0.13	*60J	590	Brussels	1.0	*246	1,220	Cassel	0.25	*441	680	Rome (Roma)	3.0
*242	1,238	Belfast (2BE)	1.0	DENMARK				*253	1,184	Gleitwitz	2.0	453	662	Bolzano (IBZ)	0.3
261	1,143	London (2) tests	5.0	*281	1,067	Copenhagen (Kjobenhavn)	0.75	*250	1,157	Leipzig	1.5	*501	599	Milan (Milano)	7.0
*288.5	1,049	Newcastle (5NO)	1.0	FRANCE				*270	1,112	Kaiserslautern	0.25	NORWAY			
288.5	1,040	Swansea (5SX)	0.13	1,153	260	Kalundborg	7.5	*276	1,085	Königsberg	2.5	240	1,250	Rjukan	0.19
288.5	1,040	Stoke-on-Trent (6ST)	0.13	31.65	9,479	Radio Experimental (Paris)	1.0	*283	1,053	Magdeburg	0.5	268	1,121	Frederiksstad	0.7
288.5	1,040	Sheffield (6LF)	0.13	175	1,714	S. Quentin	0.1	*283	1,053	Berlin (E.)	0.5	*283	1,053	Notodden	0.05
288.5	1,040	Plymouth (5PY)	0.13	214	1,400	Fécamp (Radio Normand.)	0.5	*319	941	Dresden	0.25	304	824	Bergen	1.0
288.5	1,040	Liverpool (6LV)	0.13	220	1,364	Beziers	0.1	*319	941	Bremen	0.35	453	662	Tronsø	0.1
288.5	1,040	Hull (6KH)	0.13	238	1,260	Bordeaux (Radio Sud-Ouest)	1.0	*325	933	Breslau	1.5	453	662	Aalesund	0.3
288.5	1,040	Edinburgh (2EH)	0.35	*272	1,103	Rennes (PTT)	0.5	*325	933	Stuttgart	1.5	453	662	Forsgrund	0.7
288.5	1,040	Dundee (2DE)	0.13	*280		Montpellier (PTT)	0.2	*372	806	Hamburg	1.5	*493	608	Oslo	1.5
288.5	1,040	Bournemouth (6BM)	1.0	288.5	1,040	Petit Parisien	0.5	*390	770	Frankfurt	1.5	SPAIN			
288.5	1,040	Bradford (2LS)	0.13	291.4	1,0293	Radio Lyons	0.5	*418	716	Berlin	1.5	251	1,193	Almeria (EAJ18)	1.0
*301	995	Aberdeen (2BD)	1.0	*294	1,020	Limoges (PTT)	0.5	*453	662	Danzig	0.25	298	1,121	Barcelona (EAJ13)	10.0
*310	968	Cardiff (5WA)	1.0	304	986	Bordeaux (PTT)	1.0	*456	657	Aachen	0.35	311	956	Oviedo (EAJ19)	0.5
356	842	Brookman's Park 30		305.6	981.7	Agen	0.25	*473	635	Langenberg	13.0	*34J	860	Barcelona (EAJ1)	8.0
*377	797	Manchester (2ZY)	1.0	309	970	Radio Vitus	1.0	533	563	Munich	1.5	368	815	Seville (EAJ5)	1.5
*390	753	Glasgow (5GC)	1.0	*316	950	Marseilles (PTT)	0.5	*500	536	Hanover	0.35	424	707	Madrid (EAJ7)	2.0
*479	626	Daventry (5GB)	25.0	320	914	Grenoble (PTT)	0.5	566	529.8	Augsburg	0.25	452	662	San Sebastian (EAJ8)	0.5
1,554	193	Daventry (5XX)	25.0	364	824	Algiers	12.0	566	529.8	Freiburg	0.35	SWEDEN			
AUSTRIA															
*246	1,220	Linz	0.5	308	815	Radio LL (Paris)	0.5	*1,635	183.5	Zeesen	30.0	231	1,301	Malmo	0.6
*283	1,058	Innsbruck	0.5	375	813	Caen	0.5	2,100	142	Norddeich	10.0	*257	1,160	Höby	10.0
*352	851	Graz	7.0	*381	788	Radio Toulouse	8.0	2,290	131			*270	1,112	Trollhattan	0.45
*453	666	Klagenfurt	0.5	414	724	Radio Maroc (Rabat)	2.0	*208	1,004	Hilversum (until 5.40 p.m. G.M.T.)	6.5	*322	932	Göteborg	10.0
*517	581	Vienna	15.0	447	671	Paris (Ecole Sup. PTT)	3.0	*1,071	280	Hilversum (after 5.40 p.m. G.M.T.)	6.5	*332	905	Falun	0.5
BELGIUM															
208	1,440	Radio Conference, Brussels	0.15	468	640	Lyons (PTT)	5.0	*1,071	280	Scheveningen-Haven	5.0	*433	689	Stockholm	1.5
216	1,391	Charleroy (LL)	0.25	1,444	207.5	Eiffel Tower	12.0	*542	554	Sundsvall	0.8	*542	554	Sundsvall	0.8
250.0	1,196	Scharbeek-Brussels	0.25	*1,725	174	Radio Paris	12.0	*770	389	Ostersund	0.6	*1,200	250	Boden	0.6
244	1,229	Ghent	0.5	HOLLAND											
294	1,020	Liege	0.1	31.4	9,554	Eindhoven (PCJ)	25.0	*1,348	222.5	Motala	30.0	*403	743	Berne	1.0
312	961.4	Arlon	0.25	*218	1,373	Flensburg	0.5	*450	653	Zurich	0.63	680	442	Lausanne	0.6
GERMANY															
IRISH FREE STATE															
ITALY															

All wavelengths marked with an asterisk have been allotted according to the *Plan de Prague*.

SAVE YOURSELF AND YOUR FRIENDS FROM FURTHER NEEDLESS EXPENSE

Ask your dealer to show you the Dr. Nesper Trickle Charger. With the aid of this neat little instrument it will only cost you 1d. a time to charge your accumulators.

☞ Charging may take place at any time, ensuring always an accumulator ready for working, one accumulator doing the work where usually two are necessary.

☞ This highly efficient Accumulator Charger works noiselessly and economically, does not contain any fluid or give off any smell, will not become heated when in use, and is absolutely SAFE.

☞ A Dr. Nesper Trickle Charger is a Christmas gift your friends will appreciate.

DR. NESPER LTD., Colindale Av., Hendon, London, N.W.9

NO VALVES are used in the Dr. Nesper Trickle Charger, which is more economical to use than any other known make. A Selenium Rectifier is embodied in the charger and is designed to give a steady output of .25 amp.



Simply fix plug into lamp-holder, then attach spade terminals to accumulator and SWITCH ON.

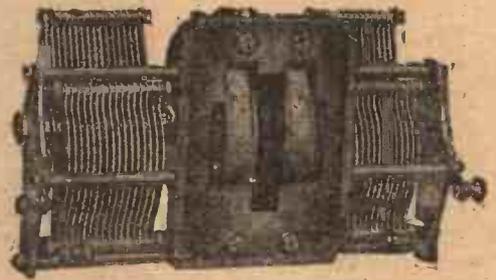
For charging accumulators of 2 and 4 volts, 29/6; 2, 4 and 6 volts, 38/6.

If you have any difficulty in obtaining from your dealer, write to us for name of nearest stockist.

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

LOOK INTO YOUR SET!

ARE THE COMPONENTS AS GOOD AS THESE....?



BURTON TWIN CONDENSER
Only two screws needed to fasten Condenser and Drum Control to the Panel. With fast and slow motion Drum Control **25/-**
With plain Drum Control **21/-**



THE BURTON VALVE HOLDER
Self Locating; means prolonged life for your valves. Complete with fixing screws **1/-**
Special 5-pin type suitable for A.C. valves .. **1/3**



THE BURTON REACTION CONDENSER
Capacity .0001, .0002 and .00015, Panel-mounting type .. **4/-**

THE BURTON MICRO-LOG DIAL

De Luxe Model, complete with Drilling Template and fixing screws. Slow motion **5/6**
Fast and slow motion **6/-**
Extra Celluloid Logging Strips, 3d. each.



BURTON AUDIO TRANSFORMER
Carefully wound to give correct ratios; a neat and compact instrument of the highest efficiency enclosed in a moulded case of high grade finish. Price **10/6**

NOW READY The new Burton Differential Condenser is now on Sale; ask for it at your dealers. Price **5/-**

... EVERY TIME YOU REPLACE A PART - REPLACE IT WITH A

BURTON

C. F. & H. BURTON, Progress Works, Walsall, England

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



ACCORDING to the annual custom, the entertainment for little Londoners to be given at the Guildhall on December 23 will be relayed to the B.B.C. stations. The broadcast will include speeches by Lord Burnham, the Lord Mayor of London, community singing, and music by the City of London Police Band.

Tommy Handley is to be the principal comedian in this year's wireless version of the pantomime *Cinderella* to be broadcast from 5GB on Christmas Day, and from 2LO, 5XX, and other stations on the following evening. The cast also includes Jean Allistone, Miriam Ferris, and Alma Vane.

On December 30, when the B.B.C. revives the musical comedy *The Beloved Vagabond*, Frederick Ranalow will play his original part. On that date the performance will be broadcast to 5GB listeners; 2LO, 5XX, and other stations will transmit it on January 1.

More than 400 cases are listed to be heard by the Federal Radio Commission in America before the present term expires, December 31. These are mostly applications for wavelength and power changes.

On Christmas Night, at 9.20 p.m., Mr. Winston Churchill will make an appeal from the 2LO microphone on behalf of the British Wireless for the Blind Fund.

By special request, on December 26 the B.B.C. will again broadcast a series of well-known military marches, in which the playing of each tune will be preceded by a short history of the piece explained by Mr. Walter Wood.

Interchange of radio programmes between German broadcasting stations and the National Broadcasting Company in America have been given final approval by the Reichspost Ministerium of Germany. These programmes will be sent through the short-wave station recently erected at Königswusterhausen.

Turn your lights out on Christmas Eve and be thrilled by a series of ghost stories from the pen of such past masters as W. W. Jacobs, E. F. Benson, and Desmond MacCarthy; they will be sent from 2LO.

To usher in the New Year, 2LO, 5XX, and other stations will relay excerpts from the Continental transmissions at intervals between 9.40 and 11.40 p.m. Later the European studios will pass on the B.B.C. programmes until 12.10 a.m. to their local listeners.

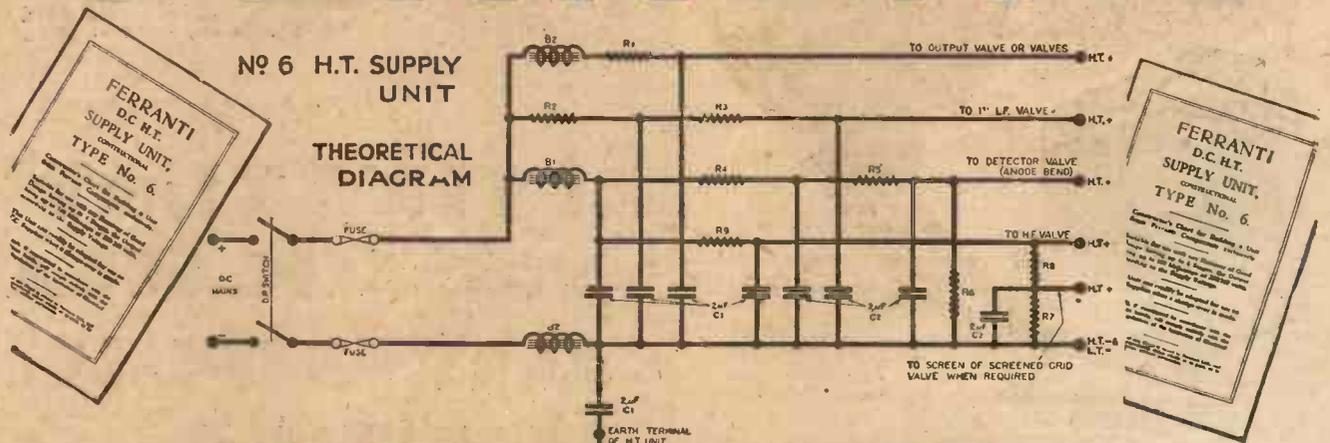
Early in January an exchange of broadcast programmes will be effected between the United States of America and Germany via WJZ (Bound Brook, New Jersey) and Königswusterhausen (Berlin). Tests have already been carried out by the Zeesen short-wave transmitter, and a programme from Holland was also successfully picked up at Riverhead, Long Island, and re-transmitted over the WEAJ (New York) network.

In a concerted drive to round up unlicensed users of radio receiving sets in Australia recently, there were 1,707 reported infractions, and of these there were 804 convictions.

Prisons in Japan are to be equipped with radio. Concerts will be tuned in occasionally, but the convicts will be especially directed to listen to educational programmes.

(Continued on page 1050)

FERRANTI



D.C. ELIMINATOR

CHOKES, CONDENSERS, ANODE FEED RESISTANCES and SAFETY BOXES (With Automatic Switch and Fuses)

For providing H.T. from D.C. Mains.

Charts will be sent post free on receipt of details of your requirements. Units constructed in accordance with these charts are simple to build, safe to use, reliable in operation, and free from hum and "Motor-boating." The total cost of the above components is approximately £8 11s. od., including safety box.

FERRANTI LTD.

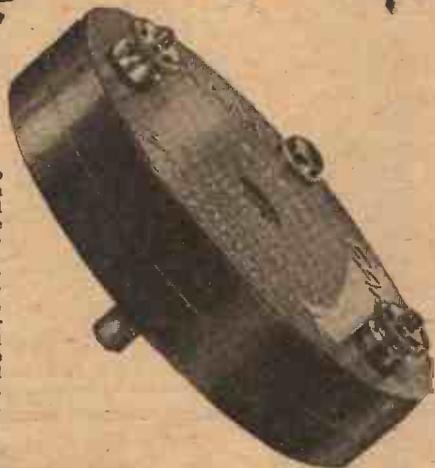
HOLLINWOOD

LANCASHIRE



A61 FOR A BRASS-VANED LOG CONDENSER

Just a typical example of Graham-Farish valve. A brass-vaned log-mid-line variable condenser using Bakelite as a dielectric. Robust in construction, and ideal for portable sets. Can be mounted for either drum or ordinary dial control, with one hole fixing with special claw panel grip. .0005, 4/6; .0003, 4/3; .00015, 4/3.



5/-
EACH

The "MULTIWAVE" H.F. CHOKE designed for modern valves. By employing solenoid winding followed by sectional windings, high impedance is obtained with low D.C. resistance. Also very effective for use in H.F. stopper or filter circuits. With Base 5/- each.



2/3
EACH

The famous "OHMITE"—a new-process Moulded Resistance with a value that remains constant. Infinitely better than wire-wound. Hermetically sealed in Bakelite. Noiseless and efficient. Negligible self capacity, so that the high notes are retained. Also fitted with terminal ends. All values 1,000 to 500,000 Ohms. 2/3 each. Holders for above 6d.

GRAHAM FARISH

BROMLEY



KENT

146/6



5/6

General Purpose
and Power

7/6

Super
Power



THE CONCERT VALVE

—Brings "Purity of Reception" to Radio. But with low current consumption and high amplification! The valve craftsmen who make FOTOS see to that. And extensive research and test makes certain. It will pay you to try FOTOS — the Concert Valve — next time!

ASK FOR IT BY NAME—

Type	Volts	Amps.	Use in Set	Price
B.A.9	1.9v	0.05	General Purpose	5/6
B.C.9	1.9v	0.1	General Purpose and Power Valve	5/6
B.D.9	1.9v	0.2	Super Power Valve	7/6

Same Types in 4 volts: Also Pentode 18/6 & Screened Grid 15/6

SAY "FOTOS"—AND GET THE BEST

or write for Leaflet A14 from

CONCERTON RADIO & ELECTRICAL CO., LTD.

256/7 BANK CHAMBERS 329 HIGH HOLBORN, W.C.1
TELEPHONE: HOLBORN 8687

Sole Distributors:

J. F. Paull, 43 Caroline Street, CARDIFF
J. F. Paull, 200 Dock Street, NEWPORT (MON)

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The Easy Way TO PERFECT RADIO

In addition to their own extensive range, PETO SCOTT offer YOU Every Known Radio Receiver of Component—all on

EASY TERMS with SERVICE AFTER SALES

The following list is merely representative, and we ask you to fill in the coupon below or send us a list of your requirements.

THE 1930 ETHER SEARCHER (described in December 7 issue) Complete kit of components, including drilled panel, drilled chassis and valves, £8 2s. 1d. or 12 monthly payments of 14/10. Any parts sold separately.

OSRAM MUSIO MAGNET. Cash, 29, or 12 monthly payments of 16/6. Valves included.

CELESTION C.12 LOUD-SPEAKER, in Oak. Cash, 45 12s. 6d., or 12 monthly payments of 10/4; in Mahogany, 25 17s. 6d., or 12 monthly payments of 10/8.

ULTRA AIR CHROME U.12. Cabinet Model Loud-speaker. Cash 43 19s. 6d., or 12 monthly payments of 7/4. All Chassis and Cabinet Models also available.

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A.W.21/12

"RADIOGRAMS"

(Continued from page 1048)

Jack Hylton and his Band will visit the Brixton Astoria on December 27. Their stage act will be relayed to the London and Daventry stations.

The Radio Corporation of America reported profits for the September quarter of £1,745,878—the largest quarter since that ending December 31, 1928, when net profits totalled £2,017,775.

Services at the underground chapel of Mynydd Newydd Colliery, Fforestfach, New South Wales, relayed from a depth of 600 ft., are part of the local radio broadcasting programme.

Establishment of headphones in the cells at Sing Sing Prison, New York, has begun and, having proved successful in amusing and interesting the convicts, it is to be extended to all parts of the prison.

The Council of the Union Internationale de Radiodiffusion at its recent conference at Barcelona adopted the report of its Technical Committee on the results of the Prague Plan brought into operation on June 30 last. It is stated that more rigorous enforcement of measures to restrict broadcasting stations to the wavelengths allotted to them are to be taken in future, and an effort will be made to reduce the grave interference which is now being caused in some quarters by transmitter defects.

In America there are now 182 government inspectors working under the supervisors policing the ether.

Station WTAM (Cleveland, Ohio) is now using a new 50,000-watt transmitter. The wave used is 280.2 metres, or 1,070 kilocycles. This station is now one of the most powerful in the United States and is expected to cover a wide territory.

According to the latest Swedish statistics, over 412,000 receiving sets are in daily use in that country, representing a proportion of 67.5 instruments per 1,000 inhabitants.

The power of the Spanish broadcasting stations, according to the new plan, has been fixed as follows: Madrid, 20 kw.; Barcelona, 10 kw.; San Sebastian, 3 kw.; Vigo, 6 kw.; Saragossa, 3 kw.; Valencia, 3 kw.; Seville, 3 kw.; Bilbao, 1 kw.; Oviedo, 1 kw.; Salamanca, 1 kw.; Cadiz, 1 kw.; Cartagena, 1 kw.; Almeria, 1 kw.; and Valladolid, Malaga, Palma (Májorca), Ciudad Real, Tenerife, or Las Palmas (Canary Isles), .5 kw. to 1 kw. each. In addition, the scheme calls for a short-wave transmitter to be erected at Madrid for the broadcast of musical programmes and news bulletins to the Spanish-speaking states of the South American continent.

Radio-Alger, the new 13-kilowatt broadcasting station installed at Algiers (North Africa) was officially opened on November 19 last by the Governor-General of Algeria.

IGRANIC DUAL IMPEDANCE COUPLING UNIT



PRICE 30/-

This interesting L.F. Coupling Unit contains two iron-cored inductances with a coupling condenser of values calculated to give maximum amplification of marked purity. It possesses many advantages over resistance-capacity coupling and, for a given H.T. voltage, enables greater amplification to be obtained.



IGRANIC TAPPED OUTPUT C.C. UNIT



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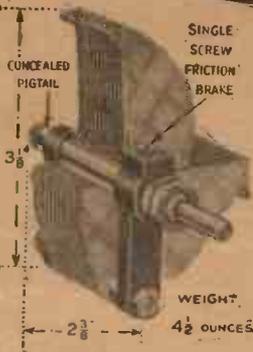
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As specified for the MUSIC LEADER described in No. 384.

In four Capacities

- .0005
- .00035
- .00025
- .00015

4/6 Each

*Double spacing of vanes for Ultra Short-wave work. As used for the "World-Wide Short-Wave Set" described in No. 387.

The Finest VERNIER DIAL obtainable.

MECHANICALLY PERFECT. POSITIVE BRASS CONTACT drive on SOLID BRASS SCALE ensuring smooth movement, with absolutely NO BACK-LASH. ROBUST in Construction and Trouble Free. SMALL. EXTREMELY ELEGANT. EFFICIENT.

TUNING WITHOUT IRRITATING UNCOMFORTABLE CROUCH or STOOP

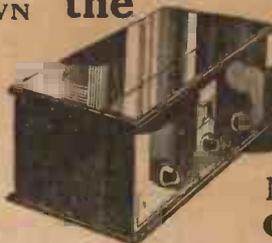
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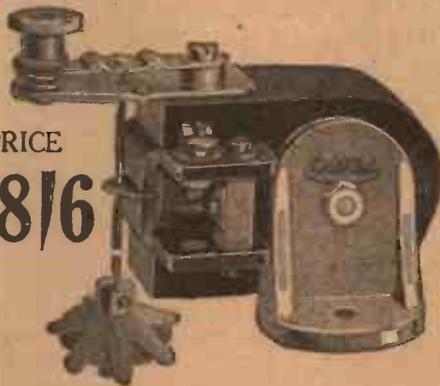
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If your dealer cannot supply you with a Watmel Unit or Kit, write direct to us, giving his name and address.



Wireless Co., Ltd.

Imperial Works, High St., Edgware, Middlesex
Telephone: Edgware 0323 P. & T:

(PAREX)

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"1930 ETHER SEARCHER"

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THE LETTS' 1930 AMATEUR WIRELESS NOTEBOOK DIARY

1/6 88-page Reference Section 2/6
 Full of Useful Data

LETTERS TO THE EDITOR

The Editor does not necessarily agree with the views expressed by correspondents.

A Fine Set

SIR,—Your little "Fav. witz 2" (1928) is a marvel. It fills my house with music, and reproduction is excellent. It may interest you to know that I experienced no difficulty in tuning and separating the new Brookmans Park regional stations on 261 and 356 metres on the occasion of the initial test.

Y. (Harlesden).

Eliminating Atmospheric

SIR,—Reading "Thermion's" recent paragraph relating to the three greatest problems in wireless, I was reminded of some experiments which I carried out a few months ago. These were in connection with the elimination of atmospheric.

I do not claim to have solved the problem—not by any means—but I did prove that it was possible to reduce the strength of atmospheric without interfering with the normal reception.

The principle worked on was that of the ordinary "parallel" wavetrap. Since most atmospheric disturbances are at a very low frequency (long wavelength), it was found that a suitable coil connected between aerial and earth would by-pass these unwanted frequencies.

Experiments were therefore carried out in order to find a suitable coil, and eventually the secondary winding of a burnt-out transformer gave the best results. One end of this was connected direct to the aerial lead-in and the other to earth. The aerial terminal of the receiver was connected through a .0001-microfarad condenser.

It will be seen that the transformer secondary (acting as an ultra long-wave coil) provides an easy path to earth for the atmospheric and, furthermore, the small fixed condenser makes it much more difficult for them to enter the receiver.

2BJO (Liverpool).

SUPER-MICROPHONES

New, highly sensitive, made on the latest principle, a vast improvement over all other types: will pick up whispered words from a distance of several yards, also strongly amplify and transmit speech and music over a distance, through Loud-speaker or Headphones. Splendid instruments for making Detactaphone, Deaf-aid, LOUD-SPEAKING TELEPHONE. Announcements through Loud-speaker, Amplifier, for Crystal or Valve Sets. Electric Sound Detector, Experiments.



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Owing to the demands upon our space in this issue it has been necessary to hold several letters over

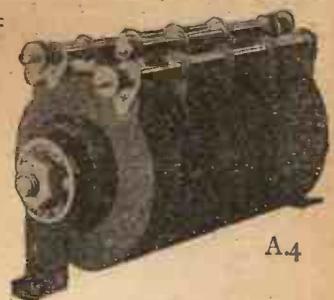


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 D.C. Output 9 volts,
 1 amp.
23/6

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BUILD THE 1930 ETHER SEARCHER

H. & B. KIT ASSURES SUCCESS

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1—.0002-mfd. fixed condenser (Ormond)	7
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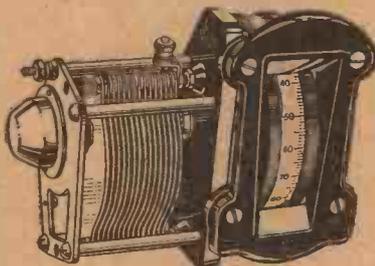
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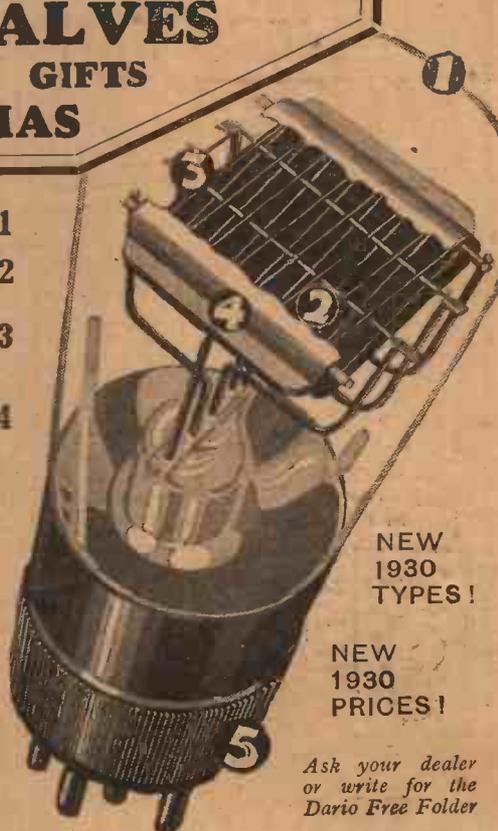
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- 1 New Glass Bulb. Finer yet Tougher.
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Universal	.075 amp.	5/6
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Super-Power	.1 amp.	7/6
Hyper-Power	.15 amp.	9/6
Pentodion15 amp.	18/6

DOMINION VERNIER DIALS



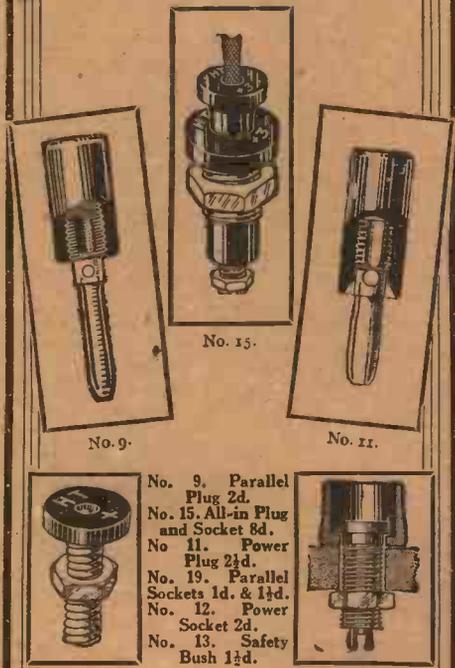
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WIRELESS IN PARLIAMENT

(From our own Correspondent)

MR. E. EVANS asked the Home Secretary if there were any regulations of his department preventing the use of the services of the British Broadcasting Corporation for the purpose of broadcasting descriptions of the bodies of unknown dead persons whom the police or other authorities were anxious to identify, and, if so, whether he would consider amending such regulations in order to permit such broadcasting in cases where the chief constable of a city or county asked for such facilities.

Mr. Clynes replied that the arrangements made between his department and the British Broadcasting Corporation for the broadcasting of police messages provided that recourse was to be had to the facilities afforded by the British Broadcasting Corporation only in cases of immediate urgency, when the circulation of a message by other means, e.g. by a notice in the Press, would not serve the purpose. This limitation had been imposed in consequence of the Corporation's desire to reduce to a minimum the interference with normal programmes which such messages entailed, but he was satisfied that it did not prevent the broadcasting of any message which could with advantage be circulated by that means, and he saw no reason to modify the arrangements.

B.B.C. Accounts

Mr. Marjoribanks asked the Postmaster-General whether, seeing that the British Broadcasting Corporation were responsible to him for their accounts, he would say how their profits were allocated.

Mr. Lees-Smith said that the British Broadcasting Corporation's report for 1928, which had been published as Command Paper No. 3324 of 1929, showed that the net revenue of the Corporation at the end of the year 1928 was £141,409 and that of this amount £134,167 was transferred to capital account to cover capital expenditure incurred on the regional stations and for other purposes, while the balance of £7,242 was carried forward to the 1929 account.

The new Italian 50-kilowatt transmitter now in course of erection at San Palomba, in the immediate neighbourhood of Rome, is on the point of completion and tests will be carried out within the next few days.

In response to requests sent by Germans abroad, the Königswusterhausen short-wave transmitter on 31.38 metres daily broadcasts a news bulletin at the end of the evening transmissions.

Letts' Amateur Wireless 1930 Notebook Diary

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B.B.C. WAVE BAND HIGH WAVE
10/6 12/6

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The Sovereign H.F. Choke is a great favourite of set designers. It is efficient; effective over a very wide frequency band; minimum capacity; low loss Bakelite former; terminals and tags. Follow the set designer - he knows.

The Sovereign Base-board Mounting 400-ohm Potentiometer may also be used in the Penector Two; smooth action; Bakelite former; no soldering. Also the Sovereign Panel Mounting 50-ohm Rheostat, Bakelite former; very smooth action; terminal connections. Specified for most popular sets.

The Sovereign range stocked by all dealers includes Dual-range Panel mounting Coils, Six-pin Base, Two-pin Coils, X-coils and Speaker Kit. In cases of difficulty write to us.



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XMAS with a DIX - ONEMETER will be perfect 50/- only

CONDENSERS. Fixed W.D. 250 v., 2 mfd., 1/6; 4 mfd., 5/6; 6 mfd., 7/6. New Sterling Mansbridge Smoothing for up to 400 v., 2 mfd., 2/10; 4 mfd., 5/6; 6 mfd., 7/6. 500 mfd. Dry, 12 v. for L.T., mains supply L.T. Filters, 10/-. Dubilier .01 Type 577 1,000 v. List, 7/-. Sale 1/-.
HIGH VOLTAGE CONDENSERS. All guaranteed. 500 v., .01 mfd. List 7/-. Sale 1/-.; 4 mfd., 6/8; 8 mfd., 10/-; No. 20H; 1,000 v., .05 mfd., 2/6; 1,500 v. 6 mfd., 12/6; No. 16B; 2,000 v., 2 mfd., 22/6; No. 20C; 3,000 v., 2 mfd. (oil) 45/-; No. 20FO; 10,000 v., .0025 mfd., 3/6. No. 16A1, 20,000 v., .002 mfd., 35/-; 1 mfd. 4,000 v., 40/-; 30,000 v., .0025 mfd., 10/-; No. 16HW.

CHOKES, VARLEY DOUBLE WOUND, carry 60 m/a and fitted ebonite panel with terminals, for use in H.T. Eliminator Filter circuit from the mains. Bargain, 4/6.
MAINS SET PARTS. 200/250 Power Transformers with three centre tap secondaries. Hefty 200 watt H.T. and L.T. type suitable for a multivalue set or a power amplifier. Usual price, 90/-. Bargain Sale 55/- only. Small Transformers. 220 v. to 3-5-8 v., 7/6 only.

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TABLE ELECTRIC PROJECTORS for Spot Light or Photo Slide Home experiments. 4 Magnif. and focus lenses, swivel stand. Socket cord and plug. Sale 25/-

PHONES for 3/-. Sullivan's Double L.R. phones, 3/- Royal 2,000 ohms each, brand new, 4/- per pair. Hear Easy phone pads, 2/6 per dozen. Brown's 120 ohms, 15/- per pair. Lightweight 4,000 ohms, 3/6 per pair.

VIBRO-MASSAGE SETS. Cost £4. New, in case. Sale 25/6. X-Ray Tubes, 35/-. Neon Lamps, 2/6. Photo Electric Cells, 60/-.

THE LATEST BARGAIN A.C. to D.C. BATTERY CHARGERS. 110 v. or 220 v. A.C. for a 2-, 4-, or 6-volt battery gives 6 amps. D.C. Sale at half price £2 10s. Larger type for 12-volt Car Cells, £4. Both Fitted plug, cord, and C.Z. Ammeter.

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RECEIVERS. New R.A.F. Aircraft 3-Valve semi-portable, 1 Det., 2 L.F., 3 anti-prong Holders, Remote Control, Variable Condenser, and Rheostat. All tested on Broadcast, 27/6. R.A.F. 5-valve ditto, with Valves, £4. Or fitted in polished Mahogany Cabinet with S.M. Dials, £5 10s. Berndepf 6-valve Super-Het. with valves and 2 frame amplifiers. New and O.K., £18 10s. List £45. 3-valve L.F. Amplifiers, 30/-. G.E.C. Victor 3 with valves. List £6 17s. Sale, £4, new.

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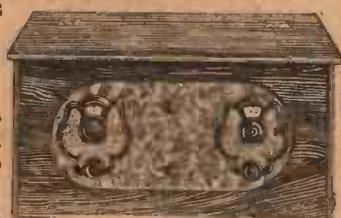
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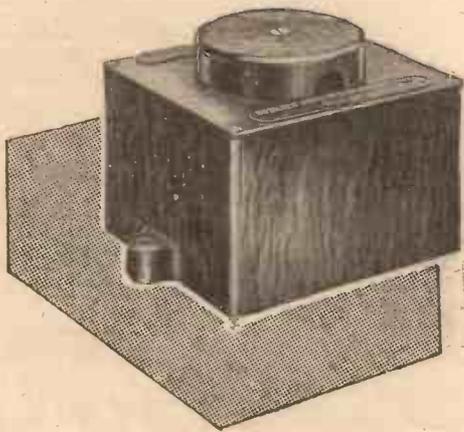
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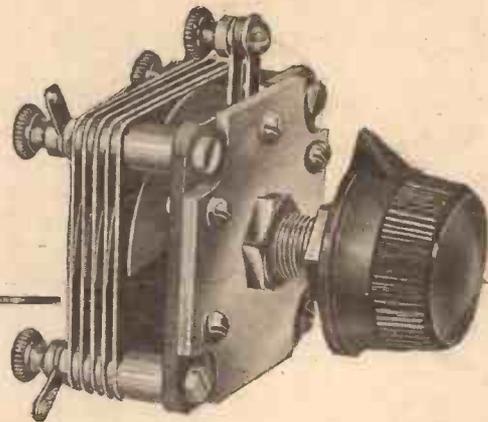
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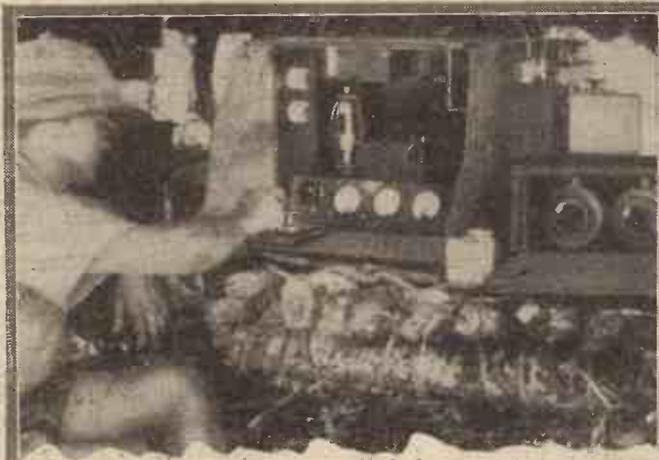
A Happy New Year!—Those "B.P.'s"—The B.B.C. Helps—The Broadcast Pantomime—Court-Treatt's Radio—A Sheik and His Harem!

A Happy New Year! This issue of AMATEUR WIRELESS will be in your hands in good time for us to wish you a Happy New Year—and the best of reception for 1930. May your valves not burn out, nor your batteries run down; and may your reception log in 1930 be even better than in the year which has flown!

Those "B.P.'s"—How are you faring with regard to the reception of the two "B.P.'s"? Some of our readers, doubtless, will be situated at such a distance that good reception from both, and from foreigners, is obtainable; and there will be many, too, who are within the "wipe-out" circle, and find that they have to rely on the B.B.C. only for their programmes, the foreigners being completely blotted out. But listeners are akin to anglers in their fondness for exaggeration, and much of the talk of "hopeless" jamming is due to old-fashioned sets. There is little interference that cannot be eliminated by a series aerial condenser or a wavetrap, or both, and in both cases an add-on H.F. unit similar to that recently described in AMATEUR WIRELESS will be found effective.

The B.B.C. Helps—Not often does the B.B.C. take a hand in the technical side of radio, but in a partial attempt to quell querists who slang the engineering staff ament the new conditions, the pamphlet-producing staff has been called to act. A pamphlet entitled: "The Reception of Alternative Programmes," describing in the order of their cost and merit a number of ways in which existing apparatus can be made sufficiently selective for alternative-programme requirements, will be supplied free of charge to any listener who cares to apply to the B.B.C. for it.

The Broadcast Pantomime—No longer need the kiddies complain because *paterfamilias* doesn't take them to the pantomime! The



This is the short-waver in Sudan, with the Court-Treatt party, which is being heard in America (see accompanying paragraph)

B.B.C.'s pantomime this year is *Cinderella*—always a favourite. The chief characters are Jean Allistone, Miriam Ferris, and Alma Vane. Tommy Handley, who, it will be recalled, wrote about "Comedy Broadcasts," in a recent issue of AMATEUR WIRELESS, is to be principal comedian. *Cinderella* will be given from 5GB on Christmas Day and from 2LO, 5XX and other stations on Boxing Day. Then there are ghost stories; and please turn out the lights while the

loud-speaker is telling "thrillers." Ghost stories will be told from 2LO on Christmas Eve, by some past masters in that form of literary recreation. They include W. W. Jacobs, E. F. Benson, and Desmond MacCarthy, so you really should be thrilled!

Court-Treatt's Radio—Recently we mentioned the radio work which Major Court-Treatt's party is doing while film "shooting" in the wilds of Sudan. And now the first photograph has just come to hand of part of the radio gear in the jungle. This set is regularly being heard in London, and in the States, 5,000 miles away. There is a "thrill" in picking up the signals from these explorers, and if you want to receive them, listen in on about 30 metres when your short-waver is working. The call-sign is FXCT, and you'll find the signals pretty weak.

A Sheik and His Harem!—And, while on the subject of radio from afar, what about the following story? Recently an Arabian sheik visited Alexandria, where he ordered a powerful set for his own use. The set, together with equipment, was taken miles across the desert on a camel's back, accompanied by an installation engineer. After days of travel, an oasis was reached and work commenced forthwith on the erection of the gear. In a short time tests were completed and PCJ came roaring through the speaker. Later a Turkish station was tuned in and from behind a curtain in the sheik's tent there came exclamations of delight from his harem, who had been listening to the proceedings. This sheik is now a regular radio fan, so they say!

Radio on Farms—Farmers in all parts of Scotland greatly appreciated the series of special agricultural talks broadcast last winter. Another series is now being commenced,

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TRACKING THE OSCILLATOR!

How You Can Assist in Abating the Nuisance



A picture showing how the oscillator-tracking van operates

HAVE you a howler in your district, spoiling your reception?

If so, then take steps to quell him. There is an efficient department of the B.B.C. and of the Post Office, the especial job of which is the hunting of howlers, and all that is necessary to set the machinery into operation is a card dropped to the B.B.C. It isn't even necessary to find out which neighbour is causing the trouble, or to attempt to wring condemning evidence from him during radio chats on the 9.15 up!

The Post Office's Part

This oscillator-hunting business is rather involved, but to cut a long story short, the Post Office run a detective van equipped with a multi-stage H.F. set, an accurate marine-type compass, and a directional frame aerial: with this equipment it is easily possible to get accurate D.F. readings, and in many cases the oscillating set can be traced to within a hundred feet or so.

The heading photograph shows the van drawn up against the side of a row of houses. Where such an "oblique" reading can be obtained against a number of houses, it is possible to pick out the right house within one or two, and the rest, of course, is done by personal investigation.

If you are having trouble with oscillation, write or phone to the B.B.C. about it. In return you will receive a questionnaire, a booklet explaining various facts about oscillation (it might be *your own set causing the trouble!*), and a cancellation post card.

The questionnaire asks innocent questions such as the kind of set you use, the regularity or otherwise of the interference, and finally asks, "Could you in confidence

fore a court, if the man responsible hasn't a licence.

With the questionnaire comes a yellow post card, which you are requested to send to the B.B.C. should the interference stop while inquiries are being made. The card is already worded and addressed for you, and the object of it is to save wasted effort. Don't omit to use it if the oscillation does stop in the meantime.

Copies of the information you give on the questionnaire are sent to the Engineer-in-chief or the Secretary of the General Post Office, and if the case warrants it, the van immediately goes out in the charge of two engineers.

You know, there is some consolation in this! It is pleasing to know that at least a fraction of the radio-licence revenue which goes into the Post Office coffers, and not to the B.B.C., is expended in this beneficial manner.

The B.B.C. gets approximately 15,000 complaints of oscillation each year. Perhaps you didn't know it was so bad as all that. The number is steadily decreasing.

Frequently articles have appeared in AMATEUR WIRELESS dealing with oscillation in H.F. stages and so forth, and nobody need have any doubt as to the why's and wherefore's of the matter.

The B.B.C. publish a pamphlet dealing with the "don'ts" of oscillation, and anyone can have this for the asking. A thorough grasp of the working of a set would stop many present cases of interfering oscillation.

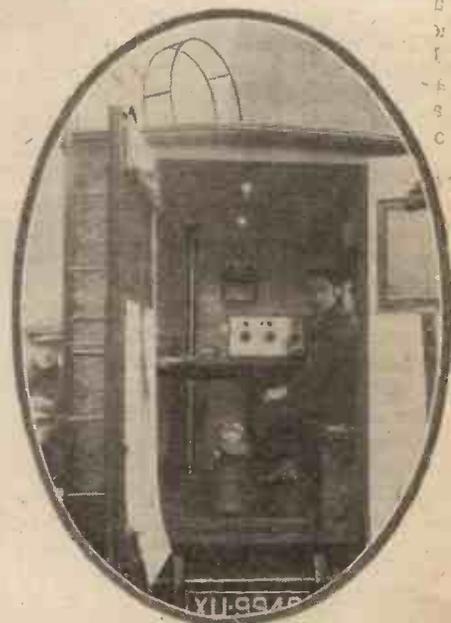
You will find that both the B.B.C. and the Post Office are anxious to do everything possible to ensure interference-free

reception. The Post Office share is an expensive one, and the van is often in use for months at a time. It has just spent several weeks in the Glasgow area.

It should be borne in mind that oscillation is a serious matter. The Post Office has the power to cancel a licence in a case where the oscillation is proved to be deliberate—so let this be a warning to experimenters who try out super-hets on open aerials, or who try neutralising experiments on broadcast wavelengths.

There is some confusion in many listeners' minds as to the reason for the Post Office taking action. It should be remembered that to track down an oscillator involves entering his house and examining the set. The B.B.C. can't do that, the right to do so being vested wholly in the Post Office. This authority is provided by Clause 5 on the back of every broadcast licence.

Just one final point. Do make sure that the trouble isn't being caused by yourself! In four months alone the P.O. engineers



Inside the van: A compass is in the foreground and the frame aerial directive control is seen to the left

investigated forty-one cases in which the oscillation was found to be in the complainants' own sets! K.U.

In occasional chamber concerts the B.B.C. in Scotland intend to feature chamber works by contemporary Scots composers during the present season, just as larger Scots works are being featured in the outside orchestral concerts.

LET THE BLIND HEAR!

What the British "Wireless for the Blind" Fund aims to do

By CAPTAIN IAN FRASER, C.B.E.



A War-blinded man listening-in in his own home on the type of receiver which it is proposed to issue in connection with the Fund

THERE are approximately 3,000,000 holders of wireless licences in the United Kingdom and Northern Ireland, and I cannot believe that any one of those millions will be able to turn a deaf ear to the great appeal which has just been launched to provide every blind person in these countries with a wireless set.

How many of our blind are without sets? Careful consideration has been given to this matter, but there is not enough information for anything but a rough estimate.

At Least 15,000 Sets Needed

One estimate, based upon a detailed inquiry into the conditions in London, suggests by *pro rata* calculation that at least 15,000 blind people are actually known to be without wireless sets. But there are thousands of others about whom full information is not available.

Of the total blind population of Great Britain and Ireland, 60,000 are over the age of sixteen. The free licences granted by Parliament have been taken out by about 16,000 blind people, composed of (1) those who have been supplied with free sets by established charities, such as the National Institute and the County Associations for the Blind and St. Dunstan's; (2) blind people who have been supplied with free sets by special funds, such as those run so successfully in Manchester and Birmingham; (3) blind people who have been given sets privately; and (4) blind people who have purchased sets themselves. Further, it is estimated that about 6,000 blind people are resident in homes or institutions and do not require individual sets. Then there are some who are too deaf or too old to listen, or who are enjoying their wireless free, but have not actually taken out the free



Capt. Fraser at work on an amplifier

licences. If generous allowances are made for these categories, I estimate that at least 20,000 or 30,000 persons will be found to require free sets.

Perhaps I may claim to be in a particularly favourable position to explain how much wireless means to those without sight.

Almost as soon as broadcasting began, I took a very keen interest in its development and the means it provides of bridging the great gulf between those with and without sight. In the enjoyment of wireless the blind and those who can see are for once on an equality.

What Broadcasting Means to the Blind

Imagine for one moment the barrier to the full joy of living which loss of sight brings. The beauties of Nature, of graphic art, of the reading of books and newspapers, of the following of many athletic sports—all these are denied the blind. There are exceptions to this, of course, notably in the ever-growing production of Braille. But not all blind people are able to acquire proficiency in reading by this

system of raised dots, and it is obvious that only a comparatively small number of books can ever be in Braille type.

The news of the day—to all of us one of the essentials of interesting discussion with our friends—that must be read aloud to the blind. The vast range of classical and popular music, histrionic and elocutionary art, political and other oratory, lectures and addresses, all these are beyond the reach of the majority of those who are blind. But with wireless they can garner the news and enjoy the pleasures and recreation which wireless affords for themselves, without the need to claim anyone's help.

And that brings me to another and a very great source of interest to blind folk which wireless provides—the technical manipulation and care of the apparatus itself.

Not all of us, whether sighted or not, are mechanically minded enough to enjoy this phase of wireless, but I can vouch for many in at least one section of the world of the blind, to whom this part of radio

practice gives very great pleasure. Those are the men who were blinded in the war. For years past St. Dunstan's has done everything possible to help its men in their use of wireless, and to-day there is no member of St. Dunstan's great community who is not in possession of a wireless set of some description.

Granted that most of these men have been trained by St. Dunstan's to the use of tools, yet it says volumes for their keenness and adaptability that many of them have designed and built wireless sets for themselves, and that most of them maintain and work their apparatus without help.

Personally, the purely technical and mechanical side of radio has always interested me greatly. Perhaps I have rather exceptional opportunities of hearing political and other oratory at first hand; I visit theatres frequently; classical music (honest confession is good for the soul!) I do not care for, so it may be that when I switch on my wireless set I am at least as critical and interested in the way it is working and the quality and volume as in the programme.

(Continued on next page)

I do not imagine that many blinded folk have this attitude to wireless, but I quote my own case as an instance of how wonderful a hobby or pastime the mechanical side of wireless may be to those without sight.

The Principal Object

But the principal aim and object of the British Wireless for the Blind Fund is, as I have explained, to bring the wealth of entertainment and interest, which the broadcasting programmes of to-day pro-

vide, within the reach of all those into whose lives of physical darkness all possible light should be brought.

His Royal Highness the Prince of Wales has honoured the fund by becoming its president, and the Rt. Hon. Reginald McKenna is acting as honorary treasurer. To him, at 226 Great Portland Street, London, W.1, all donations to this fund should be sent.

The British Broadcasting Corporation, which is represented on the committee of the fund by Mr. R. Gambier-Parry, is giving

its wholehearted support and is assisting by every means in its power.

On Christmas Day, at 9.15 p.m., a microphone appeal will be made by the Rt. Hon. Winston Churchill, and will be broadcast from all stations.

I very earnestly appeal to every reader of AMATEUR WIRELESS to give the greatest possible support to the fund. Think what pleasure wireless has brought to you personally, then multiply that a thousand-fold and you will begin to know what it means to the blind.

CAPT. IAN FRASER An Appreciation by R. GAMBIER-PARRY

POLITICIAN, sportsman, born organiser, fluent and lucid speaker with a capacity to select the vital from a tangled mass of evidence, marshal facts with accuracy and strategic force, detect infallibly the weaknesses of any case; possessed of untiring energy and a brain of unique nimbleness and resource; these characteristics would qualify any man to be regarded as an outstanding personality among his fellows. Add to them the fact that he has lived only 32 years and that for the last 14 of these he has been totally blind, you have some impression of the forceful character of my friend Ian Fraser.

When a mere boy of 18 years, the career which he had chosen was shattered, before it had well begun, while leading his men into action in the Battle of the Somme. Almost before his physical strength was restored to him, he was working for long hours at St. Dunstan's, learning what blindness meant to himself and his fellow blind men, and searching for new spheres of expansion.

St. Dunstan's

After the death of Sir Arthur Pearson, he became, at the age of 25, chairman of St. Dunstan's and set about the mammoth task of the future care of blinded soldiers, sailors, and airmen. Not content with creating an organisation for his fellow blind men which has no parallel in efficiency, he claimed and won the right to a hand in the administration of our country, for from 1922-29 he was Member for North St. Pancras either on the London County

Council or in Parliament. He earned the respect and affection of the House of Commons as an active, loyal, and extremely capable member. He was one of the first of our public men to welcome radio with open arms, and he has worked indefatigably for its development.

An Early Radio Enthusiast

It is typical of the man that in championing this new cause he must needs make a complete study of its technique. In the matter of a few months he armed himself with sufficient expert knowledge to obtain from the Postmaster-General a licence to operate an experimental transmitting and receiving station. I am sure there are many experimenters who share the regret that they no longer hear on the ether the one-time familiar cheerful greeting from 5SU.

He was certainly the first to appreciate the immeasurable value of the broadcasting service to blind persons. In 1926 he introduced a Bill authorising the Postmaster-General to provide all blind persons with free wireless licences, and piloted this measure through Parliament.

In 1925-26 he was appointed a member of the Earl of Crawford's Broadcasting Committee, upon the recommendations of which the present constitution of the B.B.C. is based. He was chosen to represent the Tory Party as one of the three Members of Parliament to serve on this Committee, a qualification of the appointment being that they should represent no special commercial or other interest likely to be affected by the Committee's recommenda-

tions. He was therefore one of three to hold a brief for the interests of the general public in the future of broadcasting.

Since its formation in 1927 he has been Chairman of the B.B.C. Wireless Organisation Advisory Committee. He is a past-President of the Radio Society of Great Britain and Vice-President of the Radio Manufacturers' Association. He is Chairman of the 1930 Radio Week Committee, and his latest and perhaps most important radio activity is described on the preceding page. He is certainly a tower of strength in British radio.

Many Parts

It might well be thought that he had little or no time for other occupations, but he recognises more than most men the value of physical fitness. He is fortunate to possess an iron constitution. He rides, fishes, skates, swims, and rows with more than average ability. Last year he won the Single Sculls at Putney Regatta. He is a familiar figure in London society, dances extremely well, is an enthusiastic theatre-goer, reads copiously and is one of the best-informed men in the country. He plays a shrewd hand at bridge, and woe betide his opponent who revokes or leads from the wrong hand.

Ian Fraser has given his fellow-men, sighted and blind alike, an example of courage, perseverance, and public service for which it is hard to find adequate expression. It is superfluous to add that I am more than proud to be able to number him among my friends.

AT THE QUEEN'S HALL

THE National Chorus sang Granville Bantock's musical edition of Fitzgerald's "Omar Khayyám" at the last B.B.C. concert of this year. What a beautiful poem this is! It is an obvious translation, but did not somebody say that here the translation is better than the original? The oddness of the rhyming system enhances the slightly clumsily perfect effect which is quite unlike the work of any other poet.

The music adds nothing to this poem. It only mirrors its atmosphere at intervals.

HAVE YOU NOTICED

— that there is still a considerable number of those amazing people who, when asked their opinion of wireless, reply, either in actual words or their equivalent, that they know nothing and have no desire to know anything about the subject? These provide perfect examples of one of the many utterly intolerable types which we, unfortunately, have to put up with in this world.

Competent orchestration does not save this piece. I could not help being struck by the artificiality of both the creation of "parts" and the division of the words among them. Much of this music resembled a film accompaniment.

The soloists and the multi-coloured National Chorus sang finely, but at this time of the year one sighs for the "Proms."

L. R. J.

Nearly 300 stations in the United States broadcast special agricultural programmes for the benefit of farmers throughout the country.



You Can Improve Your Gramophone!

Some Hints on Keeping the Machine in Order and Aids to Better Sound Production. By A. G. McDONALD

A COMBINATION of gramophone and wireless set is undoubtedly the ideal home entertainer. Two systems are in common use. First, we have the all-electric system, in which a low-frequency amplifier and loud-speaker act both as the sound producer for a radio set and a gramophone run by aid of a pick-up. But before this very modern set was developed, there was in use another combination set in which the internal, exponential horn of a cabinet model gramophone served as the horn for the loud-speaker of the wireless set. This equipment, in which the motor is usually spring driven, appeals mostly to people who are without a supply of electricity in the house and who, therefore, are restricted to accumulators and high-tension batteries for current supply to the set.

Care of the Gramophone Motor

A good modern gramophone is designed to be as nearly as possible fool-proof. This, however, does not mean to say that care and attention are not required. For instance, the quality of the sound produced depends on the sound-box, and the pitch of the note on the constancy of speed of rotation of the motor. Any attention which has the effect of preventing wavering or alteration of tone amply repays the slight trouble it involves. Suitable oiling and greasing of the motor bearings and springs is very desirable at intervals. Such care helps the motor to be noiseless.

The control of speed of the turntable, of course, centres round the spring governor, and when the gramophone is being used, this should be borne in mind. When starting a gramophone to play a record, the turntable should be allowed to gather speed naturally and should not be speeded up by pushing round by hand, as this undoubtedly strains the three springs on which the governor balls are suspended.

On the other hand, when you wish to stop the turntable revolving at the end of a record, it is an excellent scheme to stop it gently by hand, as the stop usually mounted is far from gradual in its action. Occasionally a wavering in pitch is noticed when a record with heavy piano chords or loud orchestral passages is being played. This can usually be traced to the motor speed changing because the motor is not powerful enough, or it may be that the main springs require greasing. It should also not be overlooked that the change in tone may be due to the record slipping on the turntable. If it is noticed that this slip is taking place, the cure is quite simple. A rubber mat, sold by all gramophone dealers, will stop the slip, and the mat has the extra advantage that it tends to prevent any motor vibrations being transmitted through the needle to the sound-producing diaphragm.

Cleaning Records

Records are very susceptible to damage by the miscellaneous pieces of dust and dirt which collect. Consequently, care in cleaning a record before playing is very well worth while. Suitable pads are specially made and should be used by everyone who has a gramophone. In this connection it is interesting to note that if a silk or velvet pad is rubbed very vigorously on a record,

it becomes electrified and will attract dust. Therefore, when cleaning a record, only a few light sweeps of the pad should be made.

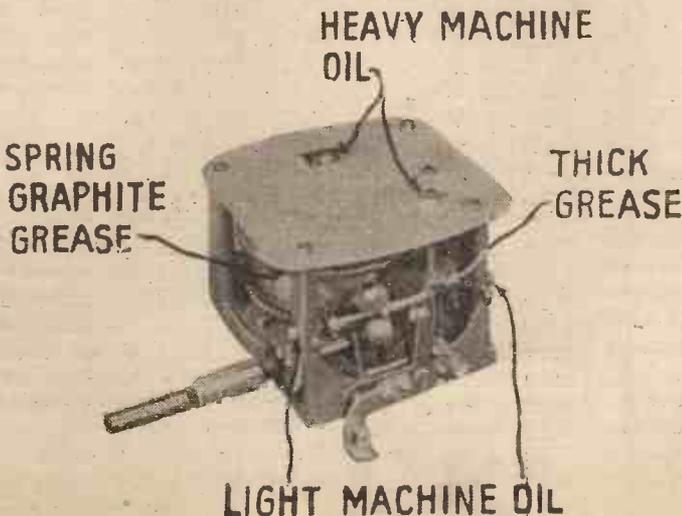
Needles

It is well known that the reproduction of any gramophone is governed by the grade and type of needle used with it. Although personal taste largely enters into the choice of a needle, it may not be out of place to indicate the factors that influence the question from a scientific aspect. Messrs. Maxfield & Harrison, of the Bell Telephone Laboratories, first showed that in a mechanical system, such as that of a gramophone, in which transformation of energy takes place, it is necessary to match the impedances at the various places where the energy undergoes a change. Mathematical investigations on these lines have showed that it is desirable for a needle to be rigid throughout its length, but with a slight flexibility at its point.

Semi-permanent Needles

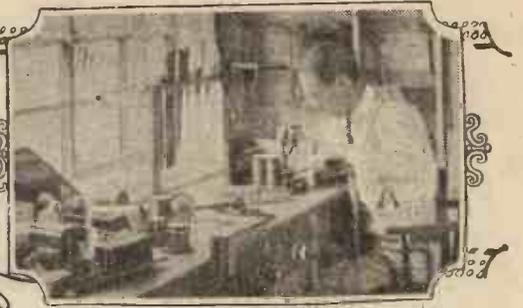
There are two types of needle which satisfy this condition. First, there is the Tungstyle needle, the point of which is a piece of tungsten wire projecting from the body of the needle. The second type is the diamond-pointed needle, such as the Petmecky or Columbia Spear Point. With regard to Tungstyle needles I certainly agree that their tone on a modern long-horn gramophone is admirable, yet I am diffident about using them generally, as a buckled point will utterly ruin a record. The Spear Point needle is my own personal recommendation if it is of the semi-permanent variety, by which I mean it is advertised to play ten or more records. Actually, of course, records being dear and needles cheap, no needle should be used for more than one record. The semi-permanent needle gains on the score that when it is half way across the record its point is still reasonably sharp, where, under similar conditions, an ordinary steel needle would have

(Continued in 3rd col. of next page)



Proper attention in respect of oiling will do much to improve the running and prolong the life of the motor

My Wireless Den



Weekly Tips—Constructional and Theoretical—by W. JAMES

My Views on H.T.

MY views regarding the supply of adequate high tension for the anodes of the valves of a receiver or amplifier intended for good quality of reproduction are well known.

But whilst in the past one has had to confess to the everyday use of as much as 400 volts of high-tension and five valves for the reception of the broadcast, the time has surely now arrived when one may boldly announce this fact! I remember creating quite a stir in experimental circles by stating (this was about four years ago) that a certain set which I had designed ought to be supplied with 160 volts. And, as a matter of fact, it is true even to-day, when valves are so much better than they were then.

Most amateurs fit a battery that is alleged to provide 120 volts, but after a little use the voltage approximates more nearly to 100 or even less. Good quality of reproduction, with reasonable volume, cannot be obtained when the high-tension is so little as this. The anode current of the power valve is so small, and therefore the amount of the possible output is very limited.

Nevertheless, the reproduction from a small set having low high-tension is acceptable to many listeners who cannot afford more. At the same time, I would say to those of you who claim to receive at considerable strength—there very probably is bad distortion. The 1st stage is overloading. Grid current is flowing when the signals are strong and the valve is rectifying. Therefore raise the value of the high tension, adjust the grid bias, and so arrange matters that there is, anyway, a small margin of safety.

That Gramophone Motor

I have an electric gramophone motor in my wireless-gramophone set and, beyond occasional oiling, it neither needs nor receives attention. But I find it is necessary to apply a little oil at regular intervals rather than to use an amount of oil once now and again.

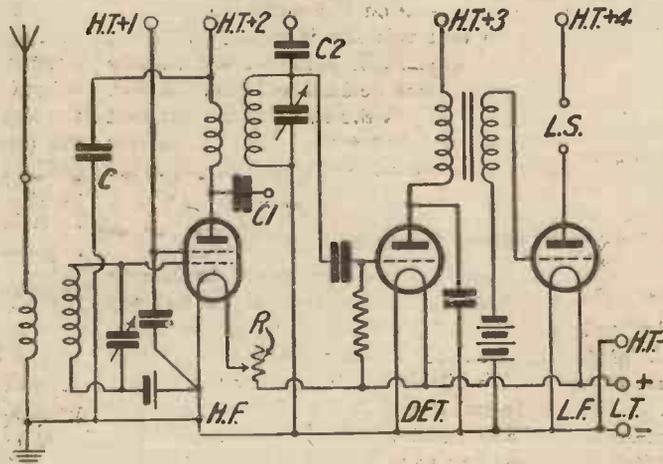
The framework of the motor is earthed to stop noise. When first I tried the

machine a lot of noise was emitted by the loud-speaker, but earthing the framework, either directly or through a fixed condenser of 2 microfarads, stopped the row at once. A good earth seems not to be needed, for I noticed that the noise was greatly reduced merely by touching the framework.

However, no harm can result through using the wireless earth, as the broadcast is not received whilst playing a record!

Cutting Down Volume

The local station is often received at such strength that, even when a volume control is fitted, the use of the high-frequency stage at all seems unnecessary.



Useful arrangements giving alternative aerial connections

It is therefore a good plan to consider the alternative methods of connecting the aerial to the set without using the high-frequency stage.

Two possible connections are indicated in the accompanying figure. First, the high-frequency valve is switched off by turning the volume-control rheostat R and then the aerial is connected to the terminal connected either to condenser C1 or C2.

When it is joined through C1 the primary of the transformer is included in the aerial circuit. The high tension is also joined to this winding, but it will not affect the results in the least, as the coil is joined to earth through condenser C, which is the usual by-pass.

When the aerial is connected through fixed condenser C2, only the grid tuning coil and tuning condenser are in circuit. This connection is probably the better one

to use. No reaction is shown in the diagram merely for the sake of simplicity.

"Everybody's 3" Results

"Everybody's 3" has proved itself. It has not been out very long. But already reports are to hand that it is being used with every success.

The London regional transmitters do not swamp this set. One may be received well clear of the other at close quarters; and it is sensitive, too. The claim of a minimum of twenty stations under normal conditions is a modest one.

Have you heard this set? Personally, I am rather proud of it.

Don't Fear the Mains

I wonder why there are still amateurs who are rather nervous of mains units? Time has shown them to be safe enough: they do not catch fire, neither do they harm a user.

Many of those marketed have a metal case. When this is earthed the apparatus is quite safe to handle, as it is impossible for it to become at high-voltage.

Some types have a safety switch. You know how they protect a user, the mains being entirely disconnected when the lid of the unit is raised. Others are fitted with fuse protection.

I consider the flexible connecting cord sometimes used might, however, be of higher grade.

"YOU CAN IMPROVE YOUR GRAMOPHONE!"

(Continued from preceding page)

a chisel point. Enthusiasts have for years been keen on Spear Points, and it must be of considerable interest to them to know that their preference is backed up by mathematical reasoning. Different grades of needles are often used for volume control, but my own feeling is that such a variation involves the loss of tone quality. If the average volume of sound of an ordinary gramophone is not satisfactory, it is much better to change over to the pick-up system, in which volume control can be carried out without any change of tone.

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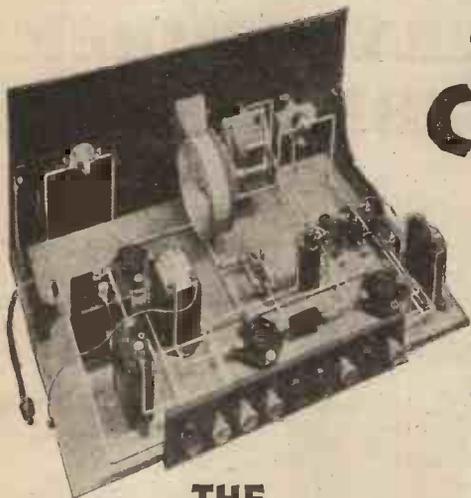
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On Your Wavelength!

Wireless "H" Dropping

THOSE who devise scientific names of all kinds are generally rather bad lads. Their words are generally borrowed from Latin or Greek, and not infrequently form an awful mixture of both languages. "super-heterodyne," for example, is a compound of three words, one Latin and two Greek. "Super" is Latin for "above," the "hetero" part is a Greek word meaning "other," and "dyne" is from a Greek word meaning "power." This sort of thing is bad enough, but still worse offenders are those who mutilate the words from which they manufacture what are often nothing but high-sounding labels for very simple things. One word that has been rather hardly dealt with is the Greek "hodos," meaning "a path." It appears quite correctly in "anode" (a way out) and "cathode" (a way back). But what about "pentode," which is intended to mean "five paths"? Unless we want to drop our h's we should, of course, say "penthode"; or, if we insist on saying "pentode," we should be consistent and say "catode."

How It Is Done

I understand that the details of the new Stenode method of reception will probably be available before the end of January. Naturally, the inventor does not want to tell the world at large too much about it until the patent position is on a proper footing. I can, however, give readers a little information which may enable them to obtain an inkling of the way in which he set about the apparently insoluble problem of separating two transmissions with frequencies as little as 50 cycles apart from one another. It all began in this way. It occurred to Dr. Robinson some time ago that within thirty years of the discovery of Hertzian waves we were rapidly approaching a time at which we could make no wider use of them for communication purposes, since every available channel in the ether would be filled.

On thinking the matter over, he saw that it was the sideband business which imposed such definite limits, particularly in the case of telephony. Suppose that you send out a pure carrier wave at a frequency of 850,000 cycles and apply to this the modulation resulting when the middle C of the piano is played, then the theory accepted at present says that, instead of a carrier with a single wavelength, you will now have a ribbon of waves ranging from 850,000 plus 256 to 850,000 minus 256. Play a very high note and your ribbon becomes much wider owing to the big band of frequencies apparently required by the fundamental and its harmonics.

The Method Used

First of all, do sidebands really exist? Mathematics appear to show that they do, and anyone who tries to tune out Brookmans Park at a range of ten miles has probably discovered that this transmission with an ordinary receiving set is something much more than a ribbon! Further, if you decide to have real selectivity and put in cascade several circuits with knife-sharp tuning there is an immediate and obvious loss of quality. Theorists tell us that this happens because our tuning is too sharp, which means that we cut out the sidebands and so don't receive the higher frequencies. Dr. Robinson has quite different views on the matter. He says that all previous attempts at sharpening up tuning have been made in one way only—by reducing damping. You can minimise damping by low-loss methods or you can cancel it out to a great extent by employing reaction. But there can be no doubt that the circuit with damping reduced to the lowest possible limits is completely hopeless for the reception of broadcasting.

The ultra-modern view is that this happens not because sidebands are cut, but because of a quality known as "persistence" in such circuits. Press down the loud pedal of the piano and strike a note; it goes on ringing for a long while. By depressing the pedal you remove damping from the string. So if you remove the damping from a tuned H.F. circuit it will ring in much the same way. Get rid of persistence or ringing and you can make your tuning as sharp as you like *without* any loss in the quality. The action of the Stenode circuit is very like that of the pianist's foot. As he plays he is continually removing damping for a moment and then re-applying it to stop ringing.

Do Sidebands Exist?

Most probably sidebands exist, for they can actually be made use of in a particular way for transmission and reception. In what is known as the single-sideband system both the carrier wave and one-half of the sidebands are strained out by the transmitting plant. The remaining sideband is all that is sent out. This is picked up at the receiving end, but nothing can be heard until the carrier is put back again by means of a local oscillator.

Dr. Robinson claims that sidebands are completely unnecessary for the reception of either telegraphy or telephony. He says in effect that the carrier wave contains within itself all the modulation that is required and that a non-persistent circuit can obtain from it perfect reproduction, though all the sidebands are completely

cut out by the sharpness of the tuning. Myself, I rather doubt whether we shall see the Stenode method applied in the very near future to broadcast reception for there is likely to be such an enormous demand for commercial purposes, especially for transmissions over long-distance cables. The Stenode method greatly simplifies all multiple working over cables, enormously increasing the number of words that can be sent in a minute.

Once Bitten . . .

Though a large part of my job in life consists in fiddling about with electrical apparatus, I am one of those unfortunate people who are very susceptible to electric shocks. Others are far luckier. I have seen horny-handed mechanics many a time place two fingers across a 220-volt source of A.C. to see whether there was any juice there, and I had one telephonist during the war who used to test a broken line by placing both ends in his mouth. He got literally the shock of his life one day when he tried this method, not knowing that Siemens' phones were in use. These gave a terrific voltage over the line—far more than the D.3 telephones, which some of us remember so well—and it was quite a little while before he knew whether it was Woolwich or Thursday.

A Lesson

My own receiving set bit me pretty badly the other day in a very low-down way. I disconnected everything and pulled it out of its cabinet to make some small alteration. Steadying it by placing my left hand on the screening box, I proceeded to loosen a nut with a box spanner. Zinggg. . . I got a shock which made my arm tingle for some time. You see, I use decoupling circuits with rather fat condensers between various D.C. high-potential points and earth. Even a quarter-microfarad condenser of good quality can store up enough energy to give a fairly useful shock if you are susceptible to them.

Of course, the fact that you get a shock is proof that the insulation of the condenser is excellent; but, personally, I prefer something milder in the way of proofs. If you are susceptible to shocks and go in for fairly large decoupling condensers, I strongly advise you after disconnecting the set to short each of them in turn before you get to work on making alterations. If they are up to the mark you may be quite surprised at the fat sparks that some of them give when you place the blade of a screwdriver with an insulated handle across their terminals.

On Your Wavelength! (continued)

Following in Father's Footsteps

ZLO Junior is now at work at certain periods of the broadcasting day, and readers will have been able to judge for themselves by this time what reception is going to be like in their localities when both father and son are in operation. Lest readers should accuse me of selfishness in anything that I have to say, let me remark at once that, personally, I am quite alright, for, though I live in a "swamp" area, my own receiving sets have all the selectivity that is necessary. Therefore I don't worry very much on my own behalf. The people I am sorry for are those within a range of fifteen miles or so of Brookmans Park and use crystal sets, single-valvers, or rather antiquated multi-valve sets. In many cases (I know of several in my locality) these sets could not be bought without much scraping and saving, and they have in the past been a continual source of joy to their owners. Funds will not now permit of their being brought up to date or replaced by more modern apparatus. They won't separate Brookmans Park Senior from Brookmans Park Junior; they will no longer bring in 5GB as they once did.

Coming Events

Now, if you take a map, find Potter's Bar on it, and then with a pair of compasses draw a circle with a fifteen-mile radius, you will probably be surprised to find what a large area of pretty thickly populated country is included in it. Actually, the wipe-out area is a little wider than this, and it is no exaggeration to say that for hundreds of thousands of folk high power means useless receiving sets. Those who dwell at a suitable distance from Brookmans Park are better off than they ever were before; but they do not realise that in many cases their own day is coming, for many of them before they are very much older will have regional transmitters planked down on their doorsteps, and that will be that. Myself, I still can't see that there is the slightest necessity in these enlightened days, for any power greater than 5 kilowatts.

A Problem in Interference

One hears a great deal about the difficulty of cutting out Brookmans Park just now, but I came across some interference of an unusual character the other day. I happened to be visiting a cinema where a talkie installation was being fitted up. There were loud-speakers on the stage, leads running from the stage back to the operating box, and a resplendent eliminator—or should I say power pack, in order to come into line with the Americanese usually employed in talkie work?—followed by amplifiers, faders, and the usual paraphernalia.

The apparatus was just about to start and the installing engineer asked me to step down to the stage and make sure that everything was all right. I did so and, to my surprise, I found gentle strains of music coming from the loud speakers. I therefore said to him: "Turn it up a bit; it's so weak I can only just hear it."

"But I ain't switched it on yet," said he.

Whereupon I turned to the loud-speakers and, sure enough, there was the music. By this time my friend had come down out of his cubby hole in order to see if I required medical assistance. We accordingly both went to listen to the music, and were just in time to hear the end of the piece followed by the announcement: "This is the London regional transmitter testing on 261 metres."

What is the Cause?

Now, this cinema was at least ten miles away from Brookmans Park, so that direct induction was not the solution. Where did the music come from? For my own part, you can search me. The amplifier was earthed at all sorts of points and there was no radio reception in the building or anywhere near. Mind you, the reproduction from the equipment, when it was working, completely drowned this faint pick-up; but, nevertheless, it was present, and it proved rather an interesting problem. I wonder if any other reader has had a similar experience.

Television Facilities

The extension of facilities for television experiments will give the amateur an opportunity of testing out results for himself, which in many cases could not be done with a morning transmission. Arrangements have been made by the Baird Co. for a minimum number of a thousand complete televisions to be manufactured and assembled, and these will be available in January. Actual manufacture is not part of the Baird Co.'s policy, and the only reason for departing from it temporarily is to meet the demand for the Baird unit, owing to the delay due to other manufacturers being in the midst of their 1930 programmes.

Serving the West Coast

Furthermore, with the completion of the alternative transmitter at Brookmans Park, television will be allocated an additional wavelength so that speech and picture transmissions can then be made simultaneously. Coupled with this, we must bear in mind that broadcasting facilities from the Dublin station have been granted to the Baird Co. by the Irish Free State, and these will begin shortly. Since there are many places on the west coast of Britain that receive Dublin extremely well, but find great difficulty in tuning in London,

this will be a great boon to amateurs in those districts as well as in Ireland itself.

Cathode Rays for Television

It is rather curious that I should have mentioned Dr. Zworykin very recently in these columns, for I see that he has resurrected the old idea of using cathode-ray tubes for television purposes. He told the district convention of the American Institute of Radio Engineers that he had replaced such moving parts as the scanning disc and its motor in the receiver, while the function of the neon lamp was also taken over. The tube itself has been christened the "kinescope," being small at one end and large at the other, the received pictures appearing upon a fluorescent screen in the large end of the tube. These pictures are 4 in. by 5 in. in size, and it is stated that they can be made larger and brighter by increasing the voltage.

When I last spoke of Zworykin—who, by the way, is a Westinghouse research engineer—it was in connection with his two prisms rotating at slightly different speeds to effect spiral scanning in conjunction with an interesting optical system. His latest device functions with a pencil of electrons moving backwards and forwards at enormously high speeds and "painting" a picture on the screen. The tube—which, of course, is based on the cathode-ray-tube oscillograph—contains two plates which accelerate and focus the pencil of electrons. This stream, which moves in step with the scanning beam at the transmitter, can be controlled by two different electrical methods in building up the picture.

Two Debatable Points

I see it is mentioned also that the problem of synchronisation between transmitter and receiver is solved with the kinescope, the Baird scheme being copied in as much that the synchronising signal is sent with the picture signal. These two effects are said to be filtered out at the receiving end and applied to the cathode tube through the medium of different circuits. I gather that this new type of tube was discussed, but not demonstrated, and when it is there is one very important point about which information will be required, and that is the kilocycle sideband which has to be occupied for the efficient transmission and reception of recognisable images. In addition, one of the greatest objections levelled at the cathode-ray tube on every occasion that it has been proposed as the solution to all television problems is the excessive voltages that must be employed in order to make the tube function with sufficient intensity to give clear images. The fruits of Zworykin's researches on these points will be awaited with interest.

THERMION.



The haphazard use of transformers is to be deprecated. In this article W. JAMES shows how to make a proper selection.

At the present time transformers having ratios of from 2 to 1 to as much as about 10 to 1 are being marketed. They vary greatly in size and in price. They are also of various degrees of quality.

It does not follow that a cheaper product is proportionately more costly to manu-

facture than the most expensive. Size, in these days, when special core materials are used, is no reliable guide by itself as to the worth of a transformer; neither is weight, although it may afford a clue as to whether a case is unnecessarily large for the unit it encloses.

How may the worth of a transformer be judged, then—apart, of course, from actual testing? This question is fairly easily answered, provided a few points are always remembered.

The first is a general one. It concerns, in a manner, the parts with which it will be associated. Clearly, the best transformer that can be bought would be wasted in a set using poor valves, low high-tension, and little grid bias, with a loud-speaker of an old type. With such a set a cheap transformer would probably be as suitable, and more in keeping with the other parts, than a first-class product.

The second point concerns the valves to which the transformer is connected, and more particularly the valve joined to the primary. Is it of the low-, medium-, or high-impedance type, and what is the normal value of the anode current flowing? A further point is the number of low-frequency stages. Are there one or two, and is the transformer for the first or second stage?

With these points in mind, let us turn to the transformer and consider a few of its characteristics. A transformer comprises a core of iron or steel and two separate windings. One of them, the primary, is connected in the anode circuit of a valve, whilst its secondary is joined to the grid of the next valve. There may be 5,000 turns of fine wire, such as number 44, in the primary, and, therefore, in a 4 to 1 component there would be 20,000 turns in the secondary. Now, the primary winding has a certain inductive value, depending upon the details of the core and the number of turns of wire. It also depends upon the value of the anode current passing through the winding. Thus, for example, our transformer may have an inductance of 60 henries when the current is 1 milliamper, 55 henries for 2 milliamperes, and 50 henries for 3 milliamperes.

Obviously, then, the amount of the steady current passing through the primary coil is a matter of some importance. Most coils would carry a much greater current without overheating. That is not the point; we have to remember that the inductance falls off as the current increases. This is because the core becomes more heavily magnetised as the current increases, and is particularly noticeable when there are many turns of wire and a relatively small core.

We ought, therefore, to learn the inductance of a transformer at various values of

anode current. Having secured this essential piece of information, we are in a position to judge how well a transformer will suit a given valve as regards low-note reproduction.

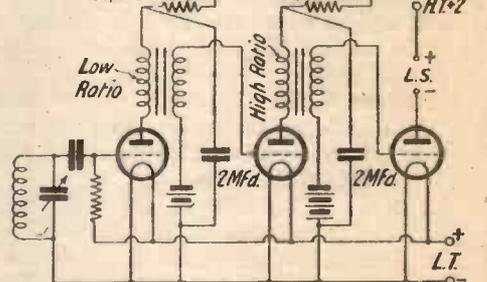


Fig. 1. In a circuit of this description a high-ratio transformer may be used

facture than the most expensive. Size, in these days, when special core materials are used, is no reliable guide by itself as to the worth of a transformer; neither is weight, although it may afford a clue as to whether a case is unnecessarily large for the unit it encloses.

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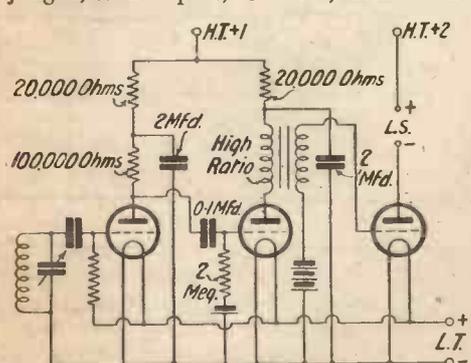


Fig. 2. When there are two stages, the first may have a low-ratio and the second a high-ratio transformer

inductance multiplied by 6.2 and the frequency. A reasonably low note has a frequency of 50 cycles, and, taking this figure and an inductance of 50 henries, we arrive at an impedance of 15,500 ohms. Now, the amplification obtained in the primary circuit is dependent upon the impedance of the valve and that of the transformer, and

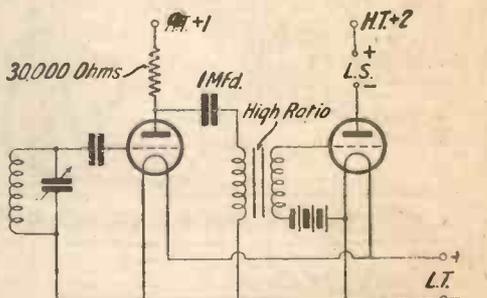


Fig. 3. In a set having resistance- and transformer-coupled stages a high-ratio transformer may be used

if the formula is worked out you will find that about 70 per cent. of the full amplification is obtained when the two impedances are equal.

Therefore, if the amplification factor of the valve is 10, the actual amplification is about 7. This figure, in a good transformer,

testing? This question is fairly easily answered, provided a few points are always remembered.

The first is a general one. It concerns, in

must be multiplied by the ratio; if it is 4 to 1, the magnification of the stage is 28.

When the impedance of the primary is twice that of the valve, about 90 per cent. of the full amplification is obtained, and as the impedance is worked out at 50 cycles the low notes will be dealt with very well.

Knowing the inductance of a transformer, therefore, and being able to estimate its impedance at the lower frequencies, we can judge whether it is suitable for use with a particular valve. The transformer mentioned above, for example, with its impedance of 15,500 ohms at 50 cycles would be suitable for coupling a 15,000-ohm valve, for a note of 50 cycles would be amplified about 70 per cent., as much as one of moderate frequency.

The Ratio Question

If quality as good as this is not required, one could take a frequency of 100 cycles, when the impedance would be 31,000 cycles. Then, with a valve of 30,000 ohms impedance the magnification would amount to about 70 per cent. of the total at 100 cycles. It would fall off for lower frequencies and increase for higher frequencies until a point was reached where about the maximum amplification was being obtained.

At the higher frequency end of the audible scale effects come into play and increase or reduce the value, but they will not be entered into here.

The points I desire to emphasise are, first, the inductance of the transformer and, second, the amount of the amplification of the lower notes. Now let us deal with the question of ratio. It is evident that on a given transformer core there is room for only so many turns of wire. The number may be 25,000 turns. If, therefore,

the ratio is 2 to 1, there will be approximately 8,300 turns on the primary. If the ratio is 5 to 1, the number is 4,170 and 3,125 for a 7 to 1.

Clearly, then, the larger the ratio for a given size of core, the lower is the inductance of the primary and, therefore, the lower the impedance of the valve for a given standard of performance. Now, the magnification factor of a valve is related to its impedance; a valve having a low impedance will have a small amplification factor. From this it will be seen that the magnification of a stage comprising a valve and transformer will not vary a great deal

magnification will be a little greater, provided the low notes are not too seriously weakened.

A high-ratio transformer of generous proportions should therefore be used to follow a valve of not more than moderate impedance (Fig. 1). Some of the high-ratio transformers marketed actually have a greater inductive value than cheaper products having a low ratio. They will obviously provide better quality and greater volume. A single transformer-coupled stage, including a good transformer of high ratio, may therefore be recommended. Two such stages should not be used.

Important Points

It is usually far better to employ one resistance-coupled stage and a transformer stage. Particular care is needed in order to obtain the best results, however, as when the amplifier is capable of dealing properly with the low and high notes there may be a tendency for self-oscillation to occur. This is best avoided as indicated in Figs. 2 and 3. In these figures suitable arrangements are given for stable low-frequency amplification. Slightly better results may be obtained in the case of a single stage by using the connections of Fig. 4, and when there are two stages dealing with considerable signal strength the circuit of Fig. 5 is to be recommended.

In this circuit a choke is used to carry the steady anode current of the second valve, which should be of the low-impedance type. The inductance of the choke should therefore be sufficient when carrying the relatively heavy anode to provide full amplification of the low notes. It is possible that the normal anode current of the second valve may be 10 milliamperes, and the inductance should still be high.

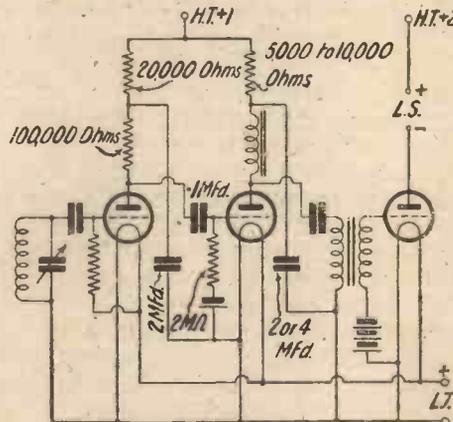


Fig. 5. When the anode current is very heavy a choke feed should be used

for different combinations, provided the quality remains about equal. On the other hand, if a low-ratio transformer is taken out of a set and another of higher ratio and the same size as regards core and winding space is put back, the quality will not be so good. The lower notes will not have the same relative strength, but the overall

MR. FLEX SUSPECTS HIS NEIGHBOUR OF—



—HAVING A JOLLY GOOD SENSE OF HUMOUR.



IMPRESSIONS OF AMERICAN BROADCASTING

AMERICAN RECEIVERS & THEIR CIRCUITS

By CAPTAIN ROUND



A typical American receiver

RECEIVER developments which in the United States have kept pace with the transmission work are quite extraordinary; but I will preface any remarks on this point by saying that I actually did not come across any ideas that are not known here, but that those we are thinking of putting into practice are already in practice over there as ordinary everyday matters.

Universal Mains Supply

Fortunately for the American designer, two of our great difficulties in design do not worry him. He has no double range of wavelengths to contend with and he has, to a very large extent, a uniform power supply, and the American public is a great user of this power system. In a few districts, in certain old towns, direct current is still in existence. New York has got a section which has direct current, and one or two other towns have the same, but in the main 60 cycles 110 volts may be considered the universal supply, and it is much more used in homes by the general public than over here.

The result is that manufacturers have almost entirely neglected all other sources of supply, and I should say that the percentage of A.C. mains-run sets in the States must be preponderant. I actually never saw a battery-operated set, but I saw one D.C. set made by a small manufacturer who had found a special field and was catering for it.

Owing to this simplification of requirements, design has been far easier and the American engineer has succeeded in making his public forget the number of valves in a set and made them think only of the overall results and the price. I examined carefully two of this year's models in the New York Exhibition, which show I had the luck to be able to see at my leisure. These receivers—the number of valves

in use in each case I have forgotten at the moment—it may have been eight or nine, including the H.T. rectifier—were contained in handsome cabinets, with moving-coil speakers, one-knob control of wavelength, illuminated dials, one knob for volume control, and one for an on-and-off switching. The output in both cases was two valves in push-pull, absorbing together 60 milliamps at 300 volts, and delivering a really big volume to the speaker. The receivers gave what we should call knife-edge tuning. The quality of these two sets was extremely good, although somehow or other, by the way, I never really liked American quality, because over there they seem to have swung rather to a low tone—too low for my ear—but as most sets sounded the same, it is apparently the tone which the public likes.

Good Sensitivity

The sensitivity of these sets was extremely high indeed, being capable of receiving at loud-speaker strength with an input of 5 micro-volts per metre, more sensitiveness than one could really want even in the neighbourhood of New York, but I was told that out in the West, particularly when away from the bigger towns, great sensi-

tivity is desired because it can be used owing to the extreme clarity of the atmosphere; and, of course, it is the desire of these people in the outlying districts to receive the material from the big centres.

American Prices

The prices of these sets, complete with valves, were round about £34, and considering the solidity of the cabinet and the extremely nice chassis work, I can hardly imagine how it could be managed. Afterwards in going through one of the factories, I got some idea of how it was done, but I am quite sure we are a long way from such figures here. These two sets I am speaking of may be considered to be representative of what can be called the cheaper type of set in America; and next year that figure and even lower, will be considered the standard price for all sets.

20,000 Sets Per Day!

I learnt that these two sets together were being produced at that time at the rate of about 10,500 per day, and taking into account the large number of manufacturers of sets, at that price and higher, I should estimate that the total production in the United States of cabinet models is certainly not less than 20,000 complete cabinets per day.

Of course, in such a short stay over there I was not able to examine conditions as thoroughly as I should have liked, but one very curious state of affairs seems to exist with regard to different grades of sets. There seems to be little attempt on the part of the manufacturer to produce really cheap sets. They have concentrated on sets of the price mentioned above; admittedly they sell the chassis or smaller cabinets without loud-speaker at a lower price, but I saw no evidence of any attempt at a smaller number of valves at a reduced price, and I asked how this market, which must exist, was being supplied.

(Continued on page 1084)



ADVERTISING—FOR BRITISH LISTENERS

The B.B.C. will not permit advertising, yet many British listeners to Radio Paris get good programmes given by prominent manufacturers. Here a programme is being prepared for Radio Paris by the secretary (left) and the technical director (right) of the radio publicity concern which "sells the air."

For the Newcomer to Wireless: TUNING

WHAT exactly happens when we tune in a station by turning the knobs of the receiving set?

Perhaps the easiest way of explaining is to get our ideas clear on the subject of wavelengths. You know that each station has its own wavelength or frequency.

2LO, 356.3 metres, and so on?

Exactly. And stations are arranged in tables in order of wavelengths. Now, a table such as these can be compared with the keyboard of a piano. Each note of the keyboard has its own pitch, and the pitch of the note depends upon its wavelength or frequency. Just think of a station with a short wavelength (which, of course, means a high frequency) as being high-pitched and one with a long wavelength or a low frequency as being low pitched.

I see the idea. The wavelength tables represent a kind of ether scale.

That's it. And, like each note of the keyboard, each station has its own particular pitch. Now, if we take half a dozen tuning forks of different pitches and place them near the piano we shall find that each of them begins to sing when the corresponding note on the piano is struck, but is not affected by notes of different pitch.

Why do tuning forks sing?

Because oscillations from the piano strings strike them and make them vibrate. The tuning fork does not vibrate unless the oscillations reaching it have its own natural frequency or pitch.

Then what about the wireless set?

Like the tuning fork, its circuits do not respond until their natural frequency is made the same as that of the station that we desire to hear. We could make a set on the lines of our series of tuning forks.

How do you mean, exactly?

Well, we could arrange it, and this has actually been done, with a number of circuits, each tuned permanently to the wavelength of a given broadcasting station. By switching first to one circuit and then to another we could bring in this station or that because, like the tuning forks, the circuits would respond. But it is more convenient in the ordinary way to make the tuning of our circuits variable.

How is that done?

You can vary the pitch of a tuning fork either by shortening its arms or by weighting them. Similarly, you can alter the "pitch" of a wireless circuit by increasing or decreasing the capacity

across the coil. When the condenser knobs are turned the effect is just the same as that of lightening or making heavier the arms of the tuning fork.

And when you have brought your circuit to the required pitch, I suppose that it responds to the transmission just as the tuning fork sings when the appropriate note on the piano is struck?

You have got it exactly. The wireless circuit does not give a proper response unless it is brought into resonance with the transmission that we want to hear, and we obtain this resonance by moving the knob which actuates the variable condenser.

Then the word "tuning" seems to be a very fitting one?

Yes, it is, for when we turn the condenser knob we are really doing exactly the same thing as the violinist does when he tightens or loosens the strings of his instrument, again by turning knobs. He raises or lowers the pitch of the string, and we do exactly the same thing to the wireless circuit by means of the condenser knob.

Why should altering the capacity have this effect? I don't quite see the connection.

That's rather a big subject, and we must leave it for another time!

SHORT-WAVE WIRELESS on AMERICAN AEROPLANES

EUROPEAN commercial aircraft generally use a wavelength of about 900 metres for ordinary wireless communication, but in the United States many of the machines operated by the principal American airways make extensive use of the short waves below 100 metres.

The Boeing Air Transport machines, for instance, are equipped for radio-telephony on frequencies of 4,188 and 5,585 kilocycles (equivalent to the wavelengths of 71.6 and 53.7 metres respectively). These transmitters have been allotted call-signs within the series KHBA-KHBV. Similarly, the Western Air Express planes have sets working on 6,470 kilocycles (46.3 metres) in I.C.W. with call-signs KHCA-KHCK.

The aircraft operated by the Pan-American Airways and the Suburban Air Lines of New York are equipped for transmission in C.W., I.C.W., and radio-telephony on 3,076 kilocycles (97.5 metres) and 4,124 kilocycles (72.7 metres), in addition to the usual aviation frequencies within the longer wavebands. The call-signs allotted to these stations are contained in the series KHAA-KHAY and KHFA-KHFH.

It will be noticed that these call-signs in

use at present are four-letter combinations, and are therefore exceptions to the rule of five-letter call-signs which prevails in respect of the civil aircraft of most other countries.

W. O.

HOW WIRELESS WILL LET IN THE NEW YEAR

ON the night of December 31 the B.B.C. will give listeners an opportunity of hearing how the New Year is celebrated in a number of European countries. In view of the difference in time, the programme sequence will be on the following lines. At 11 p.m. (midnight Central European time) the bells of Cologne Cathedral will be relayed, followed by dance music by Jack Hylton and his Band performing at the Kit Cat Restaurant. At 11.10 p.m. a short tour will be made of Paris, Copenhagen, Hamburg, Vienna, Frankfurt, Budapest, Brussels, Madrid, Milan, and Turin; and at 11.35 p.m. a relay will be carried out of the bells of St. Vitus at Hilversum to usher in midnight in Holland. The striking of midnight will be taken from Big Ben, followed by a peal of the bells of Southwark Cathedral rung by the Ancient Society of College Youths. "Auld Lang Syne" will precede the annual "Grand Good Night" and a closing salutation at about 12.10 a.m. of "Good morning, everyone!"

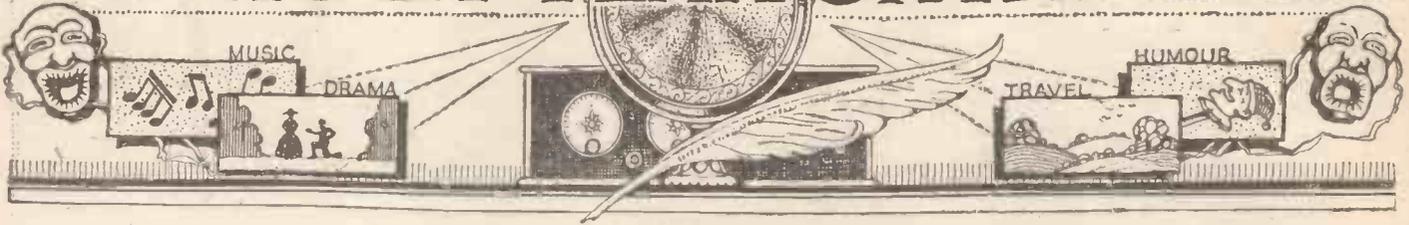
On December 31, 5GB will present a New Year's Eve party, at 10.15 p.m., under the title of *Exit 1929*.



An impression of Charles Farrell

"A.W." Solves your Wireless Problems

WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

THE chief job of a writer is to interest his readers—not necessarily to write things with which they agree. Obviously it would be a tame affair, both for readers and writers, if the spice of contention were for ever lacking. Therefore, I welcome L.G.B.'s letter which appeared in the correspondence columns of AMATEUR WIRELESS. He is good enough to say that he always turns first to this page, but that he agrees with 25 per cent. of my views. Not so bad, eh?

But stay. His point of view is not so far off the mark either, when he distinguishes between a high-brow critic and a low-brow critic. As a matter of fact, I put forward this suggestion myself in regard to dramatic and literary criticism. "Let Mr. Agate do the high-brow plays and someone else the low-brow plays," I wrote.

Same with book criticism. The multitude is not guided in regard to what books they should read. I confess I like good music—not necessarily high-brow music, as my readers know—and I like to be intelligently entertained.

In order to be on the broadest possible side, I have often mentioned many of "Harold's" critical notes on this page. "Harold" is the lowest of low-brows, basking in negro rhythm and tumpety-tumpety stuff. If I were an intolerant high-brow I would have suppressed his insistent note of low-browism. I welcome them, and send him occasional boxes of cigars (brand unstated) for his impertinence.

And, by the way, that talk of mine on "Film Criticism." The same applies here. My contention is that the masses of listeners should be guided and not merely a handful of fans in London. The talk is for January 9 at 7 p.m. Take a half-day off, listen, criticise, and win an autographed copy of a book (all my own work) by your own critic.

Late postscript about the broadcast of fight from Paris. Undoubtedly listeners expected a ring-side broadcast. That we were able to hear about the fight at all

was in the nature of journalistic enterprise, but I must admit the thing wasn't done in the usual big way of the *Daily Mail*.

I have sent a threatening letter to Compton Mackenzie for daring to suggest a claque for speakers in the studio. How on earth can one appeal to two totally different kinds of audience?

"Harold" (above-mentioned low-brow) is in a complaining mood, as usual. His pet dance music has been interfered with again and he is annoyed. He writes: "Once more the B.B.C. expresses its contempt of modern syncopated music by reserving the Brookmans Park experiments on the new wavelengths for the hours in which dance music is broadcast. It is not fair to the thousands of listeners who are devotees of this kind of music. The B.B.C. wouldn't think of mucking about with the transmission during one of their high-falutin' symphony concerts, and yet far less people would be annoyed if they did so."

"Mucking about." What a phrase! What did I tell you?

His whole point is this: Are the lovers



A sketch of the well-known soprano, Lillian Richter-Rushworth. She will be heard on December 30, from 21.0, singing manuscript songs by her father, the late Prof. Willibald Richter

of dance music in the majority or not? There is only one good way of finding out, and here it is. (I offer it to Savoy Hill for what it is worth.) With every licence there should be issued a simple form on which are printed various types of broadcasts, such as: Chamber Music, Talks, Children's Hour, Ballad Concerts, Dance Music, Vaudeville, Plays, etc.

If the licence is a renewal, the licensee should be requested to place the items in the order in which he prefers them. "A census of listening opinion thus being taken, it will be easy to see what is wanted by the public."

Yes, "Harold," but do we weak mortals know what is good for us?

I am afraid listeners were not quite ready for the inclusion of Maeterlinck's weird *Death of Tintagiles* in the middle of a vaudeville programme.

The work needs no commendation as a fine piece of writing. But I fear that, beyond feeling a sense of awe or eeriness, the average listener must have been puzzled as to what it was all about.

I know of no other radio artistes who can fill me with such mixed feelings in a short space of time as do Messrs. Flotsam and Jetsam. One minute I am groaning at the time-worn songs and parodies they dig up. The next I am full of praise for some brilliantly written new song they are singing.

For instance, the other night they kicked off with an old ditty, and I felt like switching off; then the next moment they were singing that new and rather clever song about the reporter, and—well, I didn't switch off.

The broadcast of the opera, by the way, from the Lewisham Hippodrome was first-class. I last heard it at one of the leading Berlin opera-houses.

"I have remarked on previous occasions that at times Jack Payne is too ambitious, and that he and his band spoil themselves when they try to play 'straight' music. During a recent variety hour they played no dance music at all, but confined themselves to scrappy, tuneless stuff, which alone was not worth listening to."

Above is another low-brow criticism.

A RECEIVER FOR REGIONAL REQUIREMENTS



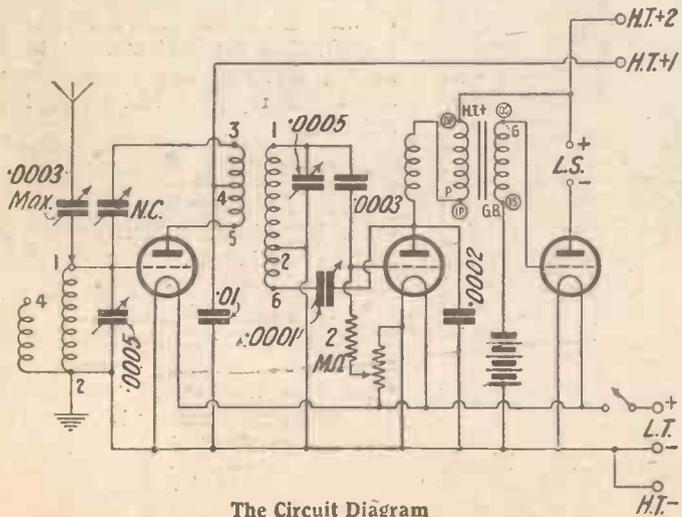
I HAVE received numerous letters from time to time since the publication of the "All-Britain Three," Christmas, 1928, asking whether any improvements have been made to this popular circuit. It will be remembered that, in order to obtain some idea of the reception conditions about the country, I made an extensive tour with a small receiver incorporating an H.F., detector, and L.F. stage. I found, as I expected, that the conditions varied considerably, but my experimental arrangements gave a good selection of stations in every district, and I therefore built up a receiver on identical lines and called it the "All-Britain Three."

A Popular Circuit

At that time the screened valve was not

anything like so popular as it is today, and it was decided to utilise the old neutralised triode for the H.F. stage. While the amplification is not so large as can be obtained with a screened valve, unless special precautions are taken, many people still prefer to use this type of circuit.

A short time ago, therefore, I decided to examine the old "All-Britain Three" with a view to its possible improvement. It had, indeed, been suggested that the conversion of the receiver into a four-valve set might be desirable, as some readers had added an extra L.F. stage to their own "All-Britain Three" with good results. Conditions, however, are rapidly changing, and with the advent of high-power stations the use of two L.F. stages is becoming less desirable. It is only too easy to overload the low-frequency valve on



The Circuit Diagram

The New A

a strong signal, and therefore some adequate system of volume control must be provided. As one of the principal features of the original "All-Britain Three" was its simplicity, I decided not to make the new model a four-valve arrangement, but to retain the original three valves.

This decision was much facilitated by the use of the new "Q" coils. The performance of these coils has been considerably improved and the signal strength on three valves—at any rate, at

my Elstree laboratories—was adequate for all normal purposes. Three or four long-wave stations can be obtained at good loud-speaker strength in daylight, and even one or two short-wave stations. On the broadcast waves, however, the signal strength usually comes up after nightfall, and here a surprisingly large number of stations can be tuned in with little difficulty.

New Coils

Those who are building the set for the first time will, of course, use the new pattern "Q" coil. The terminal connections of these coils, with the exception of the aerial arrangement, which I shall discuss shortly, are exactly the same as on the old coil, so that the circuit diagram remains the same in this particular. Those readers who have constructed the original "All-Britain Three," therefore, may either leave their coils in existence or replace them with the new one, as they prefer. In the latter instance, they will obtain better reception, but the various other improvements which are incorporated in the receiver can be carried out whether the coils are changed or not.



ALL-BRITAIN 3



By J. H. REYNER, B.Sc., A.M.I.E.E.

The circuit diagram of the arrangement is shown on this page. The aerial is taken to the first coil, which is applied to the grid of the H.F. valve. This valve is transformer-coupled to the detector valve and the transformer is provided with a neutralising winding connected through a small neutralising condenser back to the grid of the H.F. valve.

Detection

The detector requires a certain amount of comment, for there are one or two minor improvements here. In the first place, grid detection is used as in the original model. This is much more sensitive than the anode-bend arrangement and, as was illustrated in a recent article of mine, gives more nearly linear rectification than is possible with the anode-bend type. Moreover, if the H.T. voltage applied to the valve is too large it will be capable of handling quite a big grid swing without overloading. In this instance, therefore, the full H.T. is applied to the detector valve, under which conditions an input of 2 or 3 volts H.F. can safely be handled without overloading.

The application of the full H.T. to the detector, however, brings in its train cer-

tainly an easy matter in practice to find the best position by trial. Actually, a point about midway between the plus and minus terminals will be found to be most satisfactory.

A Special Feature

The next point of interest regarding the detector is the connection of a condenser across from the anode direct to L.T.—. This may appear to have the effect of short-circuiting the reaction circuit, but in practice this is not the case. The function of this condenser is to enable the detector valve to operate efficiently, for unless an adequate path is provided for the H.F. in the anode circuit so that it can leak away and leave the L.F. impulses to pass through the transformer, the rectification is not so effective as it would otherwise be. The connection of this condenser will often make a material difference to the signal strength obtained, while it has the further advantage that it tends to even out the reaction demand. One often finds that towards the bottom of the short-wave tuning scale the amount of reaction condenser required is very little, and the adjustment becomes critical in consequence. The connection of a fixed condenser of this nature will overcome this defect and improve the operation.

The value of the condenser should not exceed .0002 or .0003. The former value has been used in this instance as being the most satisfactory for the particular purpose. If a larger value is used, there is a danger of cutting off top notes in the low-frequency stages and thereby distorting the quality.

A good make of L.F. transformer is used following the detector valve, so that a high degree of

amplification may be obtained, and this is fed direct to a power valve of suitable characteristics, which in turn feeds the loud-speaker. A grid-bias battery is incorporated in the set itself, so that only H.T. and L.T. batteries have to be connected externally.

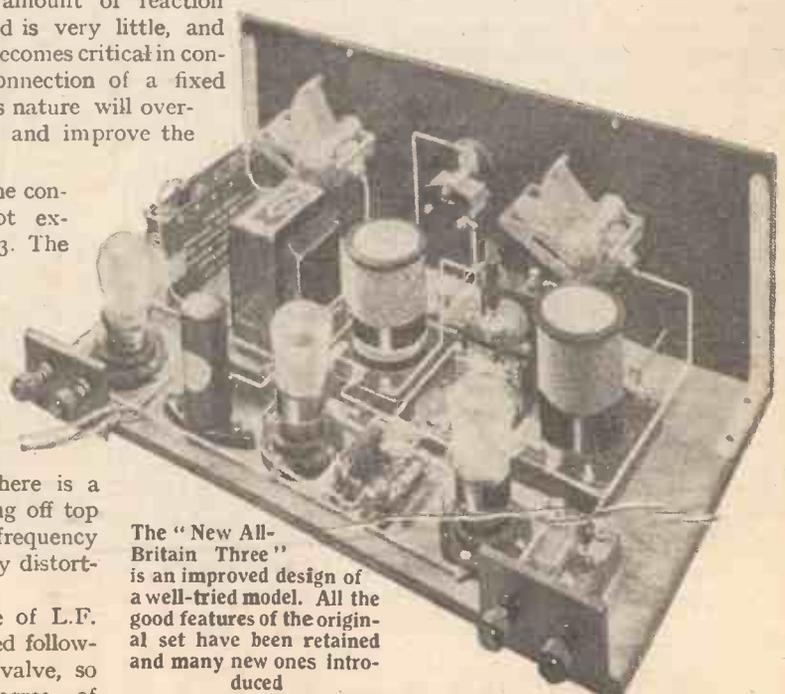
Referring back once again to the H.F. stage, it will be seen that a separate tapping has been provided for the H.T. for this stage and, moreover, that a by-pass condenser has been connected direct from the H.T. terminal (No. 4) on the H.F. coil to earth. This is useful in preventing self-oscillation due to a run-down battery, apart from the difference it makes to the amplification. The reader can try, for himself, the effect of removing this condenser (with the reaction condenser set at zero in each case) and he will be surprised at the improvement which results from its use.

Amplification

The H.F. H.T. tapping has been made variable for the following reason. Since reaction is provided on the detector, it is

The "New All-Britain Three" and the two preceding 3-valve sets, "Everybody's Three" and the "1930 Ether Searcher," which have been described in recent issues, give readers a selection of the three best types. Each has certain special features and the choice depends upon individual requirements.

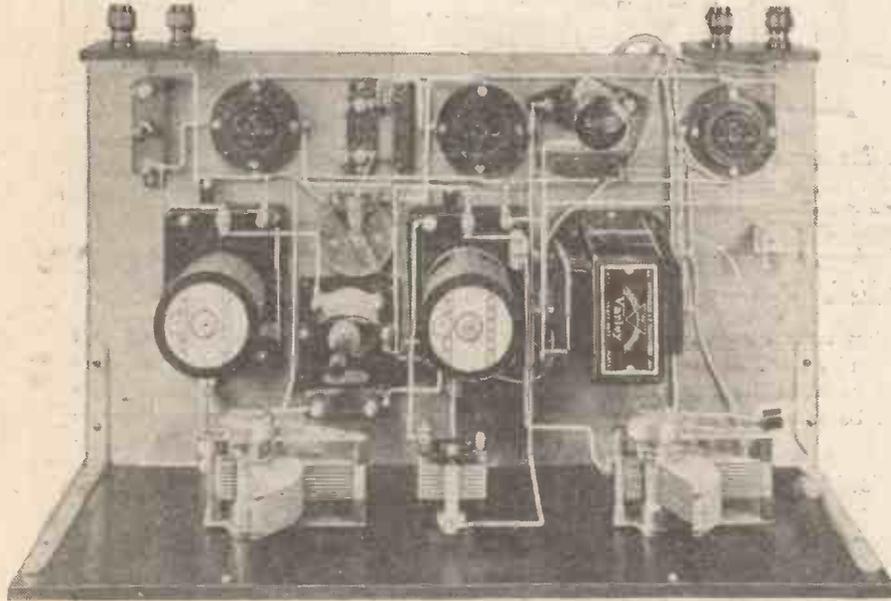
tain disadvantages. In the first place, the high-tension current consumption goes up rapidly and the reaction control is not by any means smooth if the grid leak is connected direct to L.T.+. Both these defects may be remedied by connecting the grid leak to an intermediate point between L.T.— and L.T.+, and to enable this to be accomplished a baseboard-mounting potentiometer has been connected across the L.T. terminals and the grid leak taken to the slider of this potentiometer. It is



The "New All-Britain Three" is an improved design of a well-tried model. All the good features of the original set have been retained and many new ones introduced.

“THE ‘NEW ALL-BRITAIN THREE’” (Continued from preceding page)

not essential to obtain the last ounce of H.F. amplification from the first stage, so .0001-microfarad fixed condenser (Graham-Farish, Lissen, Ormond, T.C.C.,



It is an easy matter to trace the wiring if this photograph is studied in conjunction with the diagram below

that, provided a good amplification is produced, satisfactory results will be forthcoming. Now, it will be found that there is not very much difference between the amplification obtained with 100 volts H.T. and with 60 volts H.T. on the H.F. valve. This again is a point which may easily be checked by the reader by setting the reaction condenser at its minimum, tuning in to a fairly powerful distant station (not the local station, which will be too strong in most cases) and noting the effect of varying the H.T. tap. The point is that if the H.T. voltage on the H.F. valve can be reduced, then the current consumption from the H.T. battery is also reduced.

Components Required

Ebonite panel, 18 in. by 7 in., and two strips, 3 in. by 2 in. (Lissen, Trolitax, Trelleborg, Raymond); or 2 Junit terminal strips.

Baseboard, 18 in. by 10 in. (Pickett, Camco).

Two .0005-microfarad variable condensers with slow-motion movement (J.B., Lissen, Dubilier, Ormond).

.0001-microfarad reaction condenser (Bulgin, Lissen, Keystone, Burton).

Push-pull filament switch (Lotus, Benjamin, Lissen, Bulgin).

Panel brackets (Bulgin, Lissen, Raymond, Camco).

Two “Q” coils, types Q.A.T. and Q.S.P. (Lewcos, Wearite).

Baseboard-mounting neutralising condenser (Peto-Scott, Igranic).

Three valve holders (Lotus, Lissen, Benjamin, W.B., Igranic).

Pre-set condenser, .0003-microfarad maximum capacity (Formodenser type J, Igranic).

Dubilier, C.D.M.).

.0003-microfarad fixed condenser (Graham-Farish, Lissen, Ormond, T.C.C., Dubilier, C.D.M.).

2-megohm grid leak (Lissen, Dubilier).

High-frequency choke (Lissen, Tunewell, C.D.M., Lewcos, Keystone, Sovereign, Watmel).

400-ohm baseboard-mounting potentiometer (Lissen, Igranic, Sovereign).

Low-frequency transformer (Varley, Heavy-Duty, Igranic, Lissen, Telsen, Ferranti).

Four terminals, marked: Aerial, Earth, L.S.+, L.S.- (Belling-Lee, Eelex, Burton).

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

.01-microfarad fixed condenser (Lissen, Dubilier, T.C.C., Ormond).

Two spade terminals, marked: L.T.+, L.T.- (Belling-Lee, Eelex, Clix).

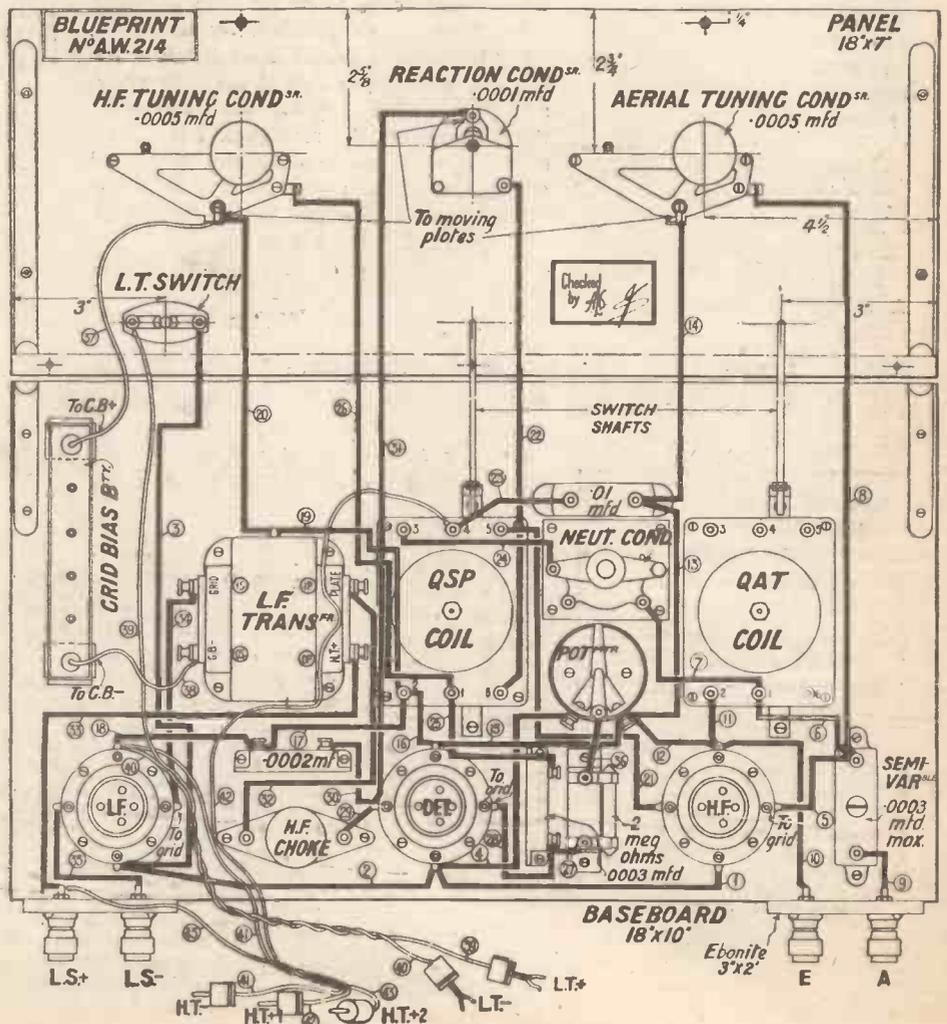
Eight yards of thin flex (Lewcoflex).

Two dial indicators (Bulgin).

Connecting wire (Glazite).

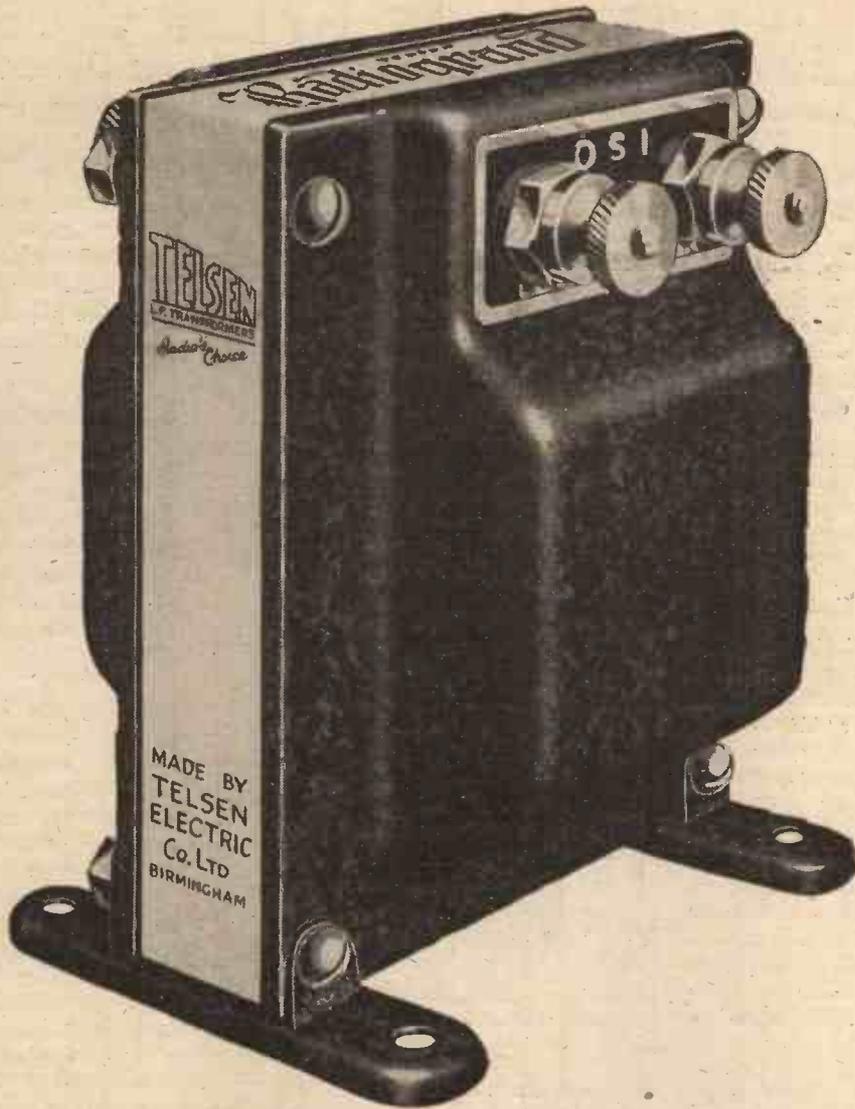
Pair of grid-bias battery clips (Bulgin).

(Continued on page 1085)



The actual wiring diagram of the “New All-Britain Three.” A full-size Blueprint is available, price 1/-

RADIOGRAND
12'6



ACE
8'6

FOLLOW THE LEAD OF THE SET MANUFACTURER

The Telsen Radio-Grand Transformer illustrated herewith is the outcome of an endeavour to place upon the market a transformer at a strictly competitive price, yet possessing equal qualities to the most expensive instrument.

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"A.W." TESTS OF APPARATUS

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

New Marconiphone Speaker

WE have previously tested in these columns inexpensive loud-speakers, manufactured by the Marconiphone Co., Ltd., and indeed the makers have had much experience in this class of work with the result that these loud-speakers, although low in cost, are perfectly efficient reproducers of speech and music.

We have just completed a test of a new Marconiphone speaker known as type 60. The speaker consists of a 10½ in cone, mounted on the standard Marconiphone unit and housed in an attractive cabinet with overall dimensions of 12½ in by 6¼ in by 13¾ in.

The unit is of the normal electro-magnetic type, with a substantial magnetic circuit.

The cone rests lightly on a ring of felt, stuck down to the front of the speaker cabinet; it is made of a light but rigid material which has been used effectively in other Marconiphone speakers.

On test we formed a favourable impression of this speaker; the sensitivity is undoubtedly above the average and in fact was slightly in excess of that obtained on our standard cone speaker. The tone both on speech and music is mellow, but quite distinct and "clear-cut." This speaker is certainly ideal for an average or small-sized room.

A Novel Gambrell Wavemeter

MANY keen wireless amateurs do not rely wholly on the programmes for their amusement but prefer to go farther



New Marconiphone speaker

afield and long distant or low-powered stations, often conducting important research work in reception. For these individuals, an accurate wavemeter is almost essential if the work is to be carried out with precision. Although a simple buzzer wavemeter is handy on occasions, it suffers

from lack of selectivity and cannot compete with a heterodyne wavemeter.

Messrs. Gambrell Bros have recently marketed a most useful form of modulated oscillator wavemeter operating on a novel principle. A screen-grid valve is employed and by suitably arranging the voltages, the valve is worked on a portion of the characteristic where its resistance is negative, causing it to oscillate. Simultaneously an audio-frequency oscillator is imposed on the H.F. oscillation with the result that an audible note of fixed frequency is produced which can be readily tuned in on a wireless receiver.

This system possesses a great advantage



A useful wavemeter—the Gambrell—which operates on a novel principle

for, when the wavemeter is tuned to the setting of the receiver, the audible note is not only received at its loudest, but a high-frequency heterodyne note is also heard and this can be tuned to the silent spot, giving extreme accuracy.

The range covered is from 180 to 2,000 metres and is obtained on two interchangeable coils. An accurate calibration chart is provided.

The instrument is exceptionally easy to handle and may be employed with a normal receiving set. We took a number of tests on various stations, in comparison with the laboratory standard wavemeter, and found that the accuracy of the wavemeter was of a high order.

The cost is 6 guineas, and the meter should prove a most invaluable article to the experimenter.

Pifco H.T. Battery

IT seems that battery manufacturers are obtaining greater electrical capacity out of smaller size cells sold at a standard price. This is a very desirable feature, for the cost and volumetric size of dry batteries are two very serious items to the wireless user.

This week we have concluded a test on a

Pifco battery made by the Pifco Wireless Battery Co., of Pifco House, Manchester. The battery, which has a total voltage of 60, is housed in a strong cardboard container measuring 6¼ in. by 5¾ in. by 3 in. high.



A Pifco 60-volt H.T. battery

Holes in the cardboard case reveal the tapping points commencing at 3 volts, then at every additional 1½ volts up to 10½ and finally at every 10 volts up to 60. The voltages corresponding to the tappings are clearly lettered in white at the side of each socket.

The makers claim an unusually large capacity for this battery and indeed the number of milliampere-hours discharge obtained before the voltage fell to half its original value was distinctly above the average. The tests commenced with a discharge of 7 milliamps, representing the normal consumption for 2- or 3-valve sets; the discharge was continued through a constant resistance for 360 hours when the voltage had dropped to half the original value. The total capacity obtained was 1,900 milliampere hours, a figure which might be associated with double-capacity batteries.

The price of this battery is only 7s., and it can be recommended for reliable service.

RADIO WEEK

A Note to Traders

IT is particularly interesting to amateurs and traders alike to note that a Radio Week is to be held from January 12 to 17. During this time especial interest in radio will be aroused, and the B.B.C. has agreed to co-operate and to give special programmes. Retailers are asked to note that they can give valuable assistance by making special window displays during Radio Week, and they are asked to make the best possible display of the window bills and other publicity material sent to them. Window bills and so on can be obtained from the Radio Week Publicity Department, 28 Southampton Street, London, W.C.1.

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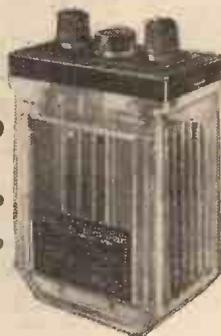
AMATEUR WIRELESS NOTEBOOK DIARY for 1930

This handy and compact reference book, which will be of assistance on many occasions during 1930, should be kept within easy reach by every wireless amateur. Here are some of the contents:

- Conventional Symbols used in Wireless.
- Technical Contractions.
- Aerials and Earths.
- Frame Aerials.
- Wavelength Frequency Tables.
- Notes on Accumulator Upkeep.
- Coil-winding Data.
- Useful Formula Section
- Calculating Condenser Capacities.
- List of World's Short-wave Stations.
- Choosing Your Valves.
- Valve Tables
- Glossary and Definitions of Wireless Terms.

The "Amateur Wireless" Diary can be obtained at Booksellers for 1/6 (cloth) and 2/6 (leather), or by post (2d. extra), from "Amateur Wireless," 58/61, Fetter Lane, London, E.C.4

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



With Indicating Floats.

P.G.F. 5 11/9
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 P.G.F. 7 13/9
 30 a.h. 2v.
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 40 a.h. 2v.

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I know when my L.T. will run out

"My Peto & Radford P.G.F. Accumulator never discharges without warning me of its condition.

Its three indicating floats—white, green, red—take care of that.

When the accumulator is fully charged these rise to the top. Soon after I 'switch on' the white float sinks to the bottom. At half discharge down goes the green, and not until the red falls is re-charging necessary."

Like every other Peto & Radford Battery the P.G.F. is

Guaranteed for 6 months

It embodies these further special features. The plates are sturdy. Paste is held in by interlocking grids. The lid is of crack-proof, acid-proof Dagenite, hermetically sealed at the edges. Terminals have acid-proof glands, and, because of their different diameters, they cannot be reversed. There is ample acid-room, and plates are held in place by glass key-ways in the box.

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PETO & RADFORD ACCUMULATORS

The beginning and the end in

POWER

W.R.5

This announcement is issued by

THE NATIONAL ACCUMULATOR CO., LTD.

FINDING A "BEST" SET

Being some helpful advice for all readers who are choosing a new set for the New Year.

By KENNETH ULLYETT



A "TWO"—
the "Talisman Two," a really efficient small-size receiver

LUCKY is the man who makes his own set! Nowadays there are so many types of receiver from which to choose when it comes to making an outfit from published designs that the intending constructor may be even more than gratified with the wide choice in front of him; he may be puzzled as to which way to turn!

Therefore, a few further explanatory notes on "Best sets and their circuits," published in "A.W." No. 391, will be helpful to those wanting a new set for the new season.

Realise at the outset that "what is one man's meat . . ." and so forth. There is no "best" set. It is all a matter of suiting a set to your own requirements and to local reception conditions. If you live on top of Brookmans Park and want to buy the components for the set on easy payments, then a one-valver will be good enough and cheap enough. *Per contra* should you chance to live down Cornwall way you'll need a very good "three," or even a "four" to give anything like the same programme service as that to be had by those lucky enough to live near a broadcaster.

Consider Reception

Nor is that all; your programme taste must be considered. If you really don't



A good three-valver—the "Clarion Screen-grid Three"

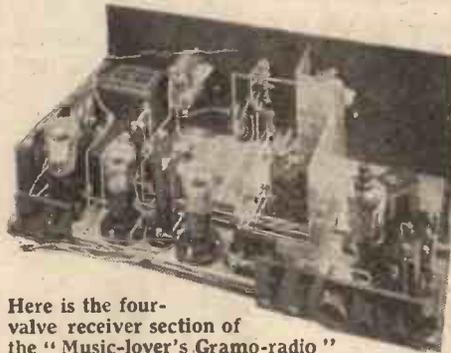
grouse at the B.B.C. (or not much, at least) then you may be content with a set selective enough only to give you the local station, 5GB and 5XX. But if you are the person behind the *Disgusted*, *Low-brow*, *Pirate* and *Indignant* who regularly swell the B.B.C. post-bag with complaints, then, presumably, you'll need a receiver selective enough to bring in the foreigners when the B.B.C. stations are working!

Then there are local problems such as the possibility of using the public supply mains for H.T. or L.T., or both. Perhaps, living in a flat, you can only have a short indoor aerial; or perhaps you have space for something rivalling the B.B.C. masts.

So you see there are a hundred and one things to be considered before picking a set; and yet there are folk who ask, "Can you tell me a good circuit?"

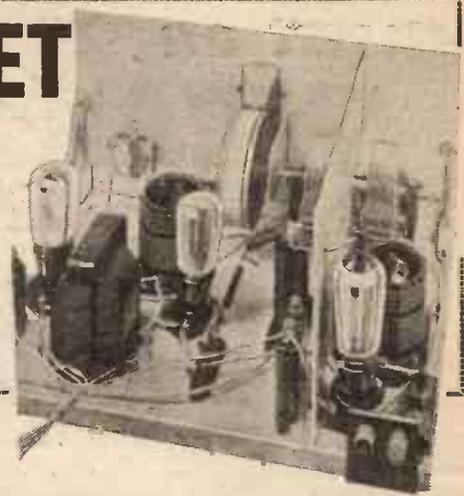
One to Three Valves

Let us start at the one-valvers. The B.B.C. itself recommends the use of a one-valver as the simplest kind of set when, for



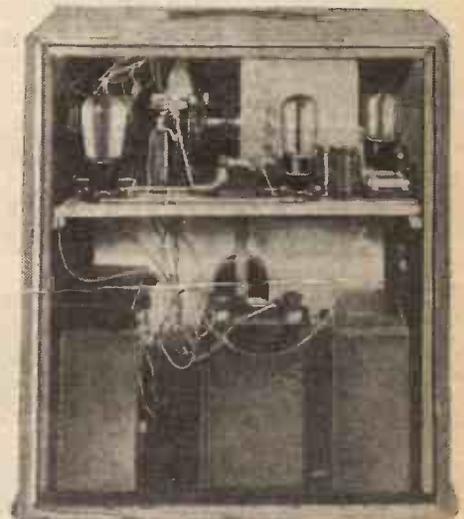
Here is the four-valve receiver section of the "Music-lover's Gramo-radio"

some reason or other a crystal set is not suitable. A crystal set alone is, of course, the simplest arrangement that anyone can have; the B.B.C. officially-recommended crystal set was described only a few weeks ago in "A.W." No. 386, and if you are within crystal range of Brookmans Park then this simple little outfit will suit you. If, however, the signal from Brookmans Park is insufficient to produce audible results it will not be helped by the addition of a low-frequency amplifier which, broadly speak-



—AND A "THREE,"
the "1930 Ether Searcher," a 'star' set of the "A.W." Technical Staff.

ing, will not amplify that which does not exist. For this reason, the installation of a one-valve set complete with its own tuning unit, etc., is suggested in preference to any form of low-frequency amplifier as an addition to your present crystal set.



An up-to-date transportable set for indoor work—the "Music Leader"

The cost of a one-valve set will be very much the same as that of a low-frequency amplifier and, moreover, it will be a more selective arrangement than the latter. This will be particularly helpful when the second programme is radiated from Brookmans Park. The use of a valve set does not mean that a loud-speaker is necessary.

The two-valver is the next step on the ladder. The scope of the "two" is best described in the argument put forward in "A.W." when the "Talisman Two" was described, in No. 373. We said, "three-valvers have sprung into deserved popularity. Much has been written and said about them. Some very good 'threes' have been described in AMATEUR WIRELESS—

(Continued on page 1080)

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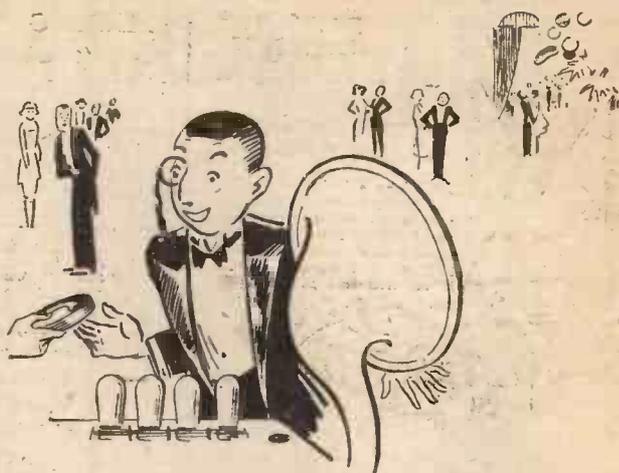
Written by a practical home constructor, this book—containing much useful wireless information—enlightens readers on the selection and right methods of using the tools and materials used in constructing wireless sets.

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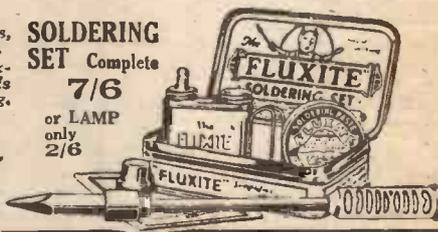
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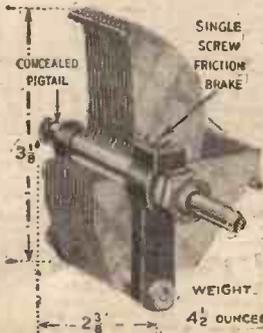
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"FINDING THE 'BEST' SETS"

(Continued from page 1078)

the 'Broadcast Three,' the 'Local or Continental Three,' and the 'Clarion Three.' to take just a few examples.

"There are, however, several purposes for which a two-valver is equally suited as a three, and when the additional expense involved by the third valve is hardly justified. A large number of people have to treat wireless as something of a luxury, which, indeed, it is; and they do not want to spend money on equipment which is too large for their needs. Not everybody wants to have a 'super' set which will ensure a big bag of foreigners on almost any night; often the reception of one or two of the louder Continental stations and, of course, the more easily receivable three or four B.B.C. stations is sufficient. This, a good two valver will do with ease. Only when it comes to working a loud-speaker at full volume or putting on a good selection of foreign stations does the three-valver score."

As we have said, the three-valver is a type of set which is immensely popular. AMATEUR WIRELESS has published some exceptionally good "threes," and in addition to those mentioned we must add that latest and most successful receiver by Mr. W. James, "Everybody's Three." The title is ambitious, but in this high-performance three-valver our Research Consultant has scored a winner and has attempted to please everybody with a set which is easily adaptable to any conditions and which in all ordinary circumstances is guaranteed to receive a minimum of twenty stations at full loud-speaker strength. Owing to the special coils used, magnification and selectivity are above the normal.

Then, again, there is the 1930 Ether Searcher. This is another type of high-performance "three," representative of latest methods of construction. It has two outstanding merits; it is exceptionally easy to build, and it has only one-knob control for tuning.

There is something between a two-valver and a three-valver, though. There is the "two-three" and a good set of this description is the "Talisman Two-three." This can be converted in a minute or so from a

leaky-grid detector and transformer-coupled "two" to a three valver of the "det., R.C., trans." type.

The "Clarion Three" won deserved popularity, and it will be recalled that one of London's largest stores, Messrs. Selfridge & Co., Ltd., were so impressed with its performance that they arranged to give away a large number of blueprints of this set entirely free.

If you have A.C. mains in your house, then you will be interested in an all-mains edition of the popular "Clarion," the "All-Electric Clarion Three."

There are two unique types of set yet to consider—the comprehensive grammo-radio outfit, and the portable set; the *alpha* and *omega*, as it were. In the "Music-lover's Grammo-radio" ("A.W." No. 381), and the "Music Leader Portable" ("A.W." No. 384) these two extremes are covered. The "Music-lover's Grammo-radio" outfit is a home-made electric gramophone and four-valve radio set which would cost £50 or more to buy as a commercial product, while the "Music Leader" is a handy little set to carry from room to room. A good portable for outdoor use is the "Holiday Portable," described in "A.W." No. 356.

As a complement to this guide, it is opportune to mention the AMATEUR WIRELESS Blueprint Service.

For every published description of an AMATEUR WIRELESS receiver, there is available a full-size blueprint, giving panel and baseboard dimensions and layouts. These blueprints are most helpful to the home-constructor, and as a complement to the detailed descriptions. They can be obtained from the AMATEUR WIRELESS Blueprint Department, 58-61 Fetter Lane, London, E.C.4.

We give here the numbers of the blueprints relating to all the receivers mentioned in the foregoing guide. "B.B.C. Official One," AW208; "Talisman Two," AW194; "Clarion Three," AW175; "Talisman Two-Three," AW203a; "Everybody's Three," AW209; "1930 Ether Searcher," AW211; "All-Electric Clarion Three," AW200; "Music-lover's Grammo-radio," AW202a, 202b, and 202c; "Holiday Portable," AW188; "Music Leader," AW203.

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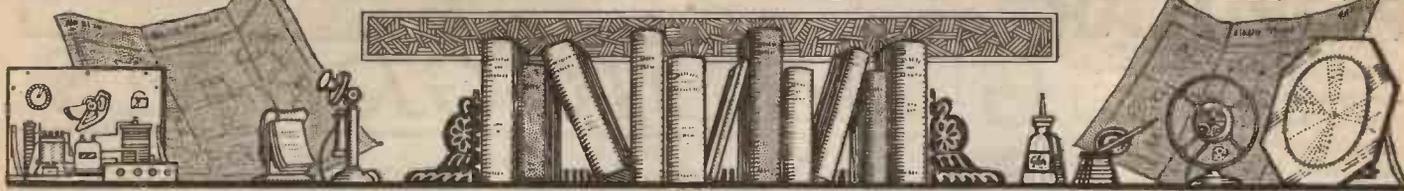
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OUR INFORMATION BUREAU



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D.C. versus A.C. Mains Sets

Q.—I have been on the look-out for some time for a receiver designed to be used entirely from D.C. mains. I notice that whereas you devote a fair amount of space to the description of A.C. mains sets, you appear to overlook the call for D.C. mains sets. This, in my case, is rather disappointing and I should be glad to learn why it is you seem to avoid describing D.C. mains sets?—S. A. (Leytonstone).

A.—There are several reasons why we do not go out of our way to describe receivers capable of being entirely operated from D.C. mains. Perhaps the most important reason is, at the present, it is proposed to replace all D.C. mains with A.C. Quite apart from this, however, to use D.C. mains, especially for L.T. supply, means considerable waste of energy, and therefore excessive cost of running. To explain this more fully: the electric light meter registers wattage, that is, current multiplied by the voltage. In A.C. mains it is possible to reduce the voltage, without loss, by using a step-down transformer. Thus, in the case of a valve requiring 6 volts at .1 ampere, the total wattage is .6 watts. Using the same valve with D.C. mains the only way to reduce the

voltage and also restrict the current is to use a resistance. The voltage is wasted in being dissipated through this resistance. The current used is still .1 ampere, but, assuming that the voltage of the mains is 200, the total wattage

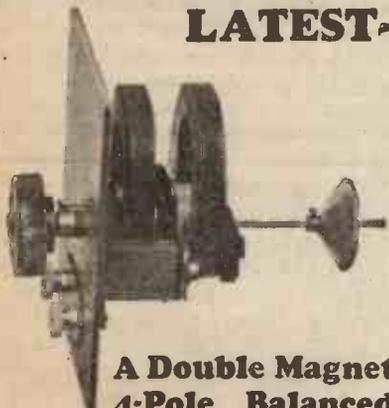
consumption, as registered by the meter, is $200 \times .1$, which equals 20 watts. Of course, a five- or six-valve set can be run as economically as a one-valver by connecting all filaments in series, but then there is the difficulty of choosing suitable valves from the .1 ampere filament type. Another difficulty is the question of mains hum. With alternating current the frequency of the current supply fluctuations is known and remains constant. With D.C., however, the frequency of the supply current fluctuations can only be determined by an inspection of the dynamo commutator, counting the segments and multiplying this by the speed of rotation of the armature. The frequency even then does not remain constant for any length of time. During the day the dynamo may be run at a speed of 1,000 revolutions per minute, but as soon as night falls and a heavier load is put on the power station, the speed of the machines is increased to supply the greater load. From this it will be gathered that it is possible to design a smoothing circuit effectively to smooth a known and constant frequency, whereas it is a far more difficult matter to design a smoothing circuit to smooth out fluctuations from a varying supply.—C.

When Asking Technical Queries

PLEASE write briefly and to the point

A Fee of One Shilling (postal order or postage stamps) must accompany each question and also a stamped addressed envelope and the coupon which will be found on the last page. Rough sketches and circuit diagrams can be provided for the usual query fee. Any drawings submitted should be sent on a separate sheet of paper. Wiring plans and layouts cannot be supplied.

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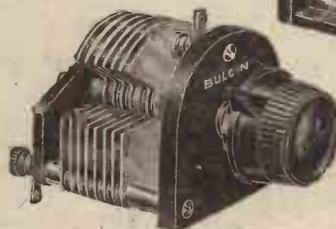
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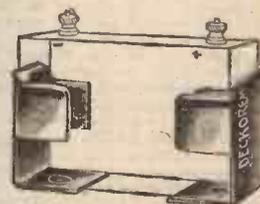


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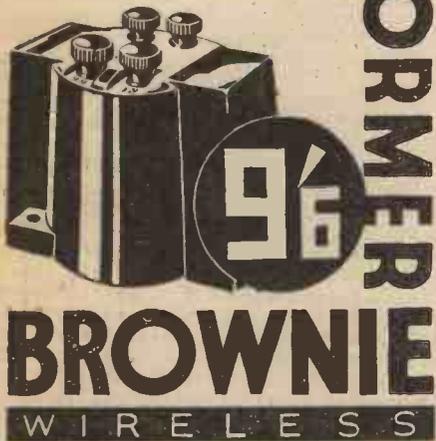
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OUR BLUEPRINT SER /ICE

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LISTENERS to the Leeds station on January 4 are to hear excerpts from the pantomime *Mother Goose*, as performed at the Theatre Royal in that city. Norah Blaney will be the Principal Boy and the Goose will be played by George Queen, a clever animal (or bird) impersonator.

The Babes in the Studio, an entertainment to be broadcast from Birmingham through 5GB on January 9, should strike a new note as a burlesque panto-rhyme. Its cast includes Robin Hood, Maid Marion, a Fairy Queen, a Demon King, a Wicked Uncle, and a few Robbers.

It is reported from Frankfurt-on-Main that recent tests have demonstrated that the installation of a high-power station at Heidelberg would not provide adequate service to the former city and Stuttgart. In these circumstances it is proposed to erect a 60-kilowatt transmitter in the immediate neighbourhood of Frankfurt.

Radio Experimental (Paris) on 31.65 metres is the first broadcasting station to transmit a Children's Hour on short waves; the broadcast is destined to "kiddies" resident in French colonies overseas.

All the programmes originating over the Columbia system in America are now re-broadcast over W2XE, the short-wave

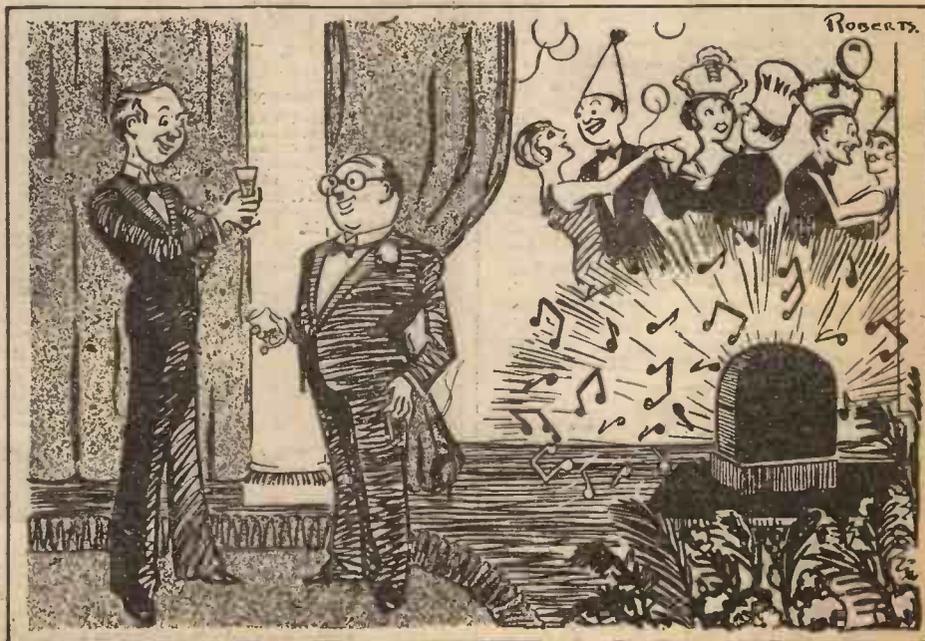
station of WABC (New York). This short-wave transmitter has been heard in all parts of the world.

WMCA (New York) is planning to install a short-wave set in a trailer behind a motor lorry and tour the city to pick up events of interest occurring during the day or night. These will be relayed to the main station for re-broadcasting.

The National Broadcasting Company in America reports that it is now giving on an average forty dramatic auditions each week. Thirty-five of each forty applicants are professional actors and actresses.

It is announced that thirty schools in the United States have installed within the last few months built-in centralised radio apparatus for the distribution of educational programmes to classrooms, and that between sixty and seventy other schools are planning similar installations.

The radio-beacon station at South Bishop, which is now in operation, constitutes the latest addition to the chain of radio-beacons established at various points around the coasts of the British Isles for the benefit of ships fitted with wireless direction-finders. This new transmitter has been allotted the call-sign GGB, and works in I.C.W. morse on a wavelength of approximately 1,000 metres.



"Don't you think Jazz is dying?"

"Well, if not, it certainly sounds as if it were suffering agonies."

MY REPLY VIA ETHER

JOTTINGS FROM MY LOG

BY JAY COOTE

A FEW weeks ago, in these notes, I mentioned the Kattowitz (Poland) Letter Box. Acting on the spur of the moment, I wrote to the director of that station and told him the interest his bi-weekly feature aroused. That I was not the only English hearer of these unconventional broadcasts was proved by the fact that in the meantime I picked up from this station several messages transmitted to listeners residing in the British Isles. I followed my own instructions, fixing a date for a reply via ether.

Kattowitz is a powerful station, well heard on this side of the Channel, and not too difficult to hold if Dublin can be kept out of the way.

Friday, November 22, at 10 p.m., I settled down to pick up whatever there might be destined to me in the Radio Pologne Letter Box. Incidentally I might add that the lady announcer who gives out at the end of the transmission details of the following day's programme in both Polish and French, has added the Polish word Uwaga (Hallo) to her call. It might be mistaken for the name of a station; it is

generally used by Wilno, and now Kattowitz, to attract the attention of listeners. At 10.20 p.m. G.M.T. I gathered from two voices that the director was in Warsaw and his assistant at Kattowitz, but that in order that the Letter Box should not be missed, special arrangements had been made to connect them up by telephone cables, thus allowing them, at a distance of over 250 miles, to chat with each other, the resulting conversation being transmitted over the Kattowitz aerial. Intermingled with "Hallo, Hallo" from both ends of the line, I was informed that my letter had been received "with many thanks"; that the experiment was a novel one, and that it would be interesting to know how the dual transmission was picked up at that distance. After calling up London, then my private address, not to mention the 'phone number, the Polish director, speaking in the French language, appealed to any listener picking up the message to relay it to me in case I should not hear him, and for some time I wondered whether by chance my telephone bell would peal out and arouse the household.

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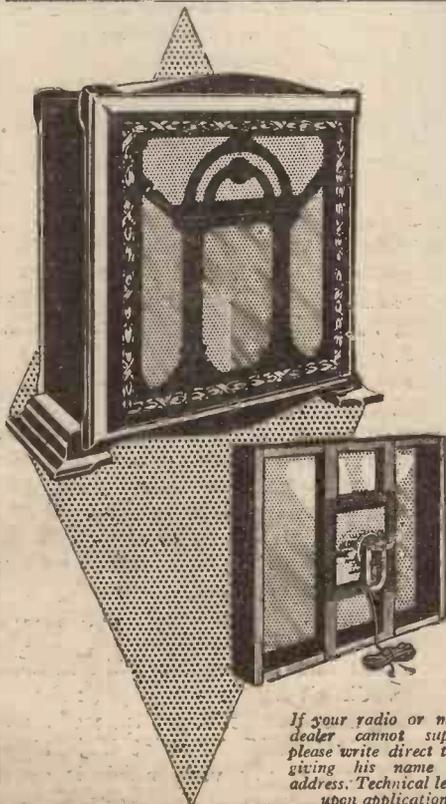
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"AMERICAN RECEIVERS AND THEIR CIRCUITS"

(Continued from page 1069)

Keeping Up to Date

The answer rather startled me, and it was to the effect that the big manufacturers consistently over-produce the better-class sets each year, but instead of hanging on to them as our manufacturers seem to do here at the end of a season, they simply wipe out all sets in stock and in the hands of dealers at very reduced prices. Those actually in stock and not taken by dealers were bought by the second-hand dealers, who sell them at less than half their original prices. Down in the neighbourhood of Cortland Street, New York, there are hundreds of such dealers, and the noise from all their loud-speakers is quite terrifying. Here one can buy up the most amazing bargains, such a set as I described above, only of course, the last year's model, being obtained for well under £10. To suggest such a policy to our manufacturers here would, I am afraid, result in one being considered a candidate for Bedlam.

American Circuits

An interesting point that I was desirous of getting information about was the American practice with regard to circuits. I found that types of neutrodyne circuit are still in use, and one reason for this undoubtedly lies in the fact that only one range of wavelengths has to be handled. The super-heterodyne still seems to form the basis of the best receivers, and I was surprised to find that American engineers consider that the super heterodynes can be produced just as cheaply as either neutrodyne or screened-grid sets.

But screened-grid sets are going very strong, and the general practice, as indicated by the radio show, tends towards the two distinct methods of (1) individually shielding all parts and (2) overall shielding. Actually I saw one case where the coils were individually shielded and the set had been built up to be generally shielded as well.

The number of circuits included in the straight radio amplification sets is generally four, but six are known, although it makes a rather more expensive receiver than the four-circuit type. The American screened-grid valve, as is well known, has the grid brought out at the top of the valve; but their valves with the ordinary battery filaments are of rather poor mutual conductance, the tendency being to go almost entirely over to the independently-heated cathodes and neglect the plain filament type. Circuit designers seem to be concentrating more on this heater type of valve; the mutual conductance of it is about 1 milliampere per volt, which is about 20 per cent. better than our average screened-grid valve of the filament type.

Super heterodynes have a number of high-frequency circuits and as many as six

intermediate circuits, usually designed with the object of getting a flat-topped tuning curve; the result is that quality can be maintained with knife-edge tuning.

Capt. Round on U.S.A. Valves

Some difficulties have been experienced in America with the screened-grid valve, due to the number of high-power stations in use. It was found that when one was only a matter of 15 or 20 kilocycles, and only a few miles away from a high-power station, another weaker station being received would have its carrier modulated by the strong station owing to the lack of straightness in the tube characteristic, and it looks as though the Americans have chosen a screened-grid valve with too fine a mesh for the control grid for their conditions over there. Various tricks are being employed to avoid this difficulty, none of which I thought were really good solutions.

The use of the independently-heated valve is becoming more and more universal, but some of the older sets, with their earlier heater types of valves, are very annoying in their sluggishness of starting. One set I handled actually took over half a minute to start after switching on, but this time has now been reduced to from five to ten seconds by better construction of valves.

For the American conditions I still fancy that the super heterodyne is supreme for a first-class receiver, and it would depend mainly upon the trend of design whether in the future the screened-valve receiver can be produced with as good a performance at a cheaper price; but it follows that as good a characteristic in a screened receiver cannot be obtained as in the super heterodyne until the number of tuned circuits in each are equal, and as this means nine or ten circuits, the difficulties are rather large.

I saw nothing very startling in the way of ganged-condenser productions. Rigidity of the base on which the condensers are mounted seemed to be the main essential in their construction, but the actual process of ganging in the shops seems to be the work of boys with pairs of pliers, who become very expert at bending the condenser plates to give the right effect, aided, of course, with an elaborate testing set.

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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. Queries should be addressed to the Editor, and the conditions printed at the head of "Our Information Bureau" should be closely observed. 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.

"THE 'NEW ALL-BRITAIN THREE'"

(Continued from page 1074)

The aerial has been shown coupled through a variable pre-set condenser to the grid of the H.F. valve. This is the same system as was employed with the old type of "Q" coil, because in some instances it is found that the primary winding on the new QAT coil is too selective. Under my own conditions at Elstree I use the coupled aerial winding every time, because it enables me to tune out Brookmans Park with little difficulty, but dwellers in more remote districts may find that the coupling is not sufficient, and in this case they may use the system of coupling through a small condenser as shown. Any reader wishing to change over, therefore, should remove the aerial from the aerial terminal and connect it on terminal No. 4 on the QAT coil. This will connect the coupled winding in circuit, and the difference can immediately be noted.

It will be found that in using the coupled winding, as just described, both coils are approximately matched in their dial readings, and it is possible to tune in the new London transmission on 261 metres just at the bottom of the scale. What is more, tested in my laboratories, which are only six miles from Brookmans Park, it is possible to separate the two stations with the greatest of ease. 5GB is, of course, received

well clear of either transmission, and a particular and very important point is that Brookmans Park is not received over the greater part of the long-wave scale. This is a particular feature of the new "Q" coils—namely, that a powerful local station does not force its way through on the long-wave band, and in practice Brookmans Park can only be heard over the first five degrees or so on the long-wave band.

Further information regarding the tuning of this set, together with operating notes, will be given in next week's issue.

CUTTING EBONITE PANELS

ANYONE who has done much work with ebonite knows how difficult it is to see the guiding line when cutting a panel by artificial light, and even by daylight, and consequently there is great risk of ruining a large and expensive panel by running the saw off the guiding line.

This may be avoided by cutting the line into the panel by means of the point of a pair of dividers and a ruler. Then rub a piece of white chalk along the line and clean the surface of the panel with a cloth. Some of the chalk will remain in the line, making it stand out clearly as a white line, instead of the usual almost invisible pencil line.

The same method may be used for engraving dial indicators on the panel.

R. D. S.

A SEASONABLE GIFT

IF you are giving a New Year gift of radio interest to a friend, or if you want something in which to jot down your New Year radio resolutions, then try a Lett's Quikref diary. Primarily, there is the Lett's AMATEUR WIRELESS diary, price 1s. 6d., in cloth, or 2s. 6d. in leather. Apart from the diary section, these pocket books contain a wealth of helpful radio information—just the thing for the pocket. Then there are the other members of the range of pocket diaries, office diaries, combined banknote or season ticket case and diaries, desk-pad diaries, and so on. They are obtainable from all stationers, or from Lett's "Quikref" Diaries, Ltd., 160 Shaftesbury Avenue, W.C.2.

Feeling that the special need of Scotland demanded the formation of a body charged with the oversight of school broadcasting in Scottish schools, the B.B.C. has devolved the educational responsibility for all such broadcasts to a Scottish Sub-Council. This body is composed of members of the Scottish Education Department, the Education Authorities, the Association of Directors of Education, and teachers.

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Home Two (D, Trans)	AW146
Globe DX Two (SG, D)	AW157
East to West Short-wave Two (D, Trans) ..	AW150
All Mains Two (D, Trans)	AW180
Loud-speaker America Two (D, Pentode) ..	AW190
Talisman Two (D, Trans)	AW194
Hyper-selective Two (D, Pentode)	AW198
Pentector Two (P. det., RC)	AW213
Q-coil 2 (D, Trans)	WM62
Crusader (D, Trans)	WM69
Flat-dweller's 2 (HF, D)	WM76
Tetrode Short-wave Two (SG, D)	WM100
Key-to-the-Ether Two (D, Pentode)	WM107
Clipper Two (D, Trans)	WM135
Twinflex (Reflex)	WM138
Continental Two (D, Trans)	WM143
Stay-put Two (All AC, D, Trans)	WM155
Ether Ranger (D, Trans)	WM156
A.B.C. 2 (D, Trans with copy "W.M." 1s. 3d.)	WM160
Brookman's Two (D, Trans)	WM168
A.C. Two (D, Trans)	WM175

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All Britain Three (HF, D, Trans)	AW158
Bantam Three (D, RC, Trans)	AW160
Listener's Three (HF, D, Trans) Price 4d. free with copy of "A.W."	AW169
Binowave Three (D, RC, Trans)	AW172
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Local and Continental Three (HF, D, Trans D, or RC, Trans)	AW189
Broadcast Three (SG, D, Trans)	AW192
James dual-range Three (HF, D, Trans)	AW196
All-wave High-Mag Three (Det. 2 Trans)	AW199
Knife-edge Three (D, RC, Trans)	AW201

Talisman Two-three (D, RC, Trans)	AW203a
Wide World Short-wave Three (HF, D, Trans.) ..	AW207
Everybody's Three (SG, D, Trans)	AW209
1930 Ether Searcher (SG, D, Trans)	AW211
New All-Britain Three (HF, D, Trans)	AW214
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All-wave Screened-grid Three (HF, D, Pentode) ..	WM110
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New Year Three (SG, D, Pentode)	WM123
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Simple Screen Three (HF, D, Trans)	WM131
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At Home Three (D, 2RC)	WM141
Short Wave Link (D, RC, Trans)	WM142
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Brookman's Three (SG, D, Trans)	WM161
Community Three (D, RC, Trans)	WM164
New Q 3 (SG, D, Pentode)	WM167
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Broadcast Picture Four (HF, D, 2RC)	AW163
The Orchestra Four (D, RC, Push-pull)	AW167
All Europe Four (2HF, D, Trans)	AW173
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Copies of "Amateur Wireless" and of "Wireless Magazine" containing descriptions of any of these prints can be obtained at 4d. and 1s. 3d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine" sets.

LETTERS TO THE EDITOR



The Editor does not necessarily agree with the views expressed by correspondents.

Correspondence should be brief and to the point and written on one side of the paper.

Solo Instruments for Broadcasting
SIR,—Further to expand my previous letter, may I specify certain instruments that, used for solo purposes, would give infinite pleasure to the average man who is not much studied by the B.B.C.? These instruments "come over" finely on our speakers: The flute, the flageolet, the saxophone, the English concertina, the Irish bagpipes (which are really sweet), and the Scotch bagpipes (more stirring and strident, perhaps). The organ (not the cinema type) is fine for light popular music.

Now, why cannot those who love light and simple music of a cheery type be catered for, as well as those who are called highbrow? The present programmes are boring by their monotony.

W. J. F. (Redruth).

An Appreciation

SIR,—It is a long time since you published the "Chapman-Reinartz" receiver in your paper, but I must write an appreciation of it as I have constructed the set, and find it splendid and quite capable of matching most of the three- and four-valve sets costing pounds. I can sit down any evening and guarantee myself seventeen stations on the loud-speaker on one coil, ranging from 220 to 480 metres, and have picked up twenty-one between these wavelengths. This evening (Sunday) I tuned in a British station (unknown) transmitting a church service at 7 p.m.; and Berlin, Bratislava, Cologne, Glasgow, Langenberg, Munich, Nürnberg, Paris, Toulouse, Göteborg are among those I can choose from just when I want.

H. (London, S.E.).

The Regional Scheme

SIR,—The many debates in your columns relating to the regional scheme are indeed interesting, and the pros and cons of the system appear to be equally contested.

I have always been in favour of a fewer number of stations working on a higher power, but I feel that the whole thing is being badly overdone. The power being used is too high, and undue interference is bound to result.

In AMATEUR WIRELESS dated October 10, 1925, I wrote: "If there were seven stations of about 10 kilowatts each, evenly distributed over the country, there would be a very small area not served sufficiently well for crystal users, and valve users would be little troubled by interference so long as the stations were not situated too

near the larger towns." Admittedly, that was four years ago and conditions have changed, but I am still of the opinion that the power mentioned would be adequate. In fact, our present knowledge of receiver design should make the lower power more acceptable now than four years ago.

I now read in the press that the Prague Committee has decreed that no European broadcasting station shall use more than 100 kilowatts. Past history leads me to believe that this will induce every station to use that power or as near that as possible.

The whole idea of immense power seems so ridiculous when it is remembered that when 5XX originally worked on 10 kilowatts, that station was received in India and Africa, as well as over all Europe. Furthermore, the crystal range was in the neighbourhood of eighty miles.

F. P. (Liverpool).

American Reception

SIR,—In reply to "Thermion's" invitation in AMATEUR WIRELESS for readers receiving America on the medium-wave band, I should like to give you my experience.

On Sunday, December 1, I commenced my daily reception at about 12.30 p.m. and was very surprised to find the weaker Continental stations coming in at what is usually evening strength. After a few minutes of this I was reluctantly compelled to leave the receiver for dinner.

I resumed my dial-twisting at 2 p.m., and by 4 o'clock I had logged on the loud-speaker over fifty stations, including Manchester, Aberdeen, Belfast, Leeds, Ljubljana, and Cork. The last-named station relaying a football match and coming in very strong. All these were brought in during daylight. But, to cut a long story short, I decided that conditions were very favourable for American reception.

I tuned in WGY (Schenectady) at 1 a.m., went on to WBBM (Chicago) at 1.35 a.m., and heard a vocalist give a very fine rendering of "Rocked in the Cradle of the Deep"; then I went up a little to WGN (Chicago), and heard vocal duets and concerted items from 1.45 a.m. until 2.30 a.m., all on the loud-speaker. By this time, I must say, I was thoroughly satisfied.

To end the story, this most interesting day's programme was received on a popular S.G. three-valve kit set, the only alteration from standard being the substitution of pentode in the place of ordinary power valve.

P. (Reigate).

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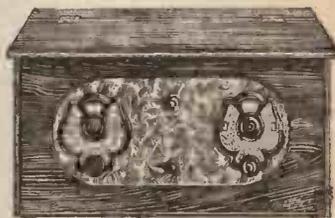
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From A. C. Morton, of Hartley Wintney, 3/10/29:—

From G. A. Rotherham, of Dumfries, 26/11/29:—

Dear Sir,—Have received wireless set, etc. (yesterday). I am more than pleased with same. It has surpassed my expectations, and you can be sure I shall recommend your firm in future to my friends. Yours truly, (Signed) A. C. Morton.

Dear Sir,—I have received the 3 Valve Set you sent me, and after more than a fortnight's trial, I am fully satisfied. It is a bargain at the price. Many thanks. Yours sincerely, (Signed) G. A. Rotherham.

TRITRON VALVES
 2-volt or 4-volt
 H.F., R.C., Det. .. 5/6
 Power .. 7/6
 Latest DARK EMITTER
 De Luxe Model, 4-pole Bal. .. 17/6
 Unit

We Stock
 J. B. Condensers, R.I. Chokes, Transformers, and all usual products, Lewcos Coils, Chokes, etc., Ekco Mains Units, Amplion Speakers, Brown Speakers, and all components, phones, etc., Ferranti L.F. Transformers, Chokes, Anode Resistances, Coscor, Osram, Ediswan, Marconi Valves, Varley Chokes and Transformers, Ormond Condensers, Dials, etc.

TALISMAN 7/6
DUAL COIL
 (Wearite) Magnetic Reaction

TUNEWELL 7/9
DUAL COIL
 200/2000 Metres.

Brookmans Separator
 (A.W.)
 .0005 variable (S.M.); Bulgin "A" Tuner, 15/6; 7-ohm P.M. Rheostat, Sprung V.E., 1-mfd. H.P. Choke, 2 Igranic Pre-set, 8 Terminals, Base-board, Wire, and Screws.
THE LOT, 39/6, Post Free.

For Ether Searcher
 Pair Dual-range Colver Coils, 17/-
 Lissen Super, 19/-
 Lohus 00013 Differential, 7/-
 Lewcos H.F. Choke, 7/6
 Lissen, 5/6, etc. Two 1-mfd. Fixed, 5/-, etc.

TUNEWELL
 CLARION COILS, each, 10/8
 DUAL 6/PIN, each .. 7/6
 6/PIN BASES, each .. 1/9

LISSEN PARTS
 60-v. H.T., 7/11
 108-v., 12/11, etc.
 Latest 4-pole Unit, 12/6
 S.G. Envelope, 10/-
 Coils for S.G. 3, 9/6
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 .0005 Var., 6/6
 Vernier Dials, 3/6
 Ample Postage please.
 Lissen Power Pentode, 2-v., 17/6
 Only needs 100 v. H.T.

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 Blue Spot Unit 66K; 25/-
 Chassis, 12/6
 Do. Major, 18/-
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 Celestion C10, 75/-
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 Marconi, Coscor, Osram, 10/6
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 S.P., 15/-
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 Pentode, 25/-
 Sets of valves for all Coscor and Osram kits of parts, etc.

KITS OF PARTS of your own selection quoted for at a special OVER cash price when possible on receipt of detailed list. in value

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

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Transfers giving painted effects on Fabric, Wood, Metal, etc. Sample and catalogue 1/-.

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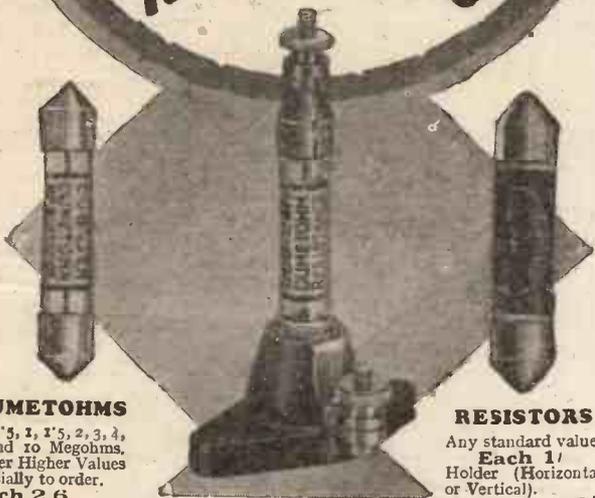
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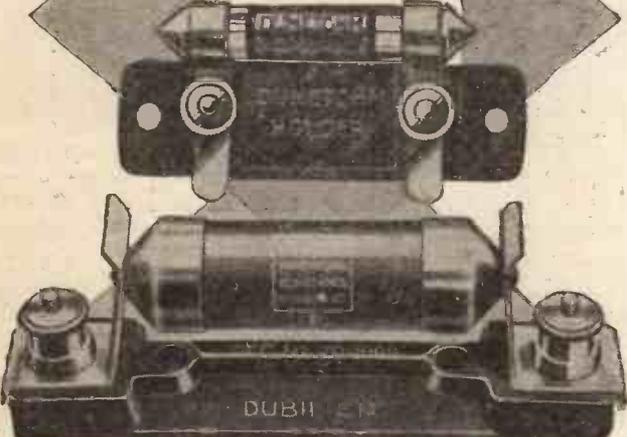
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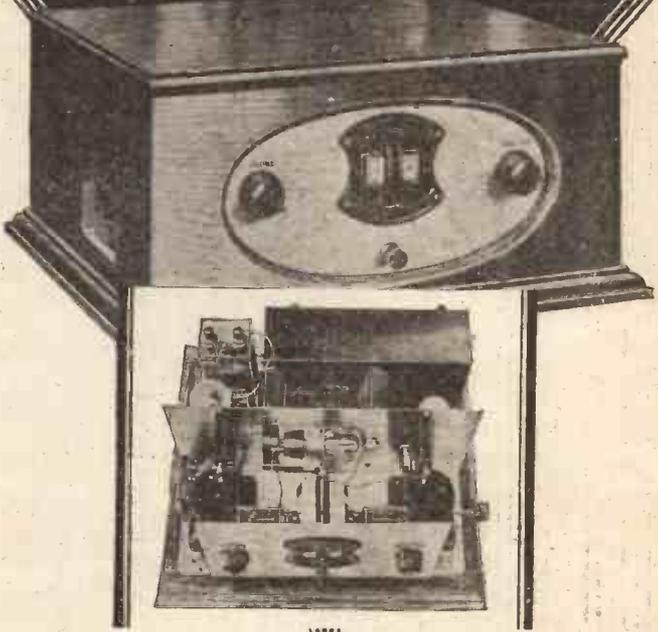


Free for the asking—
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for you at your dealer's.

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The new Lotus 3-valve S.G.P. receiver
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Build this wonderful set yourself at
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