

A BIG CHRISTMAS NUMBER  
72 PAGES

# Amateur Wireless

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Saturday  
Dec. 10, 1927

VOL. XI, N° 287

## SPECIAL FEATURES

Capt. Eckersley's Own Story:  
"My Visit to the Washington  
Conference."

Reyner's "C.T." Four-valver.  
Wireless Stunts for Christmas.

Sydney A. Moseley's "If I Ran  
the B.B.C."

Practical Set Building in Pictures.  
Ether Fishing—Identifying Stations.  
Thorne Baker's "Making Light  
do Work."

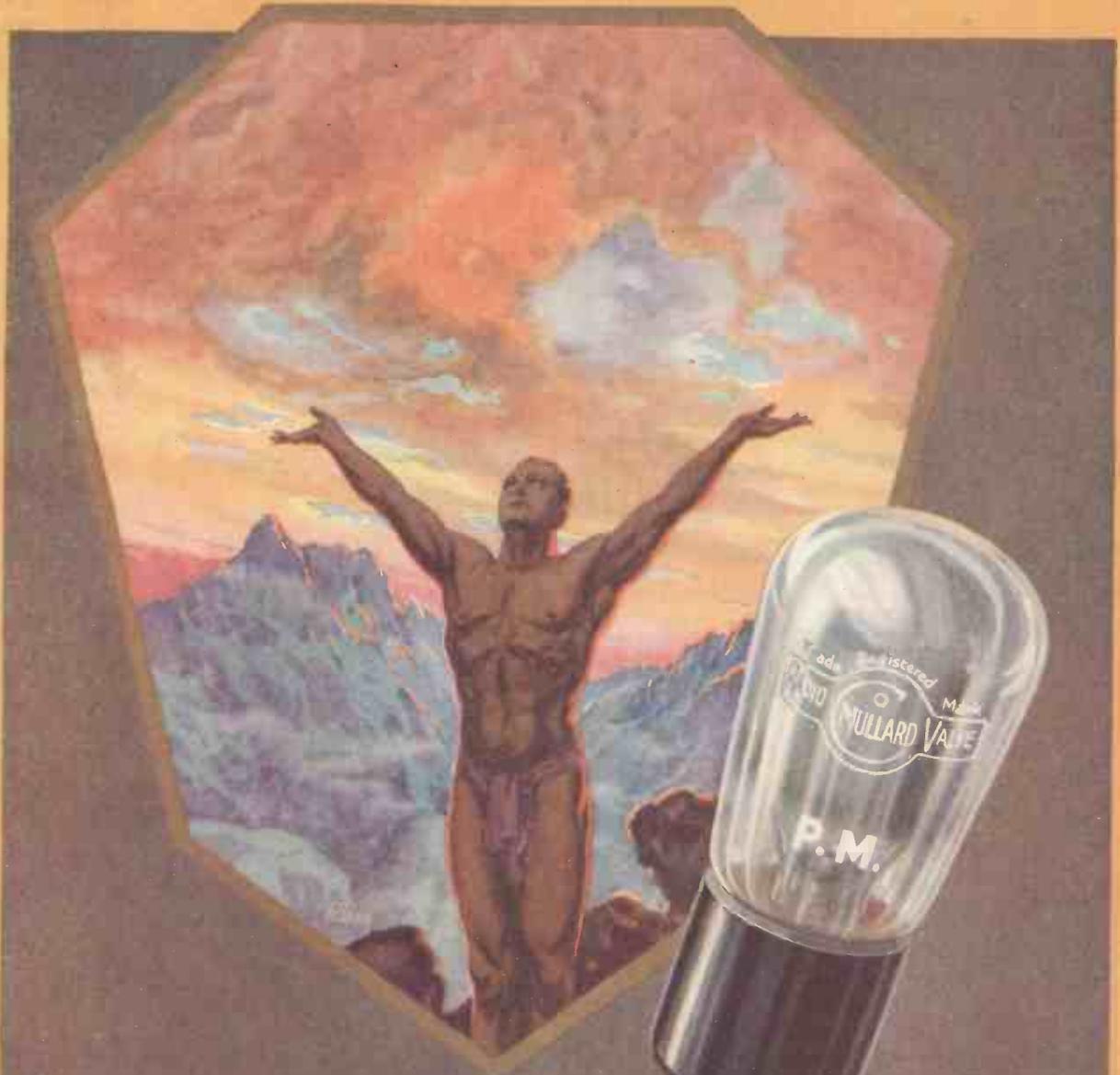
The "Yule" Two-valver.

Dr. Gradenwitz: "The Newest  
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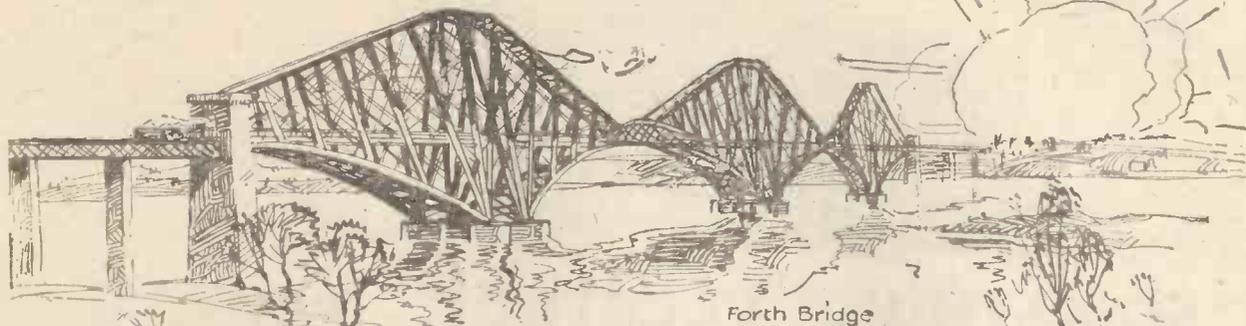


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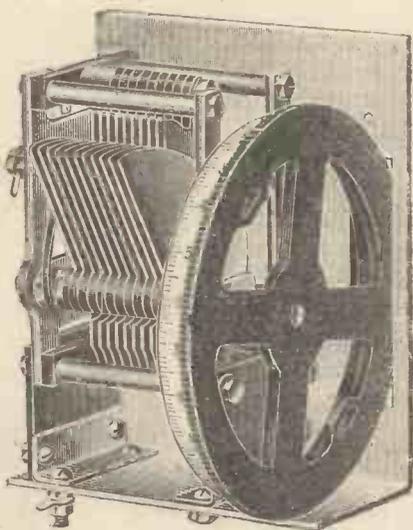
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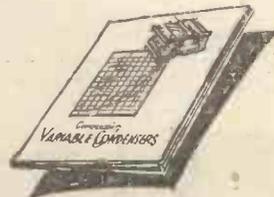
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**Cossor  
Melody Maker**



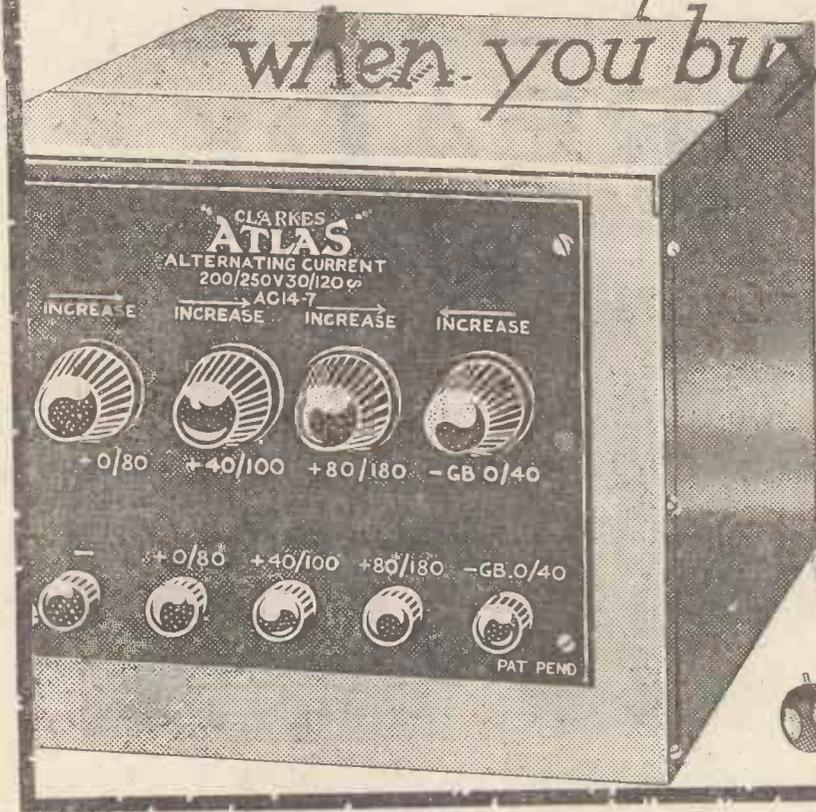
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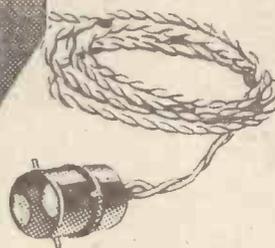
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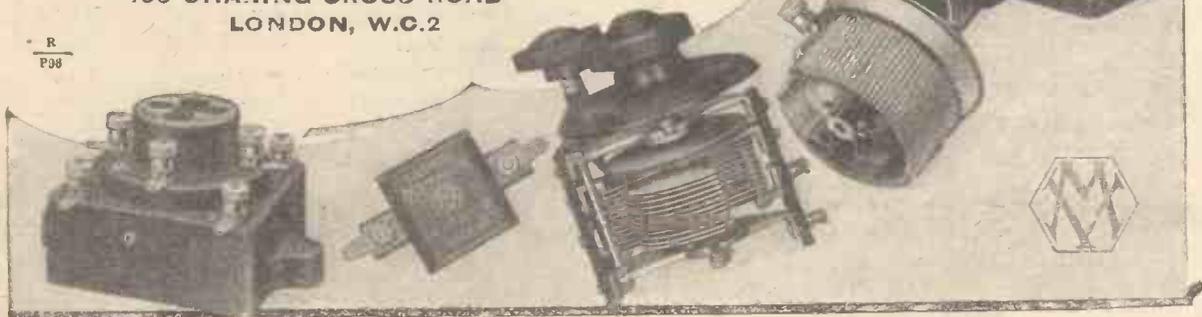
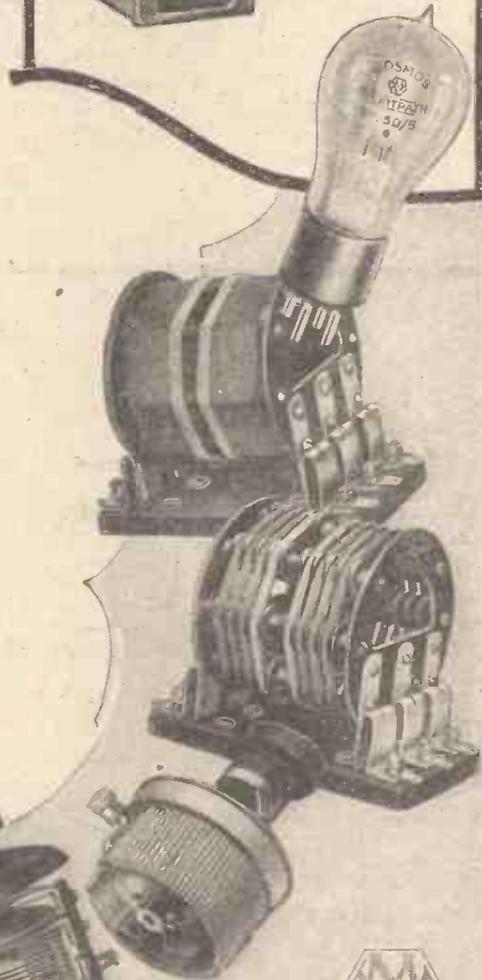
For a complete description of the full range of Met-Vick (Cosmos) Components, ask your dealer for a copy of Booklet No. 4117/6

**Metro-Vick Supplies Ltd.**

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**D**ON'T be satisfied any longer with a Set which will only give you programmes from one station. Build a *real* Set—a Cossor "Melody Maker" and get all the B.B.C. Alternative programmes as well as concerts from France, Holland, Germany, Italy, Spain and Switzerland. The wonderful Cossor "Melody Maker" is the sensation of the Industry. Never before has it been so easy for any one without technical skill to build such a splendid Receiver. The Cossor constructional chart (supplied free) makes it easy for any one to build the "Melody Maker" in an evening. Soldering has been abolished. Success is guaranteed. Christmas is only a week or two ahead. Get your components at once and be ready to enjoy Xmas Radio from all over Europe.

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# Amateur Wireless

## and Electrics

The Leading Radio Weekly for the Constructor, Listener  
and Experimenter

Vol. XI. No. 287

Edited by BERNARD E. JONES  
Technical Editor: J. H. REYNER, B.Sc.(Hons.), A.M.I.E.E.

December 10, 1927

### A New Art—Our Competition—The Best Wireless Talker—At Washington— This Week's Sets—A True Story!

#### A Timely Word

THIS is our Christmas Number—a bumper issue, full of good articles by popular contributors. The constructional side, the theoretical side, and the lighter side of wireless are all well represented. But it must not be forgotten that week after week, all the year round, AMATEUR WIRELESS has just as interesting and varied a contents list, with all phases of wireless blended in such a way that there is always something of interest for everyone. If you like this issue—and we are quite sure you will—there is no doubt that you will appreciate succeeding issues in the same way. Next week's issue will be a notable one, wherein details will be found of an exceptionally fine three-valver produced by the AMATEUR WIRELESS Technical Staff.

#### This Week's Sets

READERS have already heard of the "C.T." (capacity-tapped) circuits. Our Technical Editor has evolved the principle from the "M.C." sets, and the "Four" is a worthy descendant! It has power behind it and is extremely selective. The other set described in this number is the "Yule Two"—a really fine little receiver. The former is very efficient, and the latter is as good for purity and volume as any two-valve receiver can be. We recommend them both to readers.

#### On 18 Metres!

THOSE who have sets capable of tuning down to 18 metres or thereabouts should try to pick up the experimental transmissions made every Wednesday from the Dutch station PCLL between 2 p.m. and 3 p.m. (G.M.T.). Announcements are made in several languages, including English. Reports received will be acknowledged by radio.

#### A New Art

MAURICE PRIVAT, the energetic French editor, who has probably done as much towards broadcasting as any one in

#### "SIMPLER WIRELESS" SETS AND INDUCTION

When a "Simpler Wireless" set works normally, with the exception, however, that there is a hum which cannot be cut out by adjusting the set, it should be suspected that the hum is not due to commutator ripple across the mains terminals of the set, but that it is caused by direct induction from the house wiring on to the aerial, earth-wire or loud-speaker leads. The remedy, therefore, is to alter the disposition of these leads with respect to the house wiring.

Such interference would, of course, occur in the case of an ordinary set using batteries and used under the same conditions, but the fact that the interference was less when batteries were used is because the mains are, of necessity, brought right up to the "Simpler Wireless" set and so are probably nearer to the leads mentioned than they were in the case of the ordinary set.

If, however, the hum is accompanied by poor signal-strength or distortion or both, the set is not being operated correctly. Hum will nearly always be heard when the set is not working correctly and no attempt should be made to eliminate the hum until good reception is otherwise being obtained.

France—he wrote the first piece for the Radio-Theatre and originated the *Journal Parlé*—says the French programmes today are none too good. He has come to the conclusion that new stuff must be written and composed specially to suit the new art of radio transmissions. Perhaps some day a genius will not have to think about his bread and cheese!

#### Are Announcers "Affected"?

ARE B.B.C. announcers and talkers "affected" in their speech? One sturdy Northerner we know thinks they

are, and points to Mr. Baldwin as the ideal, "straight-forward" talker. Dare we wonder if Mr. Baldwin has not studied the official pronunciation?

#### At Washington

AT one time it looked as if the amateur experimenter was going to be put right "off the map" by the Washington law-givers, which would, indeed, have been ill-reward for the pioneer work he has done. But he was not without champions, and the Technical Sub-committee has finally put him on an equal footing with the Governmental and professional services!

#### A True Story

A CORRESPONDENT writes to say that he was aroused from his well-earned slumber at 11.30 the other night by the frantic ringing of his telephone. It was one of his less scientifically minded friends wanting to know why his set had broken down. It proved to be because 2LO had closed down at 11 o'clock!

#### Exit the Dull-emitters!

THE "dailies" have recently been publishing enthusiastic reports of a new accumulator, the invention of a Spanish priest, which is said to have "ten times the capacity of an ordinary accumulator." If the invention materialises, dull-emitters will lose in popularity, we think.

#### Our Competition

ON page 904 details are given of a competition which will interest every reader. Constructors are critical and clever people (bless them!), and we have yet to meet the one who is at a loss for words when he is asked what his favourite circuit is! So fill in the form and let us know what sets you want, and we'll let you have 'em during '28! Incidentally (need we mention it?), some lucky person will receive £20!

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Capt. P. P. Eckersley

IT may interest some to read an account of my visit to the Washington Conference, as delegate of the Union Internationale de Radiophonie, to watch the interests of European and British broadcasting.

I should like to feel that readers will be as interested as I was with the many aspects of wireless with which I was brought into contact, in conversations I held with certain people, and with things I saw and experienced during a crowded and hectic month.

#### A Pleasant Change

It was with a feeling really of some relief that I stepped on board the *Minnetoka* "London's largest liner" because except for a snatched week, I had had no holiday this year and the prospect of eight clear days at sea "living like a pudding" was truly tempting. I shall be accused of padding an article if I attempt to describe those eight days of calm, storm, cold and heat, of last views of England and first views of Nantucket, of a heat-wave that made me disbelieve October, of a rough few hours that made me proud to eat my dinner, but I can at least record hearing 5GB 1,500 miles out thanks to the ingenuity of Mr. Potter, the ship's senior wireless operator.

We sailed into New York one misty early morning, a real hot day brewing, hardly believing that we had left an English summer behind. Kindness radiates from America and what with someone to meet me, and the courtesy of the Port, one seemed wafted ashore not as I so often feel on landing at Dover, emulating Caesar.

It was pleasant to see again the ever genial and competent Radio Corporation engineers and Chief Engineer of the National Broadcasting Company, Dr. A. N. Goldsmith; one of the real pioneers in the practical development of broadcasting. Having met Mr. Merlin Aylesworth, the acting President of the National Broadcasting Company, I went over their half-finished

# "MY VISIT TO THE WASHINGTON CONFERENCE"

CAPT. P. P. ECKERSLEY TELLS AN INTIMATE STORY

new headquarters in Fifth Avenue and 53rd (I think). I found the accommodation (to me) miles above street level giving lovely glimpses of Central Park, the view framed between the cliff-like silhouettes of sky scrapers. I was impressed with the practical lay-out of everything, the elaborate precautions for sound insulation between studios, the pleasant offices, the convenient passages, the most elaborate but efficient control rooms.

#### American Studios

A succession of building difficulties had delayed construction, but not delayed the date in which the staff had to move out of the old premises. Thus cheek by jowl with plumbers and plasterers, I found a gallant staff struggling to establish their positions. I was at home again and visibly reminded of those early days when a new station premises *must* be opened by such and such a date and yet is not ready. When it is all completed, the N.B.C. will have six to eight studios and as many rehearsal rooms. The biggest studios are about 80 ft. by 50 ft. by 20 ft., larger than anything we have here, but just about what we plan to have one day. There are medium-sized studios about the size of our biggest and several small ones much as we have at Savoy Hill.

#### Roxy's

Having talked awhile with the lady who runs N.B.C. programmes—a very talented person who promises to pay us a visit one day—I was taken to see Roxy's Theatre. This is a cinema on 7th Avenue . . . but a cinema! Accommodation for 6,500 people, an entrance hall which would not be crowded if our Little Theatre was built inside it, the largest carpet in the world, offices that reminded one of the salons of Versailles, and in the midst of it all, Mr. Rothafel himself. "Roxy" is the great showman of American broadcasting. As manager of the Capitol he started broadcasting his one-hundred-strong symphony orchestra and added to this a "gang" of artistes who, after their turns on the stage between "flicks," gave radio turns. As the genius of a new venture the same system obtains in Roxy's Theatre and I saw it all, studio, auditorium, symphony orchestra, well drilled staff, hospital, stage—and, at last, an excellent lunch!

It may not be much to do directly with

wireless but I cannot leave this without trying to convey to you the thrill of seeing the enormous stage from the gallery. Did you ever read "The Sleeper Awakes" by H. G. Wells? That feeling he gives you of truly enormous buildings? I saw it. Pigny performers far away on the stage, great sweeping curtains seeming to lose themselves in the sky, quaint effects of lights and pillars. Incidentally, so far away is the stage the voices could never reach over the orchestra—an orchestra which is lifted up and down in the well as they are needed or not—if it were not for stage microphones and vast loud-speakers concealed in the proscenium. A man sits, high up, controlling the volume by ear and meter, but the illusion is perfect.

Certainly one can never forget Roxy's Theatre, a triumph of art and science combined to give the thrill that cannot be dissociated from grand conceptions of this nature.

The hot train took us from stifling New York to rain-soaked Baltimore and so to Washington washed cool and white in a star-lit evening. At three o'clock next afternoon the conference opened. It was interesting to me to meet so many people again. The British delegation, many technicians and others last seen in Lausanne, American friends and acquaintances, all the bureaucracy of wireless, but few of the experts.

#### A Huge Task

In so discursive an article it would be impossible to describe all the cross currents that flowed around my insignificant self, but to generalise, one was struck with the magnitude of the task before everyone. There were over sixty nations represented, over four hundred delegates present and a book of closely printed agenda, foolscap size, containing hundreds of pages! I was concerned in but one part—broadcasting is the new and lusty child of wireless and I found myself its nurse trying to find room for it to grow peaceably alongside its elder and very jealous brothers and sisters.

I cannot say that I found the beauty and wonder of the child was fully appreciated, and as doting nurse, I was conscious of a distinguished toleration rather than open admiration of what is so obviously now the most important member of the family. It was just all this question of room to grow.

## What Happened at Washington—Capt. Eckersley's Own Story

(Continued from preceding page)

In the past there has always been plenty of room for the elder children, but in the last decade, as the family has increased, squabbles and howling have upset the peaceful jobs of those who have constituted themselves elderly nurses.

### The Long Waves

It was, of course, all a question as to the allocation of wavelengths, which services would have which, and why? There have been persistent rumours that 5XX is to go. I do not think this is the intention of the British or any delegations, all of whom jealously guard the rights of *their* long-wave stations. It was, however, a question of convincing people of a self-evident proposition that the interests of one nation owning a long-wave station was the interest of all nations similarly placed. It was, of course, beautifully logical for a delegation to propose only one exclusive long-wave for broadcasting, expecting to keep that wave for their own country, with all other waves for other services, but hardly practical in view of the fact that everyone else would also claim that one wave and the same. The Union paraphrased the pre-war cry of "we can't wait, we want eight" and several reasonable nations saw the justice of the demand.

Others, ostrich-like, their heads buried in the sand of isolation, still maintained that one wavelength was quite enough for their station—and still refused to recognise that there were ten others also claiming the "exclusive" channel. I trust my presence was of some influence in bringing to certain people's notice a self-evident proposition

that if one was to stop all must, and there must, therefore, be room for all, but 3,000 miles seems a long way to travel just to say that.

A committee at which I assisted made the valuable recommendation to state a station's frequency in kilocycles as the most important factor; thereafter the wavelength. This did not get through without discussion, many fearing to do anything so drastic and new. They, however, did propose to decide on the velocity of light! I was also told that for the purposes of classification a keyed continuous wave was not modulated. Whether this will be one of the final recommendations of the conference remains to be seen.

### R.C.A. "Outing"

A brighter feature of the conference was the "outing" on which we were taken by the R.C.A. of America to show us their stations. The organisation, forethought and kindness underlying our host's care for us was marvellous. A special sleeper train, a real breakfast, a run up Long Island in beautiful sunshine, an inspection of Riverhead, Rocky Point, and Belmore wireless stations, a run of 70 miles in luxurious motor-coaches escorted by mounted policemen which swept New York traffic aside for us, a banquet and a variety show arranged by the incomparable Roxy, a room in New York's finest hotels for the night and a run back next day in a special train being the main programme!

Of the stations themselves, Riverhead is the receiving station where Marconi beams are installed. At Rocky Point one finds

transmitters beam, long-wave telegraphy, and the transatlantic telephone transmitter. I noticed some new methods of creating the beam without the necessity of using reflectors, many "crystal" drives and still gallantly turning, surrounded by its rival valves, an Alexanderson alternator. I was particularly interested in Belmore, one of their medium wave high-power broadcasting stations, the 5GB's of America. In circuit it copies 5XX and is in essence just the same. I believe 5GB to be slightly superior in the principle used, but am willing to agree there are arguments both ways.

Going home in the coaches, I was unwise enough to go in the press coach and was bombarded with questions. I hope I kept our end up; judging from the papers it did not look so bad, next day. I met Dr. Goldsmith and together we reinforced our opinions on short-wave inter-continental links. It was pleasant to find once more an eminent technician agreeing with my point of view. To find Professor Appleton in the same coach was a further pleasure and a further reinforcement of the point of view that "short waves are very nice, but do they really work?"

All things come to an end and after fixing some details with Mr. Sarnoff, the able vice-president of the R.C.A. about short-wave experiments, I stepped on board the *Mauretania* at 10.30 E.S.T. on Wednesday night to be in London at 2.30 G.M.T. on the following Tuesday after a comfortable and smooth crossing. So I guess that's about all. I hope my discursive description is as interesting to you as the actual experience was to me.

## For the Newcomer to Wireless : What the Crystal Does

I WONDER if you could tell me just what the crystal does in this small receiving set of mine?

Well, its function is very much the same as that of the valve in the air tube of a cycle or motor tyre. You know that wireless impulses travel in the form of waves?

Yes, I've grasped that.

We can think of the portion of the wave that rises to the crest as a push and of the part that descends to the trough as a pull.

Are both of equal strength?

Yes, and if you think for a moment you will see that unless we eliminate either the pushes or the pulls we cannot do anything with the impulses, for each would exactly cancel out the one

that preceded it and nothing would happen.

The tyre valve, of course, lets air go in but will not let it come out; or to put it in another way it allows the air to pass in one direction only.

Then how does the crystal affect wireless waves?

The crystals used in wireless sets have the peculiar property of passing current very well in one direction and badly or not at all in the other.

I see; the pushes get through but the pulls don't?

That's it, and so instead of current flowing now in this direction and now in that we have, so to speak, whiffs of current all flowing in the same direction. In other words, the current is rectified.

Then what happens to these waves after they leave the crystal?

Just as whiffs of air go through the valve to fill up the tyre so spurts of current from the crystal charge up the condenser placed across the telephones. When it is charged up by a succession of spurts the condenser discharges through the phones and the diaphragms make a very minute movement.

But in this set there does not seem to be a condenser across the phones.

No, actually there is not a fixed condenser, but the two wires within the telephone cords form between them a condenser which collects the whiffs and delivers them to the phones.



# THE "YULE TWO"

*Inexpensive  
Powerful  
Economical*

*Designed  
by the "A.W."  
Technical Staff*



SO that you and those around you can enjoy the special B.B.C. programmes this Christmas, with the minimum of expense and complication, the AMATEUR WIRELESS Technical Staff has produced the "Yule" two-valver. This is a simple-to-make receiver which can be relied upon to give excellent loud-speaker results up to a distance of approximately fifteen miles from a main B.B.C. station. There is nothing novel in the circuit arrangement, although naturally we have incorporated up-to-date components in the receiver itself. As is the case with many other "straight" circuits, the results obtained in practice largely depend upon the quality of components incorporated.

The "Yule" two-valver embodies guar-

anteed components throughout, and if constructors do substitute different makes of components for those specified, we should like to emphasise the necessity of choosing really reliable apparatus.

The accessories—namely, valves, batteries, and plug-in coils—should also be selected with care.

### Guaranteed Results

We feel sure that if our advice is followed the results obtained with the "Yule" two-valver will more than justify the initial outlay and the time taken in constructional work.

There are three controls in the

receiver: the variable condenser dial for tuning, and the knob for varying the coupling between the reaction coil and tuning coil. The third knob to be seen on the panel is the filament resistance controlling the filament current of the filaments of both valves.

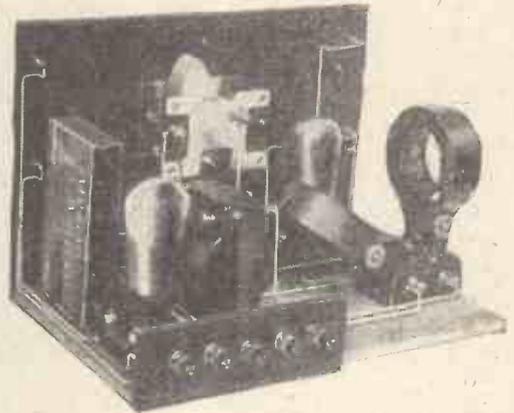
At the back of the cabinet housing the receiver is an ebonite terminal strip carrying the H.T., L.T., and grid-bias terminals. The aerial, earth, and loud-speaker terminals are mounted in convenient positions on the front of the panel.

A feature that will appeal to the less technical listener is the total inclusion of the valves and two-way coil-holder.

From a theoretical point of view, there are but few circuit details which require explanation.

The theoretical circuit diagram shows how simple is the arrange-

ment. Tuning is possible over the whole of the wavelengths used by broadcasting stations, different bands being covered by simply changing the plug-in coil for one of a different size. A No. 35 or No. 40 plug-in coil is suitable for most B.B.C. stations when an aerial with a length of between 70 to 100 ft. is used. A No. 150 or No. 200 will bring in Daventry 5XX and other stations on nearby wavelengths. The size of reaction coil is not critical; a No. 50 or No. 60 gives

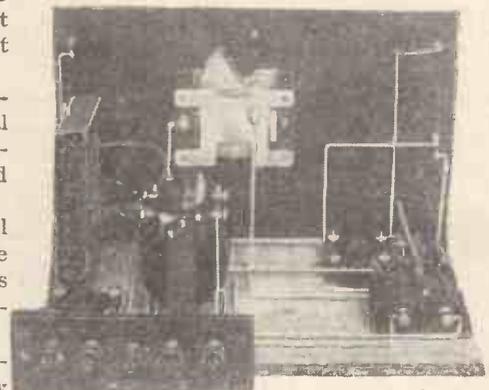


The Set is Simple to Construct

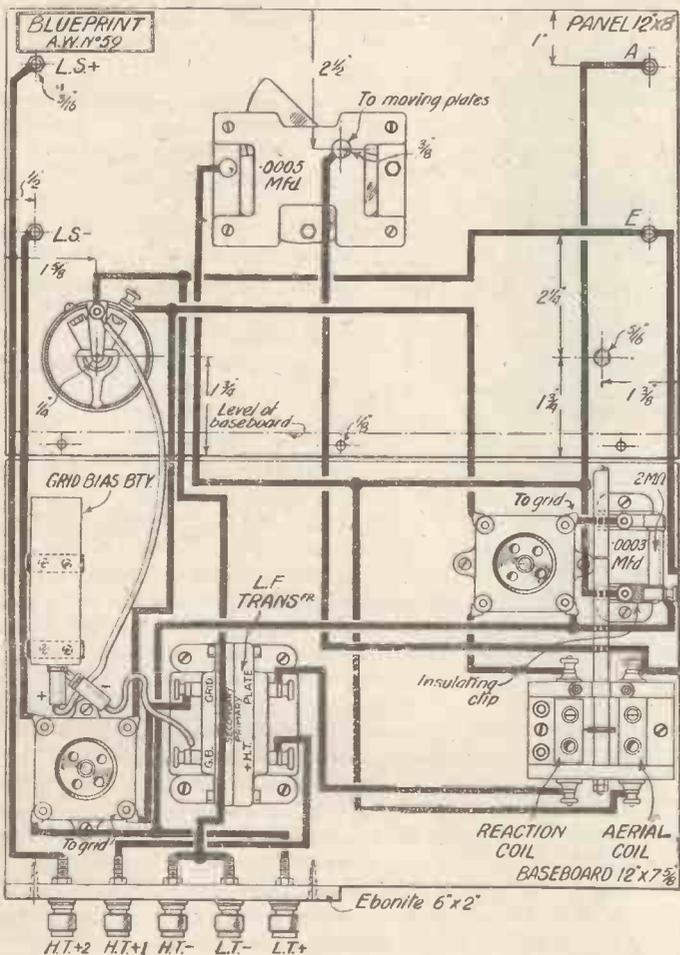
good reaction effects on the wavelength band between 200-500 metres and a No. 100 on the long wavelengths.

### Reaction

The reaction system is the simplest possible. A plug-in coil is wired in series with the anode of the detector valve and the primary winding of the L.F. transformer. This coil is arranged so that it can be



Few Components are Required



The Wiring Diagram (Blueprint available, price 1/-)

variably coupled to the aerial-tuning coil in a slow-motion two-way coil-holder.

The old objection to this form of reaction was that the application of reaction was not gradual enough. This fault can be practically eliminated by using a small reaction coil, just sufficiently large to give reaction over the tuning range of the particular coil to which it is coupled. The use of a good slow-motion coil movement, such as that used, also assists in giving a gradual reaction application. "Plopping" or reaction overlap is usually due to the wrong value of grid leak or too high a value of H.T. on the detector. Attention to these points will enable the operator to obtain a good reaction control.

It will be noticed that a small fixed condenser is shunted across the primary of the L.F. transformer. Here again this is an expedient to assist in the production of smooth reaction effects, which would be somewhat erratic were the condenser omitted. Its function is to by-pass the H.F. current flowing from the anode of the detector valve through the reaction coil to H.T. +.

The Ferranti L.F. transformer embodied in the "Yule" two-valver has this by-pass condenser already wired inside the iron case, but if other makes are used it will be necessary to add this externally.

As far as the battery connections are concerned, these are quite simply arranged. A grid-bias battery is connected between the IS connection of the secondary of the L.F. transformer and L.T. -. Common to the two-valve filaments, in the L.T. + lead, is a 7-ohm filament rheostat. There are two H.T. + tapping, the detector tapping being taken to about 60 volts and the L.F. tapping to 120 volts.

The grid leak and condenser rectification included is the most sensitive form known, though it should be noted that the grid leak is *not* connected across the grid condenser, but between grid and L.T. +.

So much for the circuit diagram. To build up the "Yule" two-valver you will require the following components, together with two valves, some plug-in coils, H.T., L.T. and grid-bias batteries, a loud-speaker, and a reasonably good aerial-earth system.

**Components Required**

Panel, 12 in. by 8 in. by 1/4 in. (Ebonart, Peto-Scott, Becol, or Raymond).

Cabinet (Camco, Raymond, Radio Supply).

.0005 low-loss variable condenser (Ormond, Burton, Cyldon, or Dubilier).

Two valve-holders (Benjamin or Lissen).

Two-way coil-holder (Lissen).

Fixed condenser, .0003 (Dubilier, Lissen, or C.D.M.).

Variable rheostat, 6 ohms (Lissen, Dubilier, or C.D.M.).

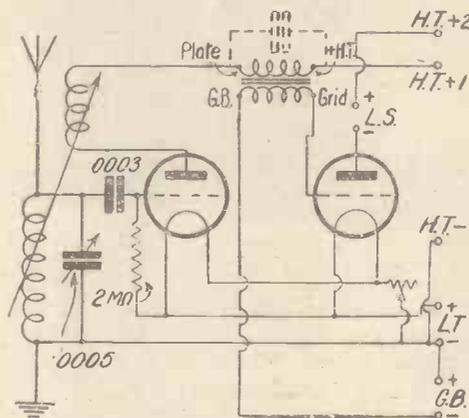
Transformer (Ferranti A.F.3, R.I. and Varley, or Lissen).

Grid leak, 2 megohms (Dubilier, Lissen, or C.D.M.).

Nine terminals, marked H.T. +1, H.T. +2, H.T. -, L.T. +, L.T. -, A, E, L.S. +, L.S. - (Belling and Lee or Eastick).

Connecting wire (Glazite or Junit).

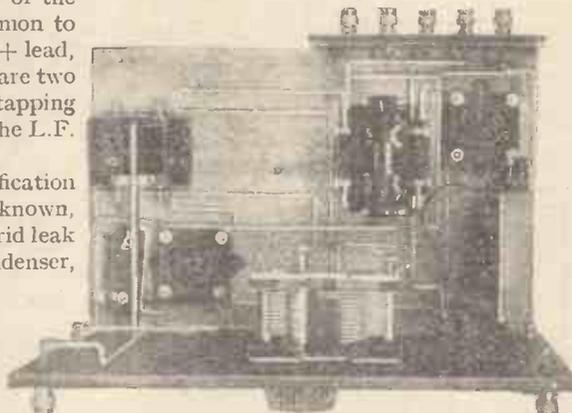
Grid-battery clips (Bulgin).



Circuit Diagram of the "Yule Two"

**Construction**

With these available the duplication of our layout can be undertaken. A special blueprint (price 1s.), showing the panel and baseboard layouts, can be obtained from this office. The blueprint can be used as a drilling template for the panel components, and in this connection it should prove invaluable to those who are not natural "handy men."



The Wiring of the "Yule Two" is quite straightforward

The panel is drilled to accommodate the variable condenser, filament rheostat and the knob of the two-way coil-holder, and the aerial, earth and loud-speaker terminals. In drilling the hole to take the spindle of the Lissen coil-holder, accuracy is necessary in order that the moving coil-holder can be smoothly adjusted.

The baseboard layout is quite clearly shown by the photographic views and reduced reproduction of the blueprint. The grid-bias battery is mounted vertically at one end of the baseboard by means of two G.B. clips. The L.F. transformer has to be placed sufficiently far away from the two-way coil-holder to allow the reaction coil to swing well away from the tuning coil.

When the baseboard components have

been mounted and the panel and terminal strip fitted as indicated, the simple wiring-up process can be started. Here again the blueprint is of great value, and is strongly recommended to those who find difficulty in following theoretical diagrams. White Glazite wire was used in the model illustrated, and this serves very well. The two grid-bias leads are short lengths of rubber-covered flex, one from the L.F. transformer, the other from the positive filament busbar.

The "series" clip on the Dubilier condenser provides the necessary extra connection for the filament positive end of the grid leak.

In our tests a Mullard PM1HF was used as a detector and a PM2 as the amplifying valve. This combination gave excellent results. Other pairs of valves which we can recommend are given in the valve table below.

Make	V1	V2
B.T.H. ...	B21	B23
Cosmos ...	SP181G	SP181RR
Cossor ...	210HF	220P
Ediswan ...	HF210	PV2
Marconi ...	DEL210	DEP215
Mullard ...	PM1HF	PM2
O-ram ...	DEL210	DEP215
Six-Sixty ...	SS210HF	SS215P

**"IF I RAN THE B.B.C."**

(Continued from page 858.)

lowest of "brows." I should maintain a high standard which the average listener expects in wireless transmissions as he expects in everything else. And if it is true, it is our duty not to pander to it.

In other directions I will candidly admit that I would make little change. I would continue to give the public opera because, despite what a good many ill-informed Jeremiahs declared some time ago, operas are popular.

I would continue the "Proms." and the National Concerts, and I would extend this idea to big public speeches by the leading speakers of the day, and I would encourage first-class debates—*informal* and not *prepared* speeches, which sound like essays.

Finally I should certainly not attempt to interfere with the fine spirit which permeates the Corporation. Under the direction of the Director-General Sir John Reith, a wonderful *esprit de corps* has grown up and this is easily manifest in such intercourse as the staff has with the outside public. Certainly if I ran the B.B.C. I should re-appoint the Director-General!

But, of course, there is not the smallest likelihood that the job will be offered to me! Nor indeed should I welcome it.

# Making Light Do Work

By T. THORNE BAKER,  
M.I.R.E., F.Inst.P., F.R.P.S.

EVERY time light falls upon any substance, no matter what it is, a certain amount of work is done. It is never entirely reflected.

This article describes how the energies of light-freed electrons are directed into the service of wireless.



THE action of light may be to bleach the colour of a fabric, to heat, to oxidise or to reduce—it may have a dozen different effects. But in every case the reason for these effects undoubtedly originates from the liberations of electrons.

If light illuminates a plate of metal, electrons are liberated from the surface, the electrons being particles of negative electricity. As long as the illumination continues, the metal plate has potential energy relative to its surroundings, just as a tank of water high up in the air possesses potential energy that could be made at any moment to do work if the water were allowed to fall.

We are all accustomed to thinking of the stream of electrons emitted from the incandescent filament of a valve. Something of the same sort happens when a metal plate is illuminated by light. The effect is usually much smaller, but it obeys very distinct laws, and, minute though it is, it is being made use of in many branches of electrical and physical work. It is, in fact, a mere matter of calculation that with two plates of copper a sixth of a square mile in area, one of them merely exposed to sunlight, and the other kept dark, one could obtain a kilowatt of energy as long as the light lasted!

Light can, in fact, be made to work, and as the wireless transmission of pictures and wireless television come more into general use, light energy will become more and more utilised.

### A Simple Experiment

All kinds of experiments can be contrived once we have some sort of unit that is sensitive to light. Such a unit is the selenium cell, which has been recently shown to generate photo-electric currents in addition to changing in conductivity on being illuminated. Another such unit is the copper-oxide cell, undoubtedly the cheapest

and most interesting photo-electric unit so far discovered, with which and a really sensitive relay, all kinds of interesting experiments can be done. Fig. 1 shows a copper oxide cell as used by the writer, two copper sheets about  $\frac{1}{120}$  of an inch thick and 2 in. by 1 in. in size, cut with scissors out of copper sheet with a lug as shown, are separated with match sticks and held together with an elastic band. The pair of copper plates is immersed in a solution of copper sulphate, 15 grains; tap water,  $3\frac{1}{2}$  ounces, in any convenient containing vessel of glass, and is left for about a week in darkness. Such a "cell" will then, when connected in series with a microammeter, show the production of a current of 50 microamperes upwards if the light from a 100 c.p. metal-filament lamp be allowed to fall upon one side, i.e., one plate of the cell, the other being kept as dark as possible.

### Vacuum Cells

The type of cell used in the new photo-electric making of gramophone records, in wireless photo-telegraphy and in the television systems of Mihály, Belin, Ives, and others, is a vacuum "cell" containing a cathode of sodium, potassium or rubidium

complete evacuation a trace of argon or helium is introduced, which greatly increases the electron emission for a given amount of light. The cathode metal is thallium, in the case of the cell invented by Case for talking kinematograph films, while recently a cadmium cell has been introduced for the measurement of light in medical treatment with ultra-violet rays.

### Practical Application

The number of wireless picture systems which employ the photo-electric cell is constantly growing. Francis Jenkins, the Bell Telephone Company, Professor Karolus Edouard Belin, and Captain Ranger all employ it. In each system the principle is roughly the same.

If we consider a photographic transparency (really a lantern slide), printed on celluloid film and wrapped round a small glass cylinder in Fig. 3, we can imagine an electric lamp E, the rays from which are concentrated by a lens so as to cross the picture at a point P, the light is then reflected upwards by means of a prism Q, so that it falls upon the photo-electric cell PE. Now if the cylinder is revolved, different light and dark parts of the picture will continually intercept the beam of rays at P, causing lesser or greater amounts of light to fall upon the photo-electric cell; and if, as the cylinder revolves it is given an upward motion, in addition, so that in due course

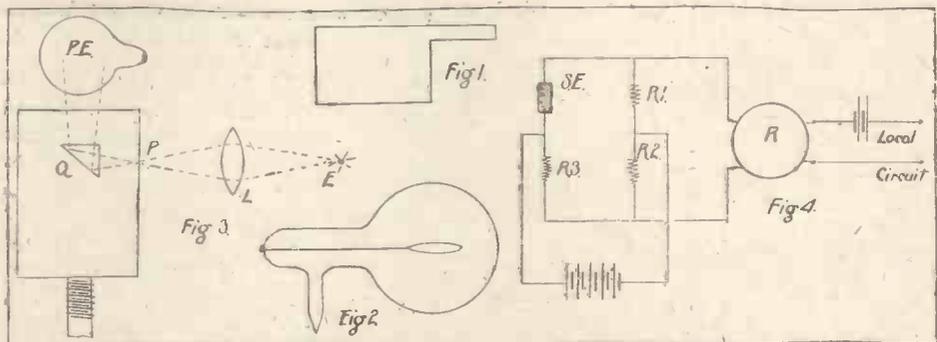


Fig. 1—A Simple Photo-electric Cell    Fig. 2—The Commercial Type of Photo-electric Cell  
Fig. 3—Photo-telegraphic Transmitter    Fig. 4—A Photo-electric Relay

deposited on the glass. The electrons flow from this (when illuminated) to an anode ring collector, as indicated in the diagram in Fig. 2. The most sensitive cells are treated with hydrogen until potassium or sodium hydride is formed, and after com-

plete evacuation it travels in front of P, it is obvious that every minute part of the picture in turn will be analysed or explored by the beam of light.

We thus see that the photo-electric cell  
(Continued on page 906)

# My Christmas Diary

## THE DISCERNMENT OF DALRYMPLE'S DAD

By  
E. H.  
CHAPMAN



**DECEMBER 15.**—Solved the difficult problem of the boy's Christmas present to-day. Douglas-Smith, my wireless neighbour, was more than usually



Dropped in a big wireless store

enthusiastic-over his pet hobby this morning. For once in a while, I listened to him. Glad I did so, for I got the idea from his talk that I might buy the boy a wireless set this Christmas. Understand wireless appeals to boys as much as to grown-ups, so am hoping to have hit upon something really good for dear boy Dalrymple this year.

**December 16.**—Dropped in a big wireless store in town this afternoon. Heard several large sets. Afraid a large set would prove too much for the boy at present. Dal is only nine—or is he ten? I really am not sure which.

**December 17.**—Purchased Dal's wireless set; a neat little affair called a crystal receiver. Smuggled it in home by the simple expedient of entering by the back door.

**December 18.**—This wireless set idea is working out a little more expensive than I thought at first. Douglas-Smith tells me I shall need an aerial, an earth, and a lightning protector.

**December 19.**—Purchased aerial wire—hundred feet of seven-twenty-two. These technical terms seem to come rather easily to me.

**December 20.**—Tried Dal's crystal set over at Douglas-Smith's place. Heard faint music, and on one occasion distinguished two consecutive words. Becoming quite efficient at twiddling the little twiddley wire which touches the crystal; but why this wire should be called the catwhisker is beyond me. Speaking from a lifetime's experience of a suburb with an

abnormally high cat population, I doubt if the cat with curly whiskers has yet been born.

**December 21.**—Great success with Dal's crystal set. Heard a whole sentence clearly—"Further outlook unsettled." So elated was I with my success that I immediately fell in with Douglas-Smith's suggestion to ring up Savoy Hill. Rather strange the B.B.C. folk should have at headquarters as telephone operator a somewhat laconic—one might almost say *blasé*—female with no interest whatever in wireless.

**December 22.**—Tried Dal's set at home for the first time, the boy having been pushed off to bed early, much against his will. Ran the aerial wire out to the roof of the summer-house. Earth to water-pipe in scullery. Tried for an hour, but heard nothing more than a fizzing noise when



—come very easily to me

someone turned the scullery tap on. Cold job winding in the aerial wire in the sleet. Shivered for an hour in bed, and was finally compelled to go downstairs and partake of a stiff dose.

**December 23.**—Right as rain this morning. Told Douglas-Smith of last night's poor results. D.-S. says imperative must have a thirty-foot mast for aerial; so telephoned old man Sykes, our very worthy local builder, to supply and fix mast. Douglas-Smith phoned me at office; greatly agitated; forgot to tell me to be sure to have a pulley fixed to top of mast and a rope through pulley. Called on builder Sykes on way home to tell him about pulley and rope. Sykes rather sarcastic. Says that since he lost his trained monkey, two years ago, from an acute attack of diagnosis, he has made a point of

fitting every one of his wireless masts and flagpoles with pulley, rope, and cleek before they go up. Wonder what a cleek is? Cannot find the word in the wireless dictionary, accidentally borrowed from Douglas-Smith.

**December 24.**—Met wife and Dal in town for lunch. Both fell in eagerly with my suggestion of an afternoon's shopping, followed by tea in town. Rushed off home to see mast fixed up. Wife in secret, of course, but Dal not in the least suspicious. Big job putting up mast in garden. Held whole weight of mast alone for half an hour while Sykes mixed his concrete and his men held guy ropes. Perspired dreadfully, and had to change everything while Sykes fixed bracket on chimney. Aerial finally completed at five o'clock—a good hour before wife and Dal returned. Got the boy off to bed at eleven. Proceeded to bore window-frame for leading-in tube. Fool of a police constable mistook me for a burglar or something of the sort.

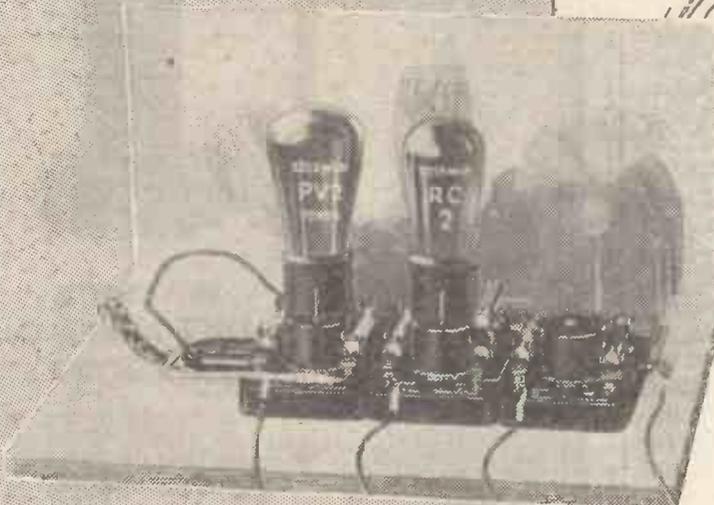
**December 25.**—Dal delighted with his wireless set. Found pair of phones in own stocking; present from wife. Pair of phones in wife's stocking; present from self. Very thoughtful of us. We can all listen-in together at the same time now. Spent morning driving iron pipes in ground for earth. Seems Dal knows something about wireless, and recommends a short earth lead in preference to my long lead to the water-pipe in the scullery. Tried all afternoon to hear something on Dal's crystal set, but no luck at all. Dal tried after tea and picked up London within a couple of



It is doubtful whether he knows it

minutes. Looks to me as if wireless is another of those modern things in which children invariably do better than their  
(Concluded on page 897)

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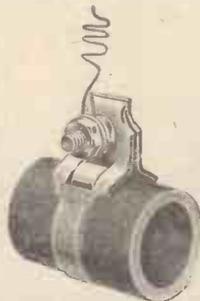
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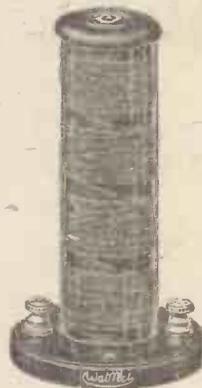
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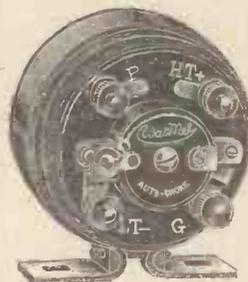


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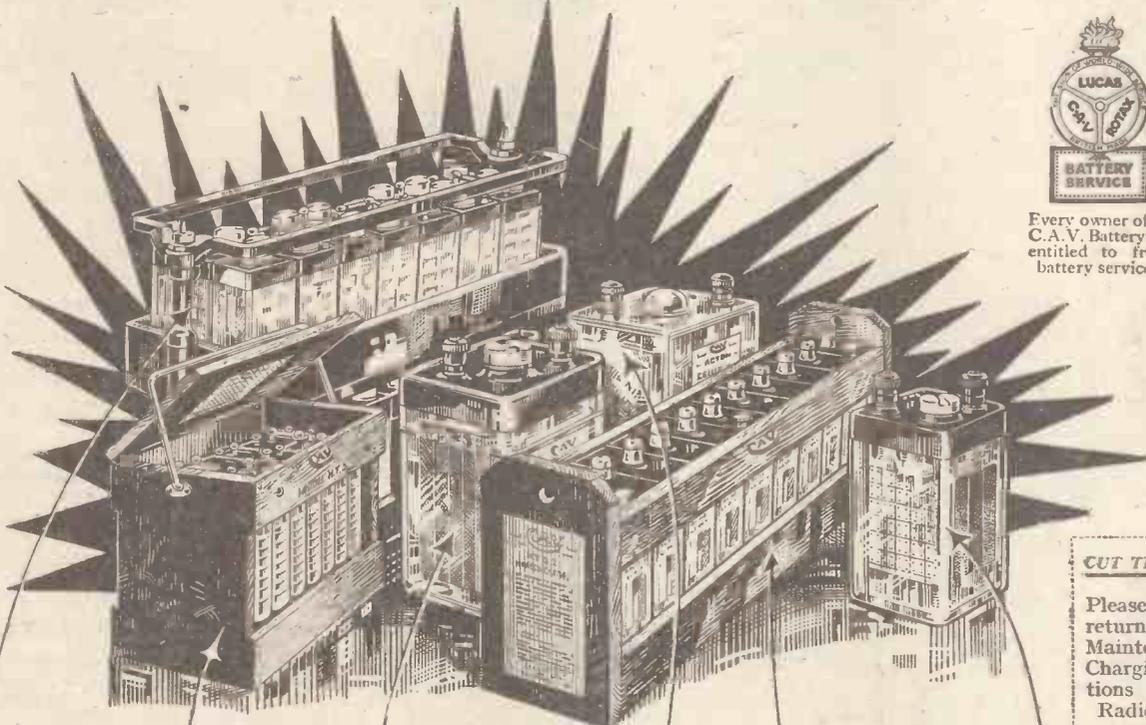
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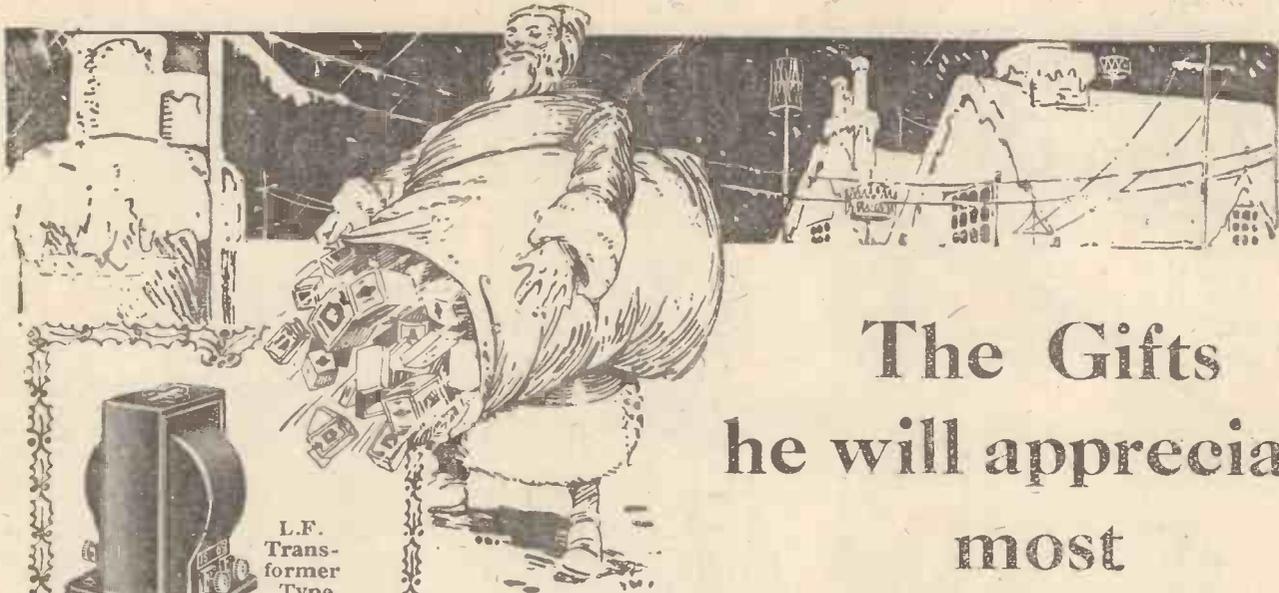
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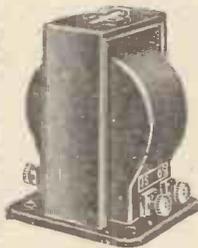
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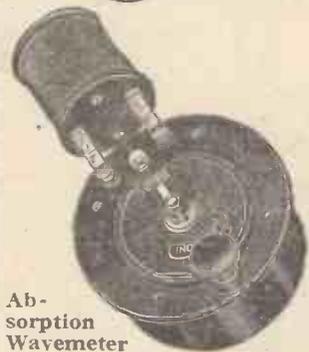
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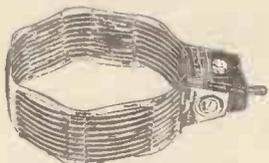
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# On Your Wavelength!

## What is Happening

ONE does not seem to hear very much of 5SW just now, either by means of the receiving set or by reports. One may be wrong—one hopes fervently that one is—but there is somehow the impression that the B.B.C. has not so far taken up short-wave transmission very strenuously. With the plant available and with the power that is behind it, one would have expected some really outstanding results to have been achieved ere this. I am not saying that there have not been results, but they have been a little disappointing.

The queer ways in which the short waves behave are, of course, proverbial. 2XAD and 2XAF provide an excellent case in point. During the greater part of the summer, 2XAD was the better and more certain signal in this country. 2XAF was really well heard only at times round about two and three o'clock in the morning. Conditions now are exactly reversed. 2XAF is nearly always an excellent signal, but 2XAD is at his best during the Saturday evening football match relays and gets steadily worse as the night goes on. The explanation is that transmissions on the 32.77-metre wavelength are best heard when it is dark in both countries, as it is just now from 11 p.m. onwards.

## Radio Drama

IN order to "lift" radio drama from its monotonous level a number of recent "productions" have had the assistance of people additional to the production staff at Savoy Hill. Some success has been achieved, but, listening to these broadcasts, it is difficult to detect any difference in the manner of telling the story. The noticeable difference is that the plays have been more varied. In most cases this variety of subject has not been achieved by outside aid.

## R.U.R.

THE revival of *R.U.R.* was very effective from the point of view of the listener and the producer. The element of luck was considerably reduced, and I was pleased to note that the play was produced by listening, and not in the old way of the producer rehearsing the cast in the studio as for a theatre performance. Undoubtedly the best place to hear these plays is in the noise studio, for there the greatest tragedy becomes a side-splitting burlesque. Standing among the ghastly instruments which produce these weird noises, you can see through a glass door the actors and actresses speaking their lines. That in itself makes the most dyspeptic critic laugh. Yet more is to follow. Some of the lines of *Rossum's Universal Robots* are

appallingly doleful, but to the magician of the noise studio these are but "cues." As I listened to these depressing words the magician rushed about with perspiring brow, the book of the play in his hand, and frantically stirred up all the noise instruments within reach. There were whistles blowing, the clash of machinery, and the rushing of water.

It was all great fun to me, but from the anxious look of the young noise-maker I gathered that his "cues" were very important. I remember that on one famous occasion during one of the B.B.C.'s first revues a dog was supposed to disappear up a vacuum cleaner. At the critical moment a moaning cat-call was given out instead of the dog's expected whimper.

*Rossum's Universal Robots* looked as if they might be mixed in like manner at any moment, but fortunately the young man working the gadgets hit on the right noises at the appropriate moments. Personally, if I worked this medley of old iron I should want a little more space. Another point is that different instruments produce different noises according to their movements. If any listener wants full value for his licence he should gain admission to the noise studio during a full-blooded melodrama. As a tip, I suggest that he should wait for *Metropolis*.

## A Puzzle—and the Solution

DURING the last week or so until by accident I discovered their solution, I have been worried by two small problems as regards the wavelengths of a Dutch and an Italian station, of which the transmissions are being received regularly in the British Isles. I knew that the new Huizen transmitter had adopted two wavelengths—namely, 1,840 metres and 1,950 metres, the latter in common with the commercial Scheveningen-Haven transmitter—but for the life of me I could not make out at what particular times these different wavelengths were used. For the guidance of readers, I am pleased to say that I am now able to give definite information. On Sundays, Huizen apparently transmits on 1,840 metres until 1.40 p.m. G.M.T., when it changes over to 1,950 metres, and again reverts to the lower wavelength at 5.40 p.m. G.M.T.; on weekdays it broadcasts on 1,840 metres until 5.40 p.m. G.M.T., from which time it works on 1,950 metres. The reason for so doing is that at certain periods of the day the Scheveningen-Haven station sends out bulletins, and the two transmitters could not possibly work at the same time on the same wavelength.

## —and Another

THE second puzzle to which I referred is of a transmission picked up on most

evenings on a wavelength of about 540 metres, which it was easy to identify as emanating from Italy. On most occasions the broadcasts were merely relays of the regular Milan programmes. As the Como experimental station which had been erected during the period of the Volta Centenary Exhibition in that city, according to official statements, was closed down towards the end of October, the solution of the problem was rendered more difficult. However, I now learn that the new 7-kilowatt telephony plant has now been brought into operation for the Milan service, which is still using its old 1½-kilowatt transmitter. For the present, therefore, these programmes, for the purposes of tests, are simultaneously broadcast on two wavelengths, namely, 317 and 545.6 metres.

## Through the Fog

WIRELESS is always being useful to the traveller by sea or by air, and the other day we had a remarkable demonstration of what it can do to help when conditions are adverse. Shortly after leaving Le Bourget one of the cross-Channel aeroplanes ran into thick fog. The pilot, of course, rose to get above this, and found stretching below him an apparently endless sea of mist. Still, he was able to continue his journey, landing safely at Croydon Aerodrome on scheduled time. From the moment when he first encountered the fog until that at which he landed at the aerodrome he never saw land or water. He was, in fact, guided the whole way by wireless.

## Startling!

WANDERING gently downwards from the 300-metre mark the other night, I came suddenly upon a signal of terrific strength. I was wearing the phones at the time, and I can assure you that I very hastily removed them for fear of having my eardrums blown in. Dance music was going on at the time, and when I had switched over to the loud-speaker I sat down to wait for the call-sign or some other indication that might help me to identify this amazing transmission. A reference to the calibration chart showed that the wavelength was just a tick under 246 metres. A further reference to the list of stations showed that there was nobody down as using any such wavelength. Still, there was the transmission right enough, and I knew that the calibration chart did not lie. Then an inspiration came. A rapid calculation was made, and I bet myself tuppence that I had spotted the station.

Before you read any further, just think about it for a moment and see whether you can. You can't? Well, just try

## On Your Wavelength! (continued)

dividing 491.8 by 2. The answer (said he with a superior smile) is 245.9. What I was listening to was the second harmonic of 5GB. Any lingering doubts were shortly set at rest by the voice of the announcer. With me this harmonic is tremendous, and, curiously enough, it comes through with practically as good quality as the fundamental. I don't know at what sort of distance it is heard, but possibly some of those who complain about spark interference on 5GB's wavelength may find it worth while to try receiving him on the harmonic. Curiously enough, I do not get a short-wave harmonic on 491.8 metres, but several friends living farther away than I do from Daventry tell me that they receive it.

### A New Scheme Wanted

THE basis of the original Geneva scheme of wavelengths was, as you know, that there should be a 10-kilocycle separation between all main stations and between groups using common wavelengths. If you examine now the complete list of stations you will probably be astonished to find in how few instances such a separation still exists. To take one little belt, we have 5GB with a frequency of 610 kilocycles. Immediately below is Berlin Witzleben on 620. The next station should be on 630, but it isn't. Lyons Doua has a frequency of 624, Langenberg of 638, Barcelona of 649, Oslo of 650, Paris PTT of 655, Stockholm of 660, Rome of 666, and so on.

There should, in theory, be more heterodynes than there are. There are enough, goodness knows; but it is remarkable how some stations manage to get through without interference from neighbours that are far too close according to Geneva ideas. Hamburg is rather a case in point. Though he is separated by only 7 kilocycles from the group which includes Cork, Plymouth, and six other stations, one can often receive him quite well. And, funnily enough, Cork, despite his seven group-fellows, often elbows his way through and is remarkably well heard. The great tip when going for foreign stations is to take the most powerful. If there is sufficient strength behind a transmission it is often able to entirely drown interference and to come through exceedingly well.

### Some Little Fellows

STILL, the rule about always picking the highest powered stations does not always hold good, for some of the little chaps are remarkably well heard. Amongst these I would mention the Petit Parisien, which is rated at only .5 kilowatt, and the wonderful Swedish relays. The strength at which the latter are received, though few of them are rated at more than .35 kilowatt, is nothing short of astonishing.

When I tuned down below 240 metres I hear "Stockholms Radio" again and again as the condenser settings are reduced. Not a few of them are so good that excellent loud-speaker reception is obtainable with one high-frequency stage and two note-magnifiers. Some, of course, are heterodyned or swamped by mush, but the majority are really worth listening to. Another astonishing low-powered station is Stettin, rated at .75 kilowatt. Catch him at a time when he is working alone on 236.2 metres, and you will be astonished at both his strength and his quality. Of our home relays, Edinburgh appears to have wonderful distance-getting powers.

### A Compliment

I WAS very interested the other day in listening to Lahtis, in Finland, which was transmitting a programme having a curiously familiar sound. I do not speak Finnish fluently (not at all in my usual finished manner, as one might say); in fact, I am not quite sure whether I know a word of this attractive language. Nevertheless, listening to this programme, it seemed to me greatly reminiscent, and suddenly I grasped what was happening. It was none other than our old friend "Music and the Ordinary Listener" translated into Finnish. We had snatches of explanatory matter accompanied by five-finger exercises to illustrate the particular point, after which the whole thing was blended together in an exquisite rendering of the "Guillotine March" from the "Three Blind Mice." As I say, I do not speak Finnish, so I may have misinterpreted the actual item; but there was no doubt about its character.

I am proud to say, however, that Britain still holds the field. There was not the same forceful vitality about this particular transmission which we are accustomed to associate with Sir Walford Davies, nor were there the same joyous excursions into song in order to elucidate some particular point. But who shall say that British broadcasting is dull when we have such striking evidence of imitations in such far-flung corners of Europe? [It isn't very fat!—ED.]

### Atmospheric Disturbances

IN all probability many readers will think that I am referring to the noisy type of interference when they see this title, and more than likely they will wonder what I have got to say on this subject at this time of year. I am referring, however, to the other type of interference which takes place actually on our wireless gear when the weather experiences those queer changes which have taken place during the past few weeks. More than likely, many readers will have wondered at the very apparent change

in the tuning capacity of their sets or at the noises which have arisen, but which are clearly not due to the ordinary static disturbances with which they became only too familiar during the summer months that have passed.

These noises and changes are often due to the dampness which prevails in our atmosphere, and which takes an early opportunity of invading any unprotected portions of the gear, such as unvarnished coils or exposed condensers, poor lead-in tubes and ebonite, and the like. Also a marked falling off in signal strength might be experienced from the same cause. The moral is that when a set is built in the first place, every care should be taken to render it weather-proof.

### The Short-wave Joke

NOW that we have at last reached that stage of history in broadcasting when we are able to listen to programmes on extremely short waves, public interest will be re-awakened in the design of suitable receivers for this work. In this connection it is very interesting to note that for some years many writers, mostly American, have written articles claiming that apparatus described by them is capable of reaching down to very short wavelengths such as .5 metre, etc. It has now been demonstrated beyond question that the ordinary commercial valve, such as is used in broadcast receivers and transmitters, cannot be made to generate such short waves, no matter what circuits are used in conjunction with them, and that the fundamental wavelength of the valve itself and its electrodes is higher than the wavelength named. The lowest wavelength which we can hope to reach with such valves is something in the neighbourhood of 2 metres, and even then the oscillations are hardly steady enough for heterodyne reception over anything but very short distances.

The wavelength of about 5 metres seems to be about the lowest to which we can go with ordinary types of valve, and even then very special precautions have to be taken to render the oscillations stable, owing to the fact that a certain amount of frequency pulling takes place on the filament. Some form of balanced circuit with two valves seems to be a partial solution of the problem. In the meantime, research continues, for a considerable number of stations can be placed in very narrow bands on the short wavelengths without interfering one with the other, and if by any means these wavelengths can be made a practicable proposition, we shall have heard the last of an overcrowded ether for a long time to come. The Americans are particularly keen on developing this waveband for very obvious reasons.

THERMION.



# WIRELESS STUNTS FOR CHRISTMAS!

WE wireless enthusiasts naturally wish to make the most of this opportunity to show our friends how radio can help to make a merry Christmas party still more jolly.

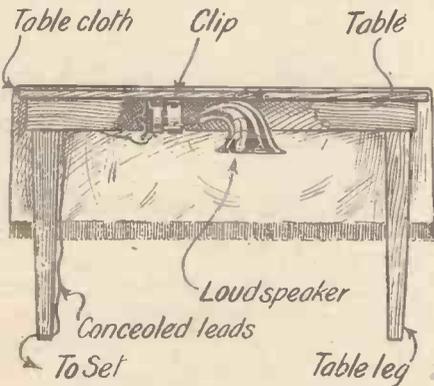


Fig. 1—The Invisible Orchestra

Apart from the fun and pleasure our experiments and tricks provide, there is another side to it: Some of the members of our party may as yet not be interested in radio; and our humble efforts may impress them more than any textbook.

An endless variety of radio tricks is possible with quite a modest equipment and few accessories, but it must be borne in mind that the simpler the "stunt," the more surprising will it prove. For this

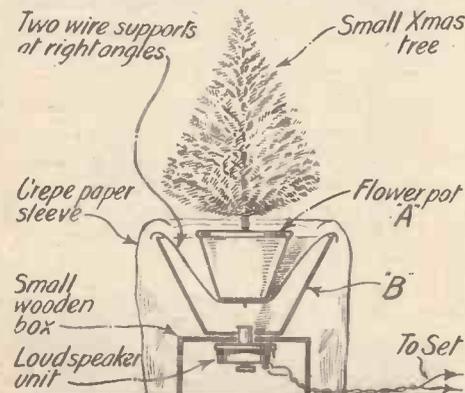


Fig. 3—The Musical Christmas Tree

reason the tricks illustrated here are as simple as possible.

Just a word of advice: rehearse each trick beforehand, else one or two may fall flat and your reputation will suffer.

"The Invisible Orchestra" (Fig. 1) is a little experiment which cannot fail to amuse. Concealed under the table, and held in

position by a brass clip or leather strap, is a small loud-speaker. Its horn points downward, the leads going to the set are hidden behind one of the table legs, and are run along the floor, concealed under the carpet.

The overhanging tablecloth assists in hiding the loud-speaker, and when the feast is well under way, a confederate switches on the wireless set which should be placed in an adjoining room, if possible.

The music must not be too loud, soft music is much more difficult to trace; if the set has a volume control this can be used to increase very gradually the volume.

"Nice music," someone will remark, "where's the loud-speaker?" If no speaker is visible in the room it will take some time before a budding Sherlock Holmes discovers the hidden instrument.

The party will vote this a jolly stunt, but we have further surprises for them. Let us see how they will like the "Singing Bust!"

We will assume that the stage is set; on the mantelpiece, or on a shelf or even a small table, stands a plaster bust which can be obtained for a shilling or two.

When the rollicking fun has died down for a moment, plug in the jack and switch on your set—mellow music will come from the bust!

When your trick is discovered, you can

explain how it was done: A small loud-speaker unit, such as the Lissenola, is mounted on a circular wooden base with three small clips bent from thin brass strips,

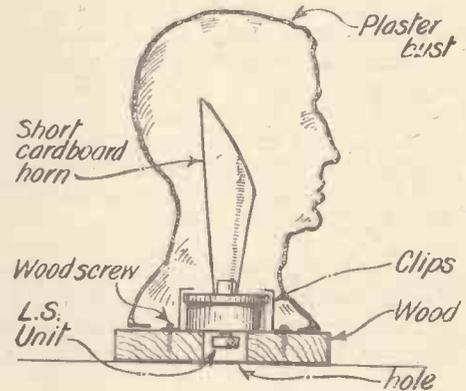


Fig. 2—The Singing Bust

the bust stands on this base, a central clearance hole in the latter affords a recess for the adjusting screw of the loud-speaker unit. A short horn, made from cartridge paper or thin cardboard, is fitted to the nozzle of the unit to improve the volume (see Fig. 2.)

Another "musical item" awaits the attention of our party. In a corner of the drawing room, on a low table, for instance, stands a little Christmas tree. Although

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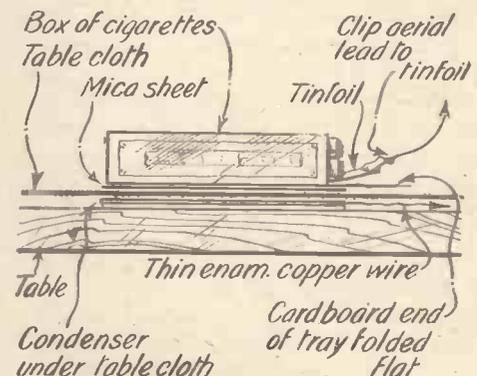


Fig. 4—The Cigarette-packet Aerial

our friends do not suspect it, this tree is really musical, and we can prove it by merely switching on the set.

Mellow music seems to come from the very roots of the tree. The secret of our experiment is revealed in the sketch (Fig. 3); the tree is planted in a small flower-pot and this is suspended inside a second,

Wireless Stunts for Christmas (Continued from preceding page)

much larger, flower-pot in such a way that a fairly large airspace is left between the two.

The large flower-pot stands on a shallow box which also houses a Lissenola or similar loud-speaker unit. The nozzle of this unit projects into the clear space between the two flower-pots, so that this space acts as a short horn. A crepe paper sleeve should surround box and pot.

We have still more surprises for our party! Casually, we ask a fellow fan: "Did you know that a packet of cigarettes makes a jolly good aerial?" Naturally, he refuses to believe such an unlikely thing, and, once more, we must prove our contention.

To show that there is no deception whatever, we borrow from a member of the party a packet of cigarettes, the only conditions we make being that the packet must be a large one (shilling size, for instance) and that the cigarettes must be wrapped in tinfoil—"Tin is essential as a conductor of electricity, you know,"—we explain.

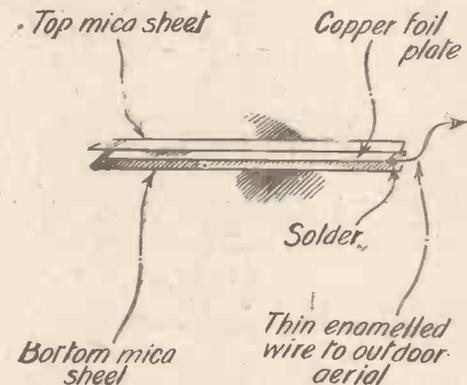
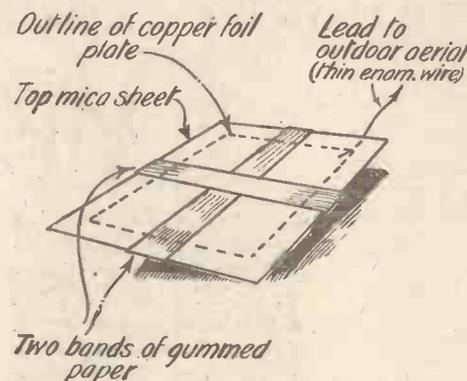
A "twenty" box is placed at our disposal by a friend, and we ask the members of the party to examine box and contents carefully to see that neither is prepared in any way.

The box is placed on the table; under the box we lay a thin sheet of mica slightly larger than the box.

The tray holding the cigarettes is partly withdrawn as shown in the illustration (Fig. 4), and folding back the flap we attach a wire to a corner of the tinfoil wrapper, using a small clip for this purpose. The other end of the

wire is secured to the aerial terminal of the set.

Now we ask a friend to switch on the set,



Figs. 5 and 6—Details of Hidden Plate

—he does so, and remarkably enough, the set works as well on this miniature aerial as with the big outdoor one.

We can prove that the "juice" is actually coming from the cigarette box, by simply tearing off the corner of the tinfoil to which the wire is attached. Immediately, the music stops, only to start again when the connection is once more established.

"Wonderful," some fellow amateurs will exclaim, "how does he do it?"

The solution is simple enough, the tinfoil wrapper is one plate of a condenser, the other plate is hidden under the tablecloth and connected to the outdoor aerial by a very thin enameled copper wire.

Together, the two plates with the mica sheets between them make a capacity lead-in, a condenser in series with the aerial.

The hidden plate is a piece of thin copper foil, about 3 in. square; to insulate it the copper plate has been placed between two thin sheets of mica (Fig. 5) gummed paper bands hold the assembly together, as indicated in Fig. 6.

The lead-in coming from the outdoor aerial is soldered to one corner of the copper foil; as very thin enameled wire is used for this connection, this lead can be effectively hidden.

The concealed plate with its insulating cover is quite thin, and will scarcely be detected under the tablecloth. The latter should be as thin as possible, to give our condenser sufficient capacity.

Naturally, when carrying out this experiment, the demonstrator must know where the hidden plate lies under the cloth, so that he can place the cigarette box immediately above it. The table should preferably stand in a dim corner, and not too far from the aerial lead.

Operating the "Standard Three" :: The Three-valve Receiver described in Last Week's Issue

IN cases where all three valves have to be used in this receiver the table gives the correct sequence of types. The table was compiled on the assumption that all three valves are to be used, but where two are sufficient, ignore column v2 and take v3 as the correct column for the second valve.

The simplicity of operation of this receiver is one of its most attractive characteristics. The main control is the dial of the slow-motion variable condenser which is rotated until the local station is received. Adjustments of grid-bias voltages, and detector H.T. voltage should then be made until the maximum signal strength combined with purity of reproduction, without reaction, is obtained. If necessary the reaction condenser can be used to bring up the strength. Do not overlook the fact that a No. 60 reaction coil, if closely coupled to the aerial-

2-VOLT VALVES FOR USE IN THE "STANDARD THREE"

Make	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>
B.T.H. . .	B21	B22	B23
Cosmos . .	SP18/G	SP16/R	SP18/RR
Cossor . .	210H.F.	210L.F.	220P
Ediswan	HF210	GP2	PV2
Marconi	DEL210	DEL210	DEP215 DEP240
Mullard . .	PM1H.F.	PM1L.F.	PM2
Osram . .	DEL210	DEL210	DEP215 DEP240
Six Sixty	SS210H.F.	SS210L.F.	SS215P

N.B.—Corresponding 4- and 6-volt valves can, of course, be used instead of the 2-volt valves mentioned.

tuning coil, will give an appreciable "build-up" effect with the reaction condenser at zero. Over-application of the reaction invariably mars the quality of reproduction. This is not so noticeable on more distant stations, owing to a number of other sources of distortion.

Using two valves, with the change-over switch "down," the local station was tuned in at good loud-speaker strength. With the switch "up" on three valves, many distant stations were readily receivable on the loud-speaker. A short aerial assists in "sharpening" the tuning, although for greatest signal strength a full 100 ft. aerial is recommended, together with a good earth connection.

An Ealing reader informs us that he has Nos. 1 to 186 of AMATEUR WIRELESS and would sell them to those who wanted them.

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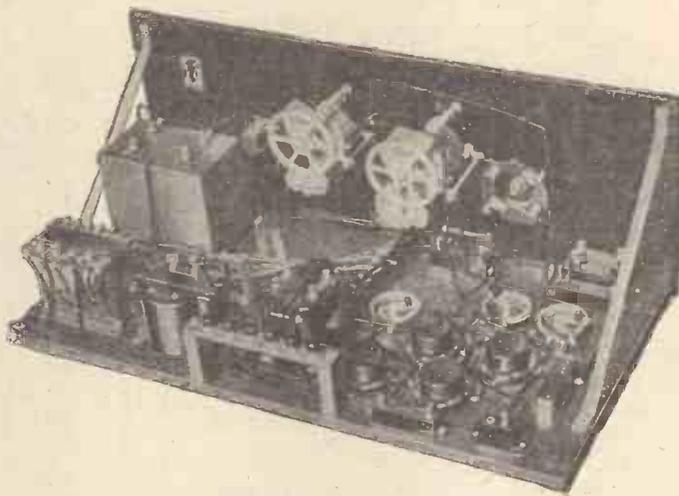
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The receiver illustrated—the K.2, a 4-valver—in addition to operating entirely from A.C. Mains, is fully as efficient as the best four-valve circuits. And remember, in addition to taking all maintenance *worries* from you, it also lightens maintenance *costs* to an amazing and welcome degree. The K.2, used every day for a year, costs, at most, 35s., and as little as 10s. or less if a power supply is available. Compare this with the annual cost of H.T. batteries and accumulator charging.

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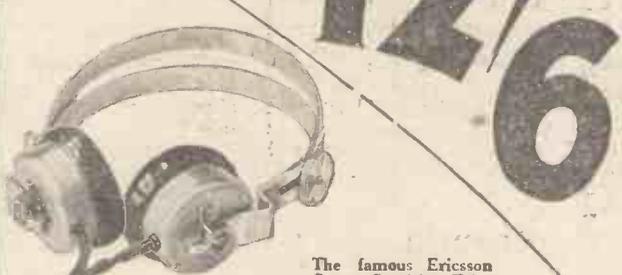
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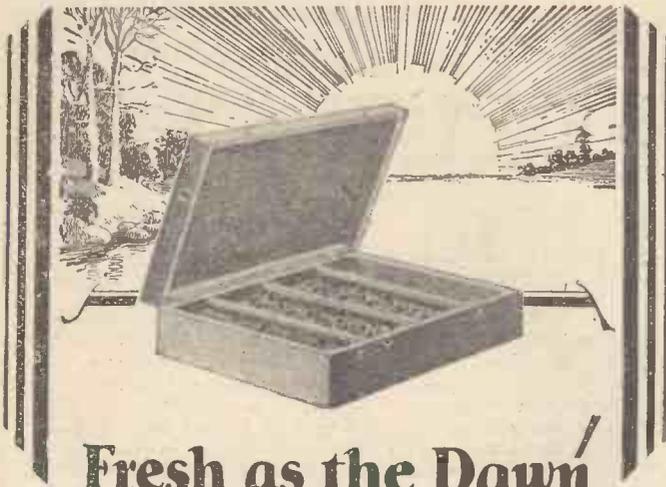
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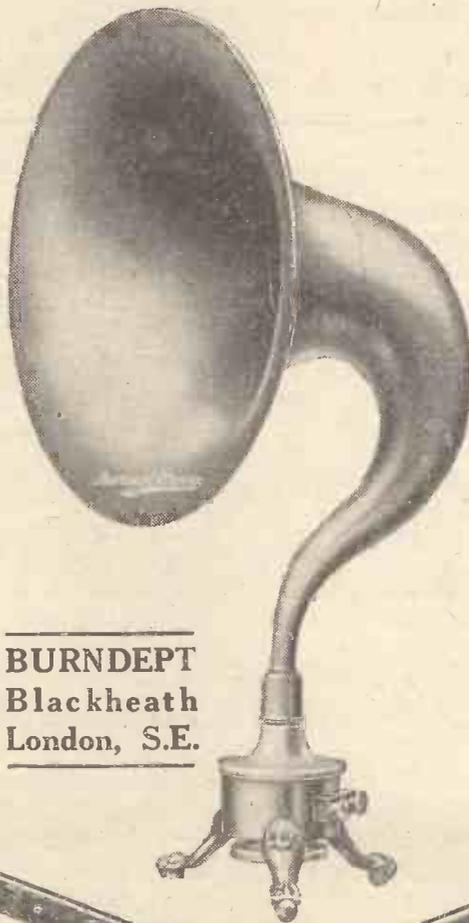
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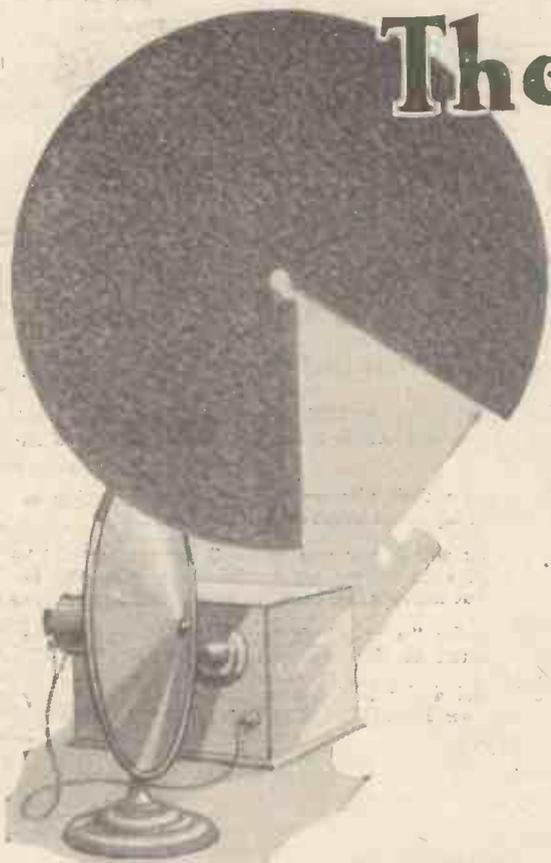
Your local dealer will demonstrate, or we will gladly do so at our Showrooms at 15 Bedford Street, Strand.

Anyway, don't delay, but ask us for descriptive folder now. Then you will just have time to make another happier home this Christmas.



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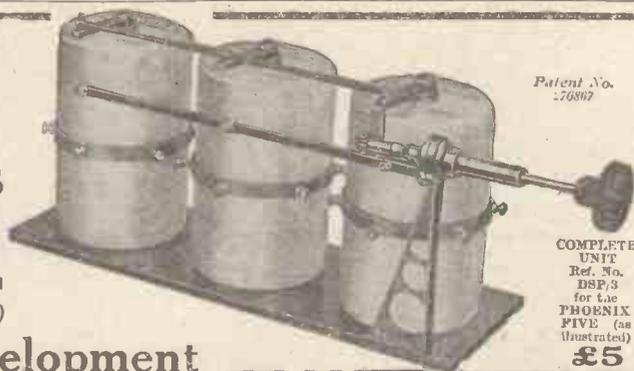
(Described in "Wireless Magazine," December, 1927)

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# Radio Photo-Telegraphy

Dr. Alfred Gradenwitz describes the New Lorenz-Korn System

MANY problems which, until a short time ago, were considered impossible of a satisfactory solution have, during recent years, in the quiet of the laboratory, been solved, and difficulties once thought unconquerable have been disposed of. This was the case with the airship and aeroplane, as well as radio broadcasting, to all of which the man in the street, with surprising rapidity, has grown accustomed. A similar process is now going on with photo-telegraphy—the telegraphic transmission of pictures, photographs, drawings, and handwriting—which during the last few years has opened up new vistas of practical application. While the fundamental principle, ever since the early work of Professor Korn and other pioneers, has hardly been altered, the adoption of amplifier valves has greatly improved results, reducing the times of transmission to a fraction of their initial figures, and thus providing unthought-of economic possibilities.

Professor Arthur Korn, of Berlin, on whose system frequent transmissions of press photographs had been made before

obtained was made by Professor Korn at the recent International Congress of Physicists, held at Como (Italy). A summary of this address is given in the following:—

Tele-photographic transmissions could, until a short time ago, only be made with transmitted light, i.e., with pictures made transparent. Now, however, Korn, and other experimenters have succeeded in working with reflected light. In fact, the original picture can be used for immediate transmission in the form of drawings, sketches, photographic prints, etc.

An original such as one of these at the transmitting end is attached to a rotating cylinder, which at each rotation advances a short distance in the direction of its axis; so that all the various sections of the pictures will be passing, one after the other, below the searching device. The cylinder is about 15 cm. long and 20 cm. in circumference, thus allowing pictures of 13 by 18 cm. to be readily used.

The intense light of a lamp is, by means of a lens, concentrated on a picture element less than  $\frac{1}{16}$  square millimetre in area. The light reflected from this minute section eventually passes through a lens system the focus of which coincides approximately with the picture element, being ultimately reflected therefrom on to a photo-electric cell; that is, an electric cell sensitive to light. Instead of ring-shaped cells, Korn uses minute rectilinear glass tubes lined inside with potassium, thus preventing any but the light actually reflected from the various picture elements from striking the cell and eliminating, as far as possible, any disturbing light effects. This is why there is no need to cover the transmitter, which in moderately strong daylight can be left quite open.

The beam of light, which, according to the actual shading of the corresponding



Prof. Arthur Korn, from a sketch by Frau Korn

picture element, is more or less intense, will in the sensitive photo-electric cell set up a current impulse of varying intensity. This is amplified as desired, supplied to the radio transmitter, and super-imposed

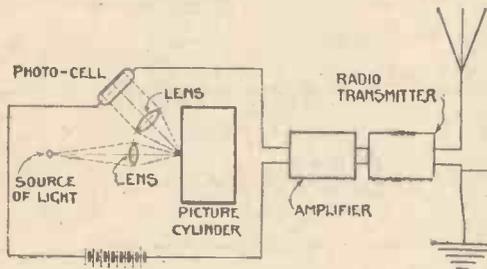


Diagram of Lorenz-Korn Transmitter

the war between Berlin, on the one hand, and Munich, Paris and London, on the other, as well as between the Scandinavian capitals, has lately been working in conjunction with the C. Lorenz firm—one of the two or three German companies which, ever since the early days of radio-telegraphy, have been engaged in developing wireless. The result of these joint endeavours is an outfit which, even at its present stage, is well developed in every detail, and which, with surprisingly short times of transmission—with or without the intermediary of conductor lines—enables excellent photo-telegraphic reproductions to be obtained.

The first statement of results so far

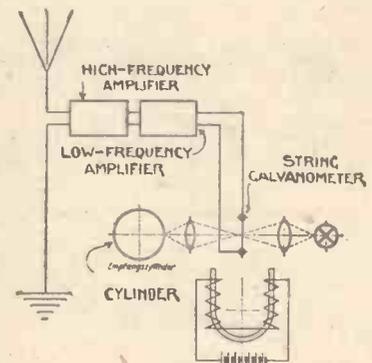


Diagram of Receiving Arrangements

upon the electric waves issuing from the latter—just the same as the microphone currents in ordinary broadcasting.

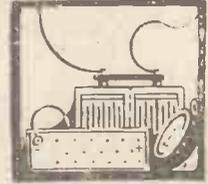
At the receiving station there is a rotating cylinder similar to that of the transmitting station which carries a sheet of photographic film or paper. The receiving cylinder turns in perfect synchronism with the transmitting cylinder and, like the latter, advances a short distance with each rotation. It is located in the interior of an opaque box (Concluded on page 886)



Examples of Radio Photo-telegraphed Reproductions



# PRACTICAL ODDS & ENDS

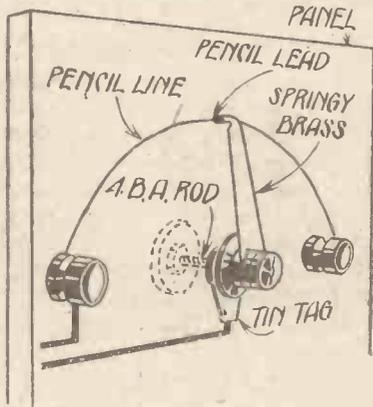


## A Variable Grid Leak

THE variable grid leak illustrated in the diagram given below has two novel features which will recommend it to constructors. In addition it is very simple and cheap to fix up.

The use of a graphite line as a resistance is well known. The chief virtue of this particular method of using the principle is that constant contact is ensured between the moving arm and the graphite line by the piece of lead pencil "nipped" on to the end of the arm.

Some space and a good deal of trouble are saved by having the pencil line on the back of the panel itself. The constructor



A Variable Grid Leak

should first roughen the ebonite with emery paper; it will then take the lead better. Care should also be taken that the line makes contact with the terminal to which the connection is made. It is advisable to use a second terminal or stop.

All other constructional details are shown in the drawing. C. V.

## Making Accumulator Cases

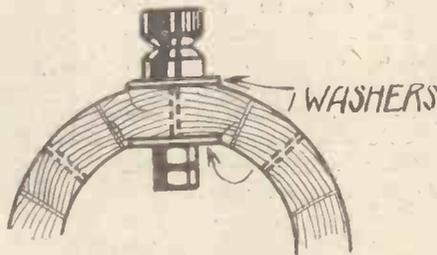
MANY amateurs choose to make their own accumulator cases. Usually soft wood is used because of the difficulties encountered when working hard wood. The next difficulty is that they are not acid resisting and do not last long as accumulator cases.

To overcome this give the case two coats of black enamel. This preserves the wood. To preserve the enamel against the acid, sprinkle over the bottom of the case a little solid sodium bicarbonate or baking soda. This will neutralise the acid as it reaches it. Of course, the sodium bicarbonate has to be renewed periodically and the case cleaned out. C. M. B.

## Centre-tapping Home-made Coils

SHOWN in the illustration is a neat method of centre-tapping home-constructed honeycomb coils, which the writer has made use of very successfully.

When winding the coil a loop should be left where it is desired to make the tapping.



A Centre-tapped Home-made Coil

The loop should then be bared and clamped under the washer and nut of a small terminal, the shank of which is pushed through one of the openings in the honeycomb, as shown in the drawing.

A large washer should be placed on each side of the coil so that when the nut is tightened up the terminal will not damage the wire. K. C.

## Obtaining Voltage Tappings

IN the way shown in the drawing given below an ordinary flash-lamp refill can be converted into a very serviceable grid-



Flash-lamp Grid-bias Battery

bias battery with tappings at 1 1/2, 3, and 4 1/2 volts. It is certainly one of the neatest ways of doing this and it is simple to effect.

The drawing makes most points clear. Ordinary valve sockets are obtained and soldered on to the positive tag and on to

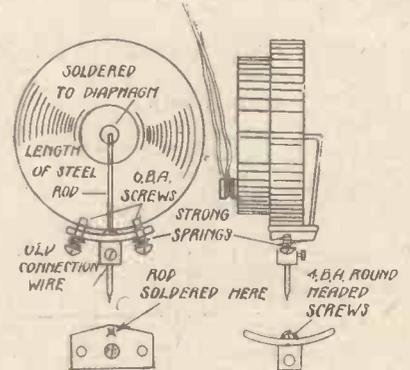
the zinc cases of the three cells, which are exposed by cutting away the casing of the battery.

Connections are, of course, made by means of valve legs soldered to the two G.B. leads. H. B.

## A Gramophone Pick-up

THIS idea will be of special interest to those listeners who possess gramophones. Although this pick-up may not be as efficient as the purchased article, the results obtained with it are good.

The essential part is the rocker plate. This should be cut and bent into the shape shown. It is drilled in the centre for the



A Gramophone Pick-up

4 B.A. round-headed screw, to which it is then soldered. The screw is also soldered into the half of a wire connector. These connectors are sometimes known as "barrel connectors."

The two 6 B.A. screws and the spring keep the round-headed screw lightly against the frame of the earpiece. They work easily and tend to restore the needle to its original position as it is rocked to and fro by the groove in the record.

It is also essential that the rod from the rocker plate to the diaphragm be of steel. A flimsy rod will not convey the vibrations faithfully. A piece of bicycle-wheel spoke is recommended.

As regards attaching the earpiece to the sound-box arm, it is best to leave this to the individual constructor, as methods will doubtless occur to his mind. The unit is, of course, connected to the valve in the usual way, that is, through a transformer. G. C.

DO NOT MISS THE COMPETITION ANNOUNCEMENT ON PAGE 904

# BROADCASTERS OF THE MONTH



**HELENA CECILE.**—One of the most popular entertainers and singers at 2LO, as well as the provincial stations. She makes a speciality of character studies and scores also as a raconteur.



**CRUE DAVIDSON.**—One of the earliest of broadcasters, Miss Davidson recently broadcast with immense success from 2LO. She possesses a very wide range as well as a repertoire varying from folk songs to operatic arias.



**HERBERT PARKER.**—A clever baritone and a popular broadcaster, Mr. Parker has sung at most of the big concert halls in the country. He makes a special cult of folk songs, as well as of the more classical songs.



**KATHLEEN MOORHOUSE.**—A young Manchester 'cellist, she has already achieved success as a member of the Hallé Orchestra. She has toured the stations as soloist, and is also a member of the Edith Robinson String Quartet.



**BEN LAWES.**—Popular entertainer. His métier is the Pellissier type of entertainment and he makes an ideal pierrot. Over the ether, he has made many friends, and his witty style of humour is always appreciated.



**TOM CLARE.**—As an actor and entertainer Tom Clare is known all over the world. He was the originator of the title role in "Cohen on the Telephone" which has been acted, recorded, and phono-filmed. He appeared recently at 2LO.



**HORATIO NICHOLLS.**—Few composers have written more popular songs than Mr. Nicholls. He may be termed the "best seller" of pantomime hits. His latest is "Souvenirs," which has caught on in London.



**LOUIS GOLDING.**—This well-known novelist has broadcast several times from 2LO. He makes a point of actually travelling through the scenes in which he lays the plot of his works. His views are distinctive, and carry weight because of the experience behind them.



**GWYNNE DAVIES.**—This famous Welsh singer has been principal tenor at Covent Garden and Carl Rosa operas, besides singing at all the great concert halls in the kingdom. His finest operatic role is Rudolph in "La Bohème."

# WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

THERE is nothing like wireless for a wet day! Nothing like the London Radio Dance Band and the Birmingham Studio Orchestra to clear away depression caused by the ubiquitous fog.

What would be intolerable in some moods becomes most acceptable under these circumstances.

I listened, for instance, with concentrated contentment (a good phrase this!) to the Hackney Schools Musical Association concert relayed from the Hackney Empire. I wonder how many hearts thrilled at the singing of that haunting school number, "Oh, Who will O'er the Downs with Me?" The Hackney kiddies certainly deserved the encore.

Did you hear Professor Davey's address from the Glasgow studio during the service which he conducted? It was of particular interest to me, because the reverend gentleman gave out the prayers and the reading in quite ordinary, rational tones. His address, too, was delivered without that over-powering exhortation which frightens so many of us. It was a scholarly address, too—or should I say essay? One fault, Professor Davey. You speak too fast. You must recollect that your audience gets what you say more or less second-hand, and consequently the impression is not so striking nor so easy to follow as it would be if one could see you as well as hear you. Next time, cut down what you have to say by half and do the whole thing in the same time.

And, while on this matter of addresses, it would be a good point if the B.B.C. not only timed a speaker, but helped him by suggesting a limited number of words. In my view, no address should be longer than a thousand words, which is more or less a column of newspaper press. If a man cannot say what he wants to say at this length, then he is a poor appellant.

The British Vocal Quartet is a great success. There is Dorothy Bennett (soprano), Esther Coleman (contralto), Eric Greene (tenor), and Dale Smith (baritone). That fascinating "Catch," which they sang unaccompanied, was irresistible, and would certainly have evoked insistent calls for encore had it been given publicly.

That, old favourite, "Carmena," was also a joy to listen to, but I fear that the soprano was drowned by her more powerful colleagues. Miss Coleman sang divinely, although I didn't like the setting of "The Sweetest Flower that Blows." Dale Smith was in fine form.

I see I forgot to mention, in regard to the religious service from the Glasgow studio, that the usual order of things was reversed. Whereas the address was good, the singing was not at all up to the London standard.

Yvette Darnac has a good voice, and one would like to hear her in some French ballads instead of the commonplace English songs that she sang. Harry Hemsley excelled himself with the Cinderella story the same evening. He is certainly a palpable wireless "hit." Neil Kenyon's subtleties do not always get across. Perhaps it is because he does not hit them home with a sledge hammer.

As I expected, Harriet Cohen, the renowned pianist, has made good and has been playing to us a good deal since first



Dr. Alfred Gradenwitz, the eminent German writer, who contributes the article "Radio Photo-telegraphy" appearing in this issue

I noticed her in these columns. She is certainly one of the world's best pianists.

I wonder how many lay listeners realise that Sir Herbert Brewer is one of our notable composers? Isn't that song, "Ninetta," captivating? It is remarkable to think that only through the medium of wireless have most of us had an opportunity of appreciating the talent of our native composers.

*A Bonny Boy*, a comedy by R. Bromley Taylor, was better than some of the other plays to which I have drawn attention. I guessed the *denouement*, however, because of the hesitation by the mother when asked what her son's name was. Others in the room, however, were mystified right to the end. Were you?

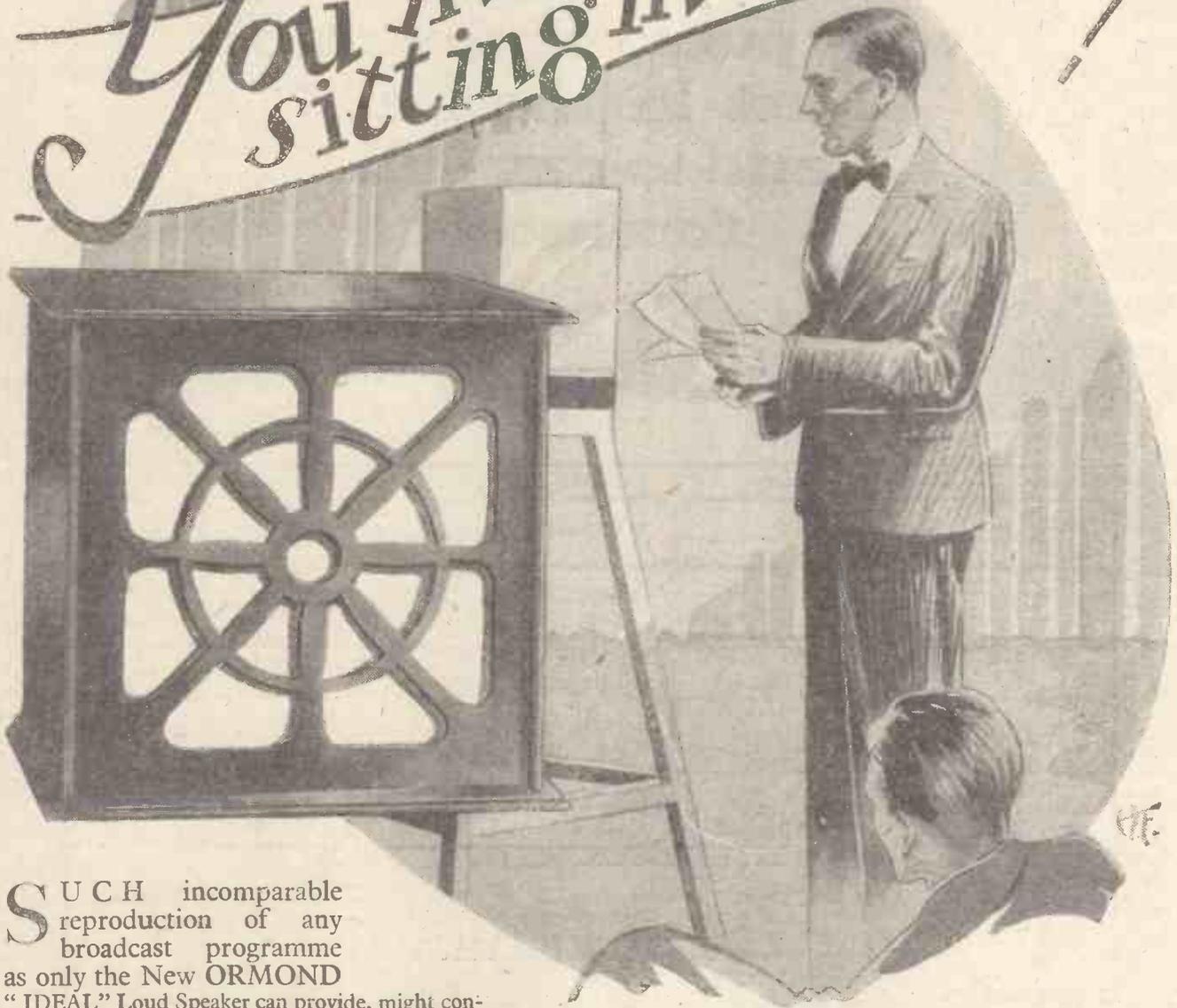
Sorry, but the Roosters do not appeal to me greatly outside their war reminiscences. The other evening they followed the tendencies which I spoke about recently—jokes about drinks, popping of corks, and inanities of that sort. If they go on doing this they will lose their reputation for originality and will have to change their title from the Roosters to the Roisterers!

And I certainly must give a little space to the entertainment entitled "This Programme Business," which was written and arranged by Cecil Lewis. Lewis is certainly an egotist, and all through the entertainment I was trying hard to conjure up the sort of listener who would be interested in this "Cecil-ing," "Donald-ing," and "Mac-ing." Why don't they call each other "darling," and be done with it? As for the Pekin story, which seemed to occupy most of the time, I am at a loss to understand why it was given at all.

Donald Calthrop, by the by, was less voluble and, consequently, much better in his little effort.

Mr. R. E. Fraser, assistant sales manager of the Electron Company, approves my estimate of Mabel Constanduros. "Speaking for myself," he writes to me, "I was very pleased to read your criticism, as she is, in my view, the best comic broadcasting turn to-day." A sentiment with which most of my readers will certainly agree.

*You might be sitting in the Studio*



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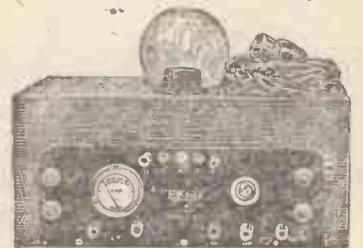
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Advertisers Like to Know That "You Saw it in 'A.W.'"

# ETHER FISHING —and Identifying the Catch

By J. GODCHAUX ABRAHAMS

IN his excitement, Graves kicked me on a tender spot.

"What's that?" he shouted with glee.

"My shin, if you don't mind," I retorted huffily as, bending down, I rubbed it vigorously.

The new wireless set had been delivered, and a friend had sent out through the telephone an urgent S O S to which, with the curiosity possessed by every radio fiend, I had readily responded.

"Sorry, old man," he added, "but what was that? Sounded like a ticking noise."

"A metronome," I replied. "The question is, from which station have we picked it up? Vienna uses it, Berne possesses one, Radio Toulouse switches it on between items, and most of the Germans have adopted it as an interval signal."

As Graves had never heard of a wave-meter, it was evident that we should be compelled to identify the station by other means:

"But this is not so difficult as it would appear at first sight," I added. "Jot down the condenser readings, and remember that the one controlling the closed circuit is the more important of the two."

He did so. "And the next step?"

"Is to find two transmitters, one on each side of, and as near as possible to the mystery station."

"If we wait," retorted Graves, we may pick up the call."

"Certainly we may, if we wait. For how long shall we have to hold it? Better to work on another portion of the band and come back to this station later."

Fates were propitious; it was a favourable night marred by but few atmospheric, and the time, 8 p.m. (G.M.T.), was one at which both home and foreign stations were on the air with their main evening programmes. A twirl of the condenser brought in an orchestral transmission at very loud strength, it was our luck to capture the closing bars of the item.

"Here," I mentioned as we read off the degrees on the condensers, "it is our duty to stand-by for the call." It was not long in coming, although the interval was greater than was the case with our home broadcasters: *Achtung*, said a gruff voice, *Hier der Sender Langenberg*. The balance of the announcement, to us, at least, was superfluous.

"Above our mystery man?" asked Graves.

"Yes," I replied. "Langenberg on 468 metres. Roughly speaking, I should say that your metronome station was about 50 metres below."

"You're going too fast for me," he observed, "and—"



Perhaps I was, so I switched off, lit my pipe and sat back in my chair.

### What are They?

"To assist in the identification of transmitters," I explained, "it is essential you should have, (1) a list of stations in order of wavelength, (2) another list of the transmitters classified by countries, and also in the same order. You will find a very useful one in each week's copy of AMATEUR WIRELESS. When you have had considerable experience with this or any other receiver, you will only need them to refresh your memory, but as you do not know all the wavelengths, you should keep them in front of you when tuning your set. Of course, you will say it is quite easy to pick up 2LO, and noting its readings, use them as a basis. It is, but as you are within two miles of this transmitter, you will probably receive its broadcasts in more than one position on your condensers; in fact, as regards the aerial circuit, it is quite likely that the transmission may cover several degrees. The exact tuning point of 2LO can be ascertained later when you have plotted out the positions of various foreign stations."

Graves nodded assent.

"Very well then, what we must do is to establish roughly the wavelength on which our mystery is operating. We know that we are using coils for the ordinary broadcast band, say 250—550 metres, and, consequently, our two outside limits are fixed."

I pointed to the log taken of Langenberg. "We also know that this wavelength is 468 metres, and now require another jumping-off point. I suggest that we try for two or three stations which are usually fairly easy to receive, say Stuttgart, Frankfurt-on-Main and Rome."

We switched on the set, and having, with some difficulty, cut out London, heard a song

(Concluded on page 900)



Ether Fishing: All Europe is Available

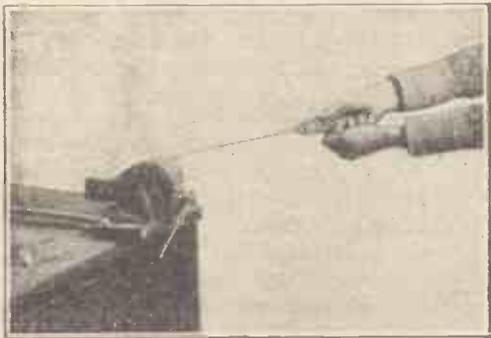
# "Set Building in Pictures"



A gramophone needle in the end of a wooden rod makes a simple scriber for marking out an ebonite panel from blueprint instructions.



When drilling an ebonite panel hold the drill upright, and when nearly through, slacken the pressure, otherwise a jagged hole results.



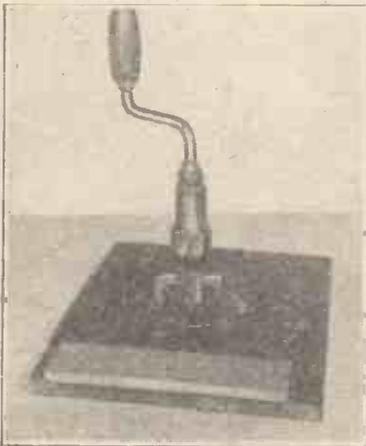
Covered wire, like Glazite, can be straightened and stiffened by nipping a bared end in a vice and stretching it by pulling at the other bared end with pliers.



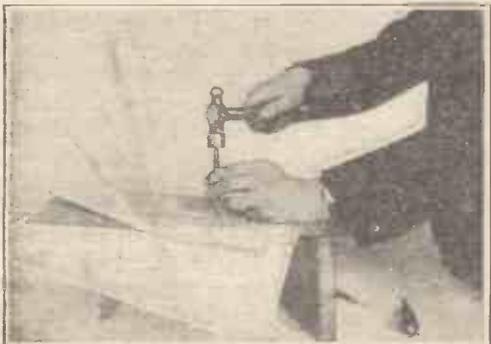
Much time and labour can be saved in cutting large holes in ebonite panels for meters, valve windows, etc., by the use of a disc cutter held in a brace.



Rough edges of ebonite panels or terminal strips are easily smoothed by clamping the ebonite in a vice and using a fine file.



A close-up of the disc cutter, showing the small pilot drill and cutter fitted in the chuck of the brace.



"A.W." blueprints can be used as panel drilling templates. Place the blueprint square on the panel and centre-punch the holes indicated.

IN the constructional articles given week by week in AMATEUR WIRELESS the detailed instructions refer to the particular receivers under consideration, and owing to lack of space there are many constructional processes which have to be taken for granted. The pictures in these pages illustrate typical stages in the work of assembling wireless receivers, which, with these notes, should help readers to the successful building of AMATEUR WIRELESS receivers.

### Blueprints

The task of assembling a receiver is simplified by the use of our blueprints. To prepare the ebonite panel for drilling, the dimensions on the blueprint can be copied with a rule and scriber. Alternatively, the constructor can use the full-size blueprint as a drilling template, in which case care should be taken to see that the blueprint is "squarely" placed on the panel. It should hardly be necessary to add that standard size panels, such as are used in AMATEUR WIRELESS receivers, need no trimming or rubbing down.

### Baseboard Layout

The baseboard layout is usually a simple matter. A careful study of the blueprint and photographic views which illustrate the article is, of course, necessary. In cases where there is a risk of components "fouling" (for example, a moving coil-holder and a transformer) the distances shown on the blueprint should be carefully measured. If components other than those specified are used, due allowance must be made for the difference in baseboard space that will be required.

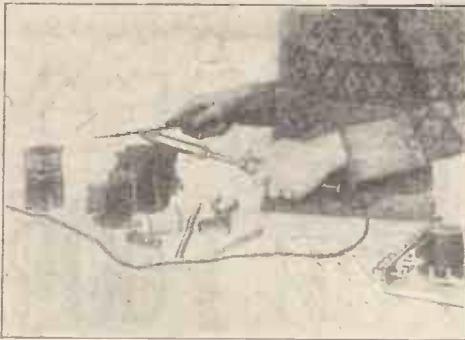
### Drilling

A good hand drill is preferable for the panel drilling, although a brace, with an adaptor chuck to hold the smaller sizes of metal twist drills, can be used successfully. In "working" the ebonite, treat it as a metal—use metal drills and a metal hacksaw.

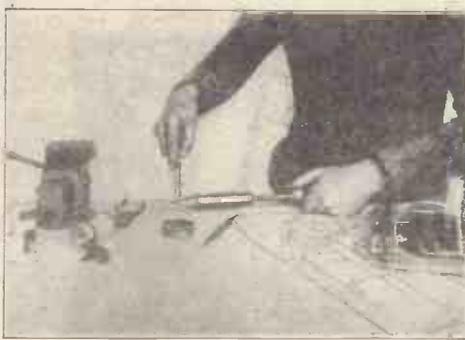
To drill a clean hole it is necessary to rest the panel on a smooth board, otherwise a jagged edge—often results. Another reason for jagged holes is due to exerting too great a pressure on the drill when the drill is nearly "through." If a considerable number of holes are to be drilled, the twist drill should be dipped frequently in turpentine to prevent the ebonite from binding.

### Mounting Components

The majority of wireless components are secured to the baseboard with two or four wood screws. Do not try to economise by using half the required number! L.F. transformers require securely mounting.



A well-tinned bit can only be obtained if the bit is clean. An old medium-cut file is the best bit cleaner to use.



A stick of solder held at the point of a hot, well-cleaned bit, which has been dabbed with flux will soon tin it.



To make the solder run into a joint, hold the bit at the angle shown in this picture.

Remember that any instability in a component will be passed on to its associated wiring with detrimental results. Never crowd the parts closer together than advised; it is always better to space them too much than to overcrowd them.

**Altering the Layout**

In order to make use of an existing cabinet, some constructors use a totally different size of panel and baseboard from those specified, with the inevitable result that the layout has to be seriously modified. It is preferable to invest in a new cabinet than to court failure by altering the specified layout.

**Wiring Up**

One of the most common sources of failure in making a receiver can be traced to poor wiring. It is not that the point-to-point connections are incorrect, but rather that the way in which the connections are made is at fault.

So many constructors avoid soldering, wherever possible, and clamp the connections under nuts and washers. But, once the simple art of soldering has been mastered, it will be found quicker to solder a wire than to secure it under a nut and washer.

**"Pressure" Joints**

Wherever possible, it is advisable to solder the wires, because, although a perfectly good "pressure" connection can be made in many ways, the contact surfaces eventually oxidise and reduce the electrical efficiency of the connection.

**Soldering**

If the constructor finds real difficulty in making a good job of soldering, the following hints may be of assistance, particularly to the novice.

The soldering bit must be kept scrupu-

lously clean, by filing the surfaces near the point with an old medium-cut file until the bright copper appears. Heat the iron to just below red heat. This sounds simple, but is often the most difficult part of the process! A bright green flame usually appears when the iron is hot enough, but on removing the iron from the gas ring, see that it is not red hot. Quickly file each surface while still hot, and dip the bit into a tin lid which contains some flux and small pieces of solder; or the bit may be dipped in the flux and rubbed with a stick of solder until the bit is thoroughly coated with solder.

Those with electric-light mains installed will find an electric soldering iron a valuable acquisition, since the heat is constant and the bit does not require frequent cleaning and re-tinning.

**Preparing Wire**

Whether bare tinned-copper wire or covered wire be used, both kinds require straightening and stretching if the same neat wiring as that photographed in our receivers is to be duplicated. No. 16-gauge bare wire is sold in 1-lb. reels, and this is the best form in which to buy it. The end should be anchored in a vice, and a few feet of wire uncoiled and stretched until the length uncoiled no longer gives. Suitable lengths can then be cut off with pliers ready for use.

**Covered Wire**

Care must be taken, when stretching and straightening covered wire, only to stretch the wire, and not the covering, which will crack if stretched. Bare each end of the covered length, secure one end of the wire in the vice, and pull the other end of the wire with pliers.

**SERVICE TO CONSTRUCTORS**

As an invaluable complement to the profusely-illustrated constructional articles appearing in "Amateur Wireless," there exists a special department that deals exclusively with the comprehensive range of "A.W." Blueprints.

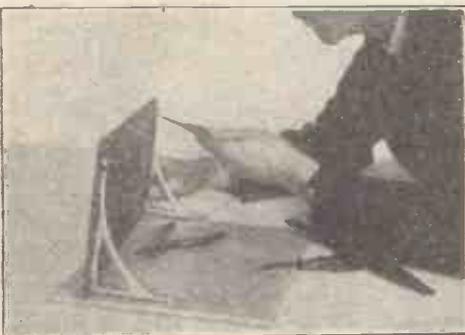
A full-size Blueprint is available of the majority of recent "A.W." receivers, and in cases where any difficulty is encountered in following the published instructions we strongly recommend a Blueprint.

Our interest in your receiver does not end with the building of it, however, and any queries relating to the assembly or incorrect working of the receiver will be promptly answered if the querist conforms to the simple rules outlined on the Information page.

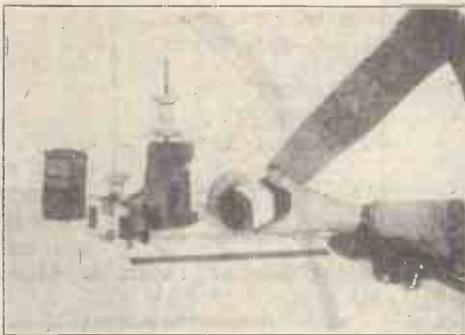
The skilled technicians in the Bureau Department are fully qualified to deal with all the general wireless problems which confront the amateur.

lously clean, by filing the surfaces near the point with an old medium-cut file until the bright copper appears.

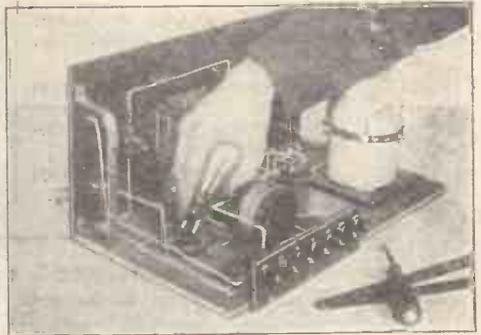
Heat the iron to just below red heat. This sounds simple, but is often the most difficult part of the process! A bright green



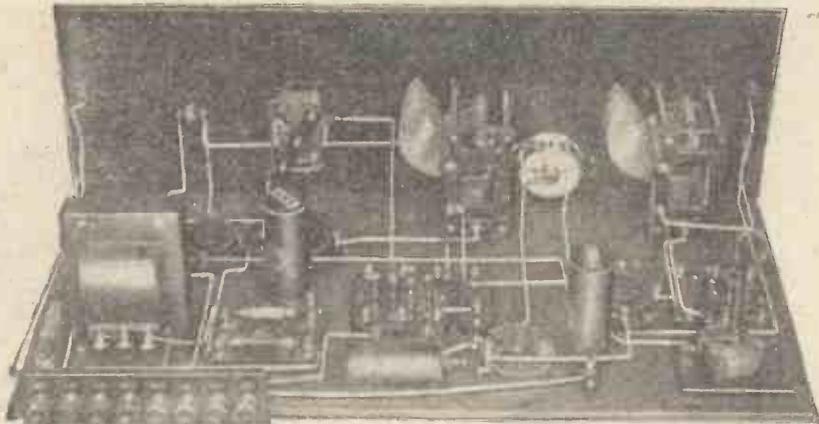
Fit the panel to baseboard by (1) screwing brackets to panel; (2) screwing brackets to baseboard; (3) screwing panel to baseboard.



A home-made coil can be easily wound by allowing the reel to revolve on a rod held in a vice.



When testing the receiver, insert the valves by holding the anode pin with the first finger to avoid a burn-out.



A Rear View of the "C.T." Four-valver

THE basis of the C.T. circuit was detailed in last week's issue. The fundamental principle is that a capacity-tapped transformer is employed in place of the usual inductive coupling, as a result of which we are able to obtain not only simpler circuits, but definitely better efficiency. The present receiver incorporates this principle, and although the layout and construction will be seen to be simple in the extreme, yet, nevertheless, the receiver is capable of excellent performance.

The circuit is shown by the diagram. The principal features of the circuit are the stabilisation of the first valve, the capacity-tapped arrangement in the H.F. transformer circuit, and the anode-bend detector. The first valve is stabilised by a neutralised system, a 1/6th tapping being utilised instead of the more usual centre tap. This gives a greater voltage on the first grid circuit. It should be noted, however, that a .000r neutralising condenser is required. From the anode circuit of this

the detector so that tuning is obtained in the normal manner. The fixed .002 condenser effectively prevents the high-tension voltage from short circuiting to earth or being applied direct to the grid of the rectifier valve.

The actual voltage developed across the grid of the rectifier is thus that across the coil, and by suitable choice of the values of variable condenser and the fixed condenser we are able to obtain a practically uniform transfer of energy over the whole scale.

Anode-bend rectification is adopted, followed by a resistance-coupled low-frequency stage. This is the most satisfactory way of using this particular form of rectifier. The negative bias on the grid has the effect of increasing the impedance of the valve very considerably, and if this is followed by a transformer stage, poor quality almost inevitably results. The use of

resistance-coupling following a valve which normally has not too high a resistance gives satisfactory results, and this system has been adopted in the present case.

The use of anode-bend rectification results in a definite increase in the selectivity of the circuit, since the detector damping is reduced to the minimum and the tuning

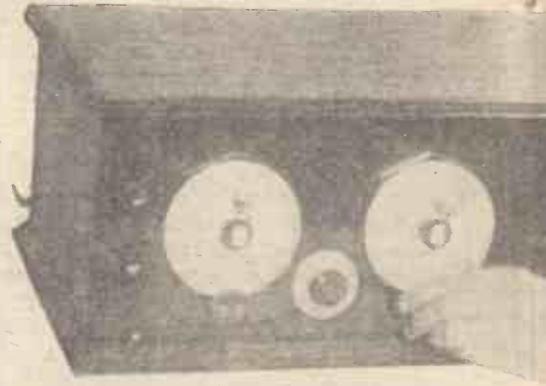
valve, energy is passed through a .0005 variable condenser on to the grid of the detector valve. Across this condenser is a coil in series with a fairly large condenser, which builds up the voltage transferred to

of the detector circuit is consequently sharper.

A final stage of transformer-coupled low-frequency amplification is added, any high-grade low-frequency transformer being

# REYNER "C. T." FOUR-VALVE

J. H. REYNER'S LATEST DEVELOPMENT  
A Four-valve Capacity-tapped Receiver



The Author Operating the "C.T." Four

suitable for the purpose. This combination gives an amplifier capable of true and faithful reproduction, while the efficiency of the high-frequency portion of the receiver enables a large number of different stations to be tuned in direct on to the loud-

## List of Components

Ebonite or Bakelite Panel, 21 in. by 7 in. (Raymond, Peto-Scott, Radion, Ebonart, Pertinax).

Cabinet (Camco, Raymond, London Radio Supply Co.).

Baseboard, 21 in. by 9 in. (Camco, Raymond, London Radio Supply Co.).

Ebonite or Bakelite terminal strip 8 in. by 2 in. by 1/2 in. (Raymond, Peto-Scott, Radion, Ebonart, Pertinax).

Two .0005 variable condensers (Cylcon, Centroid, Formo, Jackson Bros., Ormond).

Four valve holders (Lotus, Lissen, Benjamin).

Two H.F. chokes (Lissen, R.I. & Varley, Trix, Wearite).

L.F. transformer (R.I. & Varley, Marconiphone, Lissen).

R.C. coupler (Carborundum, R.I. & Varley, Lissen, Dubilier).

Reaction condenser (Ormond, Peto-Scott, Bowyer-Lowe).

C.T. coils (Wearite, Lissen).

Neutralising condenser (Peto-Scott, Wearite).

Lamplugh resistor.

One rheostat (Igranic, Lissen).

One potentiometer (Lissen, Igranic).

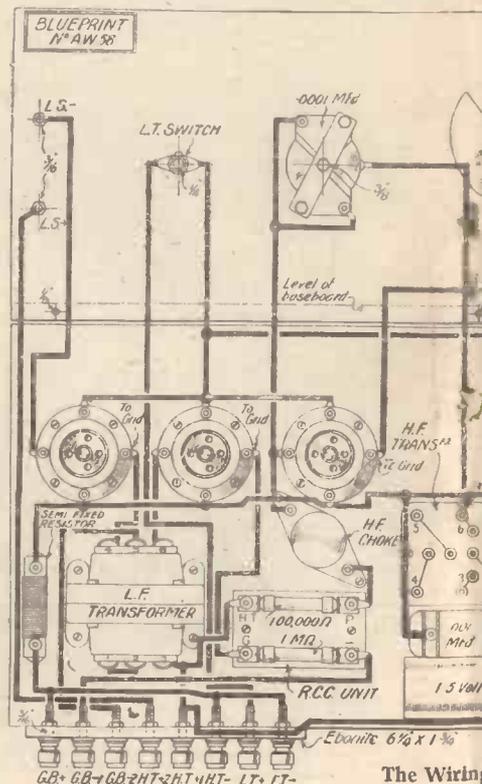
Two 6-pin coil sockets (Lewcos, Wearite, Peto-Scott).

Terminals (Belling-Lee, Eastick).

1 1/2-volt battery (Ever Ready).

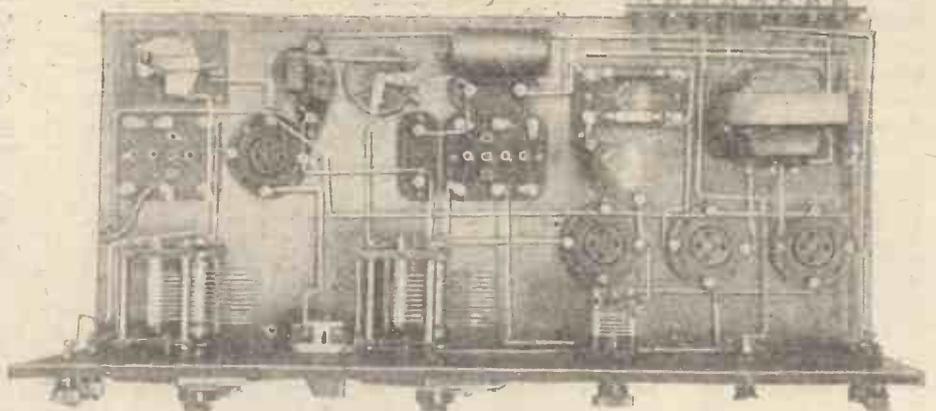
Two fixed condensers (Dubilier, Lissen).

Connecting wire (Glazite or Junite).



# 2'S LVER

OPMENT—  
ceiver



This Photograph Clearly Shows the Wiring

hand side we have the reaction condenser, which, as already stated, is little used owing to the constant sensitivity of the receiver. It can be left set a little off the oscillation point and many stations can be tuned in without any further adjustment. A small variation over the whole range will be found, and to obtain distant stations at full strength some small adjustment of this condenser will probably be found necessary, but otherwise it does not require to be altered.

On the baseboard we have the two six-pin bases corresponding to the two tuning condensers. These bases are well spaced and with the connections as shown there is little interaction between the circuits. Thus it has been found possible to dispense with screening with its attendant complications.

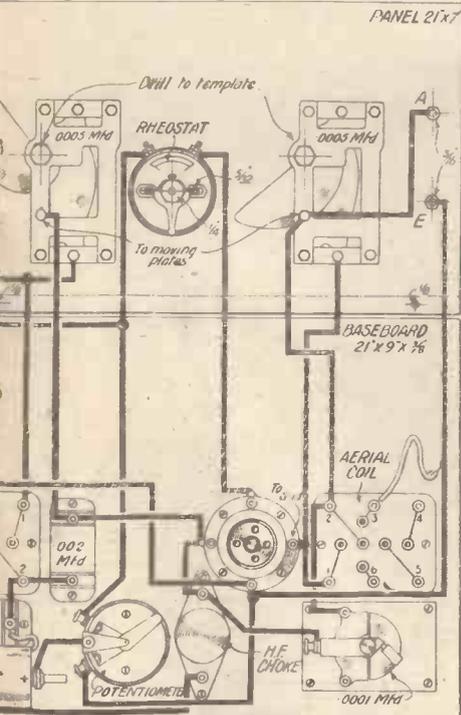
For the detector a small  $1\frac{1}{2}$ -volt cell is sufficient to provide the necessary bias, the negative end of this being taken to the coil in the detector circuit, while the positive end is taken to a slider of a potentiometer connected across the L.T. battery so that a variation of the actual grid potential can be obtained. With the slider on the negative side, the full  $1\frac{1}{2}$  volts negative is applied to the grid, while as the slider is moved round towards the positive, less and less negative bias is applied according to the actual voltage of the accumulator.

One and a half volts may seem to be a very small bias for anode-bend rectifica-

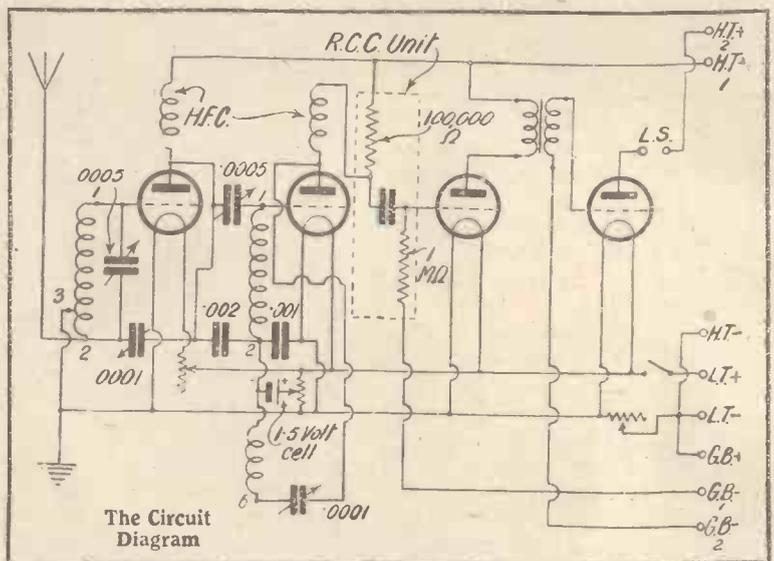
tion. It must be remembered, however, that the circuit is being used as an amplifying detector and that a certain amount of reaction is employed. As we increase the negative bias on the detector we reduce the effective amplification, and a point is rapidly reached where the reaction ceases to operate, due to the fact that the valve is not amplifying sufficiently. This effect more than offsets any increased efficiency of rectification; in practice, I have found that there is definitely a most sensitive spot which occurs with only a small negative potential when a high-resistance R.C. valve is being employed.

The valve in this detector stage should have an impedance of the order of 70,000 ohms, with a corresponding amplification factor lying between 30 and 40. A very high impedance valve should not be employed, although a somewhat lower impedance can be used satisfactorily with a slight loss in signal strength. The anode resistance following the detector valve is

speaker without any difficulty whatever. The construction of the receiver is straightforward. On the left-hand side of the panel we have two tuning condensers, provided with slow-motion dials owing to the sharpness of the tuning. On the right-



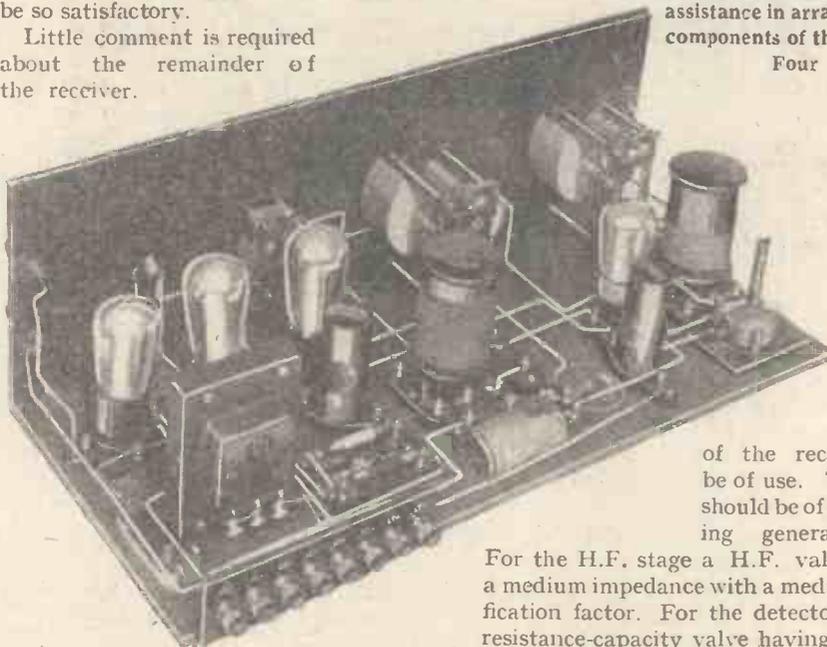
g Diagram (Blueprint available, price 1/6)



moderate in size only, being 100,000 ohms, and not 300,000 to 500,000, as is very commonly the case in modern R.C. units. Consequently, it should be particularly observed, when ordering this unit, that the

values are not the usual values supplied with the unit, and that a specially low value of anode resistance is required. If the 300,000 ohms resistance supplied with the normal unit is employed the circuit will not oscillate, and the results will not be so satisfactory.

Little comment is required about the remainder of the receiver.



sufficient selectivity with the "M.C. Four," this change-over is to be recommended.

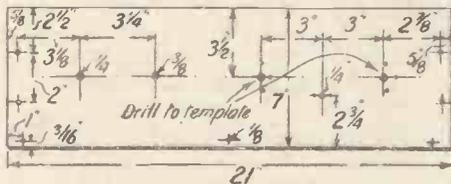
**Operation**

Some few words concerning the operation

This photograph will be of assistance in arranging the components of the "C.T." Four

the two dials are both tuned in. Gradually increase the reaction condenser and adjust the neutralising condenser until the reaction demand is the greatest. It will be found that for normal working about half of the reaction condenser will be required. If the circuit will not oscillate with any setting of the reaction condenser, alter the setting of the potentiometer on the detector valve until proper reaction is obtained. Then, by rotating the two dials together, numbers of stations will be heard at good loud-speaker strength. The high-tension voltage should be from 100 to 150 on H.T.1 and the same, or a little more if desired on H.T.2. More detailed operating instructions, with specific recommendations for valves to be employed and details of the coils for those who wish to wind their own, will be given next week.

Of interest is that a separate H.T. has been provided for the last valve. This is to avoid trouble when using battery eliminators, a double choke scheme being used as outlined in my article in AMATEUR WIRELESS No. 284.



Details of Panel Drilling

A volume control has been fitted on the high-frequency valve between the two tuning dials. This not only serves to reduce the volume on some of the more powerful stations (and it is not only the local station which requires this volume control, several foreign stations coming in at great strength), but it also serves to cut out the high-frequency valve for the purpose of neutralising, if the reader lives close to a local station. By extinguishing the filament and tuning in to the local station, a silent point can be obtained by adjusting the neutralising condenser, and it will be found that a crisp and accurate zero is readily obtained, indicating that the method of neutralising is a true balance method.

It may be remarked, in passing, that the arrangement of the components in this receiver is very similar to that in the old "M.C. Four," so that any reader who wishes to modify his "M.C. Four" to the new circuit can do so with very little alteration. In those cases of readers who have experienced difficulty in obtaining

of the receiver will be of use. The valves should be of the following general type.

For the H.F. stage a H.F. valve having a medium impedance with a medium amplification factor. For the detector valve, a resistance-capacity valve having a not too high impedance; a value of 70,000 ohms, with an amplification of 30 to 40, will be most suitable in this case, as has already been pointed out. For the first low-frequency stage an L.F. valve should be employed. The R.I. transformer must not be used after a valve taking more than four milliamps anode current, so that a power valve is unsuitable for the first L.F.

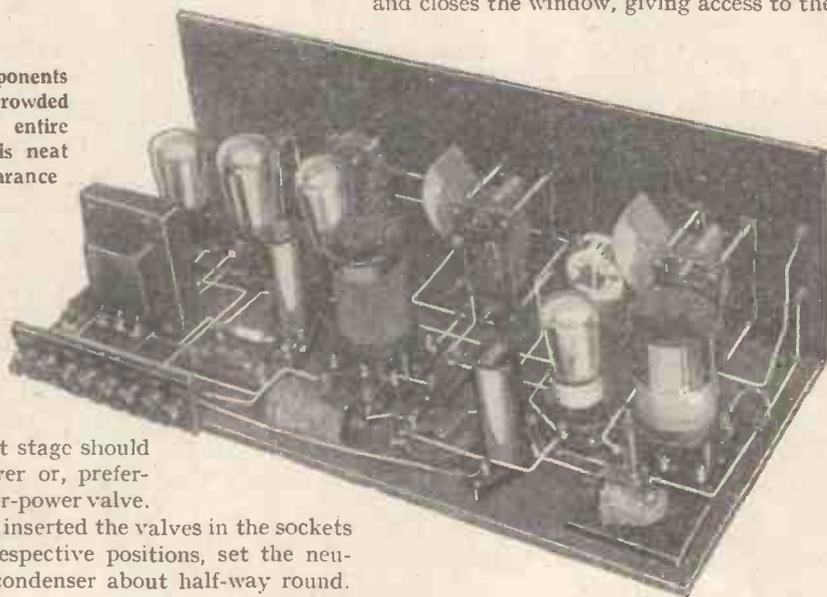
**Radio Photo-Telegraphy**

(Continued from page 875)

into which the light is only allowed to enter through a minute aperture—slot shaped in connection with "black-and-white" transmissions and of the shape of an isosceles triangle in the case of transmissions of shaded photographs.

The most vital organ of the receiver—the device for re-converting the current impulses into bright and dark picture elements or (in connection with actual photographs) into various shadings—is a string galvanometer, which with each current impulse is deflected and alternately opens and closes the window, giving access to the

The Components are not crowded and the entire receiver is neat in appearance



The last stage should be a power or, preferably, super-power valve.

Having inserted the valves in the sockets in their respective positions, set the neutralising condenser about half-way round. Set the reaction condenser to a minimum and insert the coils in the correct positions. Place the two tuning dials approximately together and tune in to the local or nearest station, the approximate position of which will readily be determined from the accompanying test report. Adjust the neutralising condenser until, with the reaction at minimum, no oscillation takes place when

light rays directed toward the photographic sheet on the receiving cylinder.

The 12 kilowatt Kharkov Narkomptchel (Ukraine) broadcasting station has increased its wavelength to 1760 metres, and is causing considerable interference with Radio-Paris.



## BETTER BUILD WITH LISSEN PARTS

*Congratulations to Messrs. Cossor on an excellent set, but we suggest it should be built with Lissen Parts*

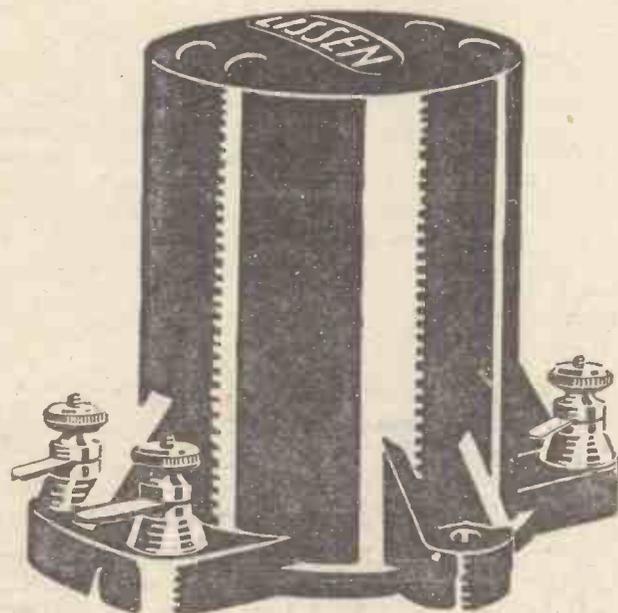
USE the Lissen Transformer in preference to all others—your reproduction will be loud, clear, and natural. Use the other Lissen parts as well—Resistances, Condensers, Rheostats, Valve Holders, Batteries, etc.

### Lissen parts for the Melody Maker

- 1 Lissen L.F. Transformer (price 8/6).
- 1 Lissen .001 Fixed Condenser (to be put across the primary of the L.F. Transformer) (price 1/6).
- 1 Lissen Baseboard Rheostat, 7 ohms (price 1/6).
- 2 Lissen Key Switches or Lissen 2-way Switches (price 1/6 each).
- 2 .0003 Lissen Mica Fixed Condensers (Grid Leak Clips are included) (price 1/- each).
- 1 Lissen .0001 Mica Fixed Condenser (price 1/-).
- 1 Lissen .001 Mica Fixed Condenser (price 1/-).
- 1 Lissen .002 Mica Fixed Condenser (price 1/6).
- 1 Lissen Mansbridge Type Condenser, 2 mfd. (price 3/6).
- 1 Lissen Grid Leak, 3 megs. (price 1/-) and 1 Lissen Combinator (price 1/-).
- 1 Lissen Grid Leak, .25 megs. (price 1/-).
- 1 Lissen Grid Leak, 4 megs. (price 1/-) and 1 Lissen Combinator (price 1/-).
- 3 Lissen Valve Holders (price 1/- each).
- 1 Lissen 9-volt Grid Bias Battery (price 1/6).

### Also use a Lissen H.T. Battery

All these Lissen parts for the "Melody Maker" are obtainable from 10,000 radio dealers throughout the country. Ask for Lissen parts in a way that shows you will take no other and be sure of perfect results.



# LISSEN

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

# "SIMPLER WIRELESS"

## An Introductory Chat on the A.C. Rectifying Unit

By J. F. JOHNSTON

AS stated in last week's "Simpler Wireless" article, the first experiments relating to the use of the system on A.C. supplies involved the use of rectifying valves and transformers. But although, the results obtained with thermionic rectifiers

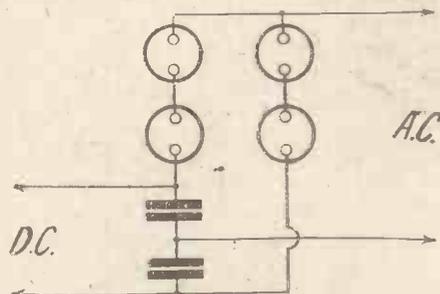


Fig. 1—How the Rectifier Cells are Connected

were perfect in every way, these rectifiers had certain disadvantages, principally connected with the high voltages which it was necessary to use, which rendered them rather unsuitable for general amateur use.

Accordingly search was made for another type of rectifier which would give as good results as the valves but which would be

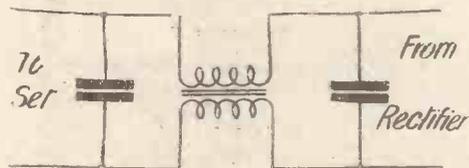


Fig. 2—The Simple Smoothing Arrangement

without the disadvantages of the latter. Electrolytic rectifiers appeared to have possibilities provided that they could be made really reliable and trouble-free. In fact, in an article published as long ago as last June, the writer forecast that possibly this type of rectifier might eventually prove the best solution of the problem of working "Simpler Wireless" sets from A.C. mains.

But in the past electrolytic rectifiers have gained an unenviable reputation as requiring constant attention and being anything but reliable. However, if every amateur had to make his own accumulator it is certain that this type of battery would soon earn a reputation at least as bad as that associated with the electrolytic rectifier!

The writer has long realised that a great future lay before the electrolytic rectifier if only some responsible firm would develop it on commercial lines and turn out a unit as reliable and as trouble-free as an accumulator which never required recharging.

This has now been done and there is at present on the market a small four-cell electrolytic rectifier of a much-improved

type which, during our tests, has proved quite reliable. All the usual disadvantages of the electrolytic rectifier have apparently been overcome. The electrolyte does not require constant attention to keep it neutralised. The electrodes do not rapidly corrode, a rise in the temperature during operation only increases the efficiency, and the price is extremely reasonable. The only attention the rectifier requires is the occasional addition of distilled water to make up for evaporation and this attention is, of course, required by an accumulator. And it should be remembered that this small rectifier replaces not only the L.T. accumulator, but the H.T. and grid-bias batteries as well, when used with a "Simpler Wireless" set.

### Various Voltages

Now the usual voltages used for electric lighting in this country vary from 200 to 240 volts and "Simpler Wireless" sets are designed to work with voltages within these limits. But there is bound to be some loss in every rectifier, however efficient, and there will also be a voltage-drop across the smoothing choke. At the same time it was desired to avoid the use of a transformer and still to provide a smoothed D.C. output of from 200 to 240 volts even when the voltage of the A.C. supply was only 200.

Accordingly resort was had to a method of connecting up the rectifying cells which while well known in some quarters, is very seldom used. This method of connection is shown in Fig. 1. The four cells are arranged in two pairs and each pair used to charge a separate fixed condenser. The two condensers are connected, as far as the output circuit is concerned, in series.

The output voltage is then twice the input voltage, less an amount depending upon the loss in the rectifier. Actually, when the arrangement shown in the diagram Fig. 1 was used on a 200 volt alternating-current supply, the output voltage was 300 volts when a current of 100 milliamps was being taken. Thus, if it had been

necessary to do so, a choke coil having a D.C. resistance of 1,000 ohms could have been used for smoothing and still have left the output of 200 volts 100 milliamps required by a "Simpler Wireless" set.

The choke actually used had a much lower resistance than this and so there was voltage to spare. This was reduced by connecting a suitable lamp in series with one of the leads from the mains to the rectifier. The simple smoothing arrangements are shown in Fig. 2. A double-choke (consisting of two windings on one core) was employed and a fixed condenser was connected across the supply leads to the set both before and after the choke windings.

### A Complete Receiver

A circuit diagram of a complete A.C. "Simpler Wireless" installation is shown in Fig. 3 and it will readily be conceded that this is by far the simplest "all-from-the-A.C. mains" circuit ever evolved.

This method of A.C. working is also by far the cheapest. It would be possible to build the complete installation shown in Fig. 3, including everything but the loud-speaker, for something like £10, and this price would allow the very best components obtainable to be used throughout. The rectifying and smoothing unit would account for about half of the figure mentioned.

The results obtained by the aid of this

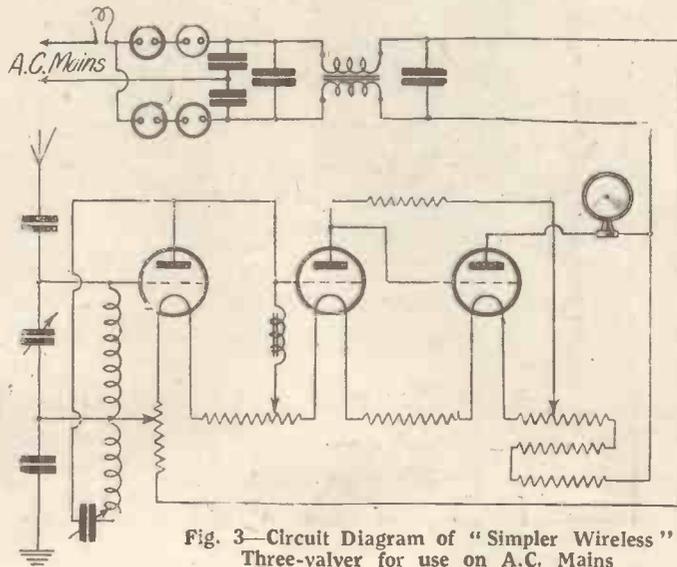
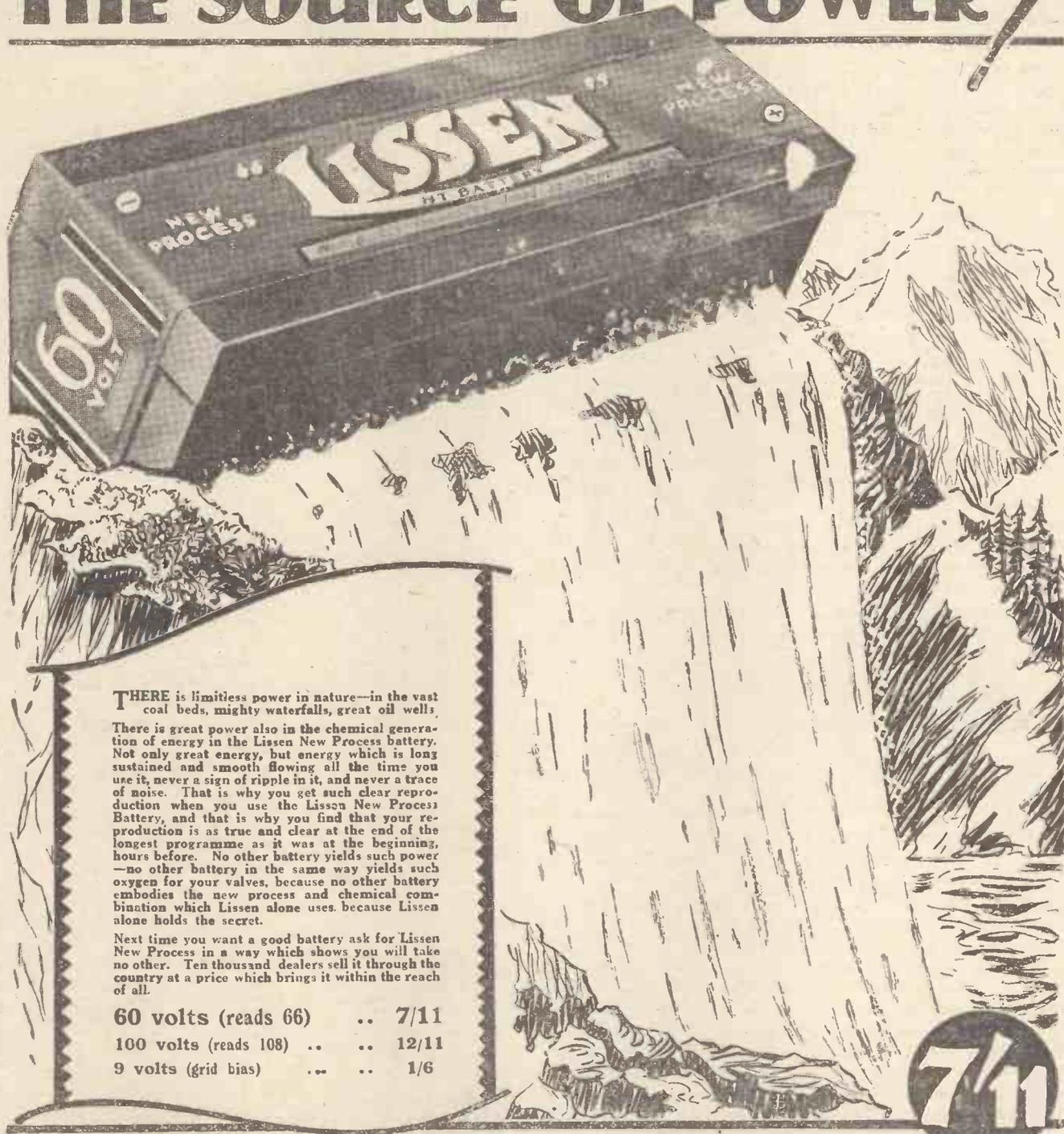


Fig. 3—Circuit Diagram of "Simpler Wireless" Three-valver for use on A.C. Mains

rectifier are in every way quite as good as when the rectifying valves were used. Perfect reception was obtained during tests with various "Simpler Wireless" sets and there was no back-ground whatever, even when no signals were being received.

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9 volts (grid bias)	...	1/6



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## "A.W." TESTS OF APPARATUS

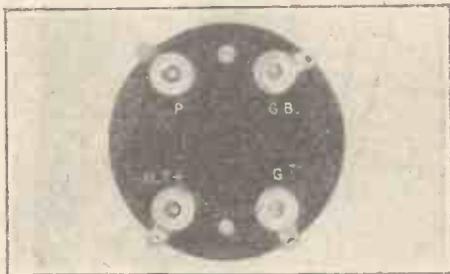
Conducted by our Technical Editor, J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

### Imperial R.C. Coupler

**R**ESISTANCE-CAPACITY coupling is in favour with lovers of pure reproduction.

The Imperial R.C. coupler is one of the most compact units which we have examined. The condenser and two necessary resistances are mounted in a neat and well-finished circular ebonite case having a diameter of 2 in. and a depth of  $\frac{3}{8}$  in. Four terminals with soldering tags are mounted on the component beside which the necessary lettering is engraved in gold.

On test, the anode resistance proved to have a value of 1.6 megohms, the grid-leak 1.3 megohms and the coupling condenser a capacity of approximately .001 microfarad. Good reproduction was obtained although it was necessary to employ a high-impedance valve in order to obtain the best results. The instrument is suitable for the first stage of an amplifier, but a lower value of anode resistance is,



Imperial R.C. Coupler

course, necessary in later stages, in order to permit of the use of lower-impedance valves having a correspondingly greater grid swing.

The Wireless Apparatus and B.C. Co., 256 Narborough Road, Leicester are the makers of the unit.

### Pickett Cabinet

**T**WO alternatives present themselves when the constructor begins thinking of the housing of the set. He can either use a cabinet of the usual type and keep it on some suitable table, or he can combine the function of wireless cabinet and furniture in one and use a cabinet which is self-contained and worthy of a place in the particular scheme of furniture.

An interesting sample of this latter type of cabinet has been sent to us by Messrs. Pickett Bros., of Bexley Heath. This is in the form of the Queen Anne period bureau. The top of the cabinet is occupied by the receiver, a fall-front being provided, while immediately below are two doors opening on a large compartment wherein batteries, eliminators and similar devices

can be housed out of sight. The cabinet is constructed throughout of solid oak, light or dark, and the doors are framed to prevent warping.

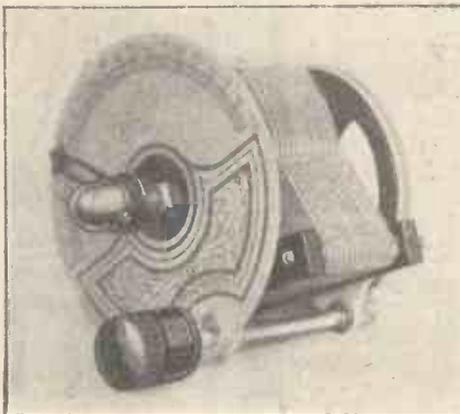


Pickett Cabinet

The price is £6 15s. for the ordinary double-depth model which is suitable for receivers such as the "Phoenix Five" and somewhat less for cabinets taking the more usual 10 in. baseboard. De luxe models at slightly higher prices are available.

### Lamplugh S.L.F. Condenser

**O**WING to the extreme eccentricity of the plates, S.L.F. condensers often occupy a large panel space. The condenser made by S. A. Lamplugh, Ltd., of King's Road, Tyseley, Birmingham, which we



Lamplugh S.L.F. Condenser

have recently tested, has a special symmetrically-mounted plate, which reduces the extreme width to less than  $3\frac{1}{2}$  in.

The condenser is mounted in a light, rigid framework. The spindle is provided with a rubber-tyred wheel 3 in. in dia-

meter, which engages with a spindle running parallel with the axis of the condenser. This provides a slow-motion drive of a reduction of 14-1. The spindle proper projects through the panel, and is provided with a pointer moving over an attractive scale having black engraving on a silver background. Two holes are necessary, one for fixing and the other for the operating spindle.

Tests on our capacity bridge gave a maximum capacity of 540 micro-microfarads and a minimum of 14, while a few check points indicated that the S.L.F. law was correctly obeyed.

### Tromba H.T. Battery

**T**HE heavy anode current required by a modern receiver is often very great. The most practical solution lies in utilising cells of large capacity. Of late the well-known Leclanché battery has been popular since a number of fairly compact cells will form a battery from which a high discharge

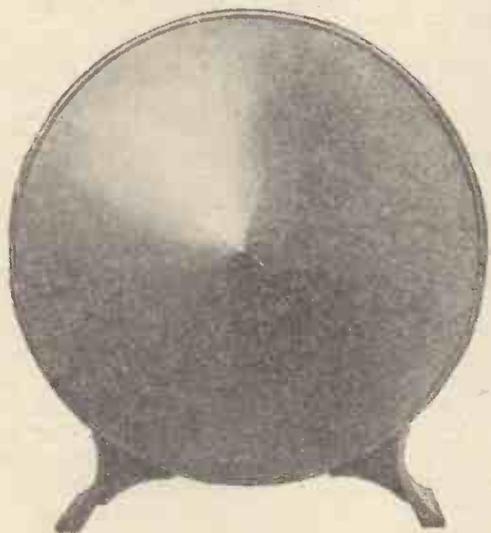
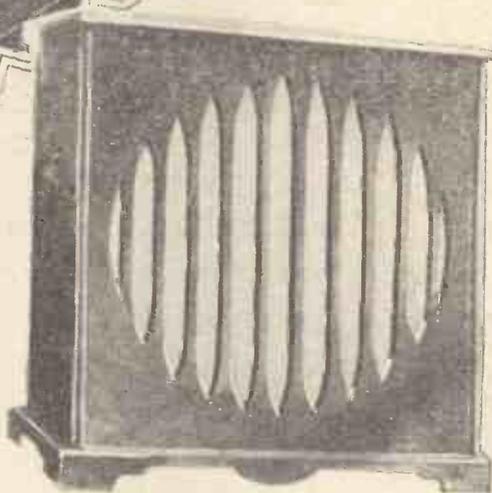


Tromba H.T. Battery Cell

can be taken for long periods, whilst, during the time when the set is not in use, the cells will recover and be ready for other long periods of use. When the useful life of the battery is attained, the exhausted elements can be replaced at low cost.

We recently tested and approved a set of Tromba Leclanché-type H.T. batteries; the makers, the Tromba Electrical Co., 17 White Hart Lane, Tottenham, N.17, have now improved the design, in consequence of which the discharge rate has been considerably increased. In the new pattern the zinc electrode is kept clear from the sacs containing the depolariser by thick rubber rings which makes for lower internal resistance, while the use of a mixed solution of 2 oz. zinc chloride and 3 oz. sal-ammoniac per  $1\frac{1}{4}$  pints of water is claimed to check the formation of oxy-chloride of zinc crystals on the sacs.

Tests showed that the cells were capable of giving a discharge of 20 milliamps, which corresponds to the discharge from a 5- or 6-valve set, without polarising.



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The wonderful Cossor "Melody Maker" owes its overwhelming success, firstly, to its Cossor Valves and, secondly, to the very careful choice of components used in the set.

Those about to build the Cossor "Melody Maker" are warned that the substitution of any components for those which we have deliberately specified in the Cossor "Melody Maker" Chart may be prejudicial to its correct functioning.

In publishing this announcement we are actuated only by the desire to see that every builder of the wonderful Cossor "Melody Maker" shall be able to obtain the same amazing results (under normal conditions broadcasting is available from six countries) which this set is capable of obtaining when the correct components are used.

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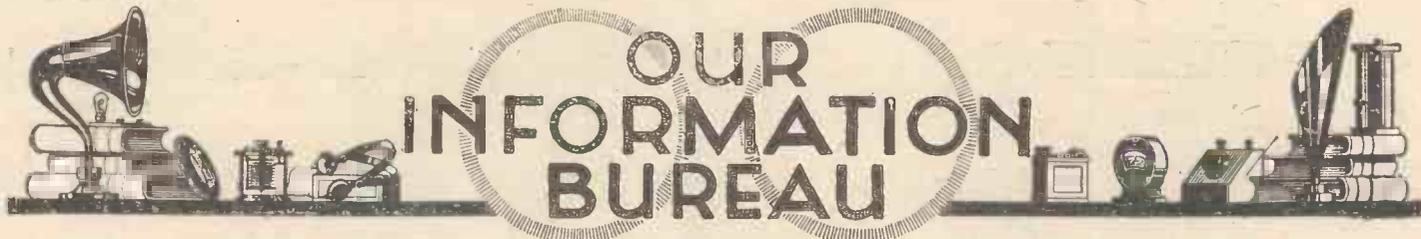
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**Restoring Crystal.**

**Q.**—The surface of my crystal, once very brilliant, has now become dull and the crystal seems to have lost a good deal of its sensitivity. Is there any way of cleaning the crystal and restoring its sensitivity?—S. P. (E.5)

**A.**—You could wash the crystal with methylated spirit, benzine, or petrol, using a camel's hair brush for the purpose, and it is probable that this treatment will restore the sensitivity.—G. N.

**Which L.T. Terminal to Earth?**

**Q.**—In most sets one side of the L.T. battery is connected to earth. Sometimes it is the L.T. positive terminal and sometimes L.T. negative. Which is the better L.T. terminal to connect to earth?—R. S. D. (E.5.)

**A.**—From the point of view of the operation of the set, it makes very little difference which of the L.T. terminals is connected to earth. However, from the point of view of safety of the valve filaments, it is better not to have the L.T. and H.T. batteries in series with each other as far as the earth connection is concerned. In other words, it is better to earth the L.T. terminal to whichever the H.T. negative is connected.—N. F.

**A Simple Wavemeter.**

**Q.**—Can you give me a few instructions for making a simple buzzer-type of wavemeter?—C. L. P. (Hendon).

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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, but it will be necessary to charge a special fee (which will be quoted upon request) for detail layouts and designs.

**A.**—The components required are a .0005 microfarad variable condenser, a coil (about sixty turns will be suitable to cover the

ordinary broadcast band), a buzzer, and some form of switch. The buzzer, switch, and a suitable battery are joined in series and put across the coil and condenser.—N. F.

**Rectification.**

**Q.**—Why should the leaky grid-condenser method of rectification give stronger signals than anode-bend rectification?—G. H. K. (Carnarvon).

**A.**—When working at the bottom of the characteristic curve, the positive impulse cause pulses of anode current to flow, but the negative impulses can, of course, have no effect. Consequently the pulses of anode current are magnified images of the positive signal impulses. When a grid condenser is used, however, the effect of a whole train of oscillations is to charge the grid up negatively, each negative half-cycle increasing the negative charge. Thus the grid becomes more and more negative throughout the arrival of the train of oscillations and the collective effect on the anode current is considerably greater than would be obtained with anode-bend rectification, though the anode current is no longer a true replica of the signal current. Hence grid-condenser rectification gives stronger signals, but of poorer quality than anode-bend.—G. N.

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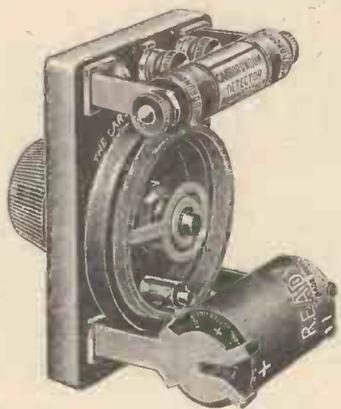
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# CECIL RIDLEY

## "RADIO HOUSE," MIDDLESBROUGH

**" MY CHRISTMAS DIARY "**

(Continued from page 862)

parents. Two hours' splendid music after supper, the three of us listening together. Simultaneously listening is, I believe, the correct technical term; but I wish that boy of mine had not developed that horrid schoolboy trick of moving his ears up and down. Makes a disturbing noise in the other simultaneous listeners' phones.

*December 26.*—Spent the evening with the Ebo-Knights. Understand their maid has a sister who is engaged to a postman who delivers the postcards to Savoy Hill; so they ought to know what's what about the wireless programmes. Heard some grand loud-speaker stuff at the Ebo-Knights. Must buy a loud-speaker set for the boy as soon as he is able to manipulate it.

*December 27.*—Might buy a three-valve loud-speaker set for the boy on his next birthday. He ought to be able to manage the set then.

*December 28.*—Great idea! Douglas-Smith suggests that I make a valve set myself. Decided to start on a set straight away, so as to have it ready in good time for the boy's birthday. Bought a soldering bit on the way home.

*December 29.*—Purchased a stick of solder and a bottle of soldering fluid. Practised soldering on an old tin kettle—at least, I thought it was old until the wife informed me otherwise. Getting on splendidly. Glad the one severe burn was on my left thumb and not on my right.

*December 30.*—Obtained blueprint and component parts for valve set. Splendid; very excited. Have taken to soldering like a duck takes to water. Great progress with set in evening. Shall take a day off tomorrow to finish set. Must have it ready for Dal's birthday—September 15.

*December 31.*—A day of days. Valve set finished just before midnight. Shall be able to get it in good going order for the boy's birthday. Results from set wonderful. Gave set to Dal for a New Year's present on condition he only uses his crystal set when I am not at home. This is going to be a grand wireless year for me. Must make a portable set for the summer and a set for the holidays, and— Rather a wireless year for me. Cheerio, brother wireless enthusiasts!

Sir Hamilton Harty is to conduct the Wireless Symphony Orchestra at 2LO on December 11, when Bantock's *Song of Songs* is being broadcast. The soloists are Dorothy Silk, Trefor Jones, and Norman Allin

With a view to placing the weather, market reports and agricultural bulletins broadcast by the Buda-Pesth (Hungary) wireless telephony station, at the disposal of all farmers and growers in the country, the Hungarian State intends to instal at least one official receiving instrument in every village.



*The*  
**Benjamin Standard**

The Benjamin Standard is known throughout the Radio trade. It stands for a greater efficiency, a far higher degree of excellence and an unequalled value. Every component that is stamped with the name of "Benjamin" is the very best of its class.

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Twelve feet of one inch copper in 11 1/2" x 1 1/2" giving 288 sq. in. of surface area. The inclined plane of the plates ensures perfect contact. Price 5/9.

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Simplest and most efficient switch. It's OFF when it's IN. Single contact, one hole fixing. Price 1/-.

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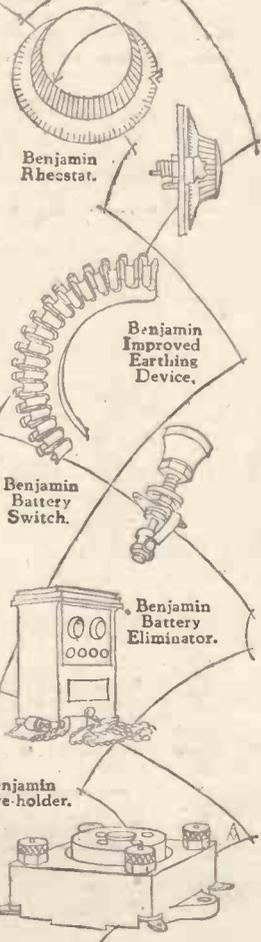
for Alternating Current 200-240 v. 50 cycles. Delivers current for loads up to twelve valves, giving 180 volts for power valve. A really dry eliminator. No acids, no liquids, no hum. £7 15 0.

**THE BENJAMIN VALVE-HOLDER.**

No other valve-holder so efficiently disperses microphonic noises and absorbs shocks so thoroughly. Valves free to float in any direction. Price 2/-.

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**THE BENJAMIN ELECTRIC LTD.**

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CW

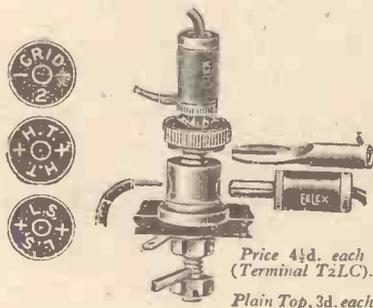
It will pay you to use



TREBLE-DUTY TERMINALS

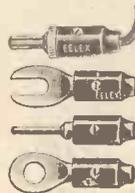
because there is all the difference between ordinary brass terminals, which are almost things of the "stone age," and EELEX treble-duty terminals. Also by fitting EELEX terminals the danger of a wrong or accidental connection is practically impossible. Here are nine reasons why it will pay you to use EELEX terminals:

1. Whatever method of connecting a wire to your set you employ, there is in the EELEX terminal a means of securing it as firmly as if held in a vice, no matter whether you use a spade, pin, or tag, plug, or just bare loose wires.
2. Plugs can be inserted in top or side of terminal. The former is of great value where space around terminal is limited or where terminal is not easily accessible.
3. EELEX terminals have indicating tops, which include 36 different indicators + Red, - Black, also in colours, White, Black, Blue, Red, Green, and Yellow.
4. Slotted stem, which enable internal connections to be secured without the bother of soldering.
5. For those to whom soldering is not a difficulty, a special tab is incorporated, and improve the appearance of your set.
6. EELEX terminals are nickel-plated and standardised.
7. EELEX fittings and interchangeable.
8. EELEX terminals cost no more, in spite of their many additional uses and advantages, than any other nickel-plated terminal with indicating top.
9. EELEX terminals are chosen by the leading designers and manufacturers to-day, and millions are being used by discriminating amateur constructors.



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BROADCAST TELEPHONY

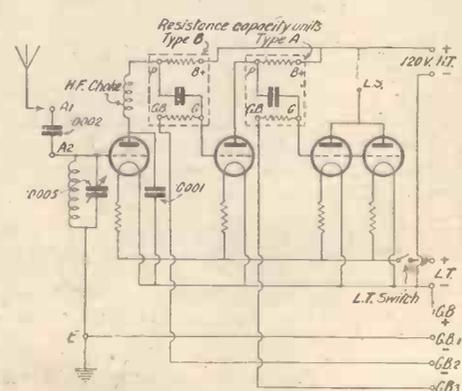
(Broadcasting stations classified by country and in order of wavelengths).

GREAT BRITAIN			Kilo-	Station and	Power	Kilo-	Station and	Power		
Metres	Kilo-	Power	metres	Call Sign	Kw.	metres	Call Sign	Kw.		
cycles	cycles	Kw.	cycles			cycles				
24	—	—	239.1	1,190	Montpellier	3.0	317	546	Milan (Milano)	4.0
252.1	1,190	—	260	1,150	Toulouse-Pyrenées (PTT)	0.5	333.3	960	Naples (Napoli)	1.5
272.7	1,100	—	268	—	Strasbourg	—	450	666	Rome (Roma)	3.0
275.2	1,090	—	273	1,095	Limoges (PTT)	1.5	545.6	690	Milan	7.0
277.8	1,080	—	278	1,079	Grenoble (Poste des Alpes, PTT)	1.5	<b>IRISH FREE STATE</b>			
288.5	1,040	—	279	1,075	Bordeaux (PTT)	1.0	319.1	940	Dublin (2RN)	1.5
294.1	1,020	—	280	1,050	Lille (Poste du Nord, PTT)	0.7	400	750	Cork (5CK)	1.5
294.1	1,020	—	291.3	1,030	Radio Lyon	1.5	<b>NORWAY</b>			
294.1	1,020	—	297	1,010	Radio Agen	0.5	423	709	Notodden	0.7
297	1,010	—	297	1,010	Radio Ager	0.5	438	692	Fredrikstad	1.1
306.1	930	—	302	993	Radio Vitus (Paris)	1.0	448	670	Rjukan	1.5
312.5	960	—	302	993	Radio Vitus (Paris)	1.0	461.5	650	Oslo	1.5
326.1	920	—	309	970	Marseilles (PTT)	0.5	344.8	870	Posen (Poznan)	1.5
353	850	—	310	970	Le Petit Parisien, Paris	0.5	422	711	Cattowitz	12
361.4	830	—	310.9	880	Le Petit Parisien, Paris	0.5	500	600	Cracow	4.0
384.6	780	—	370	811	Radio LL, Paris	0.5	1,111	270	Warsaw (Varschava)	10.0
400	750	—	391	767	Toulouse (Radio)	3.0	<b>RUMANIA</b>			
405.4	740	—	400	750	Mont de Marsan	0.3	287.4	400	Bucharest	5.0
491.8	610	—	458	655	Paris (Ecole Sup., PTT)	3.0	<b>RUSSIA</b>			
500	600	—	480	624	Lyons (PTT)	1.0	223.9	1,349	Leningrad	4.0
1,604	287	—	1,750	171	Radio Paris (CFR)	3.0	675	441	Moscow (Popoff)	10.0
*Relay stations. **Relays 2LO.			2,650	113	Eiffel Tower (FL)	8.0	1,000	300	Leningrad	10.0
<b>AUSTRIA</b>			236.2	1,270	Stettin	0.75	1,450	209	Moscow	40.0
272.7	1,100	—	241.0	1,240	Muenster	1.5	1,700	176	Kharkov	4.6
294.1	1,020	—	250	1,200	Gleiwitz	0.7	300	999	Cartagena (EAJ16)	0.5
357.1	840	—	252.1	1,190	Bremen	0.75	310	957	Oviedo	0.7
517.2	580	—	254.2	1,180	Kiel	0.7	322	932	Almeria (EAJ18)	1.0
577	520	—	272.7	1,100	Danzig	0.75	335	893	Sau Sebastian (EAJ82)	—
<b>BELGIUM</b>			272.7	1,100	Cassel	0.7	343.2	874	Barcelona (EAJ11)	1.1
08.5	550	—	275.2	1,090	Dresden	0.7	357	750	Seville (EAJ5)	2
<b>CZECHO-SLOVAKIA</b>			283	1,060	Dortmund	1.5	373	804	Madrid (EAJ7)	3
253.2	1,140	—	297	1,010	Hanover	0.7	400	750	Madrid (Radio Espana, EAJ2)	2
300	1,000	—	303	990	Nuremberg	4.0	400	750	Cadiz (EAJ3)	550 w.
348.9	860	—	322.6	930	Breslau	4.0	405	741	Salamanca (EAJ22)	550 w.
441.2	680	—	329.7	910	Koenigsberg	4.0	413	715	Bilbao (Radio Vizcaya, EAJ11)	500 w.
<b>DENMARK</b>			365.8	820	Leipzig	4.0	434.8	690	Seville (EAJ17)	0.5
337	890	—	379.7	790	Stuttgart	4.0	436	685	Bilbao (EAJ9)	500 w.
<b>ESTHONIA</b>			394.7	760	Hamburg	4.0	462	649	Barcelona (EAJ13)	2
1,153.8	260	—	400	750	Aachen	0.75	566	530	Saragossa	500 w.
408	735	—	428.6	700	Frankfort-Main	4.0	454.5	660	Stockholm (SASA)	1.5
<b>FINLAND</b>			470	638	Langenberg	25.0	1,320	227	Motala	40
375	860	—	483.9	620	Berlin	4.0	411	730	Berne	1.5
1,428	—	—	535	560	Munich	4.0	483	510	Zurich	0.6
<b>FRANCE</b>			566	530	Augsburg	1.5	680	441	Lausanne	0.6
37	8,208	—	577	520	Freiburg	7.5	750	395	Geneva	0.6
65	4,600	—	1,250	240	Koenigswusterhausen	8.0	1,100	274	Basle	0.25
138	1,899	—	1,800	166	Norddeich	5.0	<b>TURKEY</b>			
200	1,590	—	1,060	283	Hilversum (ANRO)	5.0	1,180	254	Stamboul	7
238.1	1,260	—	1,849	163	Huizen (1,950 m. after 5.40 p.m.)	5.0	1,804	165	Angora	7
<b>HOLLAND</b>			1,950	154	Scheveningen-haven	2.5	<b>HUNGARY</b>			
<b>HUNGARY</b>			555.6	540	Budapest	3.0				

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If you ask the family which station they prefer to listen to, almost invariably they answer "The local station." To them there is no thrill in a distant transmission accompanied by atmospheric and battery

members of the family a local-station receiver? The "Home-station Three" is an ideal set for the purpose. A special blueprint (A.W.45), giving full constructional layout and wiring details, can be obtained, price 1s., from this office. The description of the "Home-station Three" appeared in AMATEUR WIRELESS No. 280.

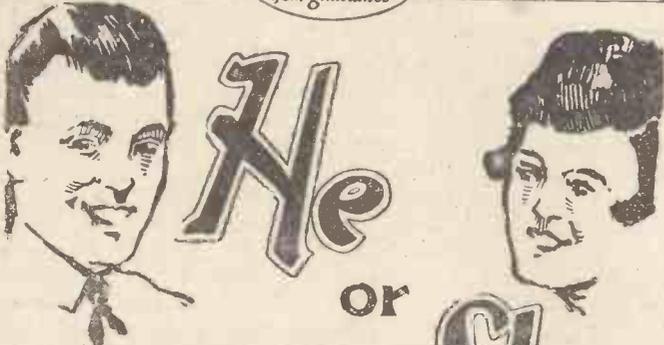


Circuit of the Home-station Three

crackles! If you are a DX enthusiast, why not build the less scientifically inclined

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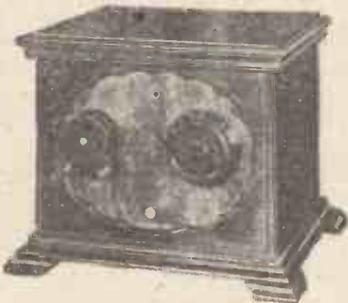
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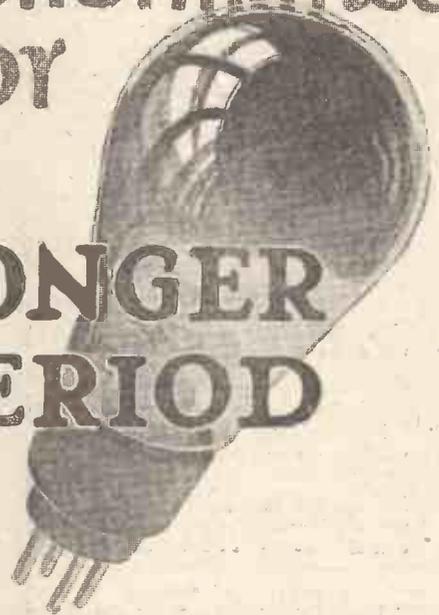
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B. 210 H. R.C. & H.F.	B. 210 L. General Purpose	B. 215 P. Power Amplifying
Fil. Volts . . . . 2	Fil. Volts . . . . 2	Fil. Volts . . . . 2
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Max. H.T. Volts 150	Max. H.T. Volts 120	Max. H.T. Volts 120
<b>10s. 6d.</b>	<b>10s. 6d.</b>	<b>12s. 6d.</b>

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WRITE a postcard to the address below for FREE POLAR-TWO Envelope, and make your set a real success. All details are contained, including full-size blueprint and drilling template. Price list of components required, photographs, constructional and operating data, coil chart, general notes, etc.

Edited by

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Writing from Devon a pleased user of the Polar III says:—

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Set of all necessary parts - £6  
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MANCHESTER LIVERPOOL  
GLASGOW NEWCASTLE  
CARDIFF

## Ether Fishing—and Identifying the Catch

(Continued from page 881)

to the accompaniment of a piano, followed by an announcement: *zwei minuten pause*, which even Graves, in his ignorance of the language, appeared to understand. Then came clearly, three musical notes repeated at intervals of about one second.

"Luck is on our side," I said with a smile. "Log Stuttgart, 379 metres. You see, we now again find two limits, namely, 379 and 468 metres. Somewhere between the two, on about 430 metres, I think, we shall pick up our mystery station."

We did; the ticking had ceased, and a man was announcing in German. It was Frankfurt-on-Main.

"Are there none but German stations on the air to-night?" queried Graves in sarcastic tones.

"By no means," I retorted, "but they happen to possess the most powerful stations, are not too far away, and very conscientiously repeat their call. They are of great use to us in calibrating a receiver as you will see."

We had now logged a few transmitters, so the next move was to search for Rome. The wavelength list showed that this station would be half-way between Frankfurt and Langenberg, that is, from the "condenser" point of view. As it happened here again we struck an interval signal, but it was a very distinctive one, three strokes on two different bells, frequently repeated, immediately followed by a woman's rather deep voice: *Radiofonica Italiana, stazione di Roma*.

Graves got busy with his pencil; the hunt had taken on some excitement, but I called for a pause.

"With a fairly selective receiver, and an efficient aerial," I said, "we could carry on this game for quite a long time. I think, however, you grasp the method I use. It is merely a question of "straddling." Find two stations; wait, if necessary, some time for their call; log them. Now halve the difference in wavelengths and search again. If you will look at your list (in sequence), you will get some idea as regards the stations you may pick up. A few evenings devoted to your receiver and you will have plotted out a fairly useful scale. You must see that if you compare your condenser readings of newly found transmitters with your chart, you can ascertain at a glance, what stations you may have picked up. Careful elimination by an examination of their programmes should settle their identity."

"Yes," said Graves rather doubtfully, "but how do I recognise them?"

"Firstly, by their approximate wavelength," I explained, "then by a definite call. In the beginning some of these languages may appear strange to you, but soon you will find that you can distinguish between

say an Italian or Spanish announcement, and a German or Swedish one. Then again, some stations use very distinctive signals such as you have heard from Rome, Stuttgart, and Frankfurt. It is true that many have adopted the ticking of a metronome, but they differ, either in *tempo* or in *tone*. The one used by Radio Toulouse, for instance, is totally different to the one you hear from the Vienna studio. Moreover, *Achtung* is typically German, and only that country uses the word to precede the call. The French say *Allo! Allo!* (no aspirate, as you hear); the Pole says *Rhalo*; Oslo says *Aal-lou*. Take Berne, the call is religiously given between each item: *Allo! Radio Berne*, and the announcements are made in both German and French.

Nothing would satisfy Graves however. I foresaw that for the next few nights, at least, many hours would be spent in his wireless den, touring Europe.

"Just one minute," he said, "you stated that some stations possess very distinctive signals. Let me have them."

"Take this down," I retorted "Langenberg, during intervals sends out the letter U in morse, Warsaw *W*, Hamburg *Ha*, Bremen *BRM*, Berlin (Koenigswusterhausen) *B*, Buda-Pesth, two notes, a dash and a dot, the former on a lower tone than the latter, and Madrid sends out a bugle-like call of four notes."

"And?—" queried my examiner.

"Similarly to Stuttgart, whose signal as you heard consisted of the notes C, D, G. Munich utilises the same method, but transmits *A, F sharp, D*, Bratislava *F, A, C, C*, and Radio Vitus, Paris, *F sharp, D sharp*.

"But you said nothing about the French stations."

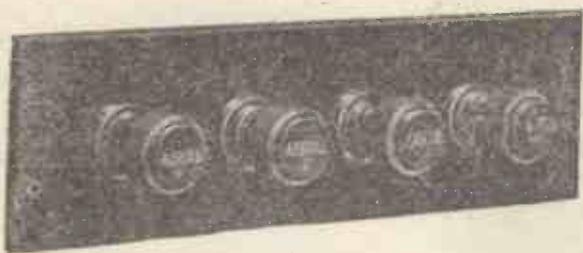
"Well, Radio-Paris gives its call as frequently as is humanly possible; Radio-Toulouse you cannot miss owing to the metronome and the constant repetition of its name between items. Some difficulty may be experienced with the French official transmitters, as in every instance you will hear the words *Postes et Télégraphes*; but Paris *PTT* always mentions the *Ecole Supérieure*, Lille and Rennes both claim that they are of the *Nord* (North), Grenoble styles itself *Poste des Alpes*, and *PTT Toulouse* hyphenates itself to the word *Pyrénées*.

"But Paris does not call itself Paris."

"No. Surely you know *Parée!* I admit it somewhat puzzles the listener when he hears *Radio-Praha*, for Prague, or *Tallinn* for Reval. It is true that the native name of Brunn is *Brno* (Broono), of Warsaw *Warschawa*, of Moscow, *Moskva*; of Munich, *Muenchen*, and of Copenhagen *Kjoebenhavn*, but the difficulty is not great in *Milano*, *Napoli*, or *Roma*."

J. GODCHAUX ABRAHAMS.

## PERFECT TERMINALS



Make your set distinctive by fitting Belling-Lee Terminals. Recommended and used by all the leading Radio experts, and by manufacturers of the best battery eliminators, the Belling-Lee patented terminal has long since proved itself to be the best designed terminal for Radio. Following are a few of its unique advantages:—

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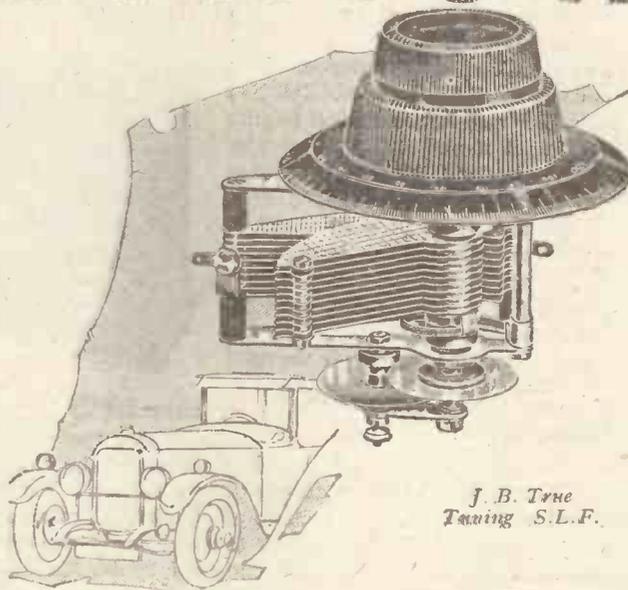
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**THE INTERDYNE**

At a special demonstration by Messrs. R.I. & Varley, Ltd., two members of the AMATEUR WIRELESS Technical Staff were able to judge for themselves the performance of the new five-valve Interdyne receiver.

The principle of the Interdyne is as interesting as it is novel. In each valve there are five electrodes, comprising two anodes, a double grid, and the usual filament. But the filament is so disposed that it affects only one of the anodes. The two grids are joined in series, and to all intents and purposes act as one grid. The anodes are quite separate, and across them is connected an accurately centre-tapped coil. The centre-tap connection goes to H.T. plus, so that currents flowing in opposite ends of the centre-tapped coil are 180 degrees out of phase. Hence any electrode capacities generated inside the valve are automatically cancelled out inside the valve by the spare anode.

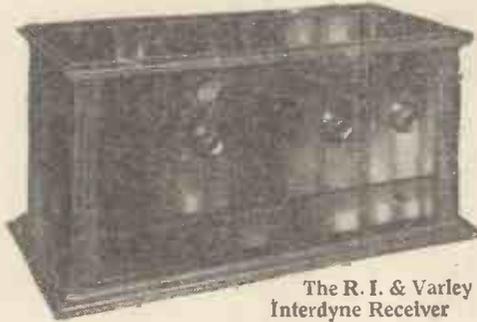
**H.F. Amplification**

In this manner a fool-proof and highly effective H.F. amplifier has been arranged. In the model we inspected there are two of these special valves in cascade, in order to obtain the high degree of selectivity and sensitiveness which modern conditions require.

The simplicity of the controls on the

five-valver most impressed us. There is one tuning control—for three tuned circuits. A good system of condenser ganging made this possible. A range control in the form of a small reaction condenser to assist in searching is seldom required. There is one more knob, which is a joy in itself, a combined on-off switch and volume control.

As the demonstration was given early in the evening, there was not a great number of stations on the air, but those that were



The R. I. & Varley Interdyne Receiver

on came in very well. After a few preliminary rounds, we were invited to try our luck. Without more ado we applied the "acid test." We tuned in Leipzig with the knob that rotates the ganged condensers, and were pleased to find that there was but a faint background of 2LO. But this was evidently not good enough for the demonstrators, who, with a slight turn of a small auxiliary control, slightly "de-ganged" the

condensers and brought in Leipzig clear of even a suspicion of interference.

Other stations on the air came in at short intervals round the dial with a pleasing evenness of tone and volume. The L.F. side of the Interdyne receiver is designed for purity and consists of a stage of R.C. coupling, followed by a stage of "straight-line" transformer coupling.

Two models of the Interdyne are available, one for 250-550 metres and the other for both 250-550 metres and 1,000-2,000 metres. The price is moderate and the performance unquestionably good.

**SHORT-WAVE CALIBRATION**

THE Q.R.P. Transmitters Society have decided to transmit calibration waves between 44 and 46 metres for the benefit of amateurs interested in short-wave work. These waves will be accurate within 1 per cent., i.e., about .05 metre. The times of transmission are as follows: Sundays, December 11 and 18, 1927, January 1 and 8, 1928, at 10, 10.5, 10.10, 10.15, and 10.20 G.M.T., the call being: "Q.R.P. de g 5YK. Here Q.R.P.T.S. calibration service Q.R.H. — metres." This will be followed by 1/2-minute dash, A.R. The wavelengths will be in steps, beginning at about 46 metres (the exact wavelength will be given at the time) and finishing at about 44 metres.



**Wireless in every room this Winter**

THE LOTUS REMOTE CONTROL enables you to listen-in in the dining room, sitting room, bedroom, kitchen—everywhere—anywhere. Simultaneously and without interference with each other.

Simply place the Lotus Relay near receiving set, wire up to rooms desired, and connect with Wall Jack and Plug. No technical knowledge is needed.

The same volume of sound throughout. The last one to switch off automatically disconnects the set. Suitable for any valve set.

**Complete Outfit for Wiring Two Rooms:**  
 1 "Lotus" Radio Relay, 2  
 1 "Lotus" Relay Filament  
 Control Wall Jacks, 2  
 "Lotus" Jack Plugs, 2  
 yards of Special 4-strand Wire.  
**Each Additional Room, 7/6**

Eliminator Remote Control for controlling L.T. accumulator and H.T. from the mains, £2 5 0 complete for two rooms.

FILL IN THE COUPON BELOW FOR FREE BLUEPRINTS AND INSTRUCTIONS

**THE LOTUS REMOTE CONTROL**

**FREE!**

To Garnett, Whiteley & Co., Ltd.  
 Lotus Works, Broadgreen Road, Liverpool.

Please send me FREE BLUEPRINTS and Instructions explaining how two rooms can be wired in half an hour.

Name.....

Address.....

.....A.W.

CAUSTON

**YOU DON'T NEED COILS NOW!**

The Dunham "ALLWAVE" Tuner completely dispenses with troublesome, inefficient and expensive coils.

The "Allwave" Tuner is adaptable to any set already made, covers all wavelengths from 150 to 2,000 metres, and is complete with reaction. It is simple to operate and easily affixed—one-hole fixing. Constant aerial tuning is employed and dead-end effects are entirely eliminated. Reaction is free and easy and remarkably smooth on all wavelengths. Used and recommended by most wireless journals.

THE "ALLWAVE" TUNER LENGTHENS YOUR RANGE, INCREASES YOUR TONE, AND ADDS ANOTHER VALVE TO YOUR RECEIVER.

"ALLWAVE" TUNER **9/6** complete with instructional blueprint.

**40 STATIONS ON LOUD SPEAKER**

This Dunham 3-Valve Cabinet Set illustrated on right has been on the market for nearly five years and has been gradually brought to its present remarkable degree of efficiency. Many thousands of sets of this type have been sold ready-made. All valves are enclosed and there are no loose wires. A lock and key is provided, and there are no troublesome coil-holders or hordes of inefficient and expensive coils.

**YOUR OWN SET TAKEN IN PART EXCHANGE WITH PLEASURE.**

**TRUTH IN ADVERTISING. LET US PROVE TO YOU THAT EVERY CLAIM WE MAKE FOR OUR SETS IS ABSOLUTELY TRUTHFUL. TWOPENNY STAMP SECURES OUR CATALOGUE, TOGETHER WITH LEGALLY SWORN EVIDENCE IN SUPPORT OF THESE CLAIMS.**

**TO HOME CONSTRUCTORS AND DISTANCE FANS.**

Our New Two-valve Receiver, illustrated on left, meets the needs of those who want an extremely simple set, yet it operates a loud-speaker at 25 miles from local station and about 100 miles from Daventry. One Dial Control only, with a smaller knob to enable you to vary strength of reception. Anti-microphonic Valve-holders. Automatic Filament Control (you just insert plug to switch on set and start loud-speaker working). No coils of any description needed. Oak cabinet with neat H.T. battery compartment under set. Supplied complete with two Gossor Dull-Emitter Valves; Exide Accumulator, extra large H.T. (300 volts) Battery, Dunham Loud Speaker—in fact, an installation complete for 12s. 6d. deposit, and balance by easy monthly payments. Cash price complete, £7 12s. 6d. Simplicity Three-Valve Set, £12 10s. 0d. complete, or 20/- down and 20/- monthly secures. 5 per cent. discount for cash. Order now for Christmas.

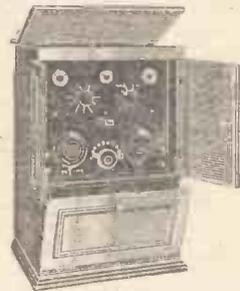
Here are a few stations that clients receive almost daily on loud-speaker with this set. Can you equal this with six valves, or indeed any number of valves?

Stockholm	Swansea	Breslau
Stuttgart	Lausanne	San Sebastian
Berlin	Hamburg	Vienna
Manchester	Paris-Toulouse	Hilversum
Nottingham	Birmingham	Oslo
Aberdeen	Bournemouth	Madrid
Belfast	Glasgow	Milan
Plymouth	Cardiff	Dortmund
Three Dutch Stations	Edinburgh	Prague
Frankfurt	Liverpool	Radio-Paris
Leipzig	Copenhagen	Mont-de-Marsau
London	Barcelona (three stations)	Langenberg
Newcastle	Amsterdam	La Petit Parisien
Daventry	Seville	Brunn
Dublin	Munster	Nuremberg
Sheffield	Rome	Three different American stations

Make this wonderful Three-valve Self-contained Cabinet Set—it gives you range and strength equal to any five-valve receiver. Write to-day for the Dunham Constructor's Envelope, giving full particulars of simplified pictorial method of construction which the merest novice cannot fail to understand. Every envelope contains five pictorial diagrams, drilling sheets, full book of instructions, advice on aerial and earth system, and, in fact, a veritable gold mine of information for home constructors. Envelope complete. Post free.

**35/6** deposit secures this complete set (royalty paid), with loud-speaker, and, as a special Christmas offer, we are supplying on all orders for this outfit, sent before December 18th, H.T. Mains Eliminator **FREE OF CHARGE**, instead of usual dry H.T. batteries, if you mention this paper.

**2/9**



**SIMPLICITY ITSELF ONE DIAL TUNING**

**12/6**

**SECURES**



If you have already paid Marconi Royalty on Dunham Receivers you need not do this again.

For those who like to make their own receivers, we have produced an attractive Constructor's envelope of this set, in simplified form, containing drilling file, panel layout, wiring diagram, and, in fact, all particulars. **7d.** Post free.



Enquiry Dept., ELM WORKS, ELM PARK, BRIXTON HILL, LONDON, S.W.2

If you purchase our three-valve set we will take your own set in part exchange. Write for full details.

**"Orphean Gem"**



**Melody & Merriment Dancing & Delight Parties & Presents**

Make the most of the coming festive season by filling your home with radio melody through the "Orphean Gem." Do not do the "Gem" the injustice of thinking it is a Baby Speaker with a baby voice—it isn't. It is full-sized and gives clear full-toned results of great purity. At 30/-, it represents speaker value which has amazed the trade.

**Complete range of fully guaranteed Speakers**  
 THE ORPHEAN "GEM" referred to above and illustrated at side **30.-**  
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 \*THE ORPHEAN "CABINET," a beautiful cabinet model. Mahogany 63.-, or Oak 60.-

(Demonstrations at all good Wireless Stores.)

**LONDON RADIO MFG., CO. LTD**

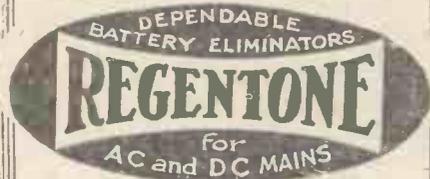
**STATION ROAD, MERTON, S.W.19.**

Telephone: Wimbledon 4658

Send a postcard to Head Office for detailed list and name of convenient Stockist who will demonstrate any or all of the models.

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

**IT PAYS!**  
to **DEAL**  
with **SPECIALISTS**



- 1 If you have electric light, and are still using batteries, you have not experienced the majestic volume obtainable from modern valves when fed with that steady maintained voltage supplied by a Regentone mains unit. Upkeep costs are negligible.
- 2 24 Models are available—one for every type of receiver. You can choose the model exactly suitable for your set and save money.
- 3 We invite you, before definitely deciding to purchase, to satisfy yourself as to efficiency by testing on your own receiver for 7 days without obligation to retain.
- 4 In every Regentone instrument, irrespective of price, quality, workmanship and high efficiency are guaranteed.
- 5 Behind each Regentone instrument are four year's specialised experience.

**WRITE FOR  
OUR  
12-PAGE  
CATALOGUE**

It describes and illustrates a full range of H.T. units, H.T. and L.T. complete power units, Mains Receivers and component parts for A.C. and D.C.

**REGENTONE COMPLETE POWER UNITS MAY BE USED WITH ANY TYPE OF VALVE AND DO NOT NECESSITATE ANY ALTERATIONS TO EXISTING RECEIVERS.**

**ASK YOUR DEALER OR COME AND SEE US  
REGENT RADIO SUPPLY CO.**

SHOW AND DEMONSTRATION ROOMS:  
**21 BARTLETT'S BLDGS., HOLBORN CIRCUS,  
E.C.4**

Central 9561.

# £35 Cash Competition

Open to Every Reader

*Which is Your Favourite Circuit?*

## PRIZES:

<b>First Prize</b> -	<b>£20</b>	<b>Fourth Prize</b> -	<b>£3</b>
<b>Second</b> " -	<b>£5</b>	<b>Fifth</b> " -	<b>£2</b>
<b>Third</b> " -	<b>£4</b>	<b>Sixth</b> " -	<b>£1</b>

To the right is a list of twelve popular sets or circuits. We invite you to tell us which among them are your favourites. To encourage you to take the little trouble necessary we are offering some splendid money prizes.

All you have to do is to select what you consider to be the six best sets or circuits and insert them in the special coupon given on this page in what you believe to be their order of merit or popularity. With our readers' votes in hand, we shall be able to determine which set has the honour of first place and in what order of popularity the rest should come; then, in due course, we shall be able to give readers the advantage of our information.

Readers whose lists agree, or most nearly agree, with the majority result will win the prizes.

- A** 2-valver.—Detector with reaction, followed by one transformer-coupled L.F. valve.
- B** 2-valver.—One reflexed valve, crystal detector, and one L.F. valve.
- C** 3-valver.—Detector, using anode-bend rectification, followed by two stages of resistance-capacity L.F.
- D** 3-valver.—High-frequency valve, neutralised; using plug-in coils, followed by a detector valve and transformer-coupled L.F. valve.
- E** 3-valver.—Detector valve with reaction, followed by two transformer-coupled valves with switch to cut out last L.F. valve.
- F** 3-valver.—Detector with Reinartz reaction, followed by one resistance-coupled L.F. stage and one transformer-coupled L.F. stage.
- G** 4-valver.—High-frequency valve neutralised; plug-in coils, detector followed by two transformer-coupled L.F. valves.
- H** 4-valver.—High-frequency valve, neutralised, detector with reaction, followed by one resistance-coupled stage and one transformer stage of L.F.
- I** 4-valver.—Two high-frequency valves, neutralised, detector followed by transformer-coupled L.F.
- J** 4-valver.—Three high-frequency valves and detector.
- K** 5-valver.—Two high-frequency valves, neutralised, detector followed by two stages of L.F.
- L** 5-valver.—Two high-frequency valves and detector, neutralised and screened with single control; followed by one resistance-coupled L.F. and one transformer-coupled L.F.

### RULES

**TO BE MOST CAREFULLY OBSERVED**

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

All entries to be written **IN INK** on the special coupon printed on this page.

Competitors may submit more than one coupon, but will not be awarded more than one prize.

In the event of two or more competitors tying for place, the Editor will decide as to the next step.

We bind ourselves to present prizes to a minimum total value of £35

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 in **AMATEUR WIRELESS** early in the New Year.

The closing date for entries is **December 31, 1927.**

### COUPON

Fill in this coupon **IN INK**, using the capital letters as above to identify the sets and circuits. Then post it to:—

**"My Favourite Circuit,"  
"Amateur Wireless,"  
58-61 Fetter Lane,  
London, E.C.4.**

1st	
2nd	
3rd	
4th	
5th	
6th	

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

Name .....

Address .....

10/12/27

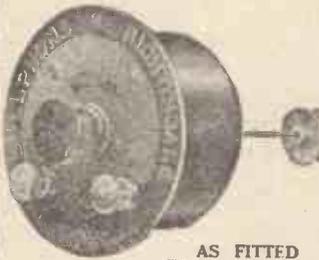
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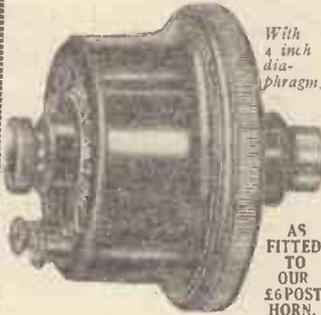
YOU'LL BE SURPRISED!

The New Wonder "Nightingale" CONE UNIT

GRAMOPHONE ATTACHMENT



AS FITTED TO OUR CABINET CONE



With 4 inch dia- phragm.

AS FITTED TO OUR £6 POST HORN.

From a 3 ply board, 3ft. square cut out a 12" circle then cut a strip of wood



16 x 3/4" and make a hole 1/2" dia. in centre, this will carry the unit. Fix strip to board as shown.

**BULLPHONE DOUBLE PAPER CONE 2/-**

Postage 3d. extra

Exactly as fitted to our own Speakers.

Reduced from 32/6 to 15/- solely as an advertisement for the famous Bullphone Nightingale Speakers. Gebalt magnet guaranteed for all time.

**ASTONISHING RESULTS.** equal to the most expensive Loud Speakers yet made, are guaranteed with either of these Units.

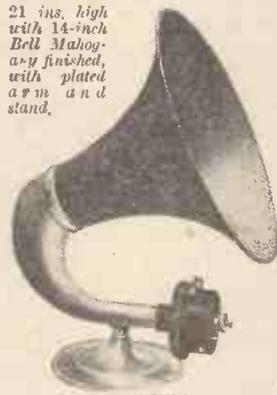
### BUY ON 10% EASY TERMS 5% DEPOSIT



CABINET CONE

Size 17 ins. high by 15 ins. in Mahogany, Walnut or Rosewood finish.

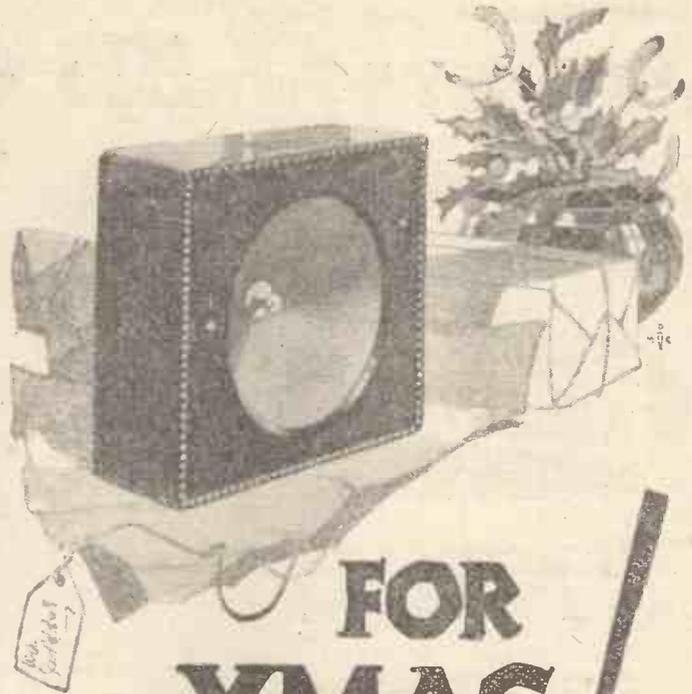
**77/6 CASH, OR EASY TERMS.** 10/- deposit. and 12 monthly payments of 6/-.



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# FOR XMAS!

The Cabinet Loud-speaker at 35/-

Every note, every syllable, clear cut and distinct; sweet mellow tones distributed evenly all over the room; no distortion or drumming on the high notes.

Try one of these lovely instruments yourself on seven days trial. If you decide not to keep it during that time your money will be returned to you.

Fine Leathcette Finish - - 35/-  
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Packing free, postage 1/3

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The famous horn-type Loud-speaker, 19 ins. high, powerful and clear as a bell - 13/6

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Advertisers Like to Know That "You Saw it in 'A.W.'"



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2. The Sap from the tree is now taken by the oxen-carts to the tanks.

**W**AY back in a Malay rubber plantation our tree is giving forth its latex. This latex, or sap, is now collected in pails by the native and transferred to an oxen-drawn cart. This takes it to the factory where is begun the long process of transformation from a milky fluid into a Resiston Panel.

Only the pick of the rubber is used to make Resiston Panels. The slightest flaw which has crept in during the many stages of manufacture bars a piece of rubber from ever becoming a Resiston Panel. Utter purity is the Resiston Standard.

That is one of the reasons why the Resiston Panel is famed for its sheer beauty. Why Resiston has such amazing strength. Why Resiston's insulation is 100% efficient. Why Resiston's dielectric constant is so low. Why Resiston's colour is permanent. Why, in short, Resiston will give you that satisfaction which comes from knowing that the panel in your set is efficient. Ask your Dealer for Resiston.

Resiston Panels come in 13 stock sizes in black and Mahogany-grained. From 6 in. x 9 in. in black, 3/5. to 8 in. x 30 in. Mahogany-grained 19/-.

**RESISTON**  
PANELS

"24 hours Cut Panel Service"

A vt. American Hard Rubber Co., Ltd., 13a, Fore St. E. C.

1153

# "MAKING LIGHT DO WORK"

(Continued from page 861)

acts as a sort of electric eye, taking count each instant of the exact shade of each minute area of the photographic image, and as the electronic emission from the cathode is directly proportional to the intensity of the light, we can, by connecting up the cell as a grid leak—or in other ways—cause the variations in intensity of the light to control the output of a wireless transmitter. The feeble current generated by a photo-electric cell, amounting to about one hundredth of a microampere, can also be magnified by valve amplification; this is actually done in the Ranger system of trans-Atlantic wireless photo-telegraphy, the current being sufficiently amplified to operate an automatic telegraph relay.

In television the amplified currents of the photo-electric cell are transmitted on a carrier-wave and are utilised in a variety of ways to form the image in the receiving instrument. One of the most ingenious of these is the control of the beam in a cathode-ray oscillograph, which excites a phosphorescent screen and causes a luminous spot, varying, of course, always in intensity, to redraw the original image with incredible rapidity.

### Other Uses

These light-sensitive elements have other uses too. A well-known example is that of the automatic beacon. A buoy is provided with compressed acetylene, a jet of which is controlled by a relay, and the relay in turn is actuated by a selenium cell in series with a battery or used as one arm of a Wheatstone bridge. At dawn the light of the newly born day falls upon the cell increasing its conductivity sufficiently to pass current to the relay. The relay operates the valve and cuts off the supply of acetylene until nightfall.

There is actually a machine in use in America in which cigars are passed on an endless band in front of a photo-electric cell. Any cigar that is too light in colour reflects an abnormal amount of light upon the photo-electric cell, which instantly operates a relay that in turn unceremoniously pushes the cigar into a rejection basket.

One of the lecture experiments which I frequently use to show the possibilities of light-sensitive cells is shown in the diagram in Fig. 4. It provides a means of causing the light of a match or the flash of an electric torch to light some distant electric lamp, or to burn a piece of fuse wire and so set off a gunpowder "bomb," or to perform any kind of work, such as opening a door, etc. If the relay be connected to an electric lamp, a flash of light on the cell will cause a flash of light to be given by the distant lamp, thus demonstrating the first prin-

ciples of picture telegraphy or television.

S is a selenium cell (which can nowadays be bought for a few shillings), R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are suitable resistances making, with the cell, the four arms of a Wheatstone bridge. B<sub>1</sub> is a battery of a few dry cells, and RE a relay sensitive to a current of 1 or 2 milliamperes. The local side of the relay can, of course, be connected through a battery, to an electric lamp, a bell, or any mechanical device. If connected up with a 3½-volt dry battery and a small lamp, the lamp will, of course, light up immediately from a flash lamp—or even a match—if held in front of the cell S. By a similar arrangement it is possible to release a catch and make a door swing open if a flash of light is thrown upon a small cell sunk into the woodwork by the side of the keyhole, and so on.

There are, however, many non-frivolous uses to which selenium and photo-electric cells are being put. There is the new type of talking ciné-film, in the making of which the performers' voices are recorded by a microphone in the usual way. The microphone currents are made to displace a minute shutter—actually the flat "string" of an Einthoven galvanometer—which acts as a shutter controlling the amount of light falling upon an edge of the picture film. When running such a film through the projector, the fluctuating light which passes through the oscillograph record is made to fall upon a photo-electric cell, which generates new currents exactly similar to those from the microphone making the "record." These currents, after the usual amplification, operate the loud-speaker.

As I write this article, news comes from the General Electric Company's research laboratories in the United States of a photo-electric warning device for use in industries where mercury is employed. Too much mercury in the atmosphere will blacken a strip of paper sensitized with selenium sulphide, and the immediate effect is that light which had been reflected from the white paper is no longer reflected on to the ever watchful photo-electric cell. This upsets the electron emission from the cathode and a relay is put into action which sets an alarm bell in motion.

New developments in the television world depending on novel and highly powerful photo-electric cells were revealed at the October annual meeting of the Optical Society of America, when Dr. Ives dealt with the Bell Telephone Laboratories' new system of televising large subjects such as landscapes, sporting scenes and so on. These will be dealt with on a future occasion.

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COPPER SCREEN AND BASE	- -	10/6
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PERFECT INSULATION

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STANDARD SIZES FROM STOCK  
THICKNESS,  $\frac{3}{16}$ " ; PRICE  $\frac{3}{4}$ d. per sq. in.

FORMERS IN STANDARD SIZES FROM STOCK

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DOES YOUR BATTERY HAVE ITS VITALS EATEN AWAY BY CORROSIVE ELECTROLYTE?

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IF IT IS AN ORDINARY DRY BATTERY, **YES.**

BUT IF IT IS A

"PERTRIX" PATENT LONG LIFE  
NO SAL-AMMONIAC  
BATTERY—**NO!**

NO SAL-AMMONIAC  
(that's the point) and there-  
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LONGER LIFE.

Send a p.c. for full particulars.  
**A.F.A. ACCUMULATORS Ltd.**  
(Pertrix Dept.)

120 Tottenham Court Road, London, W.1  
"The Battery that dies of old age."



Here's what the  
musical experts say!

"We are greatly  
impressed by the  
beautifully clear tone

of the  
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**ONE-DER**  
Loud  
Speaker"

Don't be satisfied with  
"quite a good one, sir,"  
now that you can buy this  
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Acclaimed by the musical  
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dealers—just go to a shop and  
hear for yourself the rich tone  
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Speaker—note how faithfully  
even the lowest music notes  
are reproduced.

Coloured a deep brown tone,  
the "ONE-DER" is a speaker  
of such refined appearance that  
it will tone with almost any  
scheme of decoration.

Price £2 : 10 : 0

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Ask your dealer, or send for particulars of the Ediswan Low  
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# EDISWAN VALVES

**CLEAREST-STRONGEST  
LAST THE LONGEST**

THE EDISON SWAN ELECTRIC CO., LTD., 123/5, Queen Victoria St., London, E.C.4

IMPORTANT

IT IS IMPOSSIBLE TO ADVERTISE ALL THE WIRELESS PARTS NOW ON SALE BUT IF YOU WANT THEM TRY RAYMOND'S FIRST! BE SURE YOU VISIT THE Bargain Window.

LOUD SPEAKERS (All makes stocked) Amplion, A.R.38, 38/-; A.R.65, 65/-; Oak Flare, 13/6 extra; Cone A.C.3, 75/-; A.O.I., 52/6; Jacobean Oak A.O.7, 26 10s. Celestion, 25 10s. to £25. B.T.H. C2, 60/-; Sterling Mellorox, 45/-; Geophone, all metal, 35/-.

SET OF THE SEASON COSSOR MELODY MAKER COMPONENTS FOR SAME

2 Ormond .0005 S.L.F. at 6/-; 2 Do. Slow Motion Dials at 5/-; T.C.C. Condensers, .0001, .001, .0003, .002, 2/4 each; 2 mid, 3/10; 2 Grid Leak Clips, B.B., 9d.; Dubilier, 3, 4, and 25 meg., 2.6 each; 3 W.B. V.H. at 1/9; 1 Ferranti A.F.3, 25/-; 2 Bulgin P.5, at 1/6; Wound Coil, ready to use, 6/3; Terminals, Glazite, Syncolex, 3/-; Variable Resistance, B.B., 3/-; 9-v. Grid Bias, 2/-; Handsome American Type Cabinets, baseboard, hinged lid, solid oak, for 21 x 7 panel, 25/-; Ebonart, Resistor, Parfait Panels, Mahogany, or Black Polished, Grade A, from 5/-.

KIT £4/10/0 AS SPECIFIED THE 21 in. x 7 in. CABINET IF PURCHASED AT SAME TIME WITH ABOVE PARTS - 15/- TO CALLERS ONLY.

NO POST ORDERS ON ABOVE GUARANTEED TO ANY PARTICULAR TIME OWING TO THE GREAT DELAY IN DELIVERY OF CERTAIN COMPONENTS.

NOTICE MESSRS. COSSOR HAVE KINDLY ADVISED ALTERNATIVE COMPONENTS WHERE NECESSARY. INFORMATION ON REQUEST.

COSSOR VALVES

In 4 types and 3 voltages. 2-volt: 210 H.F. (Red Band), for H.F. use, 10/6; 210 Det. or L.F. (Black Band), for Detector or L.F. use, 10/6; 210 R.C. (Blue Band), Resistance or Choke Coupling, 10/6; 215 P. Stentor Two-Power Valve, 12/6. 4-volt: 410 H.F. or Det. (Red Band), for H.F. or Detector use, 10/6; 410 R.C. (Blue Band), for Resistance or Choke Coupling, 10/6; 410 L.F. (Black Band) First L.F. Stage, 10/6; 410 P. (Stentor Four) Super Power Valve, 12/6. 6-volt: 610 H.F. or Det. (Red Band), for H.F. or Detector use, 10/6; 610 R.C. (Blue Band), for Resistance or Choke Coupling, 10/6; 610 L.F. (Black Band) First L.F. Stage, 10/6; 610 P. (Stentor Six) Super Power Valve, 20/-.

MULLARD P.M. VALVES

For 2-volt accumulator. P.M.1 H.F. 10/6; P.M.1 L.F. 10/6; \*P.M.1A (Resist. Capacity) 10/6; P.M.2 (Power) 12/6. For 4-volt accumulator or 3 dry cells. P.M.3 (General Purpose) 10/6; \*P.M.3A (Resist. Capacity) 10/6; P.M.4 (Power) 12/6. For 6-volt accumulator or 4 dry cells. P.M.5X (General Purpose) 10/6; \*P.M.5B (Resist. Capacity) 10/6; P.M.6 (Power) 12/6. Super-power valves for last L.F. Stage. P.M.254 (4 volts) 20/-; P.M.256 (6 volts) 20/-.

MARCONI, EDISWAN, OSRAM, B.T.H., COSMOS VALVES at USUAL PRICES.

DON'T FORGET TO READ THE BARGAIN COLUMN.

OUR NOTED 1-VALV (L.F.) & CRYSTAL SET

In solid Polished Cabinet. COMPLETE WITH LION MICRO DETECTOR. SET only 22/6 Carr. 1/6. Or complete with valves, phones, H.T. and L.T. Units, Aerial Equipment. Extraordinary value. 45/11 Post 2/-.

TESTIMONIAL. G. A. Ross, Esq., 21, Wharfedale Rd., N.1., March, 1927.

Messrs. Raymond, I am sending this letter to tell you how pleased I am with the three sets purchased from you. They are working in Billericay, Chiswick, and Wandsworth, and I must say the results are simply wonderful, loud-speaker reception being impossible to beat. You may rest assured that I shall heartily recommend them to anyone whom I know is in need of a set, as there is no better value obtainable anywhere. (The above entirely unsolicited.)

PERSONAL SHOPPERS

NOTE CLOSED XMAS DAY OPEN BOXING MORN 11-1

WEEK BEFORE XMAS OPEN LATE

USUAL HOURS ALL DAY SATURDAY ALL DAY THURSDAY ALL DAY EVERY DAY

TWO SHOPS if one is closed the other is open. Sat. 9 a.m. to 9 p.m. Sunday morning 11-1

NOTE WONDERFUL OFFER BELOW! STUPENDOUS BARGAINS

BE SURE YOU ARE AT RAYMOND'S! These SPECIAL LINES ARE SOLD TO CALLERS ONLY who are purchasing their regular wireless supplies at the same time.

ALL BRAND NEW.

YOU CAN ONLY BUY THESE AT RAYMOND'S WHEN BUYING OTHER GOODS. NOT SOLD AT THESE PRICES ALONE OR BY POST

H.T. BATTERIES Very best quality, 60 volt 3/6 (List, 6/11) Brand new, 100 volt 5/11 (List, 11/-) Can be purchased with ordinary goods to the value of 15/- & 20/- respectively.

VERNIER DIALS Price 2/3 with other goods. (List, 4/6) INDOOR AERIALS (List, 2/-) Price 1/- with other goods.

HIGH-CLASS VOLT METERS Dead beat, double ending for H.T. & L.T. 3/11 (List, 7/11) Can be purchased with ordinary goods value 17/6.

AMERICAN MAHOGANY POLISHED CABINET Hinged lid, baseboard. 12x8 5/- (List, 10/9) 14x8 7/11 (List, 15/11) Can be purchased with ordinary goods value 25/- & 30/- respectively.

LOG-MID LINE VARIABLE CONDENSERS (List, 4/11) Price 2/3 with 10's worth of ordinary goods.

6-PIN SPLIT PRIMARY H.F. TRANSFORMERS (List price, 7/6) Long or Short Wave Price 3/6 with reasonable purchase of ordinary goods.

LOUDSPEAKERS 7/11 8/11 10/11 15/- 21/- All listed at double. Can be purchased with orders value 20/- up to 50/- according to speaker chosen.

LOUDSPEAKER UNITS (List, 9/11) Can be purchased for 5/- with 20/- worth of ordinary goods.

ACCUMULATORS (2-volt 40). Can be purchased for 4/11 with 20/- worth of ordinary goods. List 8/11.

HIGH-GRADE EBONITE PANELS (not cheap rubbish) 10x8 1/6 14x8 2/6 12x8 2/- 21x7 3/- Can be purchased with a reasonable amount of ordinary goods.

NO POST ON ABOVE BARGAINS

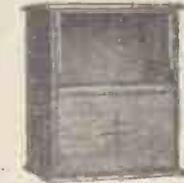
MANY OTHER LINES CHEAP

(As part of our advertising scheme)

BE SURE ITS RAYMOND'S

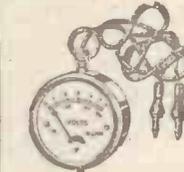
K. RAYMOND 27 & 28a, LISLE ST., LONDON, W.C.2. Phone: Gerrard 4637.

COME TO LEICESTER SQ. TUBE (Important) Ask for back of Daly's Theatre This address is opposite.



OAK CABINETS American type, opens at back, compartment underneath for batteries, etc. 12 by 8 by 9 in. deep 18/11 16 by 8 by 9 in. 25/11 Case and Carriage 2/6 Solid Oak, glass finish, beautifully made.

WESTOCK IGRANIC, CLIMAX EVERREADY, HEIGSESEN, SIEMENS, FORMO, FER, RANTI, WEARITE, ORMOND, I.B. BENJAMIN, LOTUS, MULLARD, DUBILIER, LIS SEN LEWCOS, UTILITY, MAGNUM, PETO-SGOTT, JERLESS, BURNDIPT, PYE, MARCONI, McMICHAEL, COSMOS, CARBORUNDUM, S.I. VARLEY, GAMBRELL, BROWN'S, STERLING, AMPLIONS IN FACT EVERYTHING IT IS POSSIBLE TO STOCK



WATTS UNIVERSAL TEST METER, L.T. & H.T. Also READ'S, from 1 to 35 milliamps. A really wonderful instrument. Post Free 8/6 U.K.

COMPONENT PARTS STOCKED FOR Radiano Three, Monodial, Lodge "N", Mullard P.M., Nelson, Rodney, Franklin, "Wireless Magazine" Sets, etc., etc.

SETS OF COMPONENT PARTS

RADIANO "THREE" (March '27, Wireless Constructor). All parts as specified with Terminals. 2 Ormond S.L. Variables with friction gear; 3 Coil Sockets, T.C.C. .0003 and Clips and 2-meg. Leak; 3 Benjamin Valve Holders; 3 Fixed Resistors and Bases; 9v and 0v Switch, Geophone 1st Stage L.F.; B.T.H. 2nd Stage L.F.; Engrated Strip, with Terminals and Nuts, 2 B.L. Terminals for Front Panel; 4 Gross Pinch-n. Spades, Rubber Flex. £4/10/0 lot, post free U.K. EDISWAN R.C. THREESOME. Set of Parts: 1 Ediswan R.C. units; 1 Ediswan P.V.2 Valve; 2 Ediswan R.C.2 ditto; 3 Lotus V.H. 3 Fil. Rheostats; 9-v. Grid Bias, Lotus 2-way L.H.; .0005 Tuning Condenser. £3/5/0 the lot, post free U.K.

SIGNAL BOX (P. Harris, May '27, W. Cons.) 1 Ormond S.L.F. .0005 and 2 .0003, with friction gear; 2 6-pin bases; 1 Neutrotrenita; 1 Neutralising; 4 V.H., 4 Resistors; .0001 and stand; R.F. Choke; 100,000 Anode and Base, 3 o/o Switches; Carborundum Unit, R.I. Multi; Ferranti do.; 4 Strips and Terminals; 015 Dubilier; Glazite; 6-pin H.F. Trans., S.S. type; Do. S.P. for Broadcast Range. Components as specified. The lot, post free net, £7/10/0 U.K.

FAMILY FOUR PARTS (Percy Harris, Aug. '27.) 14 Belling-Lee Terminals; 4 Anti-Micro V.H.; 4 Burnsept Res. & Bases; 1 30-ohm B.B. Rheostat; 2 six-pin Bases, 1 Formodenser; Dubilier .0003, with clips; 4 meg and 4-meg. Leaks; .015 Fixed, 110 type with Series Clip; 100,000 ohm Wire Wound; 300,000 ohm ditto Resistances (Dubilier or R.I. variety); Neut. Condenser, H.B.; H.F. Choke; Geophone L.F.; 2 "J.B." .0005 and 2 S.M. Dials; Popular .0003; Igranol o/o Switch; 2 Lotus D.O. Jacks and Plugs; Binocular Coils 250/550; 8 P. H.F. Transformers, 250/550 and 1,000/2,000 metres; S. Secondary ditto for Davenport. THE COMPONENTS, ALL AS SPECIFIED, SENT POST FREE NET FOR £8/8/0 U.K. PANELS, CABINETS, VALVES, PHONES, LOUD SPEAKERS, TO YOUR REQUIREMENTS.

West End Depot for all Magnum Parts

EFESCAPHONE VALVE SETS

complete 2-VALVE SETS with Mullard Valves 48/- Loudspeaker Accumulator All Aerial Equipment Grid Bias 100-volt H.T. Tax Paid.

Delivered on first payment of

20/-

and 12 payments of 21/- each.

ASK IS THIS RAYMOND'S

**EDISON BELL COILS.**  
 25 ... 2/6 100 ... 3/6  
 35 ... 2/6 150 ... 3/6  
 50 ... 2/6 200 ... 4/6  
 75 ... 3/6 250 ... 4/6  
 ... 300 ... 4/6

**FIXED CONDENSERS.**  
 Dubilier. 0001, 2, 3, 4, 5 each 2/6. 001 2, 3, 4, 5 each 3/-. Grid Leak 2/6. Edison Bell. 001-0001 2, 3, 4, 5, 1/2-. 002, 3, 4, 5, 6, 1/6. 0003 and grid leak. 2/6. McMichael with clips 0001 to 0005, 2/6 each. 001 to 006, 3/6 each.

**LITZEN WIRE** is the best for Tuning Coils, Variometers, and H.P. Transformers. Each individual strand is silk-covered with an overall covering of silk 20 yds. 5/6; 25 yds. 6/6; 50 yds. 12/-. 60 yds. 14/6

**CALLERS**

PLEASE MAKE OUT YOUR LIST FOR ORDERS OVER 20- IF REQUIRING COMPONENT PARTS FOR ANY SET AND WE WILL GIVE YOU A FIXED INCLUSIVE PRICE.

PARTS IN STOCK FOR THE EDISON BELL SOLODYNE MEWFLX ELBIFREEFLX 1927 FIVE AND ALL THE CHIEF CIRCUITS

**THE NEW No. 3 ORMOND S.L.F. CONDENSER**  
 00025, 5/6. 00035, 5/6  
 0005, 6/-. With 4-in. Dial With Friction 55-1 44n. Dial. 6/- each extra  
**ORMOND Square Law Low Loss.** 0005, 9/6; 0005, 9/6 (1/6 each less no vernier); Friction Geared. 0005, 15/-; 0003 13/6; 00025, 13/6. Straight Line Frequency Friction Geared. 0005, 20/-; 00035, 19/6. S.L.F. 0005, 12/-; 00035, 11/-  
**FLAMELESS RHEOSTATS** Dual, 2/6; 2 ohms or 30 ohms 2/-; Potentiometer, 400 ohms 2/6. 0001 Reaction. 4/-; Air Dielectric 2/-; Neutralising. 4/-; Neutrodyne. 2/-; Twin Gang. 0005, 32/-; Triple. 40/-; H.F. Choke. 7/6 Geared Dial. 5/-

**AMAZING VALUE**

**BROWNE CRYSTAL SET** (200-1,700 metres) Latest Model No. 3. 12/6 Pair 4,000 ohm Headphones, 7/6. Aerial and Lead-in 2/11. **18/11**  
 The above lot "08"

**VALVE HOLDERS** Non microphonic - Benjamin 2/9; Lotus, 2/6, 2/3; W.B. 2/-; Magnum 2/6; Raymond 1/9; Harlie. 1/4; Standard 9d. 1/-

**BENJAMIN** - Battery Switch 1/-; Valve Holder 2/-; with Grid Leak 5/3 With Condenser and Leak. 7/-; Rheostat 2/9.

**BRETWOOD** Grid Leak de Luxe, 3/6; with condenser 4/6 Anode 3/6

**CLIMAX** - Potentiometer Divisor, 5/-; Special Choke 10/6; Shock Absorber, 3/-; Earth Tubes, 5/-; L.L. Insulators 1/ pair.

**COLVERN SCREENED COILS**, 50 Former & Base. 5/-; 6-pin Base 1/6 Former only 4/-; Screen and Base, 3/6 3 P.H.F.T. 9/6. 3/6 do 9/6. 2 Monodial, 19/1

**DUBILIER** Dustproof Wire wound 20 000 to 100,000 ohm resistances. 5/-; 50000 ohm Base 1/6. 200,000 ohms 8/-; Volt Control Unit, 7/6. Duval's Leak, 7/6 Dumetol Holder 1/-.

**ALL POST ORDERS IN STRICT ROTATION**

**IGRANIC TRIPLE HONEYCOMB INDUC. TANCE COILS**, 50, 2/9; 200, 2/9; 500, 3/6; 750, 3/6; 1000, 3/6; 1500, 4/6; 2000, 4/6; 2500, 4/6; 3000, 4/9; 4000, 5/6; 5000, 7/-; 7500, 9/6; 1,250, 14/-; 1,500, 16/-

**ALL PARTS STOCKED.** R.I. VARLEY Latest L.P. Transformer, 15/-; Multi, 25/-; Straight Line, 25/-; Choke, 9/6. Anodes all capacities. R.O. Coupler, 20/- (Red, 22/6) Tuner Model "A", 47/6; "B", 37/6; Standard, 39/6.

**CRYSTALS** - Shaw's Genuine Sealed - Hertzite, 1/6; 1/6; Wray, 1/6; Superzilo, Long Range, 1/6; Crystal Detectors, Mcrometer, fitted Crystal, 2/6. No post

**TRANSFORMERS (L.F.)** Geophon, 2.1, 17/6; 4.1, 22/6. Formo, 5.1, 3.1, 10/6 each Igranic, 3.1, 15/-; 6.1, 16/-; Telsen Radioland, 12/6. Acc, 8/6; Marconi Ideal, 2/7.1, 4.1, 6.1, 25/- each. Pye, 2.5-1 and 4.1, 17/6; 6.1, 20/-.

**PETRO-SCOTT BAL. CONDENSER**, 7/6; 10/6; 20/6; 30/6; 40/6; 50/6; 60/6; 70/6; 80/6; 90/6; 100/6; 110/6; 120/6; 130/6; 140/6; 150/6; 160/6; 170/6; 180/6; 190/6; 200/6; 210/6; 220/6; 230/6; 240/6; 250/6; 260/6; 270/6; 280/6; 290/6; 300/6; 310/6; 320/6; 330/6; 340/6; 350/6; 360/6; 370/6; 380/6; 390/6; 400/6; 410/6; 420/6; 430/6; 440/6; 450/6; 460/6; 470/6; 480/6; 490/6; 500/6; 510/6; 520/6; 530/6; 540/6; 550/6; 560/6; 570/6; 580/6; 590/6; 600/6; 610/6; 620/6; 630/6; 640/6; 650/6; 660/6; 670/6; 680/6; 690/6; 700/6; 710/6; 720/6; 730/6; 740/6; 750/6; 760/6; 770/6; 780/6; 790/6; 800/6; 810/6; 820/6; 830/6; 840/6; 850/6; 860/6; 870/6; 880/6; 890/6; 900/6; 910/6; 920/6; 930/6; 940/6; 950/6; 960/6; 970/6; 980/6; 990/6; 1000/6

**VALVE HOLDERS** White Line, 2/3; Antipung, 2/-; Popular 0003 and 0005, 10/6. Screening Boxes, 6/-

**DUBILIER K.O. Variable** 200-1, 200-1. Variable resistances, Leaks, Condensers, Mansbridge Condensers, R.C.C. units, all in stock.

**LISSEN Valve holders**, 1/-; Fixed Con. 1/-; 1/6; Leaks, 1/-; Switches, 1/6; 2/6; Latest 2 way Cam Vernier 4/6; Rheostats, 2/6; B.B. 1/6; Lissenola, 13/6; L.F. Transformers, 8/6; 100-v. U.T. 12/11; 60-v. 7/11; Coils, 60X, 60/4; 250X, 9/9. Stats. minor major 1/6

**MANSBRIDGE CONDENSERS**, 2 mid., 3/6; 1 mid., 2/6. Other sizes, L.F. Chokes 5/6. Phones, 8/6

**ARBORUM** Detector only (No. 30), 5/-; Stabilising Detector Unit, with No. 30 Detector, 12/6. R.C.C. Unit, 8/6

**LEWCO'S G.T. COILS**, 35, 50, 75, 3/6; 150, 200, 250, 5/3 each. Binocular Coils, Split Primary Aerial, H.F.T. 3.5. Hat prices. Litz wire stocked

**BENJAMIN** - Battery Switch, 1/-; Valve Holder, 2/-; with Grid Leak, 5/3 With Condenser and Leak, 7/-; Rheostat, 2/9.

**BRETWOOD** - Grid Leak de Luxe, 3/6; with condenser 4/6; Anode, 3/6

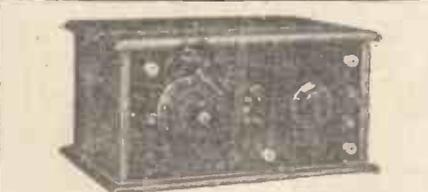
**BURNETT** - ETHO-VERNIER DIAL (with Ethio Station Indicator) 18/1 9/-

**J.B. Condensers**, T.T. Friction Ver. 0005, 13/6; 0005, 15/6; 00015, 15/-; S.L.F. 0005, 11/6; 00055, 10/6; 00025, 10/-; 00015, 10/-; 8g. Lav. 0001, 9/6; 00015, 8/-; 0005 7/-; Neutralising, Inc. 3/6

**ACCUMULATORS** 2 v. 40, 7/11, 8/6, 8/11; 4 v. 20, 15/-, 15/11, 16/6; 2 v. 60, 10/-, 11/6; 4 v. 60, 18/11, 19/11; 2 v. 80, 12/6, 13/6, 14/6; 4 v. 80, 23/6, 25/-; 6 v. 60, 26/11, 30/-, all best quality Carriage, 1/- and 1/8 each. Exide, 3 star stocked

**JACKS & PLUGS** - Lotus S.O.O., 2/-; S.O.C., 2/3; D.O., 2/6; F.S.O., 2/6; F.S.D., 3/-; Jack Plug, 2/-; P.P.J.S. S.P.D.T., 3/3; D.P.D.T. 3/-

**IGRANIC PARENT** 61, 2/-; 62, 2/3; 63, 2/6; 64, 2/6; 65, 2/6; 66, 3/-; etc. Univ Plug, 1/6  
**ASHLEY S.O.O.**, 1/3; S.O.C., 1/8; D.O., 1/9; F.S.O., 1/9; F.D.O., 2/3. Phone Plugs 1/6  
**H.F. CHOKES** - Watmel, 5/-; T.J.S. 4/6; McMichael, 9/-; R.I. Varley 9/-; Split Coil type, 12/6; Success, 10/6; Cosmos, 6/6; Sawyer, Lowe, 9/-; Lissen, 6/6; Ohma, 8/6; Special for Eliminators, 10/6; Wearite, 6/6



**3-VALVE SET** as shown in AMERICAN TYPE CABINET hinged lid, with 3 Mullard D.E. Valves and B.B.C. Tuning Coils. All parts enclosed NO POST £4 12 6 Tax Paid.



NO POST ORDERS.

**AMPLION CLIMAX BENJAMIN WEARITE COLVERN DETERX DUBILIER PENTON EDISWAN ORMOND FERRANTI HARLIE IGRANIC LOTUS LISSEN FORMO MARGONI MULLARD OLDRAM WATMEL POLAR EXIDE W. & B. DUBILIER McMICHAEL UTILITY HELESEN B.T.H. SIEMENS BURDEPT EVER-READY LEWCOS BELLING LEE** and all proprietary lines stocked



**LOW LOSS SQUARE LAW.** 0005 4 11 This variable condenser 11/6 each implies value 4 cannot be equalled by 5/11 or extra With VERNIER 1/- quality

**COIL STANDS**, 2-way Polar, with dial, formerly 10/-, now price 5/-; Lotus, 7/-; L. Handle 8/- (also left hand) "Kay-Ray", geared (P or B) 2/11; extra value, 3/6. Geophonos, back of panel one-hole fitting, also for H.B. new price, 5/-; Grand value 10 B of P. 3 11. Three-way, various makes. Special offer ebomite, 3-way, geared 6/6. Post extra



**H.T. BATTERIES** (earriage extra). Siemens, 60-v., 9/6; 100-v., 15/6; Grid Bias, 2/-; 50-v. Double Capacity Power, 17/6; 100-v. ditto 29/6

**FARADAY AND SEAFORD COILS**

Plain and centre tapped

**DUNHAM "ALL WAVE" TUNER** covers all wavelengths from 16 to 2,000 metres, and is complete with reaction "All wave" Tuner, 9/6.  
**EVER READY R.T.** Popular 66 v. 9/6. Do 108-v., 15/6 Standard 66 v. 12/6, 108 v. 21/-, L.T.S. 7/6 (4 1/2). Flash Lamp, 4.5, 6/- dozen Grid Bias 9 Tapped 14-v., 2/- (SPECIAL LINES STOCKED)  
**LEWCOS** - Frame Aerial Wire, 100 ft., 3/6 Multi-way Battery Leads, 4-way 5/6; 5-way, 6/6; 7-way 8/6. Glazito stocked. Lewcos Dust Screened Coil Units, 32/6, 67/6, and 25. Screens and 6-pin base, 9/6 H.F. Transformers, 6-pin, 10/- All kinds stocked.

**CALLERS' LINES (No Post)**

**TERMINALS**. Nickel W.O. Pillar, Phone, 1/- doz. (3 for 4d. with N and W). Brass do. 10d. doz. (1d each with N and W). All high quality Valve-Pins with nuts, 2 a 1d. Ground Screws, 6 or 4 B.A. 6d. doz., with nuts washers 12 a 1d. Bed and Black Spades, screw at side, 31d. pr. Plug and Socket Red or Black 31d. Wander Plugs, Red or Black 31d. pr. (large good) Phone Connectors, 1d. Flush panel sockets and nuts, 4 for 4d., 10d. dozen Brass Spade Pins, 5 a 1d. Large ditto 3 a 1d. Nickel Soldering Taps, 4 a 1d. Valve Pins and Nuts, 2 for 1 1/2. Full set of Circular Discs for Panel, 9d.

**SOLDER**, with Resin, 2d. foot 1/16 sq. Bus Bar 2 ft. 1d. Tinned Copper, 16 and 19 gauge, round, 9d. per lb. D.C.O., 1 lb. 20 gauge, 8d.; 22 gauge, 9d.; 24 gauge, 10d.; 26 gauge, 11d.; 28 gauge 11/-; 30 gauge, 12/- D.S.C. and LITZ stocked  
**GRAND VALUE IN GRID BIAS** 4v., tapped 1 1/2 v. 101d. & 1/-; 9-v., tapped 1 1/2 v. 1/3. 1/6. 1/6. 2/-  
**AERIALS** -100 ft. 7/22 EBONITE GRADE A. Stock sizes, 6 x 6 and heavy 2/2. Phosphor 49 7 x 5. 1/3; 8 x 6. 1/6; 9 x 6. 1/9; 10 x 8. 2/9; 12 x 6 2/9; 12 x 8. 3/6; 12 x 9. 3/-; 14 x 7. 4/6. ALSO CUT TO SIZE while you wait at 3d per sq inch 3/16th, and 1d. sq inch for 1 in Special cheap panels for Crystal Sets

**H.T. BATTERIES**. No cheap and nasty batteries sold here, only highest quality at lowest prices. Adico (Trade test award best atom) 60-v., 6/11; 100-v. 12/6; "Polo" 60-v. 6/3; 100-v. 10/11; good quality "K" 60-v. 5/11; 100-v. 10/6; 1.5 LT Hollander's, 2/6; Adico, 1/8. 2/-; B.T.H. 2/-; Flax, 2/-

**COIL PLUGS**. Ebonite on Base, 61d. 71d Lotus, 8d. Burn-Jones, 1/9. Low loss, 81d and 1/- Various stocked

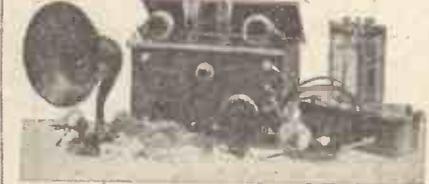
**CRYSTALS**. Superzite, 1/6; Shaw's sealed genuine Hertzite 8d. 1/-; Wray 1/0

**VALVE HOLDERS**. Anti-Microphonic, 1/2, 1/3, 1/6 W.B. Lotus, Benjamin, Burn-Jones and all good makes stocked Cheap R.B. V.H. 6d

**SWITCHES** on Porcelain. D.P.D.T., 1/3; S.P.D.T., 1/3. Sound quality Panel switches, with Ebomite handle worth double 5/12 D.L. 1/-; D.P.D.T., 1/6 Insulating Tape, 4 1/2. Copperfoil, 4d. foot (6 in wide) Grid Bias Clips, 6d. Panel Brackets, 31d., 1/- pair SHORING PLUG 3d.

**HEADPHONES**. 4,000 ohms. Dr. Nesper (non-adjustable), 5/11; Dr. Nesper pattern, adjustable, with double headbands, 6/11; very good line at 5/3; N. and K. Pattern, double leather headbands, 5/11. Don't let the price prejudice you

**PERMANENT DETECTORS** - Red Diamond (a topper), 2/-; Lion Micro (latest, cannot be equalled), 2/6; Brownie, 2/6. Enclosed Detectors, 1/-; 1/3; Micrometer, 2/-; Service do. 2/6 (both with crystal) Cat's whiskers, 2d., 3d. Set of 6 4d. B.A. S.O. S.O. stocked in standard sizes



**THREE-VALVE LOUJ-SPEAKER SET**

NOTE THE WONDERFUL VALUE. TRY ONE OF THESE! (The set shown is two-valve.)  
 Sets Local Daventry and many Continental stations.  
**THIS MAGNIFICENT 3-VALVE SET (D & L.F.)** includes handsome Polished American type Cabinet (all parts enclosed), 3 Dual Emitter Valves, Tuning Coils, H.T. & L.T. Batteries, Aerial Equipment, Leads, Loud Speaker or Phone, Tax paid Nett **5/19/6**  
 JUST THINK of 3-Valve set at 25/19/6! NO POST. It sounds unbelievable doesn't it?

**TWO-VALVE SET EXACT TO ABOVE SPECIFICATION £4 19 6 Nett.**

**NO POST ORDERS ON SETS.**  
**DARIO VALVES** BIVOLT 2 v. 05. 7/6; Loud Speaker Valve, 10/9; R.O. 05 1-8. 7/6; 3/5 05. 7/6; Loud Speaker Valve, 10/9; 3.5 R.O. 07/6. Post 6d each.

**K. RAYMOND** 27 & 28a, LISLE St., LONDON, W.C.2. 'Phone: Gerrard 4637.  
**COME TO LEICESTER SQ. TUBE (Important)** Ask for back of Daly's Theatre This address is opposite.

# THE PRACTICAL CONSTRUCTOR BUYS

## TROLITE

### THE RADIO PANEL DE LUXE

Trolite is ideal for panels and stub panels.

Trolite is easily drilled, sawn, and machined, and, being soluble in acetone, a perfect and permanent joint can be made in a few minutes without the labour and disfigurement of screws.

Trolite does not fade or discolour.

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## TROLITE

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# RADIOGRAMS



A RUNNING commentary, by Mr. J. M. MacLennan, on the Scotland v. Waratahs Match, will be relayed from Murrayfield to Edinburgh and all Scottish stations on December 17.

The prize play in the Community Drama Festival which is being held in Glasgow this year is to be broadcast from 5SC on December 15 by the winning team.

Leff Pouishnoff will be the solo pianist at the symphony concert to be conducted by John Barbirolli at the 2LO studio on December 18.

Listeners to 5GB are to hear the second half of the Oxford v. Cambridge rugby

from Alington Hall to both the 2LO and 5XX transmitters.

Glasgow listeners will hear the R.N.V.R. Prize Band on December 8.

The ninth of the series of *On the Wings of Song* recitals will be given from Bournemouth on December 8, when Leonard Gowings (tenor) will sing songs by Sir Hubert Parry and Sir Edward Elgar.

The Southern Three have not given a studio performance for the B.B.C. for over eighteen months. They will break this long silence on December 8, when they are broadcasting from 2LO and 5XX.

Mona Grey, whose impersonations attracted attention when she took part in the broadcast of the Royal Command Variety Performance early this year, will appear before the microphone at 2LO on December 8.

On December 12 listeners to 2LO will hear an ordinary carpenter's saw making sweet tones instead of the harsh ones usually associated with it. The saw is but one of the less well-known instruments the Geddes Brothers will play on the above date.

During the recent fog the steamer *Lorina* was held up by it for nine hours—within four miles of St. Helier (Jersey), its destination. To make his whereabouts known to the harbour authorities the captain had to wireless to Niton, Isle of Wight, whence the message was telegraphed to Jersey via London!

The recent wireless exhibition held at Paris would appear to have scored a considerable success; it is stated it was visited by some 200,000 wireless fans.

The Roumanian Government has decided to equip all police stations in the country with wireless telegraphy receivers in order that the Bucharest headquarters may despatch urgent messages to them without delay. It is stated that all radio apparatus necessary for the carrying of this service will be imported from foreign countries.

For the development of broadcasting, a company, backed by the State, has been formed at Bucharest, with a capital of some fifty million lei. It is proposed to build a high-power transmitter and to erect relay stations in the principal provincial centres.

George F. Gaede, an American amateur who maintains consistent radio communication with Liberia, 4,000 miles away, recently received government credentials from there for Washington.

### DO YOU KNOW?

1. Which station has two wavelengths, but only uses one in the evening time to prevent interference?
2. Which is the better for sensitivity, crystals of the hertzite type or of the Perikon type?
3. Which type of crystal is the more stable?
4. From which station, and at what times, are regular 18-metre broadcasts made?

Puzzle your friends with these queries: the answers will be given in next week's issue of "A.W."

Answers to Last Week's Queries: (1) A scene from *Cyrano de Bergerac*, at the Writtle station. (2) Copper pyrites. (3) The six firms originally the foundation of the Broadcasting Company. (4) Tonic train, giving a musical C.W. note which can be picked up by crystal sets.

match on December 13, at Twickenham. On this occasion the commentator will be Captain H. B. T. Wakeham, who described other important rugger matches during last season.

Miss Gertrude Lawrence, of revue fame, will impersonate a child when she broadcasts selections from *The Kiddies' Hour*, by Eileen De Mancha, at the London studio on December 17; she will be accompanied on the piano by H. C. G. Stevens, the composer.

On December 17 the Newcastle station will relay a brass band contest from the Town Hall. It will be adjudicated by wireless, the judge listening to the performances of the contestants on a wireless receiver in another part of the city.

A. J. Allan, well known for his remarkable adventures, will broadcast through 2LO and 5XX on December 21 another short story. It is entitled *The Visitors' Book*.

The Shrewsbury School end of term concert on December 19 will be relayed

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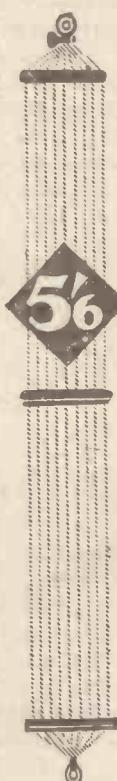
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## Letters to the Editor

The Editor does not necessarily agree with the views expressed by correspondents.

Correspondence should be brief and to the point and written on one side of the paper.

### Twenty-nine Stations on the Loud-speaker

**SIR,**—Seeing the remarks on the "Simpler Wireless" Special Three, I built the set a month ago, and, not satisfied, I experimented a little, and I now have a wonderfully simple set (thanks to Mr. Johnston) equal to any three- and some four-valve sets I have built. I can tune in twenty-nine stations on the loud-speaker with ease, with many more if I had ear-phones. I have employed Reinartz reaction which is set so that it will not oscillate and so cause interference. Mains hum is hardly noticeable, even with reaction at its fullest. I am more than satisfied, and shall never go back to batteries and accumulators.

—C. W. L. (Ryde).

### The "Ether Searcher Three"

**SIR,**—I have got so tired of taking a lot of trouble in wiring up new sets that have not come up to expectation's that, although the "Ether Searcher Three" rather appealed to me, I decided not to waste a lot of time over it, so I just "knocked it together," and was so agreeably surprised at the results that I have decided to make a proper job of it.

I have made up a number of sets, but, with the exception of a seven-valve super-het, I can quite honestly say nothing has equalled the "Ether Searcher Three," and I have not had time to properly test it yet. Although I am only about 1¼ miles from 2LO, with the aid of a wavetrap I was able to cut this out and receive 5GB at full loud-speaker strength without reaction; also 5XX, which with only very slight reaction was tremendous; and this was using ordinary H.F. valves in the first two sockets. I am to-day buying the proper valves, for I think it is a real good set, and would like to thank you for the description.

—W. E. M. (London, W.).

### "Simpler Wireless" Special Three

**SIR,**—The D.C. electric station in this town is said to be one of the most antiquated in the country, and consequently many listeners have failed to get good reception from eliminators.

I have had excellent large-volume reception from your "Simpler Wireless" Special Three, using Marconi DEL610, Ediswan RC3, and Stentor Six. A certain amount of hum persists, although I have inserted two 2-microfarad Mansbridge condensers in circuit as suggested in Mr. Johnston's article.

—F. H. S. (Dartmouth).

### Daventry Programmes

**SIR,**—Referring to the letter of "2H.F. Worthing," I should like to remark that Daventry is the only English station

any, good here, and when, between 8 and 10 p.m., there is mainly opera and symphony (hardly anyone appreciates them) it turns the otherwise enthusiast away from wireless in disgust. We should appreciate some music, but not the kind which is neither entertaining nor amusing. Of course, it is no use writing to the B.B.C. individually. —W. F. Y. (Folkestone).

### The "Wide-World Short-wave Two"

**SIR,**—I feel it my duty to write a few lines to let you know how pleased I am with the "Wide-World Short-wave Two" (AMATEUR WIRELESS No. 253). I have been interested in wireless the last five years and have made up several sets through your valuable paper. My last was the "Britain's Most Popular Three-valve," and I have been so pleased with it that I have not troubled to make anything else, but it has always been my ambition to pick up America, after picking up almost every Continental station.

I got it to work and picked up 2XAF and KDKA, and I was really surprised how clear and loud 2XAF came; on some evenings I can put 2XAF on the loud-speaker.

I have also picked up 2FC (Sydney) direct and as clear as a bell.

—A. G. (London, E.).

### Morse Interference

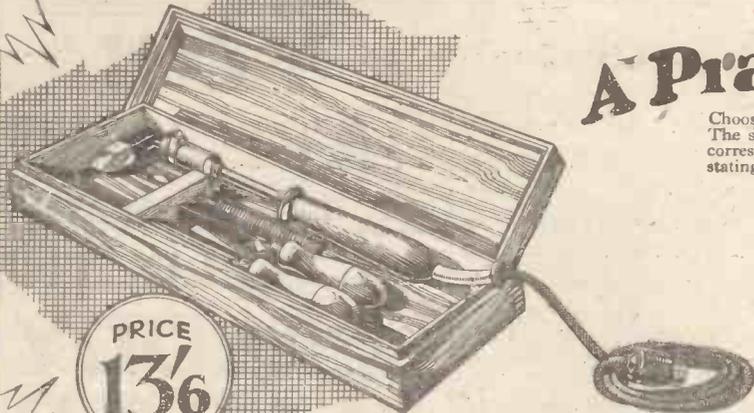
**SIR,**—Owing to morse interference on the south coast listeners are debarred from hearing the preponderating number of stations that use the lower wavelengths. Using a four-valve set, I am practically confined to Daventry and Radio-Paris for clear results. It is therefore a great disappointment to find that 5GB has adopted the low wavelength so close to London, Bournemouth, Stuttgart, Hamburg, Langenberg, Toulouse, Radio-Wien, Frankfurt, etc., all of which are here entirely ruined by morse. A. G. A. C. (Ventnor).

The small private station at St. Juan-les-Pins-Antibes (France), which temporarily closed down a few weeks ago, will blossom out this month as a 3-kilowatt transmitter. Concerts are to be relayed daily, as hitherto, from the local casino.

The French PTT is taking over the old German wireless telegraphy station at Strasbourg with the intention of rapidly converting it to broadcasting purposes. In order to compete with the transmissions sent out by the Freiburg (Germany) relay station, the concerts to be given by the new Strasbourg studio will include entertainments in French, German, and Alsatian dialects

# A Practical Present

Choose a useful present for your wireless friends or yourself this Xmas. The soldering-iron outfit illustrated is also sold without wooden case at correspondingly lower prices. Send for full list of this and other sizes stating voltage when ordering.



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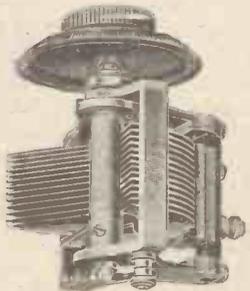
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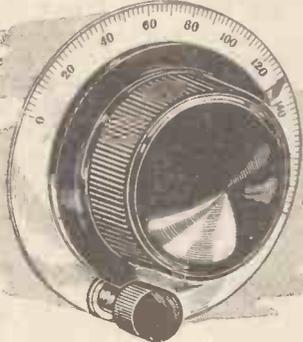
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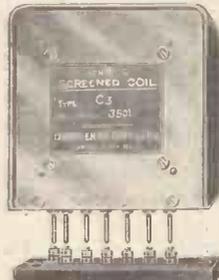
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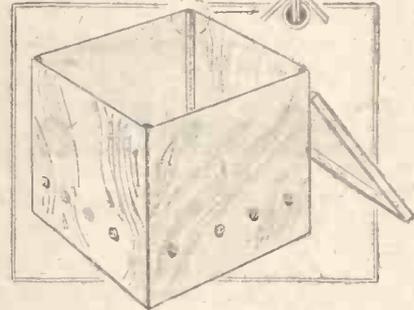
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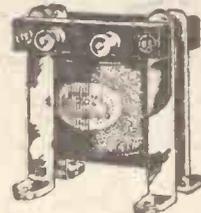


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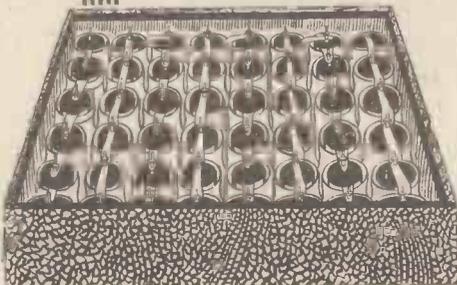


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**CHIEF EVENTS OF THE WEEK**

- LONDON AND DAVENTRY (5XX)**
- Dec. 11. Orchestral and Vocal Concert.
  - " 12. Chamber Music.
  - " 13. *The Grand Duchess of Gerolstein*, a comic opera in three acts.
  - " 14. Austrian National programme.
  - " 15. *Dropped from Heaven*, a sketch in one act by Dion Titheradge. *Shadows*, a radio scene in one act by Valerie Harwood.
  - " 16. National Symphony Concert, conducted by Geoffrey Toye.
  - " 17. *Daily Express* Carol Concert from the Albert Hall.
- DAVENTRY (5GB)**
- Dec. 11. Oratorio from Birmingham.
  - " 12. Military Band Concert.
  - " 13. Liverpool Philharmonic Society's Sixth Concert.
  - " 15. Symphony Concert.
  - " 16. Salon Music with Gerda Nette (pianoforte).
  - " 17. *Dancing Time*.
- BOURNEMOUTH**
- Dec. 13. *On the Wings of Song*.
  - " 14. *Sea Silence*, by G. E. Lewis. *The Defective Detective*, by H. S. Tinniswood, presented by the Station Players.
  - " 15. *La Serva Padrona*, an operetta by Pergolesi.
- CARDIFF**
- Dec. 12. *The Mad Whirl*, an orchestral and vocal concert.
  - " 13. *Crowd Law*, a radio play in one act by Charles Bateman.
  - " 14. British Sailors' Society community singing concert.
  - " 17. Popular Concert relayed from the Central Hall, Bristol.
- MANCHESTER**
- Dec. 12. Arthur Sullivan and Edward German programme.
- GLASGOW**
- Dec. 12. *The Man, the Maid, and the Muddlehead*, a cameo by Gordon McConnell.
  - " 15. *Shamus O'Brien*, a romantic comic opera in two acts by George H. Jessop; music by Charles Villiers Stanford.
- ABERDEEN**
- Dec. 13. A short incomplete story will be completed by the Station Octet.
- BELFAST**
- Dec. 16. *The Messiah*, parts 2 and 3 (Christmas Concert of the Belfast Philharmonic Society).

For its programme Strasbourg is relying on an association of wireless amateurs, the Radio Club du Bas Rhin, which, with local artistes and orchestras, provides two concerts weekly, on Tuesdays and Thursdays. Its news bulletins are supplied by a daily journal. The transmitter is of a power of 300 watts and works on 268 metres.

Early next year it is hoped to make experiments with Leipzig, Dresden, and a new transmitter to be erected at Magdeburg, all three stations to broadcast one programme on the same wavelength. Two systems are to be tested, namely, individual crystal control and the feeding of the three transmitters by high frequency cables as is done in Austria for the relay of the Vienna programmes to Klagenfurt Innsbruck.

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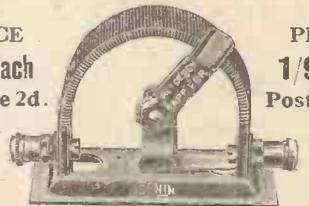
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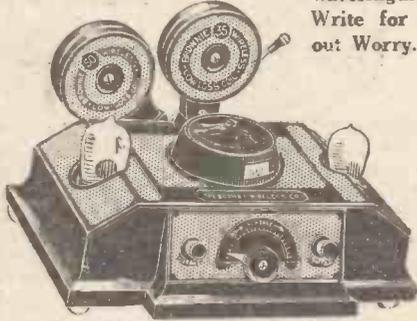
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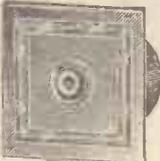
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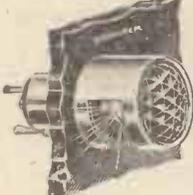
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The latest all-wave tuner is used, thus eliminating coils  
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STANDARD  
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The Scientifically correct  
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Functions as a super-choke. Perfect amplification at all frequencies. Mush and atmospherics practically eliminated. Can be obtained on a ten-day trial. Price 20/-

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	3/16 in. Thick	
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Money returned if not satisfied.  
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### WORTH WRITING FOR

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P 8 1763

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"MUST BE USED TO BE APPRECIATED"

— Says "AMATEUR WIRELESS"

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- 3-way ... 5/6
- 4-way ... 7/3
- 5-way ... 9/-
- 6-way ... 10/9



6-15-30 ohms.

### USED IN "GENERAL-PURPOSE TWO"

A multiple unit superseding the fixed Resistor. Can be used in any circuit to perfectly and independently control any number of valves. For downright efficiency use a LORIOSTAT in your set.

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Phone: Rodney 3869. WALWORTH, S.E.17

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**30 ft. STEEL 22/6 MAST**

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2v.1 " H.F. and L.F.
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**LIBERTY**, the Original.  
Still the best, but be sure it's a  
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The Christmas Double Number of *English and Amateur Mechanics* (6d.) contains a large number of ingenious and interesting constructional tricks, novelties, toys, drawing-room and conjuring illusions. Never before has such an excellent variety of useful and entertaining articles been published in a single number.

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10 x 9, 2/4	12 x 8, 2/6
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12 x 7, .10/6	18 x 7, 17/6
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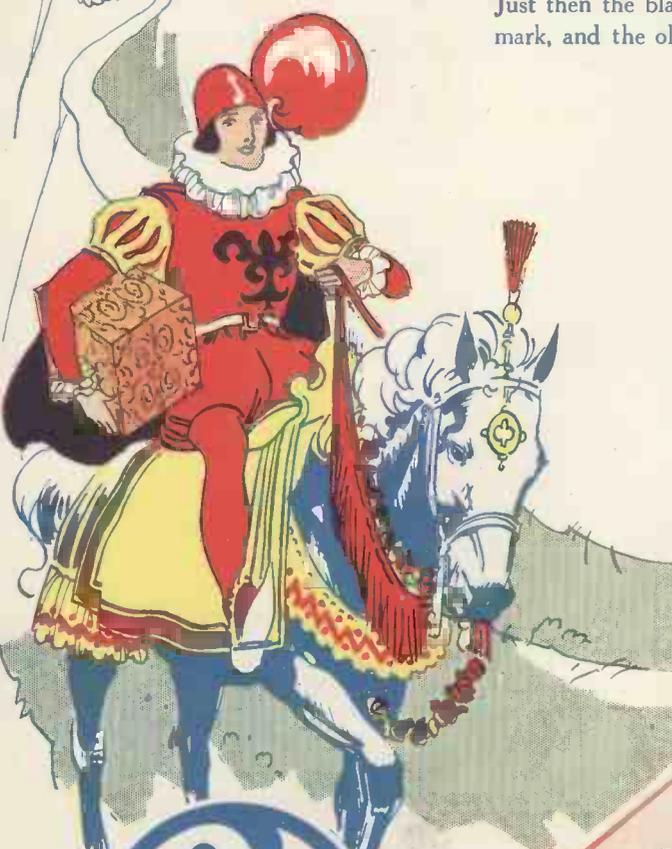
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**Amateur Wireless**

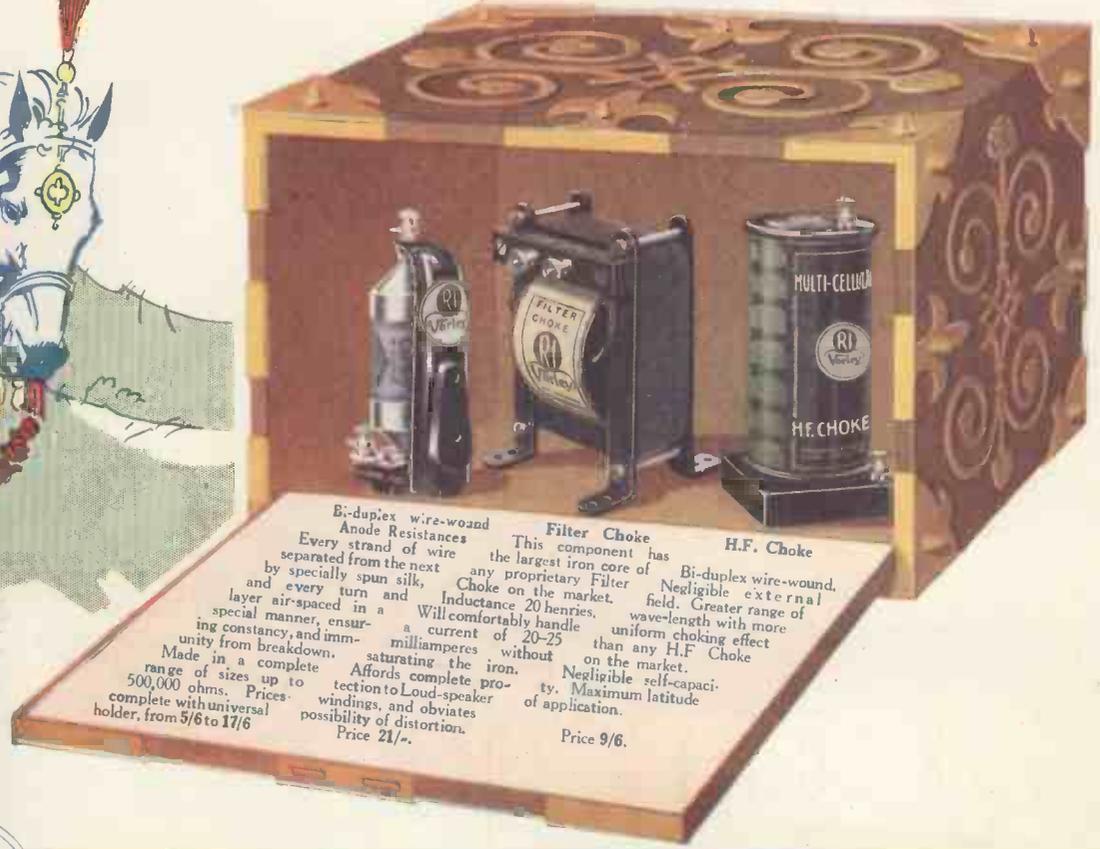
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Available until Saturday,  
Dec. 17th, 1927

# A Christmas Story

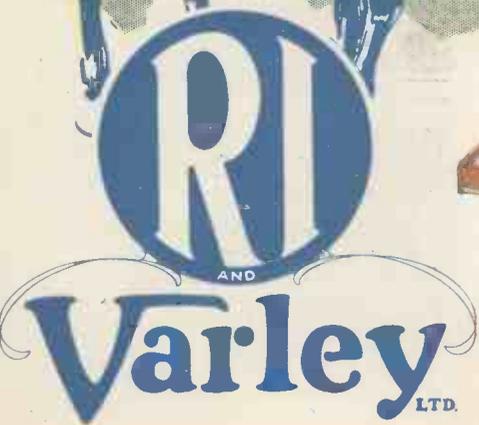


**F**AR away in an old castle there lived the kindest King in the world. He was kinder than anyone could imagine, and was loved by everyone far and wide. He had a hobby—just one hobby. In a small room in one of the turrets of the castle he kept a little instrument with which he gathered in to himself the music from other countries. But he was not satisfied. The instrument could not pick up the music of far-away lands—it could not give it to him sweet and pure—as it was rendered. But his friends to whom he had shown such kindness got together, and far and wide they hunted to find perfection for their old friend. At last they found it, and mounted on a white steed they brought the Treasure Chest to the old King. And what a Treasure Chest! On opening it he found three objects, all of which bore a peculiar mark—the letters R.I. in a circle over the word Varley. One of these—the Multi-cellular H.F. Choke—brought in music from those far-distant lands, and another—a Filter Choke—added a wonderful sweetness to the music. The third object was an Anode Resistance, and though his own wise-men had often tried to make one, they had only been partly successful, for they were not able to place any real trust in what they had made. The secret of this new Anode Resistance was something known as the Bi-duplex winding, which none of them were able to imitate. Just then the blare of trumpets announces the discovery of other new objects all bearing the same mark, and the old King in his joy orders a holiday of rejoicing throughout the whole land.

## The Treasure Chest

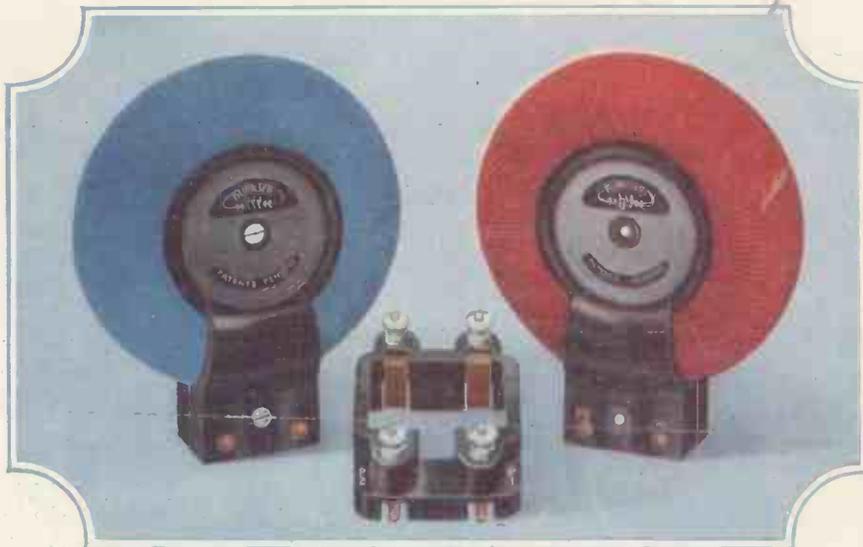


<p><b>Bi-duplex wire-wound Anode Resistances</b> Every strand of wire separated from the next by specially spun silk, and every turn and layer air-spaced in a special manner, ensuring constancy, and immunity from breakdown. Made in a complete range of sizes up to 500,000 ohms. Prices complete with universal holder, from 3/6 to 17/6</p>	<p><b>Filter Choke</b> This component has the largest iron core of any proprietary Filter Choke on the market. Inductance 20 henries. Will comfortably handle a current of 20-25 milliamperes without saturating the iron. Affords complete protection to Loud-speaker windings, and obviates possibility of distortion. Price 21/-.</p>	<p><b>H.F. Choke</b> Bi-duplex wire-wound. Negligible external field. Greater range of wavelength with more uniform choking effect than any H.F. Choke on the market. Negligible self-capacity. Maximum latitude of application. Price 9/6.</p>
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As fixed tuning couplers for crystal or valve sets they give highly efficient selective results. The Red Toroid, when shunted with a 0.0005 mfd. variable condenser, will tune between 230 to 600 metres; the Blue Toroid in similar conditions tunes between 750 and 2,000 metres. Each Toroid complete with its base costs 10/6. Your dealer stocks them.



**Price 10/6 each**

There is a wealth of information upon these products in the booklet shown here. In addition there are full instructions on how to make up five different valve circuits each possessing unique advantages. Don't be without your copy. Your dealer will hand you one, or if he is out of stock, we shall be pleased to send you one, post free 3d.



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TC83