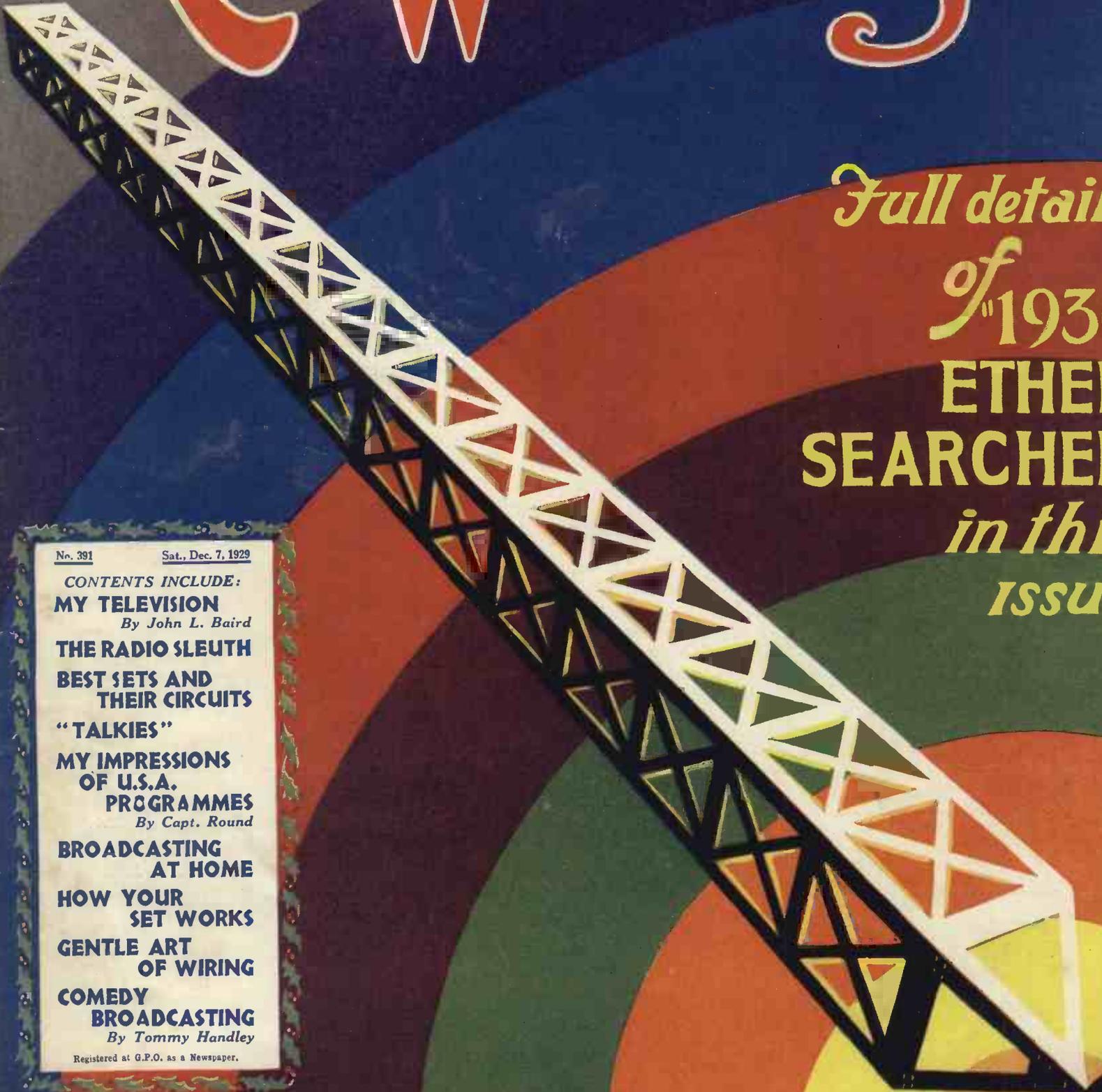


Amateur Wireless

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



No. 391 Sat., Dec. 7, 1929

CONTENTS INCLUDE:

MY TELEVISION
By John L. Baird

THE RADIO SLEUTH

BEST SETS AND THEIR CIRCUITS

"TALKIES"

MY IMPRESSIONS OF U.S.A. PROGRAMMES
By Capt. Round

BROADCASTING 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

The Imperial Wave Trap

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

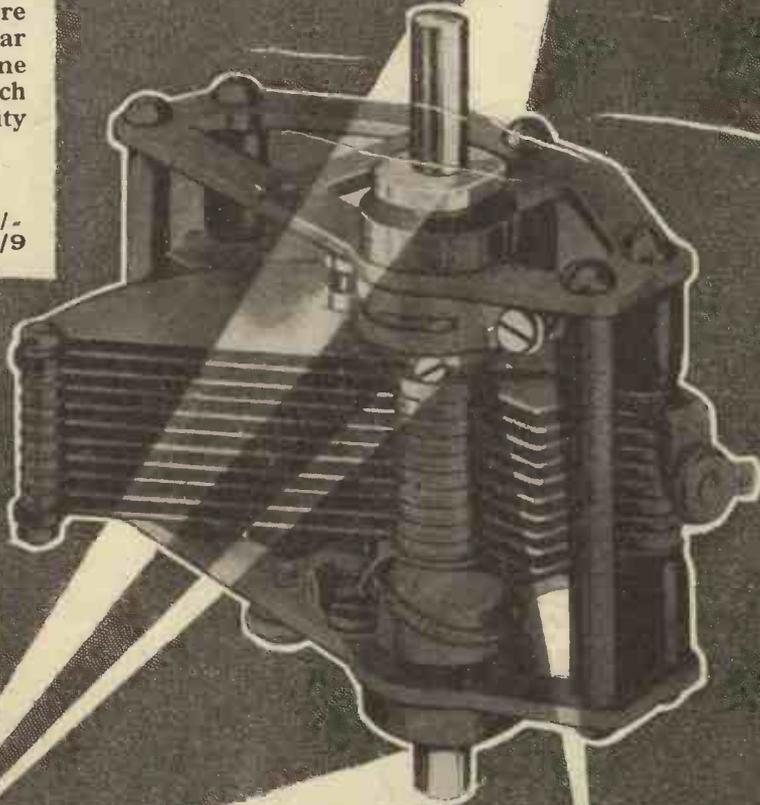
IT'S when you begin to look into J.B. Condensers that you appreciate the skill, the accuracy, the endless patience with which they are designed and made.

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.

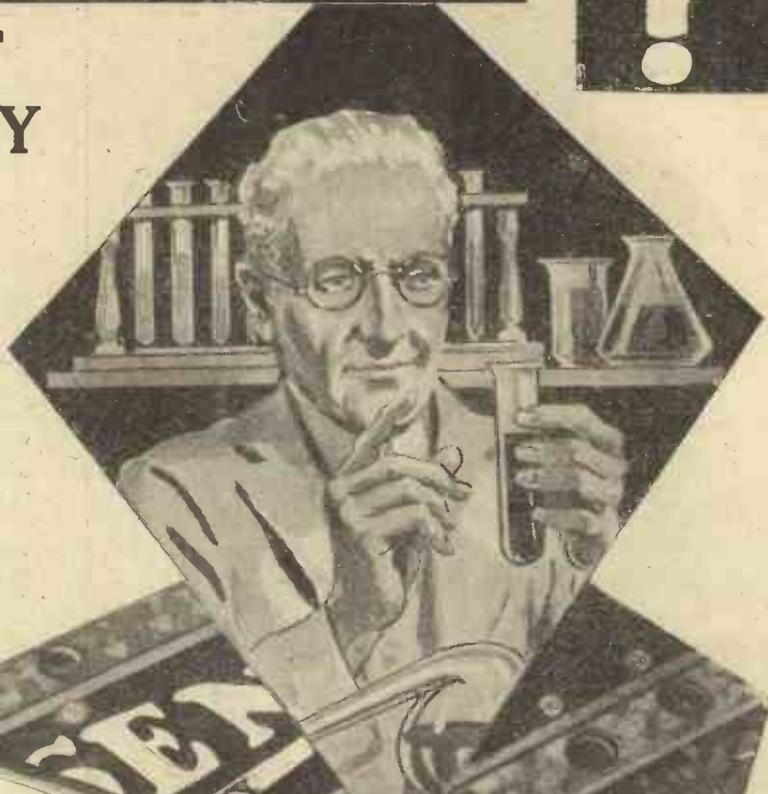
Factories also at Richmond (Surrey) and Edmonton. (Managing Director, T. N. COLE.)

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

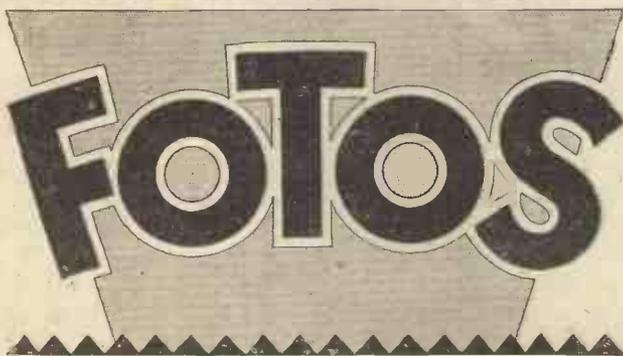
For Purity of Reception . . .

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

SPECIAL DISTRIBUTORS:

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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.



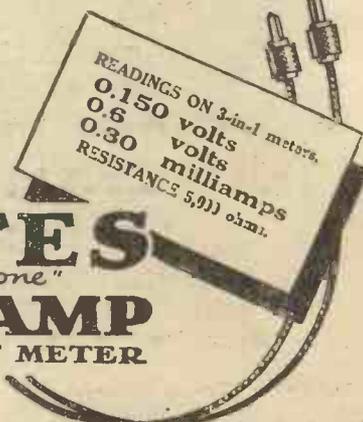
PANEL MODEL.
Fixes on to panel as illustrated. Readings on three scales obtained by simply rearranging plugs in coloured sockets. Price 13/9. With full instructions for use.

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.

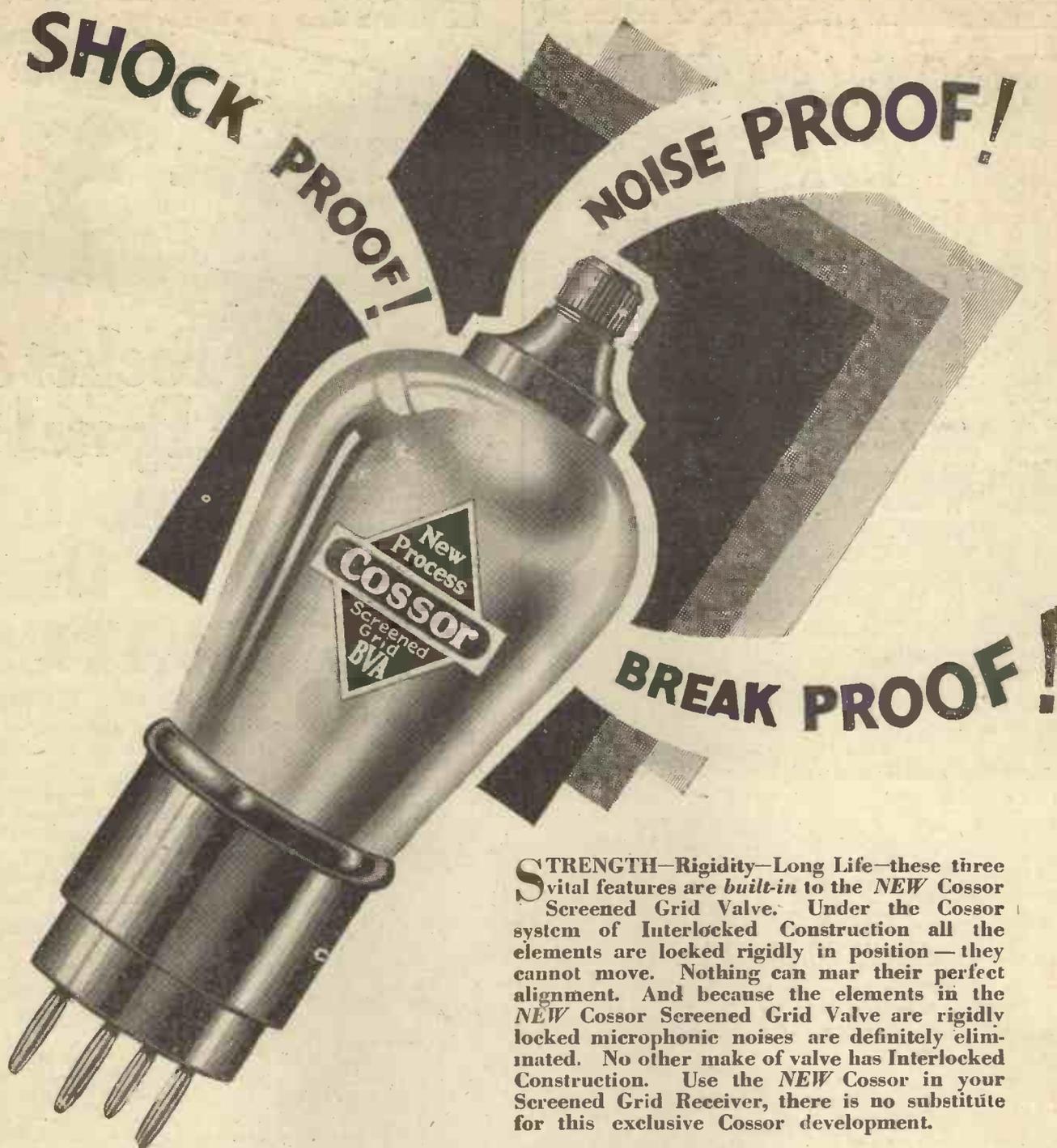


WATES "three in one" VOLT-AMP RADIO TEST METER

B35

M.B.

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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.

**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.

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 . . .!

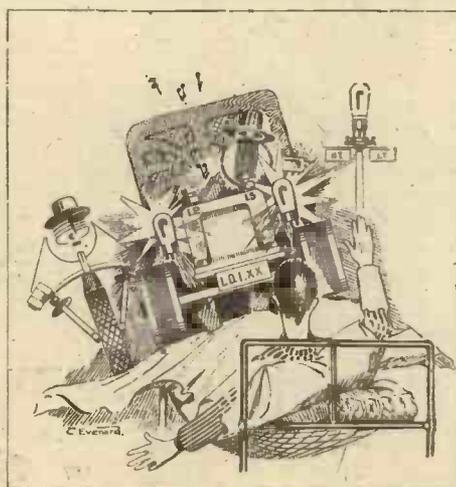
More Train Radio—Recently we described the way in which it is now possible on all large Canadian trains to listen to a radio programme, or to talk to friends via a radio telephone while the train is doing, perhaps, seventy miles per hour. The German Telefunken engineers are trying a similar "stunt," 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 grrramo-rrradio 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!*"

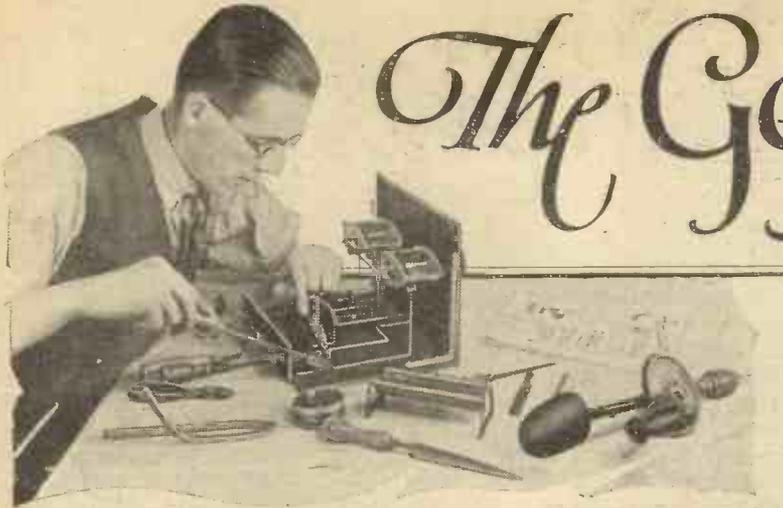
If you've heard it before, please forgive me! I tell you, it's a hard job always to know new ones!

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.

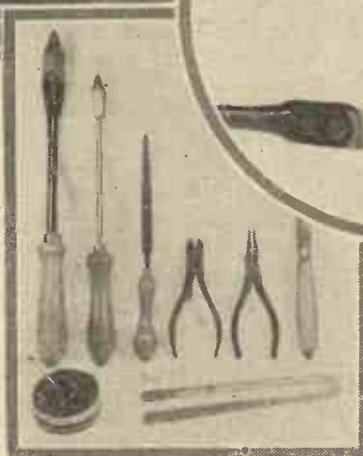
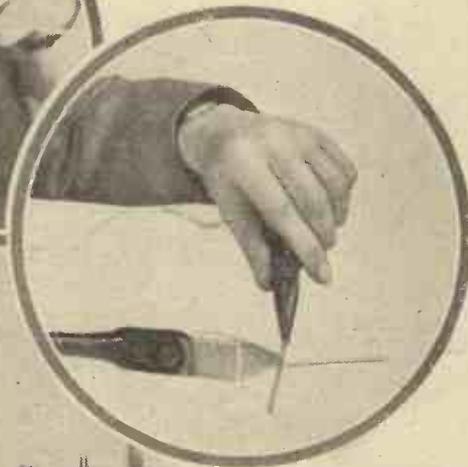
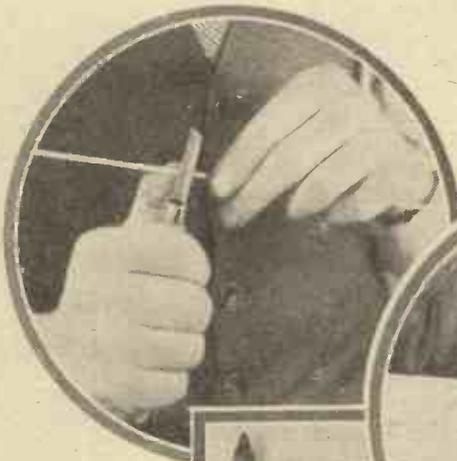
of these, special T pieces are used as they make a very much stronger joint. I have tried to make you see the value of soldering; now let me get down to details. I am often asked whether "square" wiring is worth while. By square wiring I mean the system that is adopted in most of the AMATEUR WIRELESS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

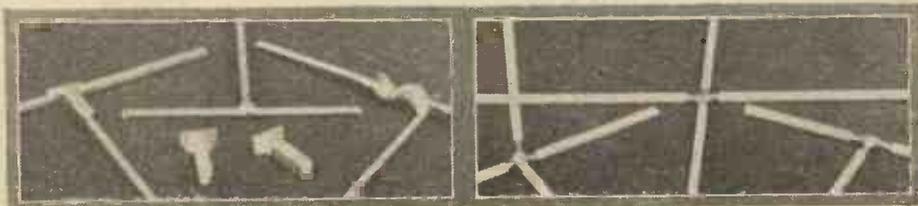
Many constructors assert that the square method of wiring introduces losses into the circuit, thereby causing quite avoidable inefficiency. Personally, I do not agree with this assertion. I have always made a practice of wiring my sets neatly, and have never found the set any less efficient for so doing.

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.



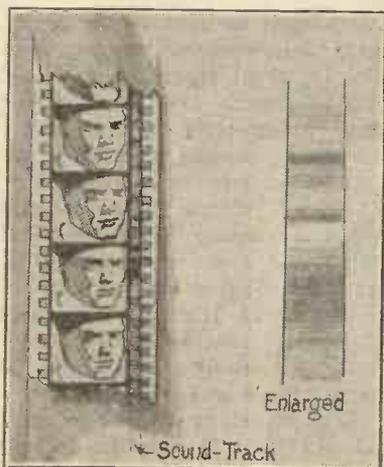
THINGS YOU OUGHT TO KNOW ABOUT THE TALKIES

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

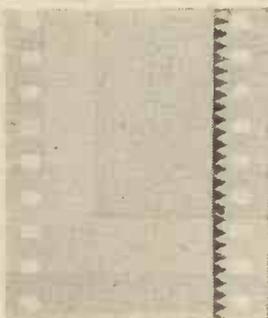
your opinion will have been formed on the "face value" of your own experiences—a few visits to your local picture palace. If you are in the "noes," it is almost certain that you have not seen the talkies at their best or visualised the possibilities of their development. Few people will dispute the fact 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



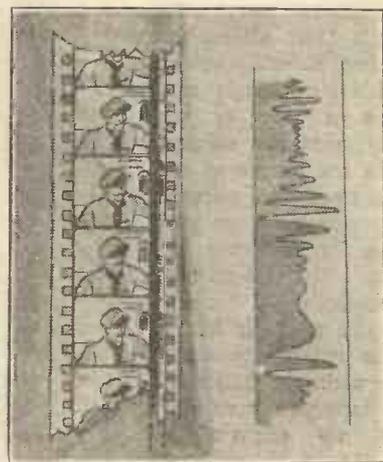
A recording made at the Gainsborough Studios on R.C.A. system of the fundamental tone of middle C of the piano, 256 cycles per second

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 $33\frac{1}{3}$ 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.

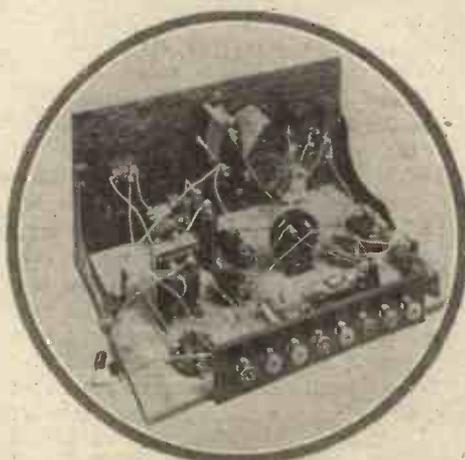
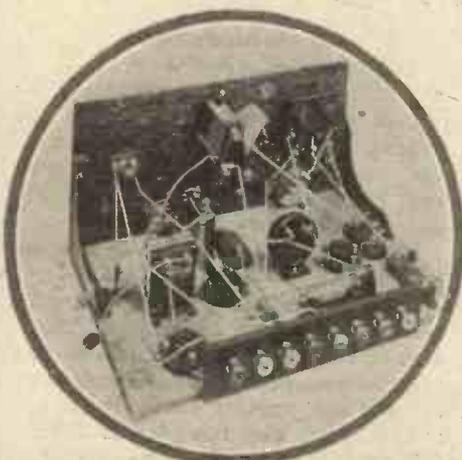
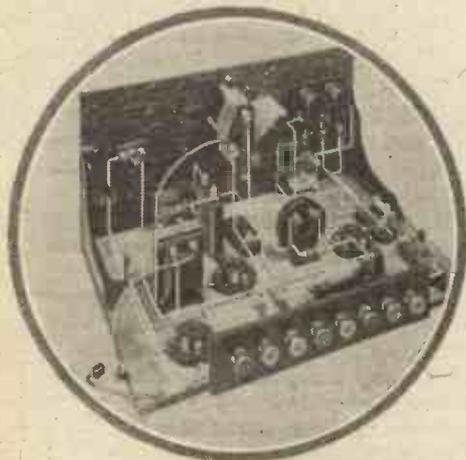
Most component manufacturers fit either permanent or loose soldering tags to their

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?

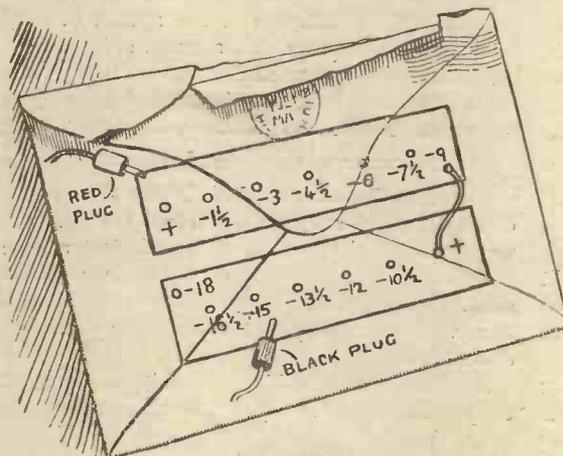
OLD H.: A two-volt high-frequency valve. So long as the original valve gave good service and performed well I should buy a replacement of the same make.

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?

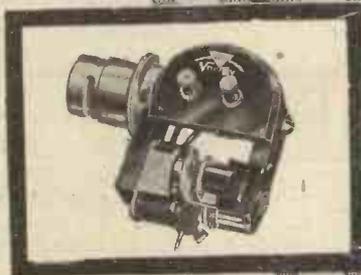
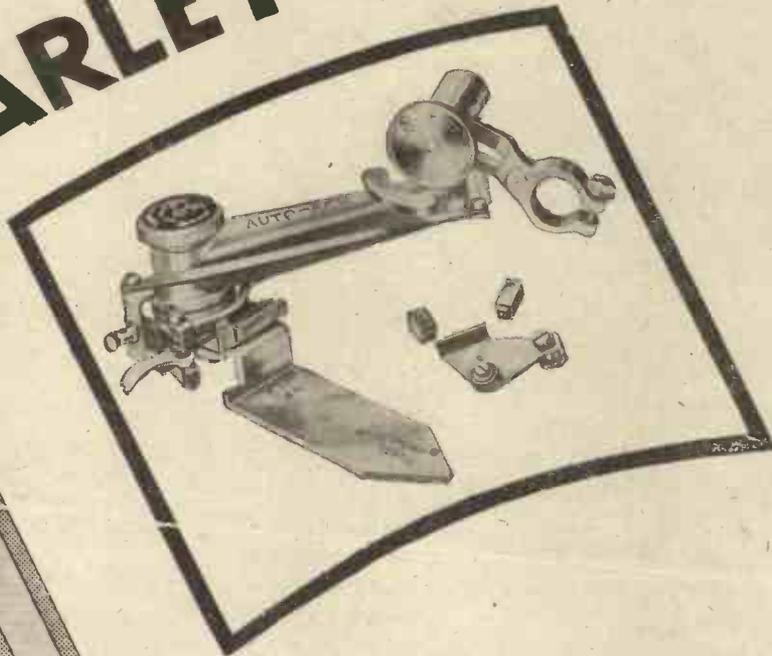
OLD H.: I'll show you how to discover that as soon as we've selected the valve that you're going to buy.

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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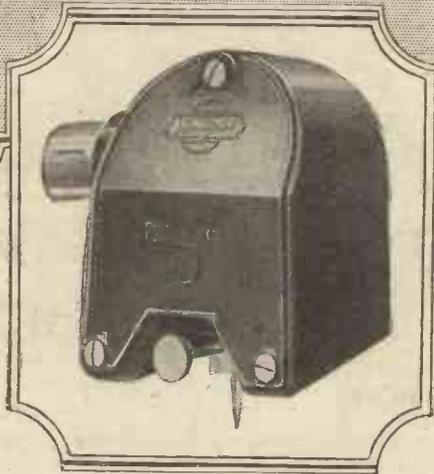
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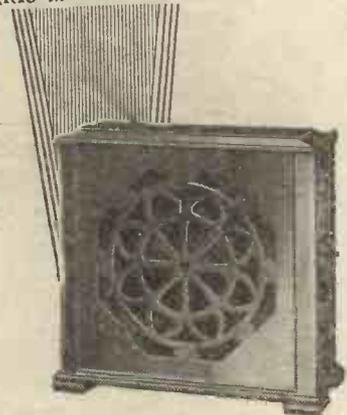
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What Next?



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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. Attkins, was given permission to work out the practical side on paper. Mr. Attkins 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 "dialled" 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. Attkins 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. Attkins 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 grouching at one time or another about the general lowness of the fees paid by the B.B.C. to artistes 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 artistes 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 ruin 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

On Your Wavelength! (continued)

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 Golley, 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, superheterodyne, 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 one 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.

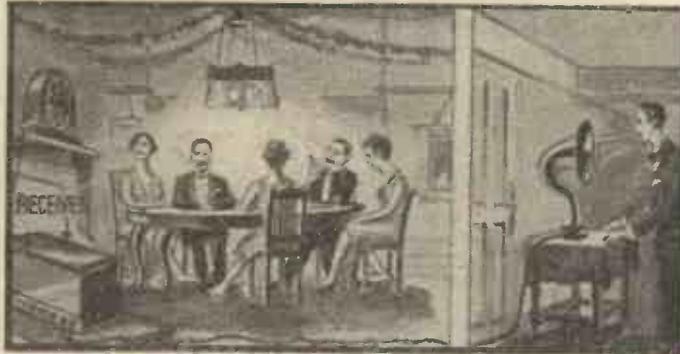
The principle of the thing is to put an improvised microphone "in front" (electrically speaking) of the set, so that the microphone currents are amplified and the speech put through the loud-speaker in the ordinary way.

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 WEAf 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 WEAf 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.

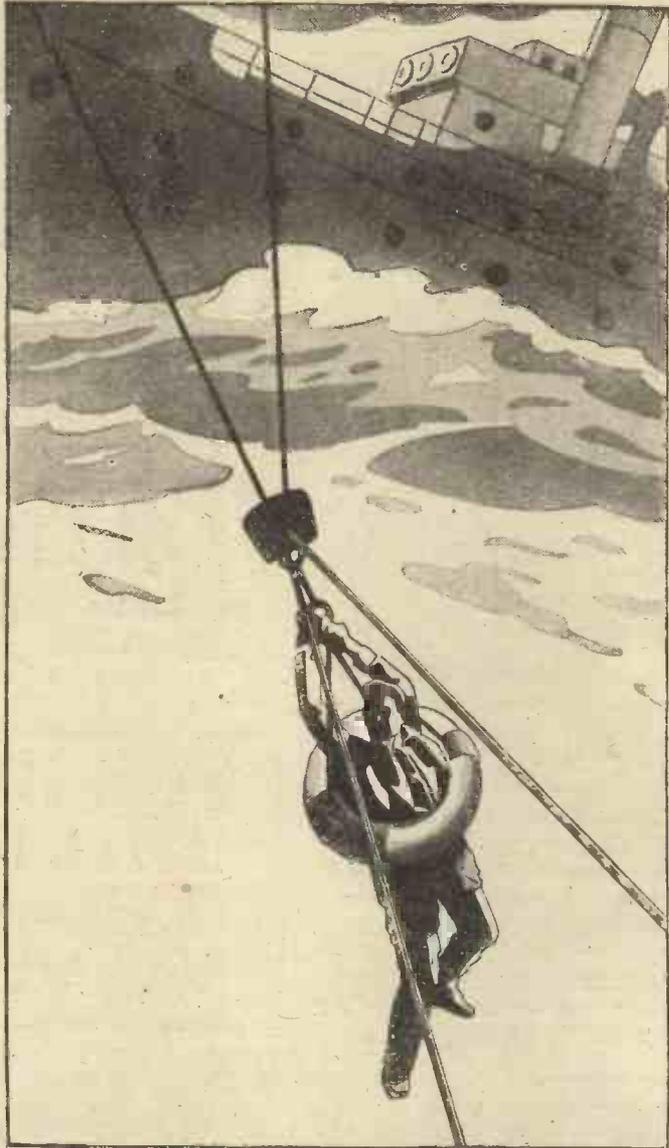
H.T. Round

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 TrinityHouse 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

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



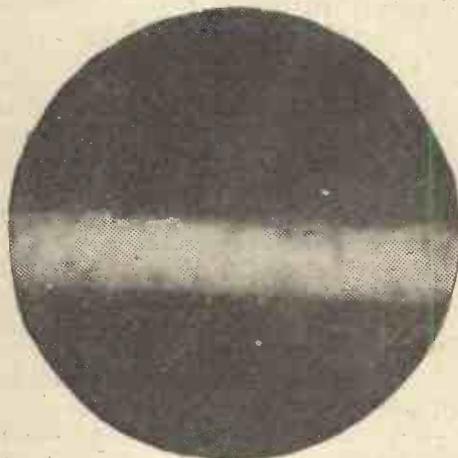
It's costly to test valves after you've bought



**YOU
MAY BE
GETTING
THIS**

**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 GET
THIS IN
OSRAM
VALVES**



**A GOOD Filament
WITH
"TENACIOUS COATING"**
This reproduction shows the coating typical of all OSRAM VALVES. Notice the absolute evenness of the coating. There are no gaps, the coating clings, so that the full benefit of the coating is maintained. The secret is the startling discovery of the scientific process of "TENACIOUS COATING."

Osram Valves

with the
"TENACIOUS COATING"

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.

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.



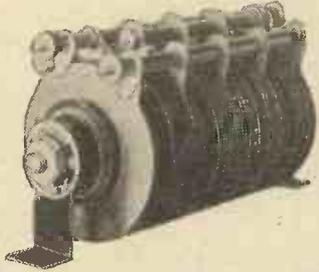
THIS CHRISTMAS, GIVE-

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.

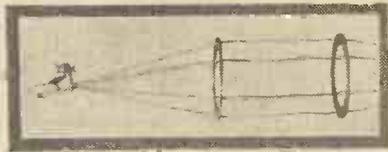
(Continued on page 931)



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.



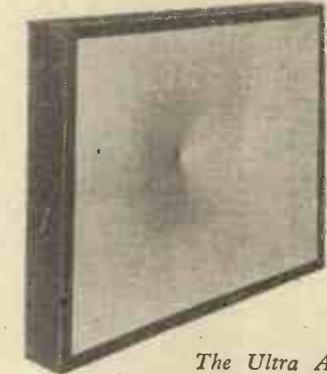
Why not electrify the gramophone at Christmas? Here is the Varley pick-up, which can be added to any gramophone.



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.



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. "popping."



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.



A Carrington cabinet would make an excellent present.



A neat plaque loud-speaker—the G.E.C.

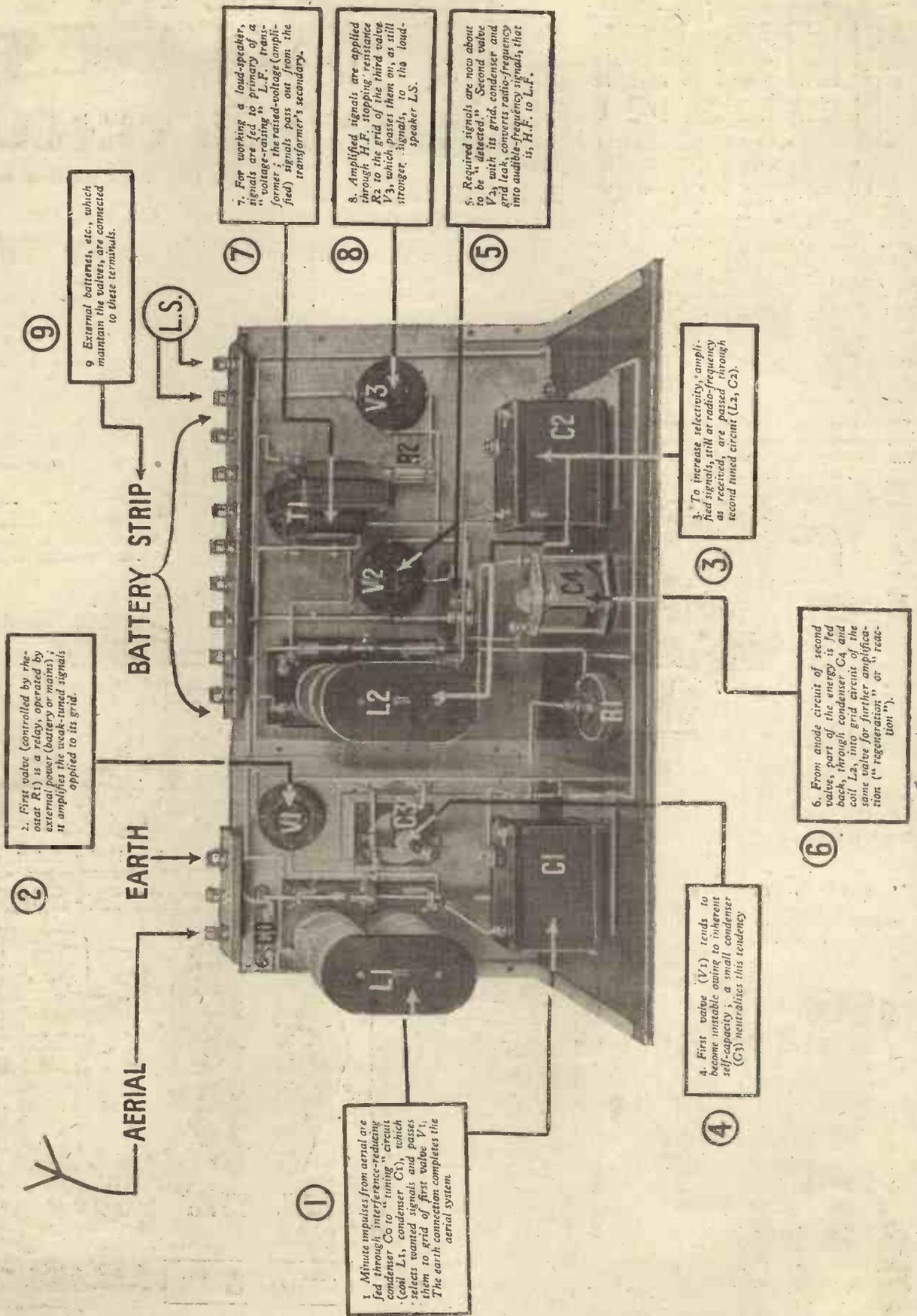


A gift popular at any season—an Exide accumulator, complete with carrier.

MORE GIFTS ON PAGE 931

Your Set - Minus Mystery

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



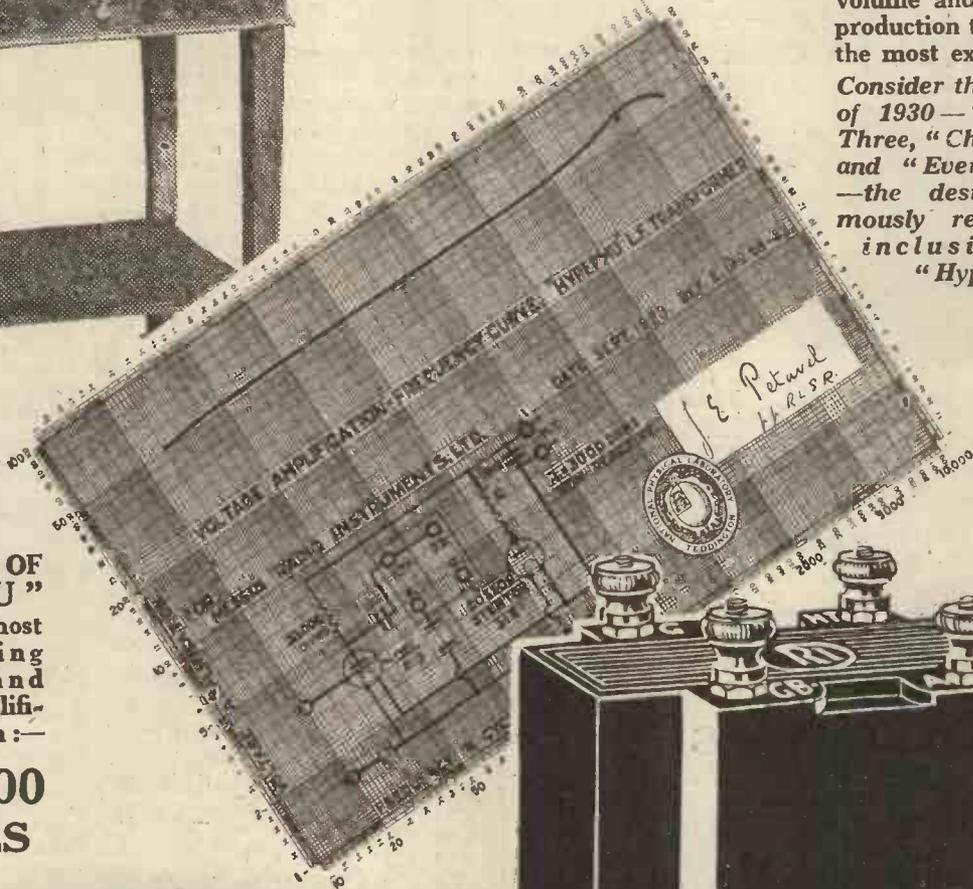
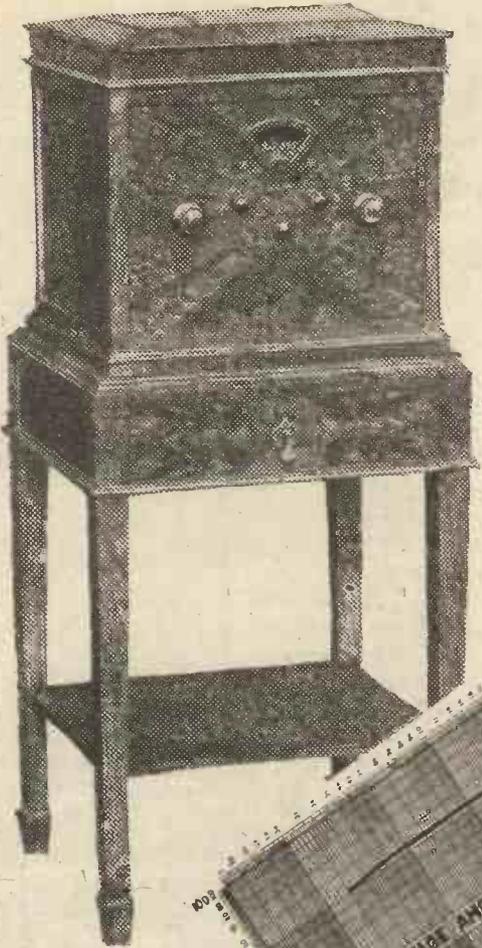
The CURVE OF SUCCESS IN SET AND CIRCUIT

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:—

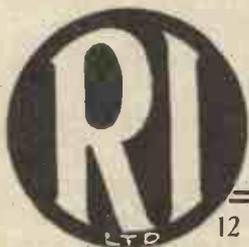
25 to 7,000 CYCLES

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.



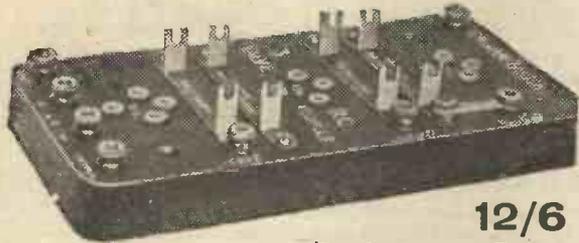
12 HYDE ST., LONDON, W.C.1

Just Perfection

GRAHAM FARISH

RADIO PRODUCTS

for Reception



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



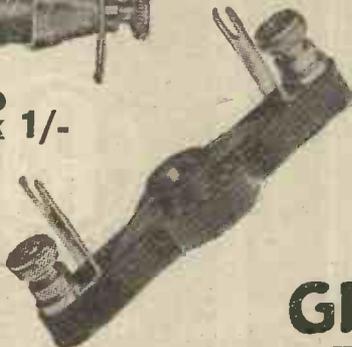
.0003 4/3 **.0005 4/6**
"MICROFICIENT" VARIABLE CONDENSER



.0001-.002 1/-
.003-.006 1/6
.01 2/6
FIXED MICA CONDENSER



STANDARD GRID LEAK 1/-



HORIZONTAL HOLDER 6D.



6D. VERTICAL HOLDER



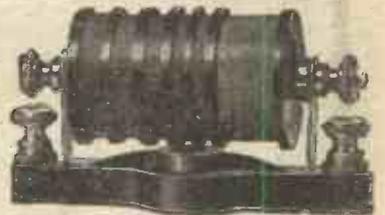
ANODE RESISTANCES
"OHMITE" 2/3
"MEGITE" 2/-



"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.



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

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

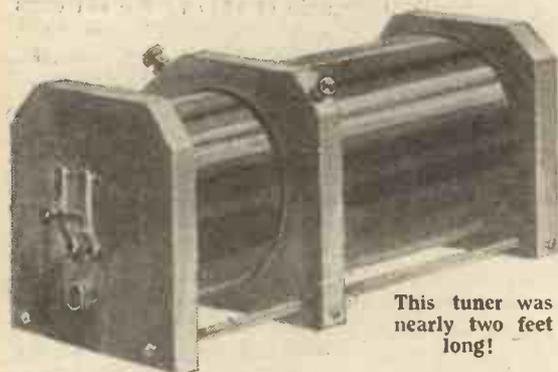
or complete with headphones and aerial materials £5."

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

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

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!

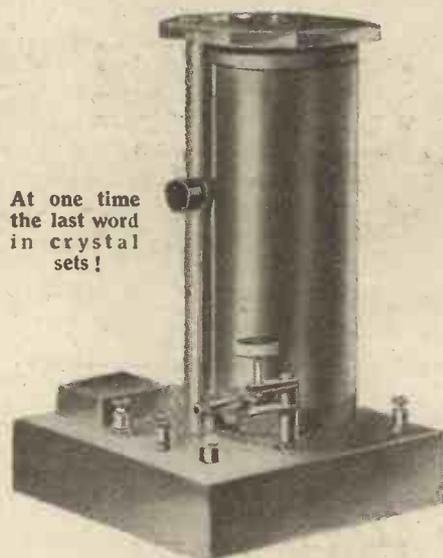


This tuner was nearly two feet long!

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.

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.

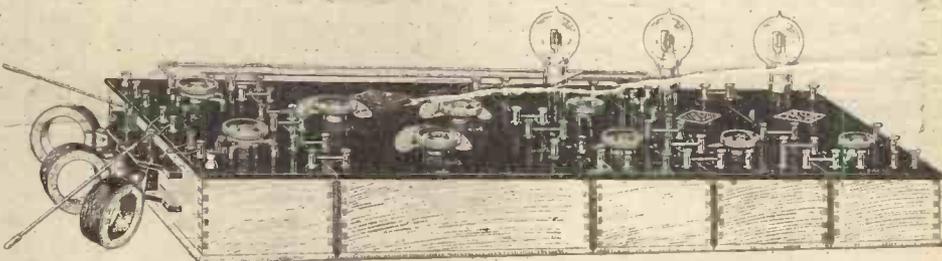
What was there to hear after one had spent all this money? The only regular broadcasting in Europe was provided by the Eiffel Tower, which gave a short daily programme, and Writtle (who can forget 2MT with "P.P.E." as chief engineer, announcer, humorist, vocalist, and entertainer?). The Eiffel Tower 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. Fahon

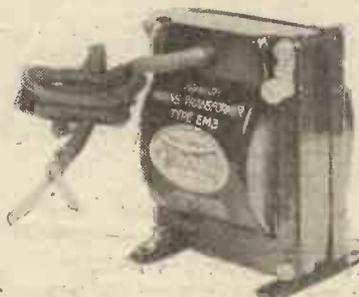
**"THIS CHRISTMAS,
GIVE—"**—continued.



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



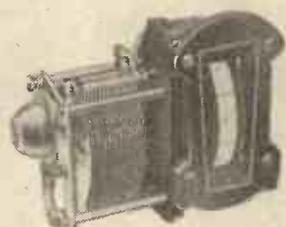
New Amplion receiver



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



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



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



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



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



A seasonable 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"

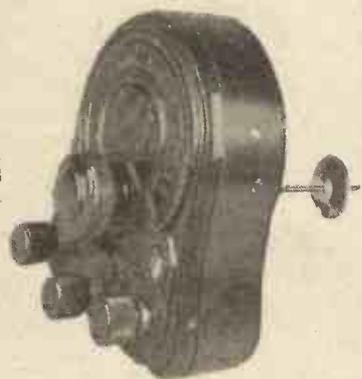


There is considerable difficulty in obtaining photographs of televised images, but these reproductions give some idea of the progress that has been made

"THIS CHRISTMAS, GIVE—" —Continued.



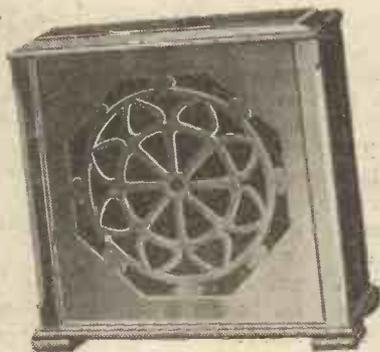
If you have battery troubles and want to solve them with an eliminator, why not consider this Climax unit? These can be had for A.C. or D.C. mains



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



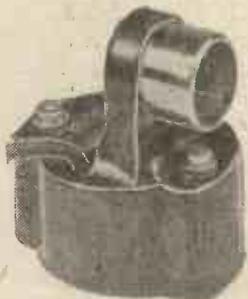
Above is shown one of the reed-type Celestion speakers, in this case a handsome cabinet instrument. This is a really "Christmassy" gift

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

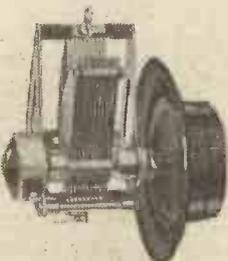
(Continued on page 949)



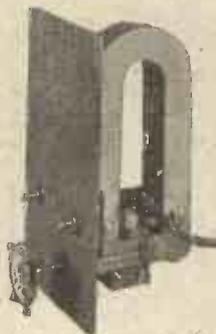
Here is the latest needle armature 'Lissen' pick-up. The needle just slips into a holder and needs no tightening



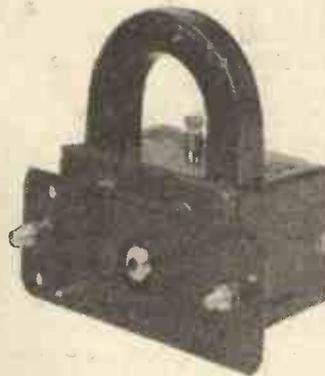
E. K. Cole's are well-known makers of eliminators. This is one of their A.C. models—a kindly thought for a man who is dispensing with batteries



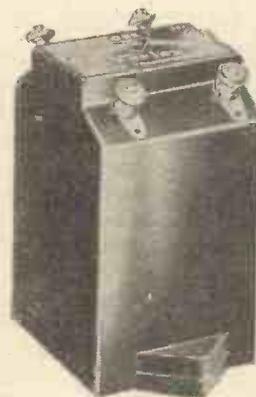
It is an easy matter to choose a present for a set constructor. For instance, what about a variable condenser from the J.B. range? Above is shown a .0003 slow-motion instrument of excellent construction



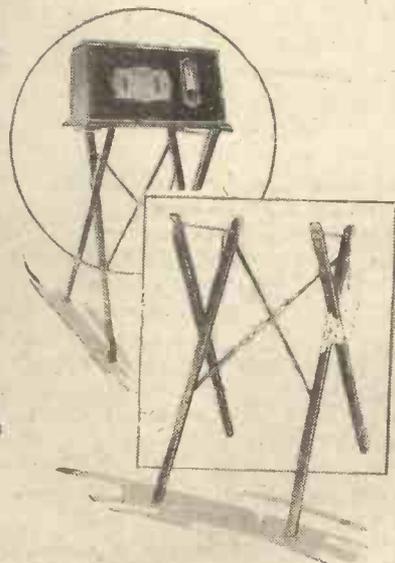
This Grawor loud-speaker unit, of the four-pole balanced-armature type, will work almost any kind of diaphragm



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

The 1930 ETHER

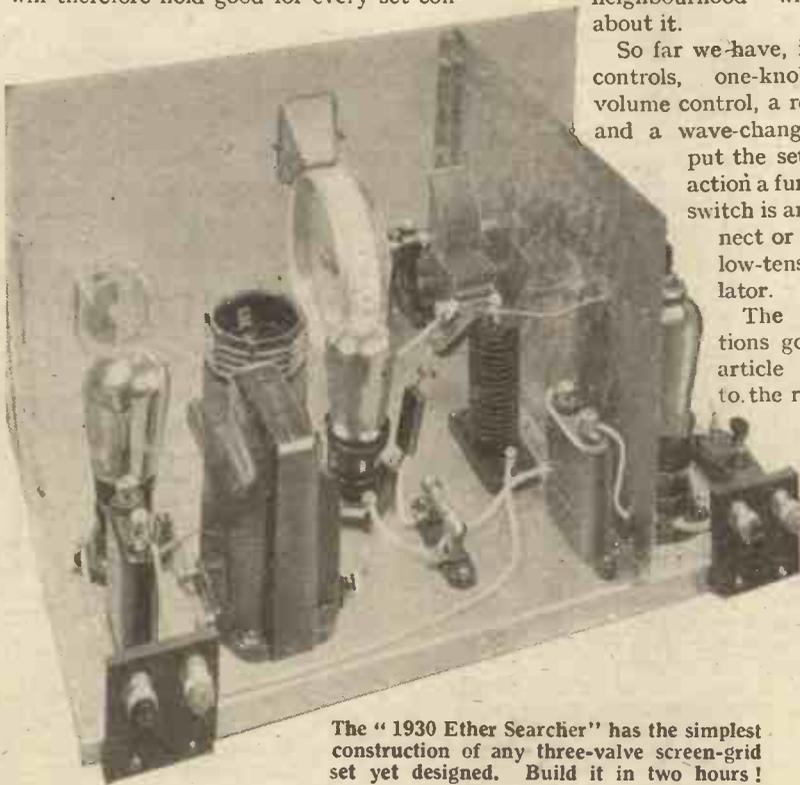
THE LAST WORD IN RECEIVERS



Designed by J. SIEGER

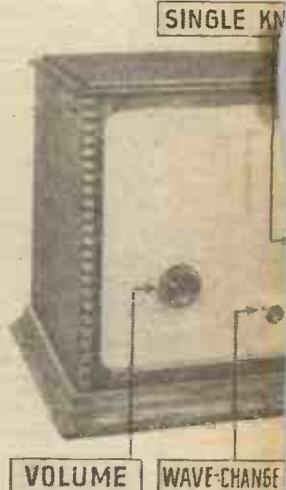
LIST OF COMPONENTS

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!

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 simplicity of the control photograph of the complete

ETHER SEARCHER



and ALAN S. HUNTER

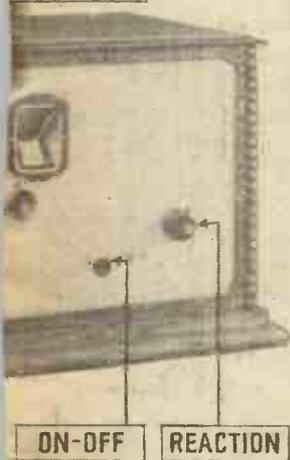
**UNIQUE ;
CHEAP :
GUARANTEED
PERFORMANCE**

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 .000025-.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, Ealex)	1 2
2 Black wander plugs, marked, H.T., G.B.—(Belling Lee, Ealex)	7
1 Screen-grid connector (Belling Lee)	6
2 Spade tags, marked L.T., L.T.+ (Belling Lee, Ealex)	9
4 doz. 6B.A. 1/8-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



Wiring details are apparent from this diagram 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 components 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

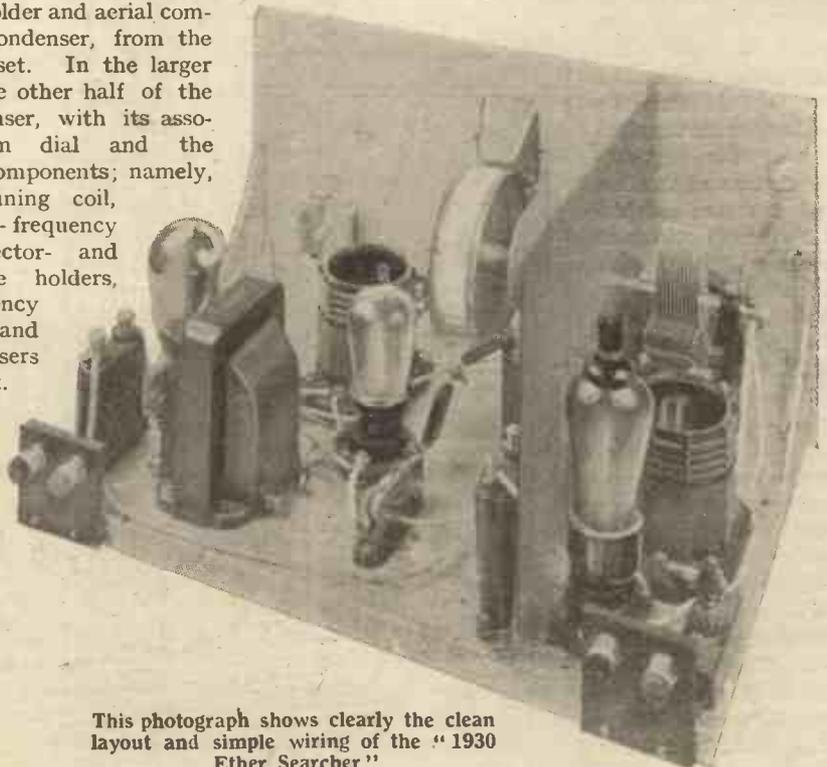
We propose to explain the assembly of the "1930 Ether Searcher" in a series of eight stages. We will assume that

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)

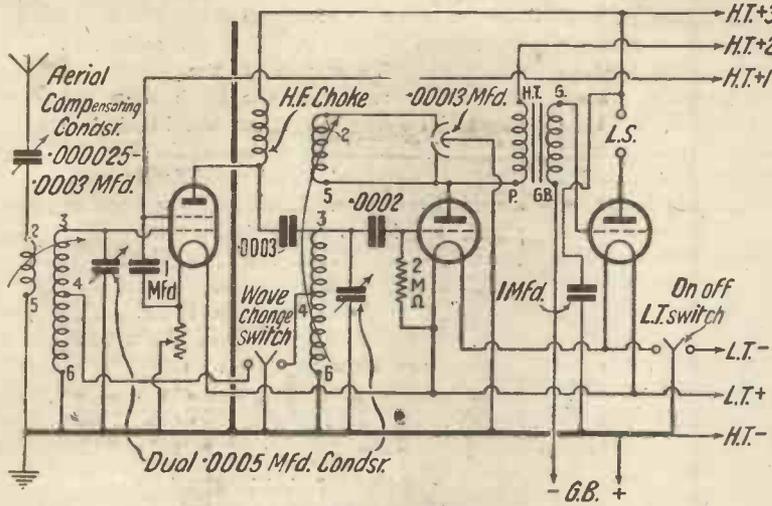
side numbered 4, 5, and 6 comes nearer the panel. The high-frequency coil, which is fixed immediately in line with the panel

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.

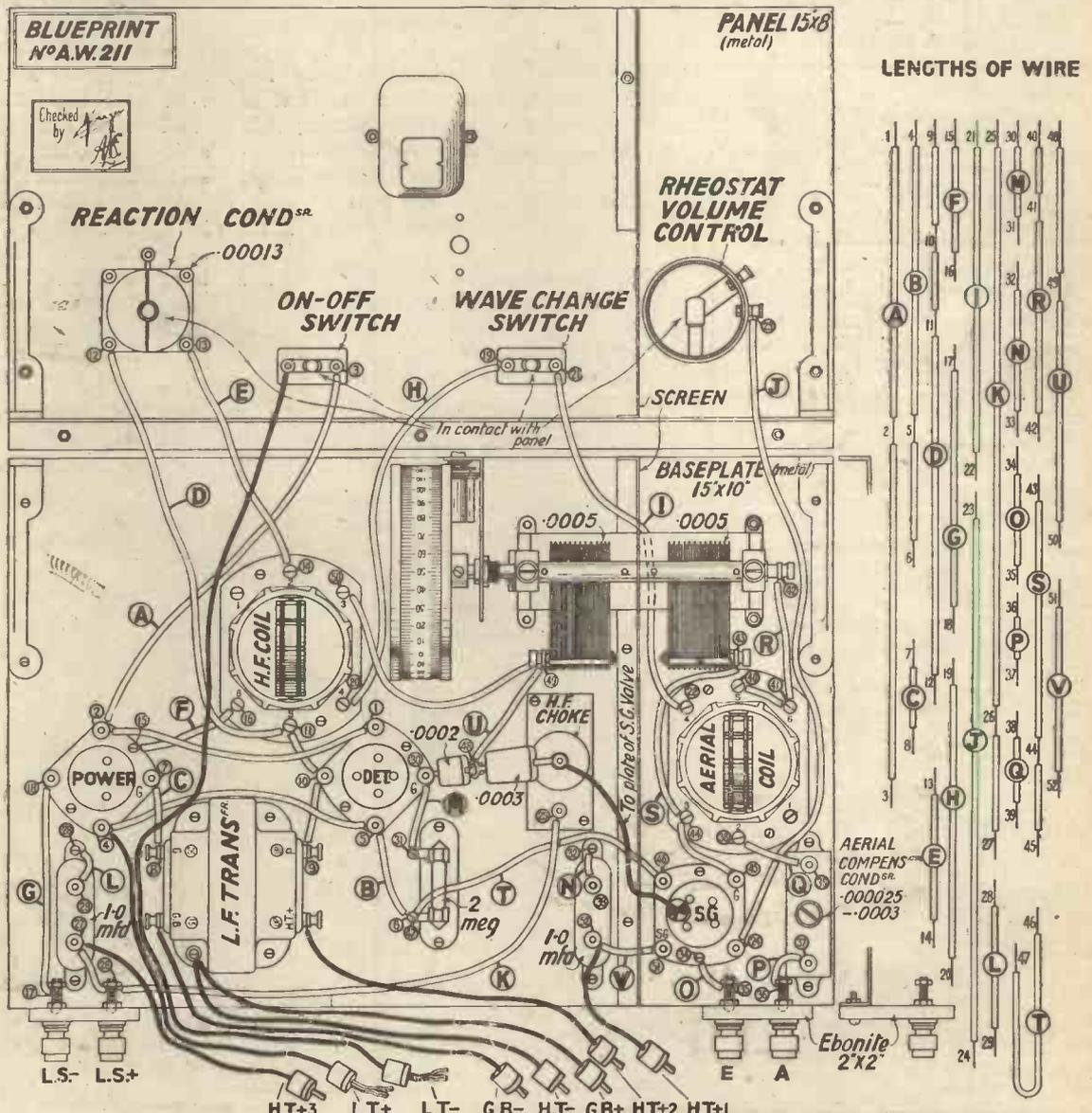
Measure off a specified length of the tinned copper wire,

(Continued on page 944)

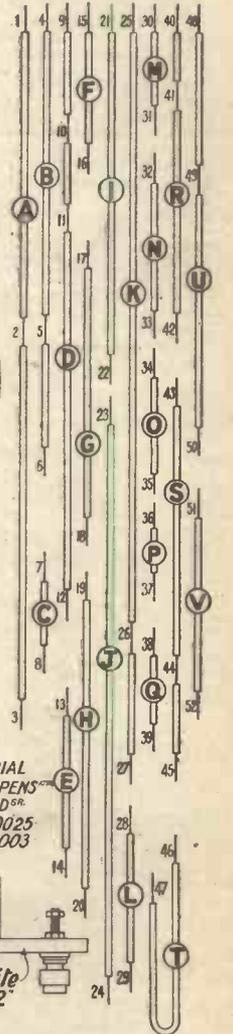
on-off switch, must have the side numbered 1, 2, and 3 nearer the panel. The fixing of most of the other parts on the base-plate is child's play.

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-

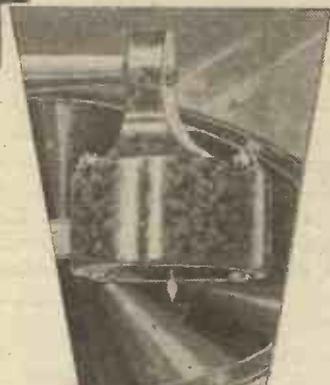


LENGTHS OF WIRE



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

Revolutionary New Lissen Pick-up



NEW NEEDLE ARMATURE FULLY FLOATING AND SO LIGHT THAT RESPONSE is PERFECT at ALL FREQUENCIES!

HOW THE NEEDLE IS SUSPENDED



Held in position by magnetic attraction without restriction by mechanical contacts.



"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 actually feels 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.

LISSEN

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PICK-UP 30/-

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D.C.
27'6
Model A

A.C.
60'-
Model A

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

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

D.C. MODEL "A"

Employs 3 H.T. + tapings: H.T.-1 giving 80 volts for S.O. 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. + tapings: 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

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
" 589 " " " "	100-110
PRICE ..	£3 : 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
" 581 " " " "	240-250
" 640 " " " "	100-110
PRICE ..	£3 : 15 : 0

LISSEN ELIMINATORS

LISSEN LTD., Worplesdon Rd., Isleworth, Middlesex (Managing Director: T. N. COLE)

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.

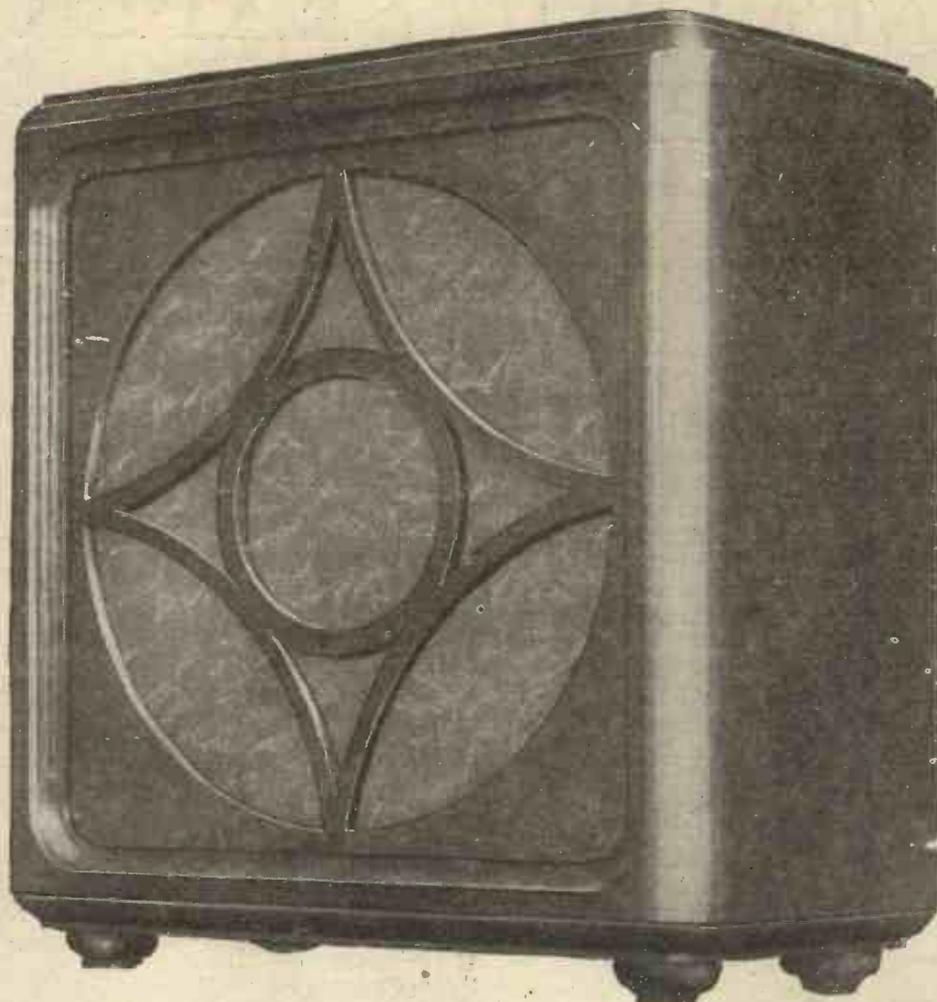
He appends a list of what was arranged for a whole week at the daily hour of 7.45 p.m. :—

- 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



The

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The "Goliath" of the Blue Spot range makes an ideal gift for the lover of true reproduction. Because the Blue Spot "Goliath" is all that a speaker should be; it reproduces *all* that is broadcast, but no more; its tone is superb . . . its appearance will please the ultra-critical.

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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

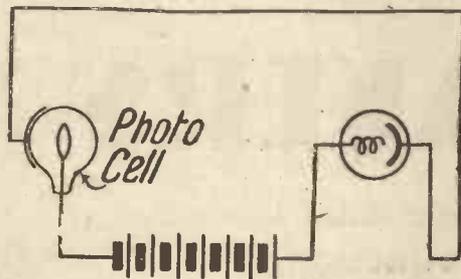


Fig. 1. An experiment with a neon lamp

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.

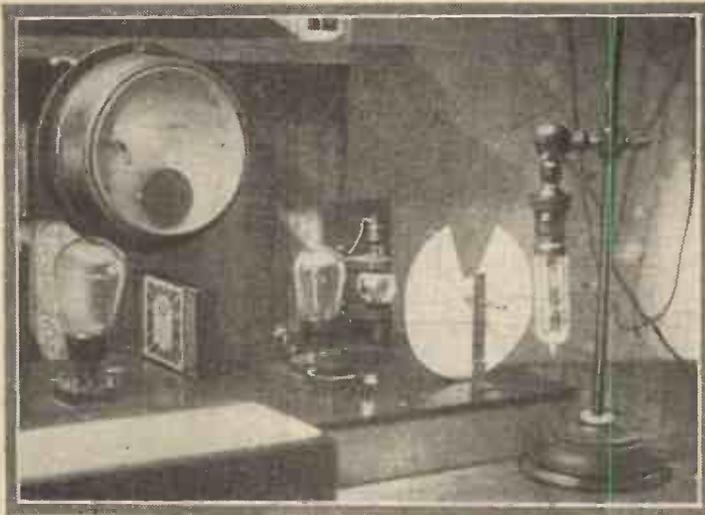
There is, however, one simple experiment that can be carried out with a photo which shows up well the fundamental principle of television. The arrangement is seen in Fig. 1. A photo cell is placed on the table or bench, and is connected in series with a battery and a neon lamp. If a 40-watt lamp be placed in front of the photo cell, electrons are emitted and it becomes conductive and the neon lamp lights up. If now a card-

board 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

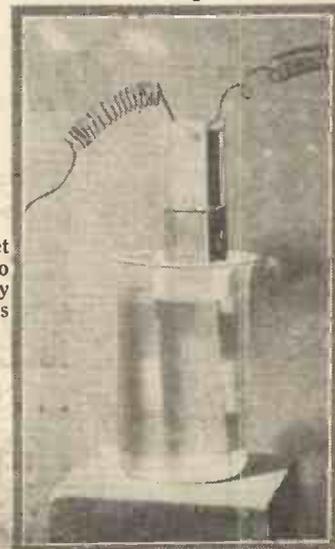


Fig. 2. A wet type of photo cell is easily made as shown

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)

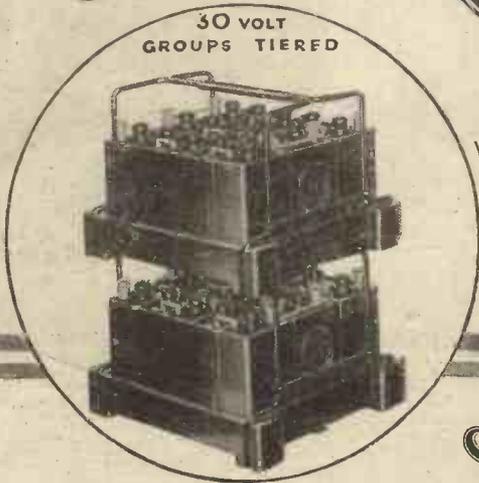
We're giving Father a new H.T. for *our* radio



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 **CAV** of course!



50 VOLT GROUPS TIERED

10 VOLTS **6/3** 5000 MILLIAMPS

ALSO IN 2500 & 10,000 MILLIAMPS



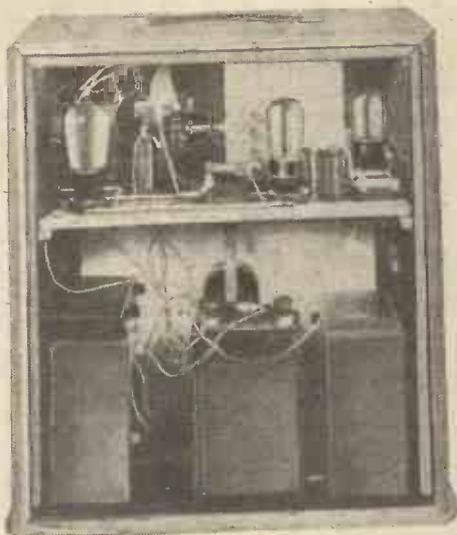
WRITE FOR CATALOGUE P.

CAVandervell & Co. Ltd.
ACTON, LONDON, W.3.

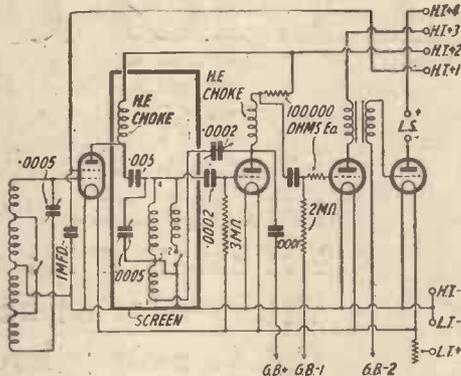
SPECIFY THE C.A.V. JELLY ACID BATTERY—THE PERFECT L.T. FOR ALL PORTABLES.

BEST SETS AND THEIR CIRCUITS

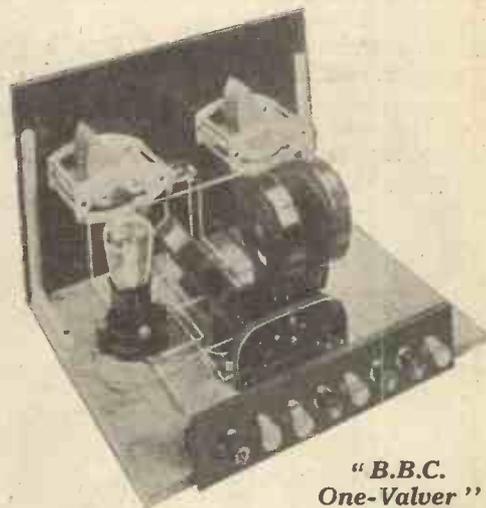
A selection from some of the recent "A.W." receivers of all types. Full constructional details are given in the issues mentioned. For particulars of the blueprints, turn to the blueprint list on page 966.



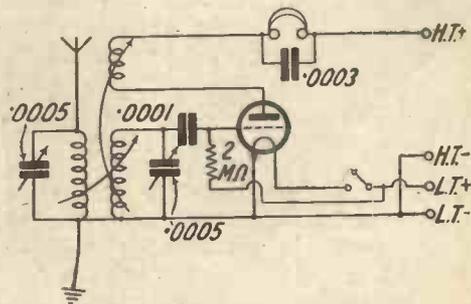
"The Music Leader"



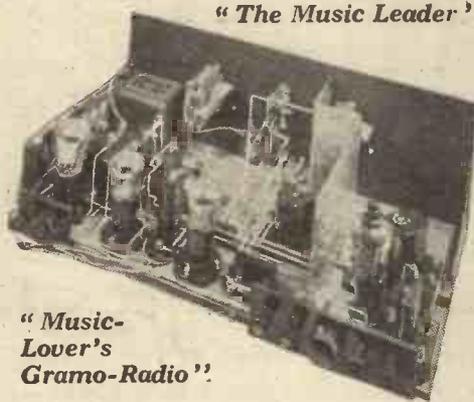
Here's a good set for indoor use—"The Music Leader." The circuit used was tested out in a portable set taken by two AMATEUR WIRELESS staff members to the U.S., and which has travelled a total of 9,000 miles! The "Music Leader" is a transportable, and can be used in any room, without worrying about aerial, 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"

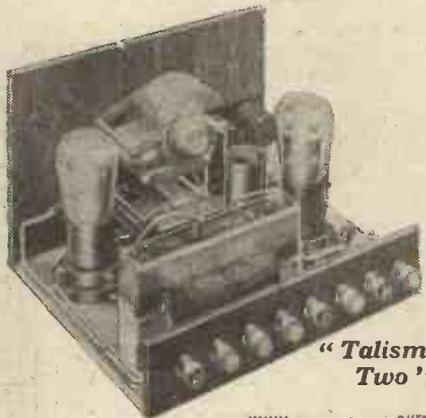
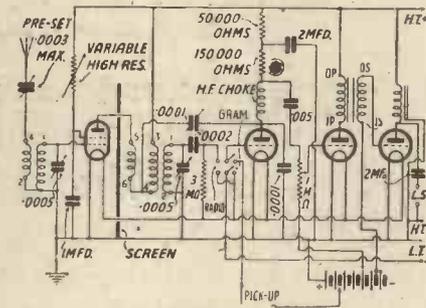


In the "B.B.C. One-valver" (AMATEUR WIRELESS No. 388, blueprint No. AW208), we have the very simplest type of set, and one suitable for working with phones at moderate distances from a main station. The tuning arrangements provide the greatest selectivity, which is a factor of the utmost importance when 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.

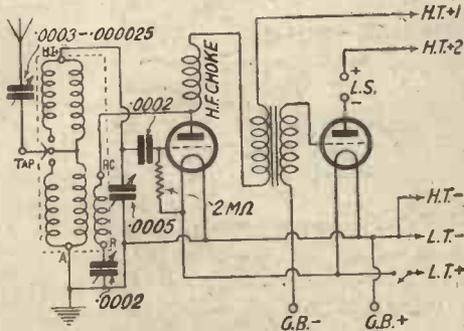


"Music-Lover's Gramo-Radio"

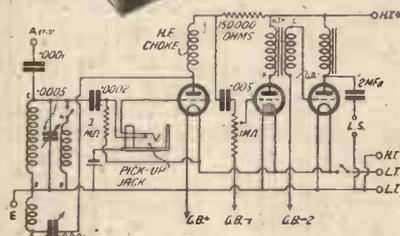
The "Music-lover's Gramo-radio" (AMATEUR WIRELESS, Nos. 381, 382 and 383, blueprints Nos. AW202a, AW202b, and AW202c), is a comprehensive electric gramophone incorporating a four-valve radio set, a gramophone unit and a linen-diaphragm loud-speaker. The receiver unit is illustrated above. The three blueprints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



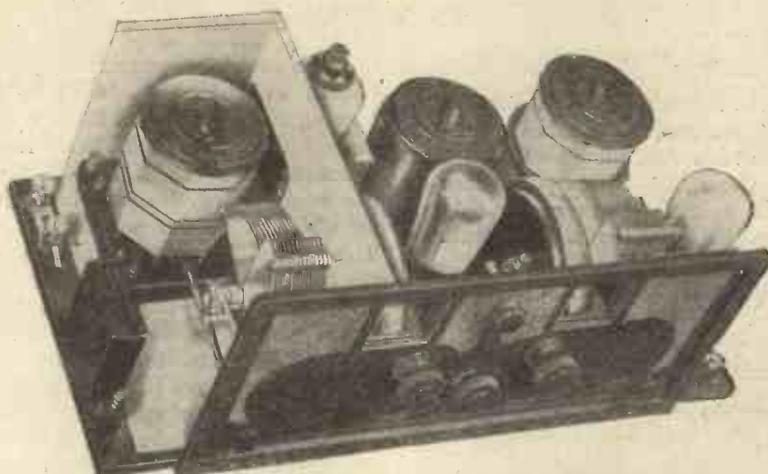
"Holiday Portable"

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.

25 STATIONS IN 5 MINUTES FOR £4 : 19 : 6

WITH THE
**BULLPHONE
SCREENED
GRID 3
KIT OF PARTS**

*Send direct for FREE
Circuit and instructions*



OUR WONDERFUL XMAS OFFER



THE WORLD FAMOUS
**NIGHTINGALE DE LUXE
LOUD-SPEAKER**

Reduced from 55/- to **25/-**
1,000 ONLY to be Sold as an Advertisement

THE NEW DUPLEX
CONE UNIT

Four-Pole Adjustable Tone

Three impedances
available

15/-

Supplied in
Bakelite Case

**ADJUSTABLE CONE
CHASSIS**

Suitable for any unit

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

"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.

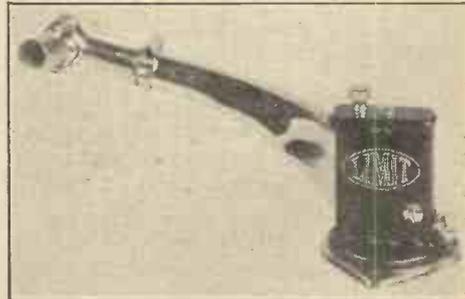
Limit Pick-up Arm

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 grammo-radio enthusiasts.

"THE '1930 ETHER SEARCHER'" (Continued)



The "Ether Searcher" ready for testing

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

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 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

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)

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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**
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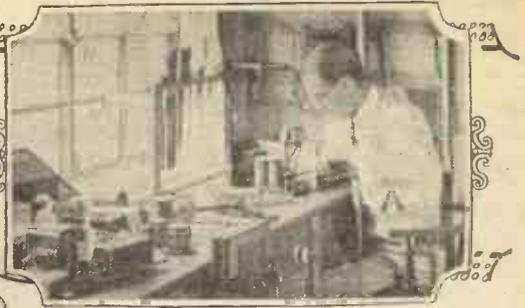
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A.W.7/12



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

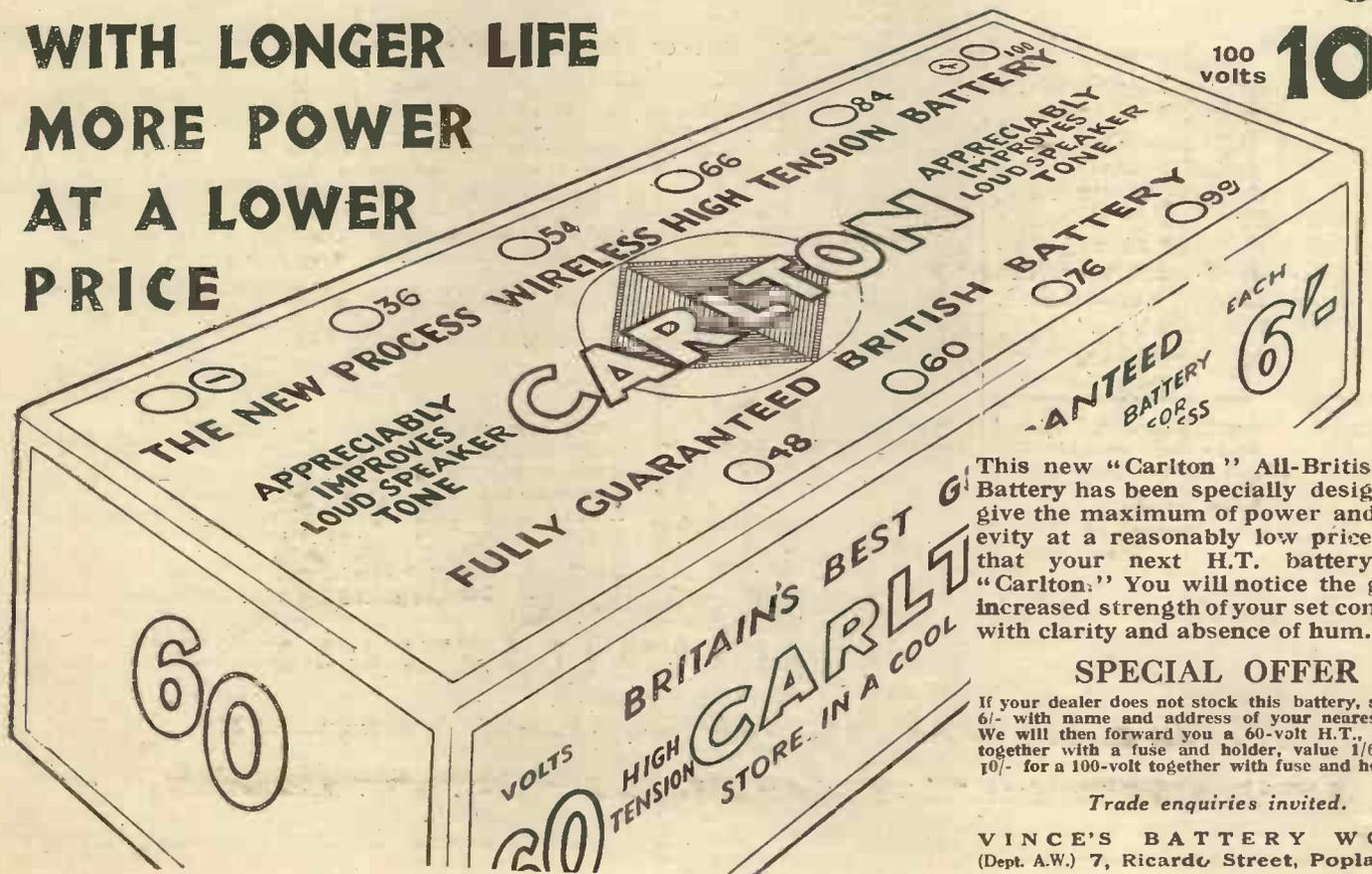
Those who experiment a fair amount will find one of the pre-set condensers, such as a Formo-denser, of value in the aerial circuit instead of a fixed condenser.

As a rule, a fixed condenser of .0001 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



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100 volts **10/-**

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A DISCOVERY IN WIRELESS!

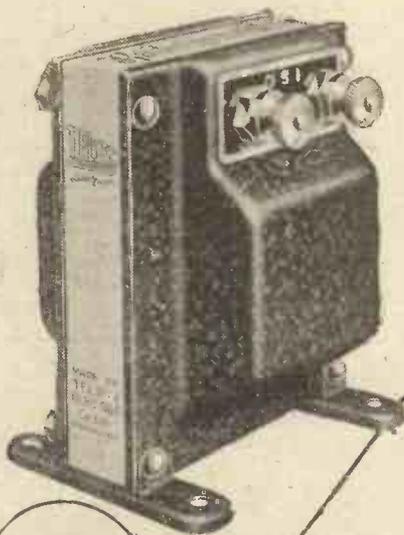


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AN ACTUAL EXPERIENCE

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.

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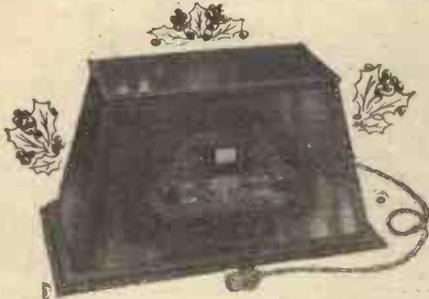


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Improved D.C. Model H.T. Unit—the most popular D.C. Mains Unit on the market—has **Ten Voltage Tappings.** Output 50 m/a total, 10 m/a at tappings. Price complete, 34/-.



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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	1,040	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
161	1,148	London (2) tests		291.4	1,029.3	Radio Lyons	0.5	YUGOSLAVIA			
*288.5	1,040	Newcastle (5NO)	1.0	*294	1,020	Limoges (PTT)	0.5	308	973	Zagreb (Agram)	0.7
288.5	1,040	Swansea (5SX)	0.13	304	986	Bordeaux (PTT)	1.0	420	698	Belgrade	2.5
*288.5	1,040	Stoke-on-Trent (OST)	0.13	305.3	987.7	Agen	0.25	583	507.2	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 (6BM)	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	433	662	Trondheim	0.1
356	842	Brookman's Park 30		*1,725	174	Radio Paris	12.0	453	662	Alesund	0.3
*377	797	Manchester (2ZY)	1.0	GERMANY				453	662	Porsgrund	0.7
*399	753	Glasgow (5SC)	1.0	*218	1,373	Flensburg	0.5	*493	608	Oslo	1.5
*479	626	Daventry (5GB)	25.0	*227	1,319	Cologne	4.0	POLAND			
1,551	193	Daventry (5XX)	25.0	*234	1,283	Muenster	3.0	*313	959	Cracow	0.5
AUSTRIA											
*246	1,220	Linz	0.5	*239	1,256	Nurnberg	2.0	*335	866	Posen	1.2
*283	1,058	Innsbruck	0.5	*246	1,220	Kiel	0.35	385	779	Wilno	0.5
*352	851	Graz	7.0	*246	1,220	Cassel	0.25	*408	734	Kattowitz	10.0
*453	666	Klagenfurt	0.5	*253	1,184	Gleiwitz	2.0	*1,411	212.5	Warsaw	8.0
*517	581	Vienna	15.0	*259	1,157	Leipzig	1.5	ROUMANIA			
CZECHO-SLOVAKIA											
*263	1,139	Morava-Ostrava	10.0	*270	1,112	Kaiserslautern	0.25	*301	751	Bucharest	12.0
*270	1,076	Bratislava	12.5	*276	1,085	Koenigsberg	2.5	RUSSIA			
*293	1,022	Kosice	2.0	*283	1,058	Magdeburg	0.5	*825	364	Moscow (PTT)	20.0
*342	878	Brunn (Brno)	2.4	*283	1,058	Berlin (E.)	0.5	038	390	Moscow (C.C.S.P.)	75.0
*487	617	Prague (Prah)	5.0	*283	1,058	Stettin	0.5	1,000	300	Leningrad	20.0
BELGIUM											
208	1,440	Radio Conference, Brussels		*319	941	Dresden	0.25	1,080	833	Tiflis	10.0
235.5	1,273.5	Charleroi (LL)	0.25	*319	941	Bremen	0.35	1,100	272.7	Moscow Popoff	40.0
246.1	1,213.8	Schaerbeek-Brussels	0.25	*325	923	Breslau	1.5	*1,304	230	Kharkov	4.0
241	1,229	Ghent	0.5	*360	833	Stuttgart	1.5	1,481	212.5	Moscow (Kom)	40.0
270	1,112	Radio-Binche		*372	806	Hamburg	1.5	SPAIN			
294	1,020	Liege	0.1	*390	770	Frankfurt	1.5	251	1,193	Almeria (EAJ18)	1.0
312	961.4	Arlon	0.25	*418	716	Berlin	1.5	238	1,121	Barcelona (EAJ13)	10.0
339	887	Louvain	8.0	*453	662	Danzig	0.25	311	956	Oviedo (EAJ9)	0.5
*503	590	Brussels	1.0	*456	657	Aachen	0.35	*343	860	Barcelona (EAJ1)	8.0
DENMARK											
*281	1,067	Copenhagen (Kjobenhavn)	0.75	*473	635	Langenberg	13.0	368	815	Seville (EAJ5)	1.5
1,153	260	Kalundborg	7.5	527.8	568	Herzogstaden (Bavaria)	0.5	403	743	San Sebastian (EAJ3)	0.5
ESTHONIA											
*207	1,010	Reval (Tallinn)	0.7	*533	563	Munich	1.5	424	707	Madrid (EAJ7)	2.0
FINLAND											
*221	1,355	Helsingfors	0.9	*560	536	Hanover	0.35	453	662	Salamanca (EAJ22)	1.0
*1,793	167	Lahti	40.0	606	520.8	Augsburg	0.25	SWEDEN			
FRANCE											
31.65	9,479	Radio Experimental (Paris)	1.0	575	521.7	Freiburg	0.35	231	1,301	Malmö	0.6
175	1,714	S. Quentin	0.1	*1,635	183.5	Zeesen	30.0	*257	1,160	Hoerby	10.0
214	1,400	Fécamp (Radio Normandie)	0.5	2,100	142	Norddeich	10.0	270	1,112	Trollhattan	0.45
220	1,364	Beziere	0.1	GRAND DUCHY				*322	932	Goeteborg	10.0
238	1,260	Bordeaux (Radio Sud-Ouest)	1.0	223	1,346	Luxembourg	3.0	332	905	Falun	0.5
233	1,256	Radio Nimes	0.25	31.4	9,554	Eindhoven (PCJ)	25.0	*436	689	Stockholm	1.5
241	1,229	Juan-les-Pins	0.3	HOLLAND				*542	554	Sundsvall	0.6
*255	1,175	Toulouse (PTT)	1.5	*208	1,004	Hilversum (until 5.40 p.m. G.M.T.)	6.5	770	389	Ostersund	0.6
*263	1,130	Lille (PTT)	0.7	*1,071	280	Hilversum	0.5	1,200	250	Boden	0.6
268	1,121	Strasbourg	0.3	*1,071	280	Scheveningen-Haven	5.0	*1,348	222.5	Motala	30.0
*272	1,103	Rennes (PTT)	0.5	ICELAND				SWITZERLAND			
IRISH FREE STATE											
*225	1,337	Cork (IFS)	1.0	*1,200	250	Reykjavik	1.0	*403	743	Berne	1.0
*413	725	Dublin (2KN)	1.0	ITALY				*453	653	Zurich	0.63
ITALY											
291	1,031	Turin (Torino)	7.0	466	644	Zurich (during afternoon)	0.63	680	442	Lausanne	0.6
*330.3	908	Naples (Napoli)	1.5	760	395	Geneva	0.25	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.

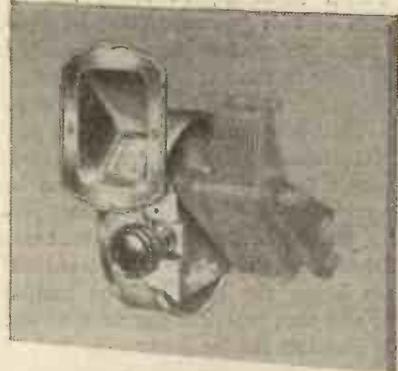
And last, but by no means least, what about the "Amateur Wireless Notebook and Diary," or a year's prepaid subscription to AMATEUR WIRELESS, so that your friends will find their favourite wireless paper awaiting them when they come down to breakfast every Thursday morning?

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 21/-
Above Drum drive, Panel, and Chassis with escutcheon ready mounted on Panel.

KEYSTONE S.G. H.F. CHOKE

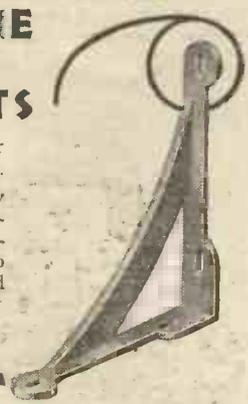
The winding in this choke makes it especially suitable for all sets using a screened-grid valve. It has a negligible self-capacity and a very high inductance. Suitable for all wavelengths, from 20 to 2,000 metres.



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 Televisor 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 Televisor. Recognisable, yes, but compare it with the others which show the images as seen on the Televisor 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.

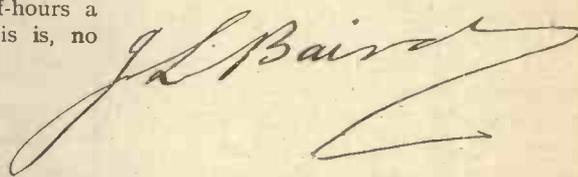
Amateur Assistance

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

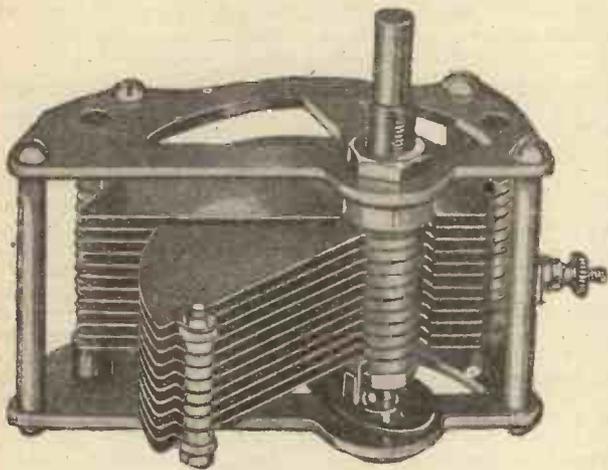
FERRANTI LTD.

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.



STANDARD

SAC BECLANCHE

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 11 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.



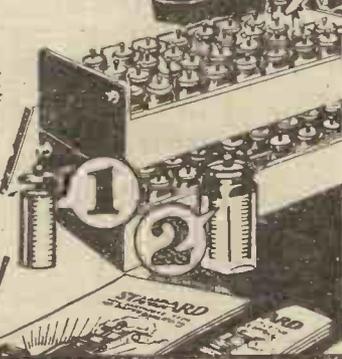
CABINETS

(on 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.

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

C. A.

Gift it with "Ekco!"

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.

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

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

EKCO

"Plug in—That's all!"

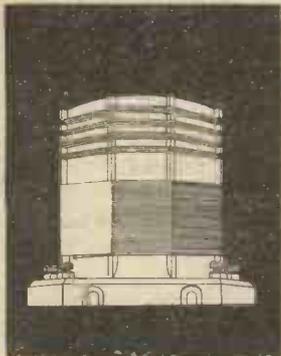
H.T. UNIT
A.C. 3F. 20
Tappings for S.G.: 60 : 120/150 at 20 m/a.
£3 : 10 : 6

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

"EKCO-LECTRIC" RADIO RECEIVERS

TRICKLE CHARGER
£2 : 12 : 6

AND POWER SUPPLY UNITS



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
Price 8/6

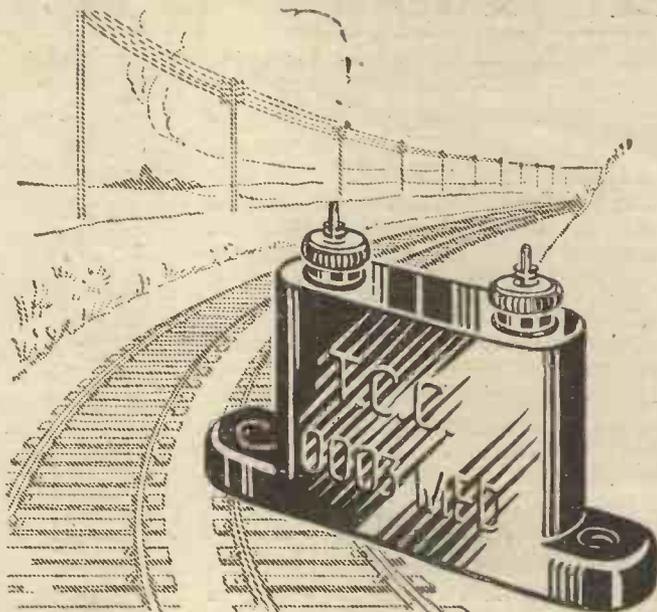
To ensure the results the designers of the season's master circuit meant you to get from them, make sure you get the specified Colvern components when you assemble your kit.

COLVERN

Adv. 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/-.



Adv. Telegraph 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 stockist's.

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.

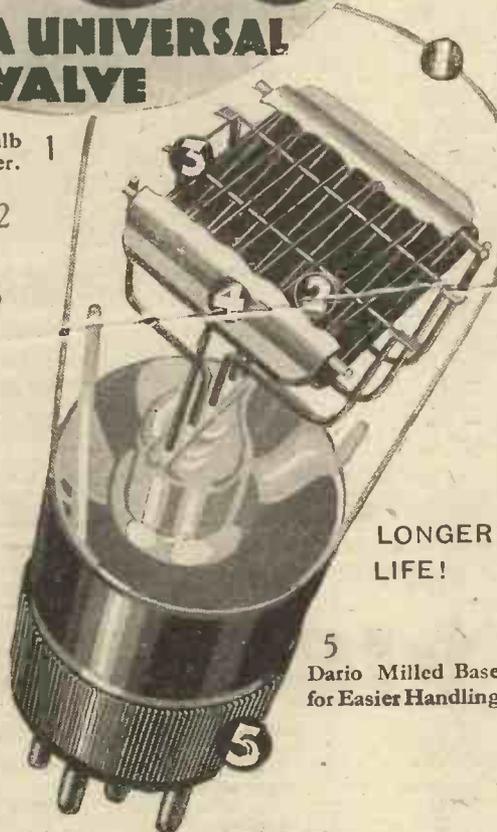
The cost of charging a 4-volt 30-amps accumulator is about 1d., and the charging may take place at any time, ensuring always an accumulator ready for working, one accumulator doing the work where usually two are necessary.

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). Telegrams: "Sedeh, London."

WHY PAY more than 5/6 FOR A UNIVERSAL VALVE

- 1 New Glass Bulb
Finer yet Tougher.
- 2 New Super
Strength Grid.
- 3 New Non-
microphonic
Filament with Special
Coating.
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Size Anode.
Easier Flow
of Electrons



NEW
1930
TYPES!

NEW
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PRICES!

LONGER
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for Easier Handling

WRITE FOR FREE FOLDER!

TWO VOLT		
Universal1 amp.	5/6
Resistron1 amp.	5/6
Super H.F.	.15 amp.	5/6
Super-Power	.18 amp.	7/6
Hyper-Power	.3 amp.	9/6
Pentodion3 amp.	18/6

From your
dealer or
direct:

FOUR VOLT		
Universal	.075 amp.	5/6
Resistron	.075 amp.	5/6
Super H.F.	.075 amp.	5/6
Super-Power	.1 amp.	7/6
Hyper-Power	.15 amp.	9/6
Pentodion15 amp.	18/6



Best way to all Stations

IMPEX ELECTRICAL, LTD., DEPT. J
538 HIGH ROAD, LEYTONSTONE, LONDON, E.11

ONE OR MORE



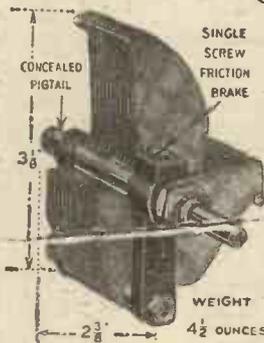
COMPONENTS SPECIFIED

In every NOTABLE CIRCUIT PUBLISHED during past year.

"1930" CONDENSERS

For COMPACTNESS, EFFICIENCY and RELIABILITY UNEQUALLED

"1930" LOG (mid-line) CONDENSER



In four Capacities

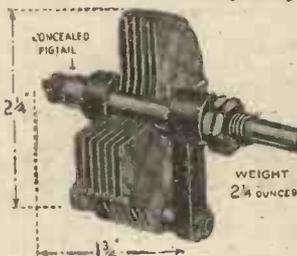
- .0005
- .00035
- .00025
- * .00015

4/6 each

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

"MIDGET" Reaction CONDENSER

Capacity: .0002 mfd.



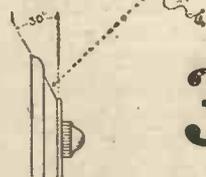
The FORMO "MIDGET" Reaction Condenser, like all other Formo Condensers has incorporated the patented Formo internal "PIGTAIL," undoubtedly the finest collector or "Pigtail" yet devised, and thereby is absolutely noiseless in operation.

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.



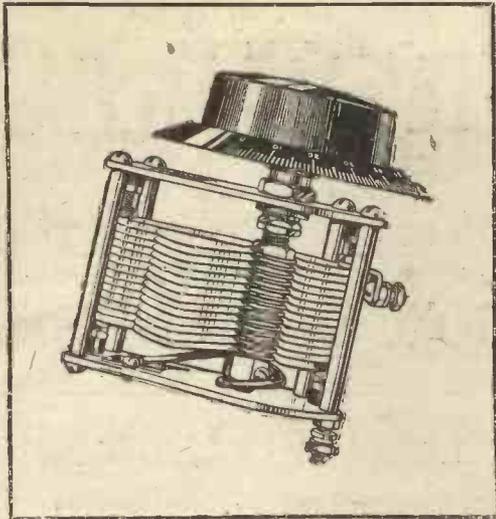
3/-



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.

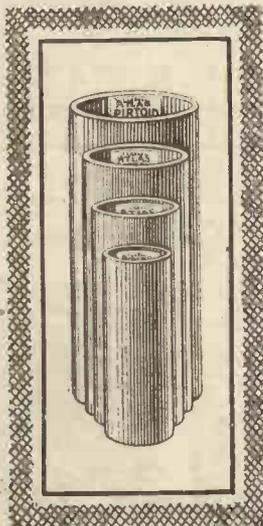
POLAR NO. 3 CONDENSER



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

MINIMUM LOSS

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 "1930 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 breakdown or trouble and giving practically everlasting life.

★ 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.

PRICE
1/6
EACH



THE BENJAMIN ELECTRIC LTD.
BRANTWOOD WORKS, N.17

BENJAMIN

Streets

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



FOR ELIMINATOR CIRCUITS

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

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

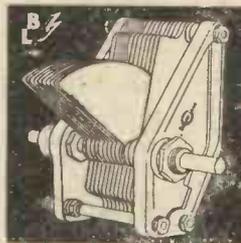
If unobtainable from your dealer write to us giving his name and address.



BRITISH INSULATED CABLES LTD

PRESCOT - LANCS.
Makers of PRESCOT and HELSBY cables

COMPONENTS WITH A REPUTATION



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.

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" " 367 .0005 " " 6/-

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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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A range of twelve for all purposes. Prices from £2

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

BOWYER-LOWE

In association with



Recordaphones Ltd.

London Showrooms: ASTOR HOUSE, ALDWYCH, W.C.2.

Head Office and Works: RADIO WORKS, LETCHWORTH, HERTS.

HELLESEN 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 Hellese's H.T. Batteries. "Naturally," he replied when I remarked on this fact, "It's the first thing I look for. If a manufacturer standardises Hellese's, 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 Hellese's and nothing less."

"Verb. Sap." I thought.

PRICES

Standard Capacity.	
"Wizy" 9-volt Grid	2/-
Bias Type	2/-
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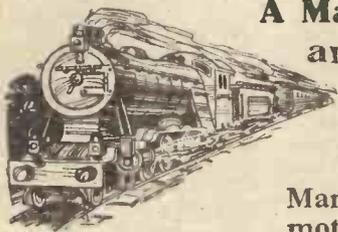
HUNTS

HELLESEN DRY BATTERIES,
ELECTRICAL MEASURING INSTRUMENTS,
POLYMET MICA AND PAPER CONDENSERS,
HANDLAMPS, TORCHES, ETC.

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.

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.

Write for illustrated Handbook No. 2, enclosing 1d. in stamps to cover postage etc. to Seelig Publicity Service (Dept. M.A.45), 23 White St., Moorfields, E.C. 2.

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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F. A. HUGHES & COMPANY, LIMITED

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

Distributors for Northern England, Scotland and North Wales: H. C. RAWSON (Sheffield and London), Ltd., 100 London Road, Sheffield, (Phone: Sheffield 26006) and 22 St. Mary's Parsonage, Manchester, (Phone: Manchester City 3329.)

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WEARITE COMPONENTS

Your friends will admire your choice

IMPROVED TYPE IRON CORED HIGH-FREQUENCY CHOKE

(illustrated below)

INDUCTANCE 300,000 microhenries.
RESISTANCE 200 ohms. PRICE
Self-capacity 3.5 M.M.F. 6/6
Effective Range 10-2,000 metres.

A.C. VALVE HOLDERS New type 5-pin 1/3

MR. CHAPMAN'S TALISMAN DUAL RANGE COIL

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

NEW "Q" COILS

J. H. Reyner's Improved Design.
Q.S.P., Q.S.C., Q.A.T., 15/- each.

Write for free illustrated lists.

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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 2 1/2 in. Price 2/-

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The R.C. Super Silk. 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. Frederikstad, 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 - RADIO CONNECTIONS

FUSE
Complete with Adaptor to fit Wauder Plug, etc., 1/-
Spare Fuse, 6d.

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

TERMINALS
Type "B" ... 6d.
Type "M" ... 41d.
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SPADE TERMINAL
4½d.

WANDER PLUG
4d.

ANODE CONNECTOR
6d.

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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FOR EVERY RADIO CONNECTION

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PAREX

PRODUCTS PAR-EX CELLENCE

1930 ETHER SEARCHER

DRILLED ALUMINIUM PANEL 7/-
as specified

ALUM. CHASSIS & SCREEN 8/6

DIFFERENTIAL REACTION CONDENSER 5/-

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"EVERYBODY'S 3"

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"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).

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).

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-

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.
Other sizes and styles, prices on application. Trade enquiries invited.

THE MISCELLANEOUS TRADING CO. LTD.
Phone: Hol. 4894. 143 High Holborn, London, W.C.1

NEW SETS FOR OLD

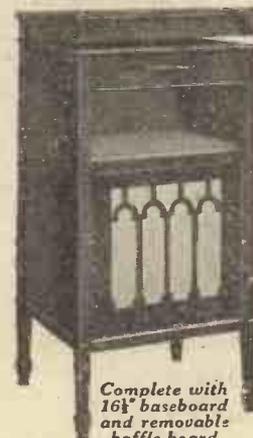


BRING or SEND that old Set, DON'T WASTE MONEY on it. I will make you good ALLOWANCE in exchange for a PHILIPS-ALL - ELECTRIC - RECEIVER—The no-trouble receiver. From £12 : 10 : 0 or 23/- per month; other Makers' Receivers supplied.

Catalogue FREE from

PONTER, 14 MALL ROAD, HAMMERSMITH, W.6

Phone: Riverside 3089.



Complete with 16 1/2 baseboard and removable baffle board.



"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.
24 Matton Garden, London, E.C.1



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.

GRAMOPHONE PICK-UP

The Loewe Radio Co., Ltd.
4, Fountayne Road, London, N.15.

Phone:
Tottenham 3911/2

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. **7/9** And it costs less! Other Voltages Available.



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

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

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

Cheaver B22

THE NEW GOLDEN P.R. VALVE

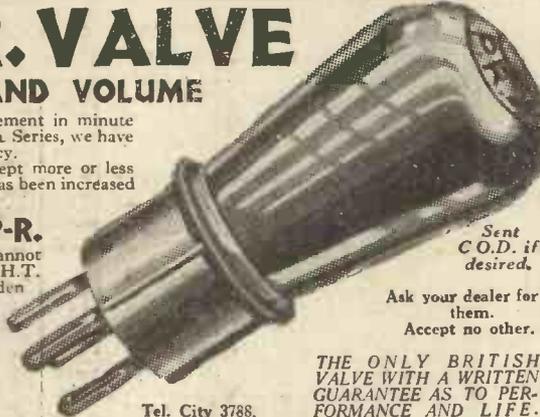
ABNORMAL SELECTIVITY AND VOLUME

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	Flt. 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.C.	
	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.C.	
	GPR 17	5-6	.14	20,000	17.5	H.F. Det.	
	GPR 18	5-6	.14	11,000	9.5	L.F.	
7/6	GPR 19	5-6	.14	75,000	41	R.C.	
	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	EACH Post 4d.	GPR 120	2	.3	3,000	4.5	Super Power
		GPR 140	4	.2	3,500	4.5	"
Screened Grid	1s. - 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 Maker, Mullard Master-Three, etc., etc.

The Westinghouse Brake & Saxby Signal Co., Ltd.,
82, York Road - King's Cross - London, N.1



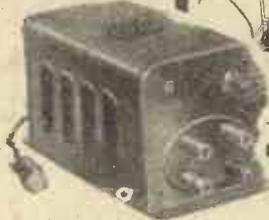
Our 32-page booklet "The All-Metal Way 1930," shows how to make any type of eliminator or charger for A.C. Mains— Full description, circuits and components required.

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

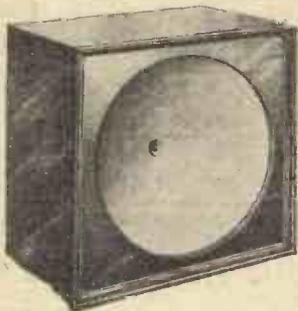
Write today for particulars of this new model, also for our free Art Booklet "Radio from the Mains," which contains full details of all Regentone products—Mains Receivers, Mains Units, Trickle Chargers, and Mains Components—and includes particulars of our Hire Purchase Terms



For Radio from the Mains

REGENT RADIO SUPPLY CO. 21, Bartlett's Bldgs.
Holborn Circus, London, E.C.4. Telephone CENTRAL 7661

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 sides cut ready for assembly, 4 pieces oak front moulding, 4 rubber feet.

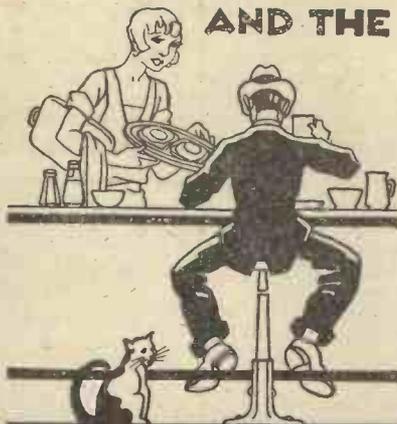
3-ply unit cradle, screws, etc. The whole sent safely packed with return of post ready for you to assemble, with full instructions.

Please note that the above consists only of a complete kit READY TO ASSEMBLE and is UN-POLISHED.

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, New-gate 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
- STANDARD, 18 WATTS, BRASS FINISH MODEL ... Was 9/8 NOW 8/6
- VOLUME CONTROL, 100-500,000 Ohms ... Was 8/6 NOW 7/6
- POWER CLAROSTAT, 35 WATTS Was 15/- NOW 13/6
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- "HUM-DINGERS," all Types NOW 4/-
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- TABLE TYPE (Distant Volume Control) ... Was 13/6 NOW 12/-

Free 36pp. booklet,

47 Illustrations 27 Diagrams
3 Scale Drawings

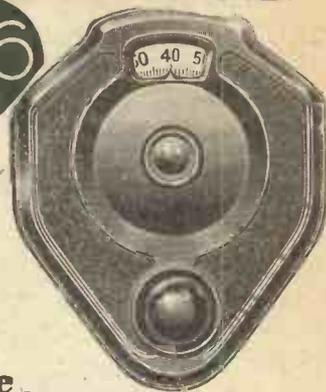
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CLAUDE LYONS LTD
76 OLDHALL ST.
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2/6



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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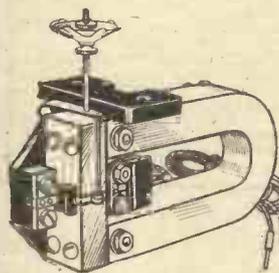
wireless

NELSON ST. WORKS. LONDON, N.W.1

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**

1-Drilled aluminium panel, 15 by 8 in. (H. & B.)	3 6
1-Drilled aluminium chassis (H. & B.)	5 6
1-Drilled aluminium screen (H. & B.)	2 6
1-Slow motion drum dial (Peto)	5 0
1-6 ohms rheostat (Varley)	3 0
1-00013-mfd. differential condenser (Lotus)	5 6
1-Push-pull switches (Bulgin)	3 0
3-Antimicrophonic valve holders (Benjamin)	4 6
1-0005 dual condenser, with supports (Formo)	15 0
2-Dual-range coils, R2R (Colvern)	17 0
1-0003-mfd. fixed condenser (Ormond)	1 0
1-0002-mfd. fixed condenser (Ormond)	1 0
1-High-frequency choke (Lewcos)	7 9
1-Low-frequency transformer (Lissen)	19 0
1-Grid leak holder (Bulgin)	9
1-Grid leak, 2 meg. (Dubilier)	2 6
2-I-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
2-Spade tag ends (Belling-Lee)	4

Cash Price £5 7 0

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

Any parts sold separately.
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/-.

BUILD THE TALISMAN TWO

With our kit of specified parts. Contains all you need. Panel drilled, Baseboard, Wire, and Screws included. Full-size Blueprint with every kit.

CASH PRICE 67/-
Cabinet, 12/6 extra. Two Mullard Valves, 23/- extra.

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Kit, as advertised in "A.W." Nov. 10. Complete kit to build this wonderful Short-wave 3.

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Complete with Battery Cord and Coils. Beautifully made. Give years of service.

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Royalties 10/- extra.
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Or 15/- down and 5 monthly payments of 10/-.

EXCELLENT XMAS PRESENT
BROWNIE 2-VALVE, COMPLETE
With 2 Mullard Valves, 120-volt High-tension Xidie Accumulator, and Brown's H3 Speaker.

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Or £1 down and 10 monthly payments of 12/-.

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Wearite 1930 Brookmans 3 Dual-range Coils, 34/- pair.
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 OSG Coils, 15/-.
Western Electric Light-weight Headphones. Were 20/- Our price 6.6.
Brown's Famous H30 Speakers. New, in original cartons. Maker's price £3 5 0. Our special price 30/-.

**THE WORLD AT YOUR FINGER TIPS
BURNDEPT 1930 S.G.4 PORTABLE**

A Perfect Receiver at a Reasonable Price.
CASH PRICE £19. 19 0
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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IT'S EASIER IT'S BETTER**

No References. Strictly Confidential.
Climax All-electric A.C. Chelohset. 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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Blue Spot 101. King of the Ether Speaker. Cash price £4 4 0.

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Brown's Vee Unit and Chassis. 8/7 down and 4 monthly payments of 8/7.

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.

Blue Spot 66K Unit and Power Chassis. 5/- down and 5 monthly payments of 8/-.

B.T.H. Cone Speaker, a perfect speaker. Cash price £3 3 0, or 11/- down and 5 monthly payments of 11/-.

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OSRAM 1930 MUSIC MAGNET
Complete kit, with 3 Valves and Oak Cabinet. Full instructions included.

CASH PRICE 29
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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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On our Gradual Payments System.

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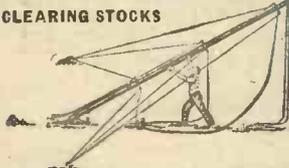
400 ohm Potentiometer for the "Magic Three," the "Magic Two," and the "Magic Four."

The Sovereign Dual Range Coil is a wonderful component—extremely efficient... highly selective and beautifully made bakelite former, panel mounting and one-hole fitting. 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 **2/-** receivers... "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.,** 6-8 Rosebury Avenue, London, E.C.1. *Battery Ad.*

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SURPLUS STEEL MASTS

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/-**
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- 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**

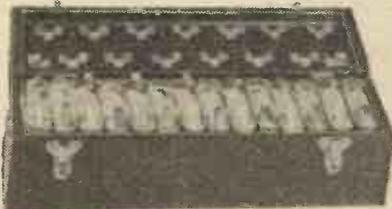
OUTFIT with MAST.—Mast rings, ample galvanised wire (cut to lengths), Pulley, Cleat, Solid Metal foot rest and strong galvanised stay fasteners. Note.—Our Masts are stayed at 4 ground points (not 3) which ensures safety.

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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MONEY SAVED—GREATER EFFICIENCY



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.

Unable to obtain at your local dealer, send direct to—

ALL BOXES LTD.
117 Central Street, London, E.C.1.

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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The Leading All-Mains Transformer

Three selections from our December List:—

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135 v., 70 ma.
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Price 21/-

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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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(One minute from Moorgate Station)

USE THE ELBETTO INSULATED TEST PRODS WHEN TESTING

ELECTRICAL APPARATUS THEY ENSURE QUICK & ACCURATE READINGS

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A PAIR Post Free



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BULGIN RADIO PRODUCTS

DON'T WASTE CURRENT

FIT A BULGIN SIGNAL LAMP

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.

Send 2d. stamp for our 56-page Fully Illustrated Catalogue.

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PRICE: 2/3, 2/6, or 2/9. BULBS 6d. EACH



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.

WHITELEY BONEHAM & CO., LTD.
Nottingham Road, Mansfield, Notts.

Telephone: Mansfield 702. Telegrams: Whitebon, Mansfield.
London Office: 21, Bartlett's Buildings, Holborn Circus, E.C.4.
Telephone: Central 9669.

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 a thin 6-ft. silk connecting cord FREE

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 Detectaphone, Deaf-aid, Loud-speaking, Telephone, Announcements through Loud-speaker, Amplifier for Crystal or Valve Sets. Receptive Sound Detector Experiments. NO OTHER MICROPHONE OF EQUAL SENSITIVENESS KNOWN; each instrument finelynickel-plated and fitted with 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, or De ectaphone, etc.; thin 3-ft. silk connecting cord fitted, inclusive light detachable headband. 8/-

Full Directions for use of Super-microphones for many purposes, Diagrams of connections, and Illustrated List of SUPER DEAF AIDS Free.

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For **8/6** Post paid by return

CONCERT GRAND 1st stage, 10/6 2nd stage, 9/6

Model "A" Chokes for output or eliminator, 10/6 All post paid and supplied with money-back guarantee if dissatisfied within 7 days.

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-CLIX-

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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CONTACT

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.

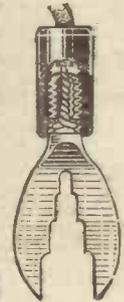
(Supplies immediately obtainable through all Dealers).



No. 15.

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. 3.



No. 1. CLIX COIL PIN. A boon to home constructors 2d.

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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"REGIONAL" STATION ELIMINATOR

DOUBLES THE SELECTIVITY OF YOUR SET

Cuts out your Local or Regional Station and brings in distant, weak and foreign Stations 25% louder and clearer.



PRICE **10/6**
POST FREE.

Brookman's Park—5GB— or Local Station cut out in 2 degrees (but not everything or anything else).

Fitted in 30 seconds.

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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.1 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 Projectors, 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 encl. 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 Cambrell, 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. Mesger 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/-.

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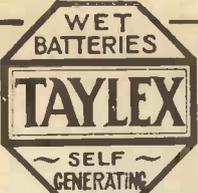
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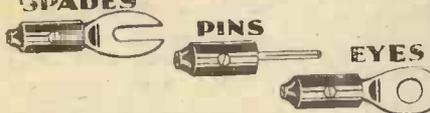
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I showed the article to a wireless friend of mine who seemed rather more than normally interested. He told me all about it afterwards; the stuff she had on her lips was insulating.—G. C. C. (Aberdeen).

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