

WIRELESS, incorporating 'Wireless Weekly,' OCTOBER 2, 1926

# WIRELESS



INCORPORATING  
**WIRELESS WEEKLY**

**2<sup>D</sup>**  
WEEKLY



Vol. V.] *OCTOBER 2, 1926* [No. 7

## LONG RANGE ON TWO DIALS

By **STANLEY G. RATTEE, M.I.R.E.**

## PORTABLE SETS AT THE EXHIBITION

THROUGH THREE COUNTIES  
WITH A SUPERHETERODYNE

By **JOHN UNDERDOWN**

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



# YOU MAY WIN THIS WONDERFUL FIRST PRIZE

## A COMPLETE ELSTREE SOLODYNE

SECOND PRIZE: A COMPLETE "ESTREFLEX" RECEIVER

THIRD PRIZE: A COMPLETE "RAZOR-SHARP" WAVEMETER

Every reader and each of his friends should try to be the fortunate winner of one of these wonderful prizes. Full details of the conditions of entry will be published in the issue of WIRELESS dated October 9th, on sale Tuesday next.

The Elstree "Solodyne"—the first prize—is the famous Five-Valve Receiver on which no fewer than fifty stations were received on the loud-speaker on one dial.

Buy your copy of WIRELESS early.

In addition, this issue will contain many interesting articles:

**Mystery Article**

*By a well-known Radio Personality.*

**Atmospherics and their Prevention.**

*By Captain H. J. Round, M.I.E.E.*

**Secrets of Modern Radio Efficiency (Part IV)**

*By J. H. Reyner, B.Sc. (Hons.), A.C.G.I., D.I.C., A.M.I.E.E.*

**What the New Wavelengths Mean to You**

*By G. P. Kendall, B.Sc.*

THE Mystery Number of WIRELESS, on sale October 5th, will give every reader the wonderful opportunity of winning an equally wonderful receiver—The Elstree "Solodyne."

So great was the enthusiasm shown for this receiver at the recent Exhibition held at Olympia that we have every reason to believe this issue will have record sales.

Copies of the Mystery Number may be difficult to obtain except on the day of publication. You may avoid any disappointment by giving your Newsagent instructions *to-day* to deliver your copy on the morning of publication day.



Obtainable from all Newsagents, Bookstalls, and Booksellers, or direct from the Publishers, Radio Press, Ltd., Bush House, Strand, London, W.C.2. Subscription Rates, 13/- per annum throughout the world.

Buy "Wireless" on the way home

**S.P. 18  
RED SPCT.**

A real two-volt power valve designed specially for low frequency amplification. Should always be used in last stage for operating loud speaker. It is also suitable as a detector.

Fil. Volts: 1'6.  
Amps.: '3.

PRICE 14/-

**S.P. 18  
GREEN SPOT.**

A high amplification valve having a moderate impedance. Designed as a high frequency amplifier and as a detector. Also suitable for resistance, choke and transformer coupling (except last stage, where an S.P. 18 Red should always be used).

Fil. Volts: 1'6.  
Amps.: '3.

PRICE 14/-

**S.P. 18  
BLUE SPOT.**

Extra high amplification valve. Designed for resistance capacity, choke and early stages of transformer coupling. Excellent as a detector or tuned anode H.F. amplifier.

Fil. Volts: 1'6.  
Amps.: '09.

PRICE 14/-



# Team work

**T**TEAM WORK counts in Radio too. Unless valves work together harmoniously reception will never be at its best. That is why BENJAMIN Valves should be used in every stage. They have been designed as a team which, working together, will give results far surpassing those that can be obtained with any other valves, in any other way.

Anode and filament are very close together, and therefore the electrons traverse a very short path. This increases amplification. A specially designed filament consumes less current. Tone is improved. Ask your dealer or write for descriptive leaflet giving curves.

## BENJAMIN SHORTPATH RADIO VALVES

THE BENJAMIN ELECTRIC LTD.,  
Brantwood Works, Tottenham, N. 17.

**D.E. 55.**

A very economical general purpose valve. For high frequency, detector and low frequency (except last stage, when the S.P. 55 Red should always be used.)

Fil. Volts: 5'5.  
Amps.: '09.

PRICE 18/6

**S.P. 55  
BLUE SPOT.**

Extra high amplification valve. Designed for resistance capacity, choke and early stage transformer coupling. Also excellent as a rectifier or high frequency amplifier.

Fil. Volts: 5'5.  
Amps.: '09.

PRICE 18/6

**S.P. 55  
RED SPOT.**

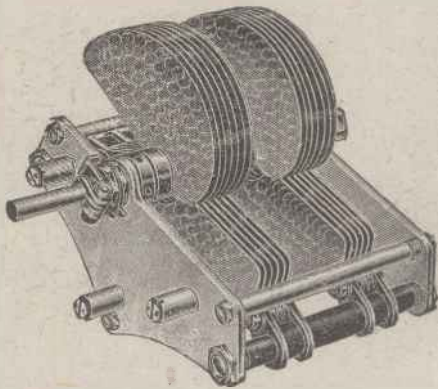
Super power valve specially designed as a last stage power amplifier. Will give great power without distortion. Also suitable for detector or H.F. amplifier.

Fil. Volts: 5'5.  
Amps.: '25.

PRICE 22/6



# IGRANIC CONDENSERS FOR ALL CIRCUITS

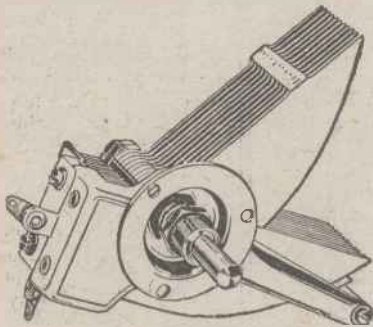


IGRANIC DUAL CONDENSER.

Look through your copies of the leading radio journals —notice the number of receivers in which Igranic condensers have been used with such outstanding success. Profit by the example of experts and use Igranic condensers in all *your* receivers.

**IGRANIC DUAL CONDENSERS.** Extremely low losses, accurate square law characteristic, positive connection to moving plates, combined ball and friction thrust bearings, stout brass plates and highest class workmanship throughout. The two halves are matched.

Dual pattern ... .0003 mfd. 22/6      .0005 mfd. 27/-  
 Single pattern { .00015 mfd. 17/-      .0005 mfd. 21/6  
                           .0003 mfd. 18/6      .001 mfd. 25/-

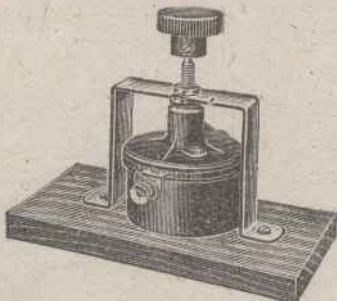


IGRANIC-PACENT STRAIGHT LINE FREQUENCY CONDENSER.

**IGRANIC-PACENT STRAIGHT LINE FREQUENCY CONDENSERS.** Straight line frequency tuning, extremely low losses, brass plates, negligible minimum capacity, smooth action.

Price ... .00035 mfd. 14/6      .0005 mfd. 18/6

**IGRANIC-PACENT TRIPLE GANG CONDENSERS.** Built up from three Igranic-Pacent .0005 mfd. condensers. The sections are thoroughly insulated. **Flexible couplings** between sections. Price £3 10s.



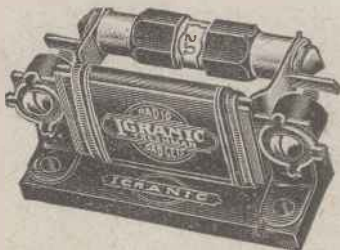
IGRANIC MICRO CONDENSER and BASE MOUNTING BRACKET.

**IGRANIC MICRO CONDENSERS.** Miniature condensers with brass plates of conventional shape. Adequate spacing between moving plates and control knob eliminates hand capacity effects. Moulded cover protects plates. Baseboard or panel mounting. (Single hole fixing.)

Price ... 5/6 Baseboard Bracket 6d.

**IGRANIC FIXED CONDENSERS.** Plates of brass, dielectric of finest Ruby Mica, accurate and constant capacity. Can be mounted in many different ways or supported on the wiring of a receiver.

Prices ... { .001 mfd., .002 mfd. 1/6 each.  
                           .003 mfd., .006 mfd. 2/- each.  
 Mounting Base ... .. 9d.



IGRANIC FIXED CONDENSER WITH IGRANIC FIXED GRID LEAK AND MOUNTING BASE.

SEND FOR IGRANIC CATALOGUE No. S31.

## IGRANIC ELECTRIC CO LTD

149, QUEEN VICTORIA STREET, LONDON.

Works: BEDFORD.



# WIRELESS

INCORPORATING

## WIRELESS WEEKLY

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# THIS WEEK'S NOTES AND NEWS

### Next Year?

**N**OW that we are safely out of the throes of the Exhibition, we are all beginning to wonder what *next* year's show will have to offer. When we look back for a year the changes that have taken place seem startling enough, although very few things seem to have changed *fundamentally*. The variable condenser still uses plates, although the shape is different. I should not be surprised if some of the forthcoming alterations are much more radical. There may not be such a thing as a variable condenser next year!

### More Indicators

**I** HEAR that it is very likely now that "luminous indicators" will be installed in European broadcasting stations when the new Geneva scheme comes into force. These have been in use in America in the experimental stage for some time. They consist of devices which cause a small Neon tube to light immediately the wavelength of the station varies in the slightest degree. More red lights for the studio!

### Aerials and Appearances

**I**S it possible to have a street with sixty houses equipped with, say, forty-five aerials in such a manner that the view from the back gardens is not impaired? Everyone will agree that the best erected aerial is hardly an ornament to the garden, and, with the increasing number of them going up, it is becoming quite a problem to prevent suburban residences from looking like dockyards. I suppose in time we

shall take the forests of scaffold-poles as a matter of course, just as we did in the case of the overhead standards for supporting the tramway cables.

### The Latest in Television

**A**LTHOUGH television is as yet hardly more than an interesting experiment, the experts are already on the track of further possible develop-

winners, by the way, were valves and coils and coil-holders, each occupying prominent places on twenty-five stands, condensers and slow-motion dials having twenty to their credit.

### Hamburg

**N**UMBERS of crystal users on the East Coast are receiving Hamburg regularly, and one or two reports come from London to the same effect. Hamburg certainly does "deliver the goods" nowadays, and Frankfurt is a powerful runner-up. Both these stations are now using ten kilowatts.

### No Escape!

**I** RECENTLY had the opportunity to go on a fairly long tour round the northern part of England, and, hardened as I am to radio, I must confess that I was astonished to find that almost every inn at which we stopped or pulled up was equipped with wireless and a loud-speaker. It's absolutely impossible to get away from it!

### Another New Station

**T**HE new broadcasting station shortly to be opened in Sao Paulo is claimed to be "the most powerful and up-to-date broadcasting station in the world." We look forward to hearing it speak for itself.

### An Overhaul

**T**HE *Gazette de Prague* says that since the equipment of the broadcasting station at Poznan does not correspond with the recent progress made in the industry, it is immediately being reconstructed on up-to-date  
(Continued on next page.)



Some of the portable receiving and transmitting equipment used in the recent army manoeuvres in Hampshire in which 10,000 troops took part.

ments. The first is that of colour. Germany is, I hear, hard on the track.

### H.T. Eliminators

**A**PARENTLY the H.T. battery eliminator has a great future before it. At the Exhibition I was rather interested to note that they were on show at no fewer than twenty-two stands, whereas H.T. and L.T. batteries themselves were only to be seen on twenty-four stands. The



The latest use of radio in the U.S.A. is for the transmission of weather maps. The maps, which are intended for ships at sea, are received on a cylindrical drum similar to the one seen above.

## THIS WEEK'S NOTES AND NEWS

(Continued)

### Interesting Talks

I SHOULD not be at all surprised if we hear Mr. Alan Cobham from 2LO after he returns from his Australian flight. Two or three topical talks of real interest will, it is hoped, be given every week in future.

### Summer Time Ending

WITH the change over into "G.M.T." once more, we shall have longer evenings, and the radio sets will have an hour's extra use each day in many cases. The manufacturers are looking forward to the ending of "Summer Time" for this reason. Reception of distant stations should be distinctly better at, say, 8 p.m. than it is at present.

### Be Up-to-Date!

THE *Times* recently issued an appeal to radio enthusiasts to use up-to-date apparatus, and not to let their results suffer simply for the sake of "using up old parts." "Few people," says the writer, "would think nowadays of using a motor-car 20 years old . . . The wireless receiver of to-day is an enormous advance upon that of even two years ago; its superiority is, in fact, on a par with that of the 1926 car over the 'horseless carriage' of 25 years ago." It is certainly true that very little can be done to improve the results obtained from really ancient, out-of-date sets, short of substituting the necessary new components and modernising the circuit.

### No Women Announcers

WE are, apparently, not to follow the examples of Rome and San Sebastian, and have women announcers at the B.B.C. stations. The B.B.C. consider that "women are temperamentally less suitable than men, and that the heavy physical strain imposed on the announcer is greater than could be borne by the average woman."

CALL SIGN.

date lines. When finished, it will be more powerful than the Konigswusterhausen station.

### In Sweden

THE listeners in Sweden now number nearly a quarter of a million, representing about 35 licences to every thousand inhabitants.

### Short Waves?

I WONDER whether the B.B.C. will ever radiate a short-wave programme similar to those sent out by KDKA and WGY? The chief advantages of such a programme would be that foreign and colonial listeners could be reasonably sure of receiving it with little or no interference from atmospherics. From a friend of mine living in India I recently heard that several of the B.B.C. stations would be quite worth listening to were it not for the latter source of interference.

### The Southport Exhibition

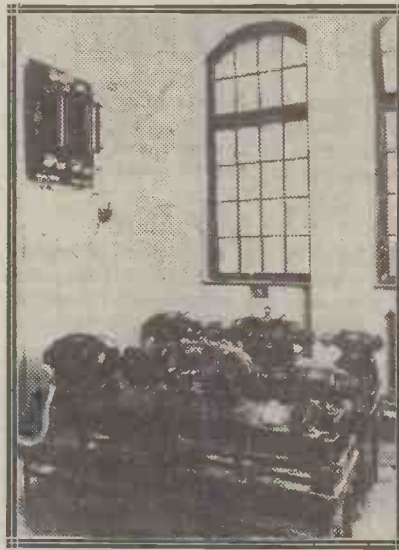
SOUTHPORT Wireless Exhibition, which will be organised by the Southport Radio Society, is to be held on October 28, 29 and 30.

### For the Business Man

IN Germany the home and foreign market news and quotations are broadcast, picked up at fixed receiving stations and telephoned to catch express trains, thus enabling travellers to obtain the latest news in the shortest possible time. When will our railways follow suit?

### Oh!

I HEAR on the highest authority that the following little incident is absolutely true. After a little group of rather eccentric literary celebrities had broadcast, the phone rang, and a voice said, "Hallo, is that the B.B.C.? This is Colney Hatch speaking. Will you put the —s in a taxi or shall we send the ambulance along for them?" I shall refrain (as usual) from comment.



The generators at the Hamburg broadcasting station are rated to give 2,000 volts each.

### An Interesting Possibility

IT is possible that during the coming winter the B.B.C. will give us programmes selected by well-known public men, who will become temporary "programme directors." We look forward with curiosity to various possibilities in this direction.

### Postmark Publicity

I HEAR that the Rugby radio service is to be one of the early victims of the "postmark publicity" campaign being organised by the P.M.G. I hope another is inscribed with the words "stop oscillating and pay your licence fee!"



A view of part of the transmitting hall at the Nauen station. Note the large banks of condensers in the foreground.



# LONG RANGE ON TWO DIALS

By **STANLEY G. RATTEE, M.I.R.E.**

With the advent of the dark evenings, DX reception is much more easily accomplished. The receiver described in this article is capable of bringing in quite a number of distant stations, and is specially designed to serve as an introduction to long-range work for those constructors whose previous experience has been limited to crystal and one-valve sets.



**T**HE ambition of the present-day home constructor would seem to be largely in the direction of receiving those stations which are hardest to get.

The more distant the station, the better and the nearer the wavelength of that station to that used by the local transmitter the greater the joy, but ambition does not stop here—on the contrary, the desired station must be received clear of the local transmission, and no interference must be experienced.

### The Reason Why.

This ambition has probably come about as a result of the fact that receivers which were built some time ago will not generally give the degree of selectivity, and human nature is such that we want most that which we cannot get, or that which is not easy to procure.

For safety in long-distance reception it is usually better to employ two or more high-frequency stages, but in doing so the question arises as to the difficulty of operation, for if, for the sake of illustration, two H.F. stages are used, these are generally tuned, making, therefore, three variable condensers to handle, namely, the first grid circuit and the two high-frequency couplings.

To many, especially to those who have hitherto only used a single-valve set, the operation of three variable condensers appears at first sight somewhat difficult, and it is to those of the many readers of WIRELESS to whom the receiver to be described will make special appeal, as an intermediate step to a more elaborate instrument.

In the first place, though two H.F. stages are used, there are only two controls, the second H.F. stage being aperiodic. It may be thought at first that the receiver would be improved by tuning this stage, and though this could of course be done with certain

modifications in design, the simplicity with which the set can be worked in its present form would be lost to some extent.

### Some Results

To give some indication of the merits of the set as illustrated,

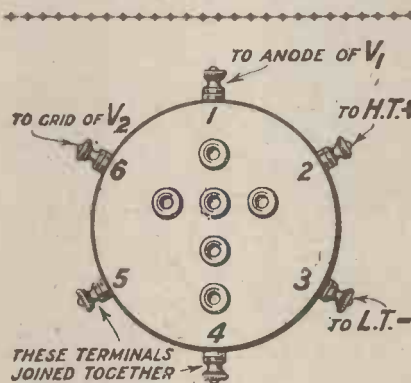


Fig. 1.—This sketch of the special coil base is intended to assist the process of wiring.

Bournemouth can be received clear of London, in the Crystal Palace district (S.E. London), while a number of the foreign stations working on wave-

Radio-Belgique, and one or two others whose identity has not been revealed during hours of listening.

### The Circuit

The circuit used in the receiver is shown in the theoretical diagram, from which it will be seen that the first high-frequency valve is neutralised. The aerial coil  $L_1$  and the grid coil  $L_2$  are both of the plug-in type, the latter being a centre-tapped specimen, tuned by the variable condenser  $C_1$ . The high-frequency transformer  $L_3, L_4$  is a commercially made "fieldless" unit, while the variable condenser  $C_2$  tunes the secondary winding. This latter winding is made in two coils, the ends of which are brought out to four connecting pins, numbered 3, 4, 5 and 6. The terminals 4 and 5 are joined together by means of a piece of wire, and terminals 3 and 6 are connected to L.T. negative and the grid of the second valve respectively.

The fixed condenser  $C_3$  is best made of one of the clip-in variety, for should it be found that the receiver tends to burst into self-oscillation in spite of the first valve being satisfactorily neutralised, a reduction in the value of  $C_3$  will bring about the desired effect of stabilising the set.

If instability is experienced at all it will be found to occur at a definite setting of the variable condensers, even though the first valve be perfectly stable; and though this position may be fairly wide, a careful choice in the value of the  $C_1$  condenser will bring about complete stability over the whole tuning range.

### A Refinement

Across the windings of the aperiodic transformer  $L_3, L_4$  is still another fixed condenser,  $C_5$ ; and though this is not absolutely essential it will generally be found that it gives an increase in signal strength when the variable condensers are adjusted near to their

(Continued on next page.)

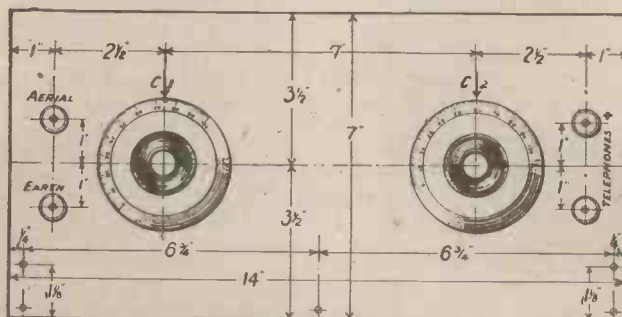


Fig. 2.—Only eleven holes are required in the panel, the positions of which are shown in this dimensioned diagram.

lengths near to that used by Bournemouth can also be received without interference. Other stations which have been received without difficulty are Newcastle, Birmingham, Glasgow, Daventry, Union-Radio, Madrid, Elberfeld, Rome, Radio-Toulouse,

# Long Range on Two Dials—continued

## WIRING INSTRUCTIONS

Join L.T. + to H.T. — and thence to "grid" socket of H.F. transformer holder and to F + contacts of V1, V2, and V3.

Join L.T. — to one side of Switch S.

Join other side of S to one side of R1, and to terminal 3 of L4, one side of R2, one side of R3, moving plates of C2 and right hand "filament" socket of H.F. transformer holder respectively.

Join same side of R1, also to flex lead (L2 tap).

Join aerial terminal to one side of L1.

Join earth terminal to other side of L1.

Join one side of L2 to fixed plates of C1 and to G of V1.

Join other side of L2 to top contact of C3, and thence to remaining side of C1.

Join other side of C3 to A of V1, and thence to terminal 1 of L3.

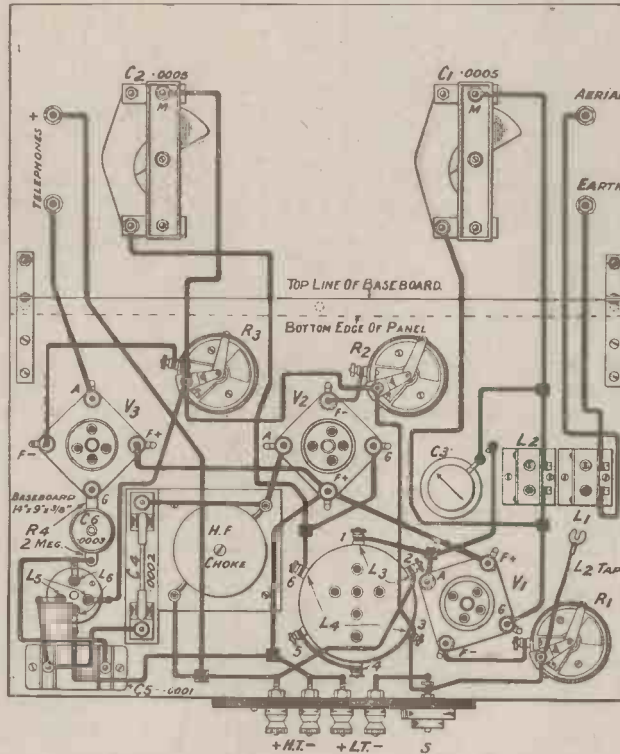
Join terminals 4 and 5 of L4 together.

minimum and maximum settings, especially if the signals are at all weak.

As to components required for building a receiver to these specifications, these are given separately; and though other suitable makes may be found in the advertisement pages, it is strongly advised that no departure be made from the values given, otherwise some difficulty may arise as to stability, wavelength range or other circumstances. The value of the condenser C<sub>1</sub> should, as given above, be found by experiment in the event of instability, but the other values should not be departed from.

## Easily Built

The constructional work involved in building the receiver will be found to be of the simplest. The components should be laid out upon the panel as near to the positions given in the wiring diagram as the components chosen will permit, while before actually screwing them down the coils and valves should be mounted to ensure that sufficient clearance is being allowed, not forgetting that long-wave coils may sometimes be used. The wiring of the receiver is again a simple matter, and it is recommended



The written instructions accompanying this diagram can be used to eradicate any difficulties which may arise when the connections are being made.

that all the internal connections with the exception of that to the centre tapping on the coil L<sub>2</sub> be soldered. The arrangement of the components and the space between them renders the use of a soldering iron an easy matter, in that in no circumstance will the constructor find his position cramped or otherwise difficult of access. The components to the back of the

formers in their respective sockets, and with a No. 25 coil for L<sub>1</sub> insert a No. 60 or "B" centre-tapped coil in L<sub>2</sub> and connect the flexible lead.

Insert the valves in their sockets after having connected the 'phones, batteries, aerial and earth to their respective terminals; whereupon turn on the switch and adjust the filament rheostats so that the valves are burning at a suitable brilliance, and tune in the local station by means of the variable condensers to its loudest volume.

With this done turn the first filament rheostat so that the first valve is extinguished, when, if the local station is still audible, turn the neutralising condenser either one way or the other until signals are no longer audible. Now light the first valve once more, and again tune to the local station, when signals should be loud and free from distortion.

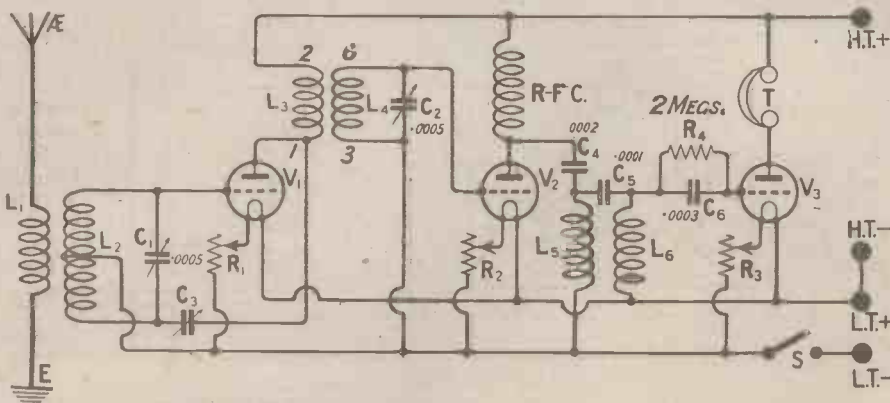


Fig. 3.—The condenser shown variable at C3 is the neutralising condenser.

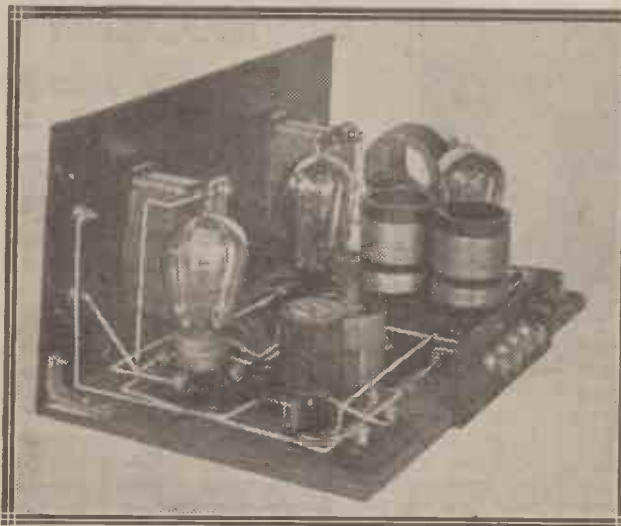


## A Simply-Controlled Three-Valve Receiver

### Searching

Slowly turn the two condenser dials so as to keep the circuits  $L_2, C_1$  and  $L_4, C_2$  in tune, when it will not be long before a distant station is found, the local station having disappeared after the first few degrees were passed through.

As the unit-scale reading of the condensers is approached, it may be found, though not necessarily, that the receiver has a tendency to oscillate, and should this be the case do not upset the neutralising adjustment, but experiment with the value of the condenser  $C_4$ . In the receiver, as illustrated, the condenser used is a .0002, this being found to be a safe value, though .0001 would be



This photograph will convey a clear impression of the completed receiver with coils and valves in position.

tried in this receiver, and with an H.T. voltage ranging between 60 and 90 volts, all gave satisfactory results. Valves specially designed for high-frequency work should be used for preference, though general-purpose types will also give satisfaction should the constructor already possess some of this type.

### For Loud-Speaker Work

The receiver has now been in use for some considerable time in conjunction with the "Wireless" Transformer Amplifier, the combination being used as a loud-speaker outfit. Using telephones alone, however, distant reception is a comparatively easy accomplishment, for though the tuning is sharp,

### WHAT YOU WILL NEED

Trolite panel, 14 in. by 7 in. by 3/16th in. (F. A. Hughes & Co., Ltd.)

Cabinet, and baseboard measuring 9 in. by 14 in. by 3/8 in. (Camco.)

Two Right Angle Brackets. (Burne-Jones & Co., Ltd.)

Two coil holders, baseboard mounting. (Burne-Jones & Co., Ltd.)

One "Fieldless" coil, 300-600 metres, and six socket base. (Lissen Ltd.)

One Neutralising Condenser. (L. McMichael, Ltd.)

Two .0005 Variable Condensers, "Popular" type. (Bowyer-Lowe Co., Ltd.)

One Radio Frequency Choke. (Beard & Fitch, Ltd.)

One .0002 Clip-in Condenser and base. (L. McMichael, Ltd.)

Three shock-absorbing valve holders. (Benjamin Electric, Ltd.)

One Baseboard mounting valve holder, ordinary type. (Radi-Arc Electrical Co., Ltd.)

One "Aperiodic" H.F. transformer, 300-600 metres. (Burne-Jones & Co., Ltd.)

One .0001 fixed condenser. (Dubilier Condenser Co., Ltd.)

One .0003 grid condenser and 2 megohm leak. (Watmel Wireless Co., Ltd.)

Three baseboard mounting 35 ohm rheostats. (Lissen Ltd.)

One On and Off switch. (Rothermel Radio Corporation, Ltd.)

Four terminals, "aerial," "earth," "phones + " and "phones - ." (J. J. Eastick & Sons.)

One terminal strip and four terminals. (Burne-Jones & Co., Ltd.)

Quantity of No. 16 "Glazite" connecting wire.

Packet Radio Press panel transfers.

Short length of rubber covered flexible wire.

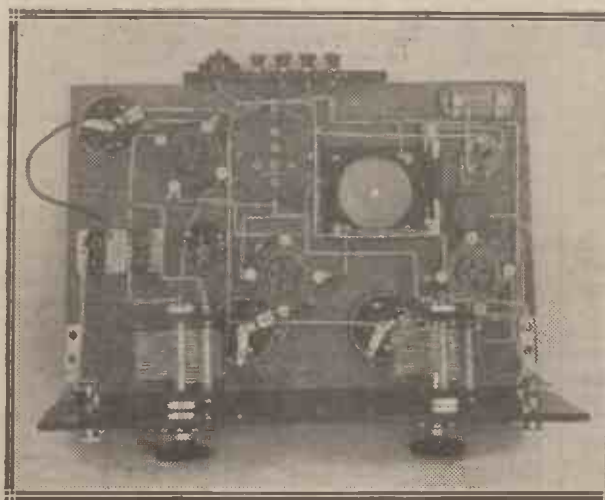
safer still with possibly some slight loss in signal strength.

It will be found that the operation of the variable condensers calls for some care, as the tuning of the receiver is quite sharp, particularly when the aerial coil  $L_1$  is made smaller than a No. 25, as suggested above.

### Long Waves

Should the constructor desire to receive the long-wave stations, as for instance, Daventry and Radio-Paris, then the coil  $L_1$  should be changed for a No. 75 or 100, and  $L_2$  for a No. 250 centre-tapped specimen. The "fieldless" coil and the aperiodic transformer should also be changed for similar components, but of long-wave design.

The operation of the receiver upon these longer wavelengths is precisely the same as on the shorter band, and



When wiring up the receiver, reference to this view will be helpful.

no difficulty will be experienced in this direction.

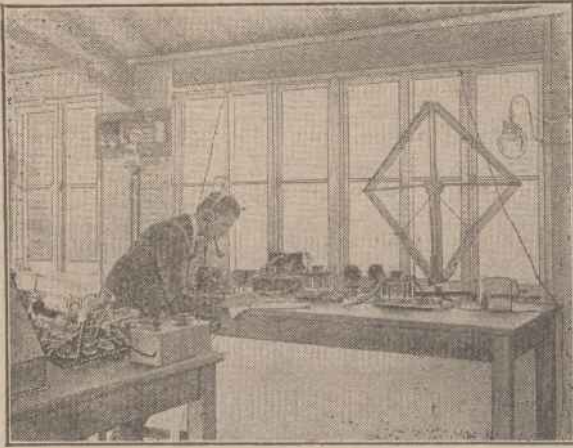
As to valves, various specimens of 2-, 4- and 6-volt valves have been

slowly turning the condenser dials together, "brings in" stations well and clearly without that doubtful pleasure of operating a receiver to the limit of stability, as is the case with many smaller sets.

It is not suggested that the receiver is the very best that one can do with three valves, but it certainly does present a means whereby long-distance work may be indulged in without very much practice in this art of tuning.

It must be remembered that the receiver was not designed for loud-speaker work, and even though when used near to a B.B.C. station it is doubtful whether anything approaching loud-speaker signals would be obtained. Should it be desired to receive signals on a

loud-speaker, then the addition of a single stage of transformer-coupled low-frequency magnification will give the desired results.



## SECRETS OF STABILITY IN MODERN RECEIVERS

By **J. H. REYNER**,  
B.Sc. (Hons.), A.C.G.I., D.I.C., A.M.I.E.E.

This, the third of a series of articles by Mr. Reyner, deals with the subject of neutralising and explains the remarkable way in which it has been developed during the last few months.



SO far we have discussed roughly the number of tuned circuits necessary in order to obtain good quality with good selectivity, and secondly the general methods by which the tuned circuits required are associated with the high-frequency amplifying valves in a receiver.

### Stability Troubles

Apart from the general principle, however, there are certain other difficulties which have to be overcome. One of the main causes of trouble which was experienced when tuning circuits in general began to increase in efficiency was the fact that the circuits were not satisfactorily under control. As they came into tune, so they burst into oscillation, and this oscillation could only be checked either by mistuning, or by introducing additional damping into the circuit, either of which courses was retrograde and therefore unsatisfactory.

### The Cause

As is by now well known, the reason for this oscillation is that a reaction effect is produced by currents which flow inside the valve through the capacity between the anode and the grid. In the circumstances which usually apply in a high-frequency amplifier this reaction effect is sufficient in quantity, and in the right direction, to produce continuous oscillation.

The success of a modern receiver is very largely due to the fact that methods are adopted to counteract the effect of this capacity feed-back. If we could eliminate the feed-back itself, then we should solve the problem, but so far this has not been done to any extent. Reports have been published, however, of specially constructed valves having shielded grids in which neutralising as we know it to-day is unnecessary, and there will probably be considerable development in the future along some such lines.

### Principal Remedies

In the present-day circuits, however, the ordinary three-electrode

valve is employed, and the effect of the valve capacity is overcome by special devices external to the valve. These devices are of two principal types, which were discussed together with the whole question of neutralising in an article appearing in *WIRELESS*, Vol. 5, No. 1. Briefly the two methods are:—

(a) The voltages on the anode of the valve in question are fed through a small neutralising condenser to some point on or associated with the grid circuit, such that counter-reaction

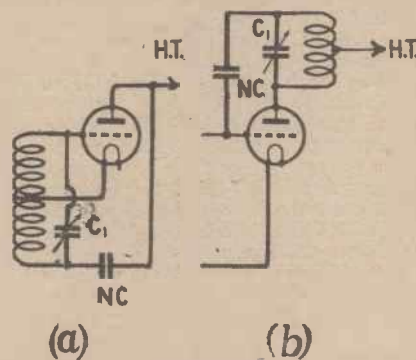


Fig. 1.—Two skeleton neutralised circuits in which centre-tapped coils are employed.

effects are produced in opposition to those produced by the valve itself.

(b) A point is chosen on or associated with the anode circuit of the valve at which the voltages produced are opposite and usually approximately equal to those at the anode itself. These voltages are fed through a small neutralising condenser back to the grid of the valve, so that again counter-reaction is produced. By utilising an arrangement of this sort the counter-reaction effect can be adjusted to be equal and opposite to the positive feed-back through the valve over the whole range of wavelength of the receiver.

### Greater Efficiency

I do not propose to elaborate this question in any greater detail because it has already been discussed at some length in recent issues of

*WIRELESS* and most people are by now aware of the general principle underlying neutralising in a high-frequency circuit. It may be of interest to remark in passing that a neutralised circuit gives essentially considerably greater efficiency than a circuit which is not stabilised in this manner. Apart from the use of devices which actually overcome the feed-back in the valve (e.g., the use of special valves), the only other means at our disposal in order to check oscillations are the introduction of damping in the circuit, or the reduction of the amplification of the valve itself (by dimming the filament or by some similar arrangement).

It must be obvious in such cases that we are not obtaining the maximum output from the valve. The more efficient we make the tuning circuit associated with the valve, the more readily does it oscillate. If we check its oscillation by reintroducing resistance or by cutting down the amplification of the valve we obviously are simply wasting time in endeavouring to make the tuning circuit efficient. If on the other hand we definitely counteract in some manner the tendency to oscillate we can then take full advantage of the extra selectivity and greater amplification afforded by the use of efficient tuning circuits.

### Centre-tapped Circuits

Now, one of the principal types of neutralised circuit which has been developed is that employing a centre-tapped tuning circuit. For example, the skeleton circuit shown in Fig. 1 (a) gives an idea of the main principle. Instead of connecting the whole tuned circuit across the grid and filament, one end is connected to the grid, but the filament is taken to the centre point on the coil. The other end of the coil is then taken through a neutralising condenser to the anode circuit. By this means the capacity feed-back of the valve itself is neutralised by the feed-back through the neutralising condenser, which is applied to a point exactly opposite in potential to the grid and therefore a counter-reaction effect is produced.

(Continued on page 233.)

EXPERTS IN RADIO ACOUSTICS SINCE 1908



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See and hear for yourself. Go to a Brandes Dealer and look over the new Brandes range. Get him to demonstrate and make your own comparisons. Not many instruments of such good class are so reasonably priced. Read about them on the next three pages.

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## IS THIS WHAT YOU'RE LOOKING FOR

**T**ESTING the new 2-valve receiver at our Works at Slough, on a standard P.M.G. aerial, we tuned in the two Paris stations, London, Daventry, Bournemouth, Birmingham and Newcastle on the loud-speaker. This despite bad screening set up by a large power station not more than 50 yards away. We were testing on 66 volts.

### THE BRANDESET II.

The new Brandes 2-valve set features simplicity of control and ingenious compactness. Condenser dial, filament rheostat, reaction dial and "throw-over" switch for long or short wave tuning complete the panel controls. Straight line frequency condenser tuning and grid-bias is employed. The standard coil is suitable for Daventry and no "plug-in" coils need be purchased. The L.T., H.T., and grid-bias leads are plaited into one cable from rear of set

**£6 10**

*(Exclusive of Marconi Royalty and Accessories.)*

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The new Brandes 3-valve receiver employs the same ingenious characteristics as the Brandeset II., except that an extra stage of Audio Frequency is employed. It has straight line frequency condenser tuning, grid-bias and is adapted to long and short wave tuning. Both receivers give most excellent loudspeaker reproduction on a number of stations, and are specially designed for this purpose.

**£8 10**

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TWO NEW  
CONE SPEAKERS



READ ABOUT  
THESE TOO

THE Ellipticon has been described as "the best loudspeaker on the market" by one who is fully qualified to judge, and who has no personal interest in our success. And we honestly consider that it is one of the best instruments we have ever turned out. The Tablecone, too, can really be said to be superior to similarly priced Cones.

THE TABLECONE

Attractive cabinet of unique design, finished in dark walnut. The cone unit is fitted with a large magnet and the circular diaphragm has an extremely sensitive driving unit which provides plenty of volume with unblemished tone. Supplied complete with cord connection. It has a genuine claim to be superior to any similarly priced cone speaker.

Height 10"  
Depth (at base) 11 1/4"  
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THE ELLIPTICON

(Registered Trade Mark)

The new Brandes Cone. Undoubtedly the best loudspeaker produced, it brings tone of great depth and sweetness. The cone has a large vibrating area and a driving unit of special design. The magnets in the unit are unusually large. There is no diaphragm but a small armature which, actuated on the "push-pull" principle, reacts to the faintest impulse. The specially designed cabinet "reflects" the sound in rich and mellowed tones.

Height 13 1/4"  
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Width 10 1/2" **£5 10**

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EXPERTS IN RADIO ACOUSTICS SINCE 1908

## TEAR THIS PRICE LIST OUT

**T**EAR it out and keep it by you for reference. You may not need any of these excellent instruments at the moment. But the eventuality may crop up and we should hate you to be without the chance to consider the satisfaction of a really first class product at a most reasonable price.

### THE BRANDOLA

Specially built to bring greater volume with minimum current input and exceptional clarity over the full frequency range. A large diaphragm gives new rounded fullness to the low registers and new clarified lightness to the high. Reproduction controlled by a thumb screw on the base. Polished walnut plinth with electro-plated fittings. Height 26 ins., bell 12 ins. **75/-**

### THE TABLE-TALKER

The new goose-neck design is the result of research in radio acoustics, which definitely establishes its value in relation to the diaphragm fitted. Patent material used in the construction of the horn eliminates metallic harshness. Volume and sensitivity controlled with small lever located at the rear of the base. Elegantly shaped, tasteful neutral brown finish, felt-padded base. Height 18 ins., bell 10 ins. **30/-**

### AUDIO TRANSFORMERS

The Brandes 1st stage Transformer has a high voltage amplification ratio of 1.5. This, together with a straight line amplification curve, means that the amplification is constant over a wide band of frequencies, thus eliminating resonance. The 1-3 Transformer amplifies over speech, pianoforte and harmonic ranges equally well. Mechanically protected and shielded against interaction. Terminals and outside soldering tags. **17/6**

Ratio 1.5 (black case). Ratio 1.3 (brown case.)

### MATCHED TONE HEADPHONES

The whole secret of Matched Tone is that one receiver refuses to have any quarrel with its twin. Ably schooled in these generous sentiments by our specially erected Matched Tone apparatus, their synchronised effort discovers greater sensitivity and volume and truer tone. There is no possibility of the sound from one earpiece being half a tone lower than its mate. **20/-**

# Brandes



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SECRETS OF STABILITY IN MODERN RECEIVERS—(continued).

A similar arrangement can, of course, be obtained by employing a tuned circuit in the anode of the valve, as shown in Fig. 1(b), neutralising in this case being carried out by the second of the two methods previously outlined. The neutralising condenser is connected to a point at an opposite potential to the anode and the energy obtained from this point is applied direct to the grid.

“Parasitic” Troubles

The principal difficulty with this type of circuit lies in the fact that

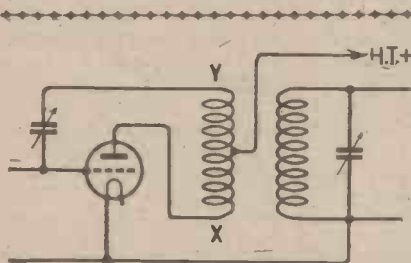


Fig. 2.—In this example the primary winding is not tuned, but is coupled to a tuned secondary.

where two such circuits are used there is a danger of the production of “parasitic” oscillations. The coils themselves possess a certain self-capacity, and it will readily be seen that one-half of the coil is virtually in the grid circuit, while the other half is in the anode circuit. Each half of the coil tends to oscillate at its own natural frequency, that is, the frequency to which the half-coil tunes with its own self-capacity. This natural frequency is very high, usually about ten times as great as that being received, so that these parasitic oscillations correspond to a wavelength of the order of 30 to 60 metres.

The Symptoms

At these high frequencies the impedance of the neutralising condenser is very small, so that its effect is negligible. The circuits therefore would tend to oscillate at this frequency, quite irrespective of the normal frequency to which they would tune with the condenser C<sub>1</sub>. These oscillations manifest themselves by the fact that the receiver suddenly goes “dead” with a loud click, and nothing whatever can be received. If the grids of the valves are touched with the finger, the usual click denoting oscillation is obtained, but no heterodyne whistles with the carriers of the ordinary broadcast stations are obtained, indicating that the oscillation is at a totally different frequency.

How They Were Discovered

These parasitic oscillations were discovered by various people more or less

simultaneously. I believe the first discovery was due to Capt. Round, of the Marconi Co., who happened to be experimenting with some high-frequency circuits in Cornwall, near to the famous Poldhu station, at which the Marconi Co. were at the time experimenting with the short-wave transmission and reception. The engineer in charge of the latter experiments, Mr. C. S. Franklin, explained in conversation with Capt. Round that he was receiving extraordinary jamming on his short-wave reception, and he could not trace it in any way. This went on for some time, when it was suddenly established that the short-wave jamming only occurred when experiments were being done with the high-frequency amplifiers tuned to the normal broadcasting wave, and as the result of investigations the presence of these hitherto unsuspected parasitic oscillations was determined.

Various other experimenters, notably Mr. Pound, of Messrs. McMichael, observed and traced the effect, while the WIRELESS Laboratories at Elstree, which had been investigating the problem of high-frequency amplification for some months, also independently observed, traced, and overcame the trouble.

Remedies

Elstree’s interest in the matter was that of obtaining superlative circuits for the amateur experimenter and constructor, and the results of these researches have been seen in the recent Elstree circuits. The “Remarkable Five-Valve” receiver was one of the first circuits published which included

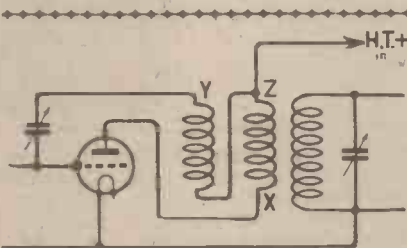


Fig. 3.—The primary winding proper is represented at XZ, ZY being a neutralising winding.

an anti-parasitic device, and subsequently a still better arrangement, more widely applicable to a large band of wavelengths, was obtained in the “Elstree Six” circuit.

In the latter case, as is well known, the trouble is overcome by taking the centre tapping to the tuned circuit at the middle point of a twin condenser instead of on the coil itself, and this effectively overcame the difficulty while permitting the coil to be changed for one covering another wavelength band, without alteration to the circuit.

(Continued on next page.)

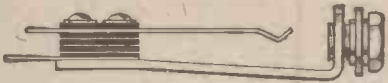
Cheaper and Better Jacks

Ashley Radio Jacks are made of nickel silver springs, with pure silver contact and Bakelite insulation throughout. Tags are tinned and spread fan wise for easy soldering.

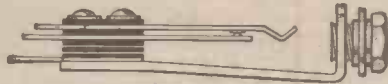


SHOWING HOW TAGS ARE FANNED.

Note the Prices below:



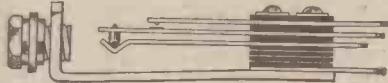
JACK No. 1. SINGLE CIRCUIT. (OPEN). 1/3



JACK No. 2. SINGLE CIRCUIT (CLOSED). 1/6



JACK No. 3. DOUBLE CIRCUIT. 1/9



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Price 1/6

Occupies less space than any other plug. Metal parts highly nickelled and polished. Bakelite insulation throughout, suitable for spade or pin tags, and any type of flexible or solid wire connection.

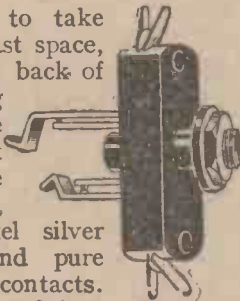
Ashley Radio

Ashley Wireless Telephone Co. (1925), Ltd. Finch Place, London Road, Liverpool.

The name 'LOTUS' is your guarantee of sound results and solid satisfaction

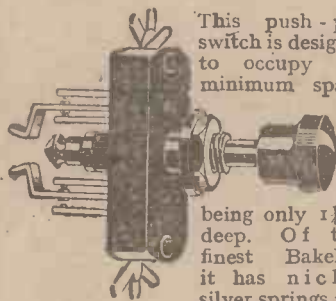
**The 'LOTUS' JACK**

Designed to take up the least space, the depth back of panel being 1 1/4 in. Made from best Bakelite mouldings, with nickel silver springs and pure silver contacts. One-hole fixing. Soldering contacts can be brought into any position.



**Prices**  
No. 3, as illustrated 2/6  
Others from 2/- to 3/-

**The 'LOTUS' JACK SWITCHES**



This push-pull switch is designed to occupy the minimum space,

being only 1 1/4 in. deep. Of the finest Bakelite, it has nickel silver springs and contacts of pure silver. Soldering contacts can be made to suit any wiring.

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No. 9, as illustrated 4/-  
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**The 'LOTUS' JACK PLUG**



Designed for use with Lotus Jacks. Made from best Bakelite mouldings and nickel plated brass. To fix, the wires are placed in slots and gripped in position by a turn of the screw cams.

**Price**  
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Made by the makers of the famed 'LOTUS' Vernier Coil Holders and 'LOTUS' Buoyancy Valve Holders

**Garnett, Whiteley & Co., Ltd.,**  
LOTUS Works  
Broadgreen Road, Liverpool

**Secrets of Stability in Modern Receivers**

(Continued from page 233.)

Following the "Elstree Six" we have the "Mewflex" and the "Distaflex," published in *Modern Wireless* and *The Wireless Constructor*, and the "Elstreflex Two," which is being described in *WIRELESS* at the present time, all of which are developments of this split-condenser principle. Mr. Harris's "Night Hawk," which combines extreme efficiency with comparatively low cost, utilises a modified version of this same principle.

**Another Method**

Another method of overcoming the difficulty consists in the use of auxiliary windings, apart from the tuned windings, for producing the required neutralising voltages. Various methods of adopting this principle have been

could not obtain satisfactory results with more than one stage of this type unless the two portions of the primary winding were very closely coupled. This led to the development of the type of transformer which was utilised in the "Magic Five" receiver, and in the "Solodyne," in which the two halves of the primary winding are wound one over the other. The circuit then becomes as shown in Fig. 3, in which there are really three windings—the tuned secondary, the primary proper, which is the winding X Z, and the neutralising winding, which is the winding Z Y.

This circuit has several advantages, one being that the full voltage of the tuned circuit is utilised, and not only half, as is the case with the circuits

*This chair, which was exhibited at the Olympia Exhibition by Messrs. Alphian Wireless, Ltd., contains a complete wireless receiving set. The frame is wound in the back of the chair.*



utilised from time to time, but the principal disadvantage is that the neutralising settings do not hold good over the whole of the tuning range.

There is one exception to this, and that is the case where a split-primary winding is adopted. A skeleton circuit of this type is shown in Fig. 2. This will be seen to be somewhat similar to Fig. 1 (b), save that the primary winding is not tuned, but is only coupled to a tuned secondary. It will be immediately obvious that if satisfactory results are to be obtained, the primary winding must be so tightly coupled to the secondary that it behaves to all intents and purposes as if it were tuned. Then the potentials at the points X and Y are substantially equal and opposite, and will remain so throughout the whole tuning range, which is the condition required for satisfactory neutralisation.

**Difficulties**

Even so, however, I found that I

shown in Fig. 1. Moreover, it is very easy to neutralise, and can satisfactorily be used without any trouble from parasitic oscillations.

**Design Problems**

This is by no means the whole of the story. There are many little points which differentiate between a good design and an indifferent one. Two receivers, both having what is apparently the same circuit, may behave in different manners, one being much more easy to control and to handle than the other. There is also another factor which enters considerably into the efficiency of a multi-stage high-frequency amplifier, and that is the problem of interaction and direct pickup. I shall deal in my next article with one particular point in design which makes for ease of control, the question of capacity coupling between primary and secondary, and finally the question of screening in high-frequency amplifiers.



# FIRST IN ENGLAND

RADIO PRESS TRIUMPH  
IN BOTH MULTI-VALVE CLASSES IN  
INTERNATIONAL COMPETITION IN NEW YORK

## THREE INTERNATIONAL PRIZES

A specially interesting feature of the great annual Radio World's Fair at New Madison Square Garden, New York, was the international competition for home-constructed sets of all types. The principal class, and the only one in which Radio Press readers entered, was the multi-valve (3 or more valves) category.

Entries were invited from all over the globe, and many sets were sent in by British amateurs, a truly international contest of set-builders resulting. The awards were made on a basis of "workmanship, appearance, volume, distance, selectivity and tone," a body of leading American experts, headed by Dr. Alfred Goldsmith, being the judges.

Every set sent was tested by independent engineers, a very thorough investigation into the powers of each instrument taking place.

There was a special competition in each class for entrants under the age of sixteen, and this proved an eagerly-seized opportunity for the keen juniors of a number of countries.

The result has proved to be a triumph for Radio Press readers, and also for Radio Press designs. The third prize in the multi-valve class in the senior competition was won by a six-valve set using the "Elstree" circuit, entered by Mr. H. E. Hassall, of 40, Norfolk Street, Strand, London, while in the junior equivalent

competition a "Mewflex" receiver (described in "Modern Wireless"), entered by a thirteen-year-old British competitor, J. A. E. Black, of Mill Hill School, won the second prize. This set also won a special cup for general fine workmanship.

These Radio Press readers head the list of the British multi-valve entrants in the international competition—another triumph for Elstree, whose circuit and complete design were respectively used.

### CORRESPONDENCE

#### "Cut Him Out"

SIR,—It may be of interest to you to hear of the success I have had with the wave-trap designed by Mr. Kendall, and published in the issue of WIRELESS dated August 14, 1926.

I have made several traps, but have met with little or no success, so you may imagine that I was reluctant to make this one. However, I made it, and when I tell you that I am only 700 yards from the Aberdeen aerial, and that I can tune in Newcastle, Manchester, Birmingham, Bournemouth, and several other stations without the least interference from Aberdeen, I think you will agree that that in itself speaks volumes for the practicalness of the trap, and more than fulfils the claims made for it.—Yours faithfully,

J. B. BATE.

Aberdeen.

## Tested and Guaranteed Components by Bowyer-Lowe



POPULAR CONDENSER.

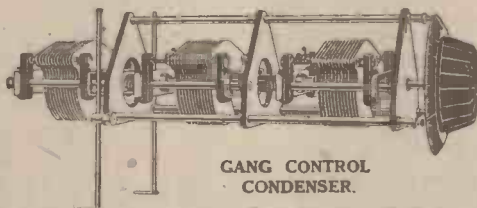
The popular price of this new Condenser of unrivalled precision presents to the amateur the ideal instrument for his experimental set. The construction executed for mechanical perfection has been achieved by the use of a ball-bearing rotor, eliminating harshness and unreliability of tuning.

Electrical efficiency and exceptional range of wavelength, together with full dial availability for tuning, is combined in its low-loss square law design.

If at any time the Bowyer-Lowe Condenser develops a fault during the twelve months after purchase the article will be replaced free of charge.

.0003 M.F., 10/-

.0005 M.F., 10/6



GANG CONTROL CONDENSER.

This Condenser has been designed for use in single control receivers such as the "Elstrac Solodyne," and is provided with three independent condensers of .0005 M.F. capacity insulated from one another, but controlled by one dial. A simple means is provided for varying the relative positions of the rotors, so that the different coils and transformers can be balanced. Each rotor is surmounted on ball-bearings, while universal joints are used between them to ensure smooth operation. Two adjustable supports are provided to remove the strain of the weight from the panel.

List No. 292, with 4 in. dial, £3 13s. Without dial, £3 10s.

Send 1jd. in Stamps for Catalogue of Bowyer-Lowe Components—a handy guide to better reception.



ANNOUNCEMENT BY  
THE BOWYER-LOWE CO. LTD. LETCHWORTH, HERTS



COIL SCREENING BOXES.

In introducing our new screening box and base for coils, which has been so largely developed by Mr. J. H. Keymer, we have achieved an almost perfect electrostatic shield, the whole base and circular screen screwing together, and being earthed by an extra terminal on the base. Six sockets, complying with the Radio Press, Ltd., standards, are fitted on the base for coils, together with six terminals for coil connections.

List No. 249.

Price 15/-

Interchangeable Coils and Transformers for any Radio Press Set from 4/8.

# WORKING YOUR "ELSTREFLEX TWO"

Some helpful operating instructions for the Radio Press "Star" receiver which was described in detail in our last issue.



AN important point in getting the best results from the "Elstreflex" receiver concerns the type of valve employed, and, as already explained last week, these should both be of the low impedance type. It must be remembered that the second valve should naturally be regarded as a power amplifier, while the first has to carry both the high- and the low-frequency currents, and it is therefore important that here also one should use a type with a long, straight portion upon the useful part of its characteristic.

## Grid Bias

What is required, then, is a valve of what is commonly called the power type in each socket, with a correctly adjusted amount of grid bias upon each. The grid bias upon the second valve can be adjusted straight away to the value given by the makers of the valve, probably about 6 or 9 volts, with something in the neighbourhood of 100 volts upon the anode, while that upon the first valve is best adjusted experimentally.

A useful guide as to the correct adjustment of the first valve may be found in the fact that if this valve has

a tendency to rectify, signals will be heard from the local station even when the crystal detector is disconnected, or when its two parts are separated by lifting the knob. The aim should be to find some value of grid bias in the neighbourhood of 4½ to 6 volts which makes the signals as weak as possible when the crystal detector is not functioning.

## Neutralising

Assuming a correct adjustment of

neutralising condenser which prevents self-oscillation, although some slight signs of distortion may be noticed as the adjustment of the neutralising condenser is brought nearer to the settings which permit the receiver to oscillate.

## Be Careful!

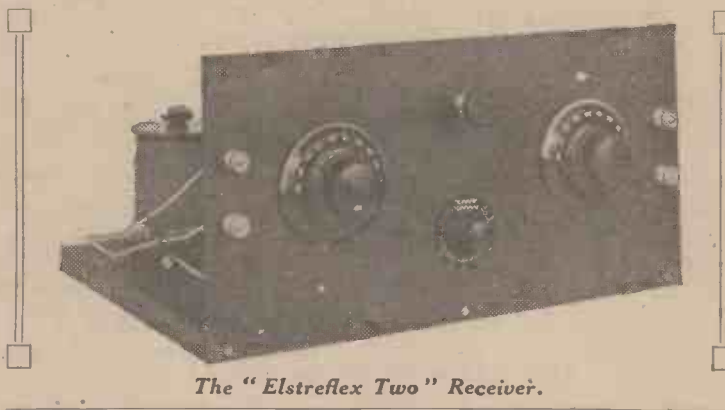
For the reception of distant stations, however, a more delicate adjustment of the neutralising condenser will be needed for the best results, and here it will be found that there is an appreciable difference between the fully-neutralised condition and that in which the set is only just nicely removed from the oscillation point. Considerable care is necessary in making this adjustment, however, for it must be remembered that if the set is allowed to oscillate it will radiate and cause interference.

## Searching

When searching for distant stations with the receiver adjusted to its most sensitive condition, it will be found that tuning is particularly sharp, and some practice may be needed to acquire the necessary skill in manipulating the two dials at the required rate of travel. The knack of keeping the two circuits in tune with each other as searching proceeds will soon be acquired, however, and it will be found that the sound of liveness will serve as adequate guide.

## Further Results

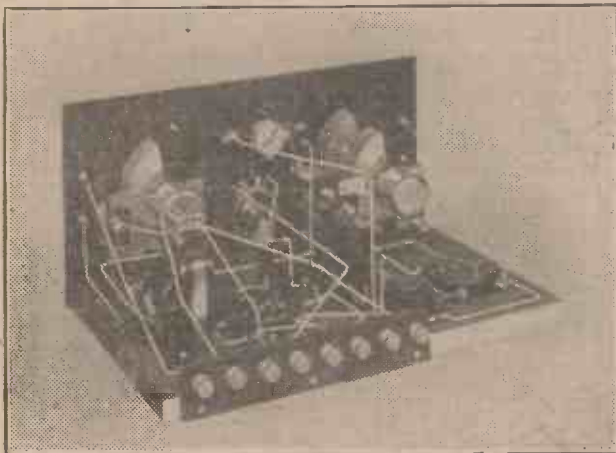
The qualities of the "Elstreflex Two" as a local receiver were indicated last week, and some results obtained in a long-distance test may be of interest. Both Bournemouth and Birmingham gave loud-speaker results, as also did Hamburg, Frankfurt and Berne (the latter on one evening only). Telephone signals were obtained from a number of stations, of which Glasgow, Newcastle, Belfast and Brussels were identified,



The "Elstreflex Two" Receiver.

grid bias and high tension, the latter being in the neighbourhood of 100 or 120 volts upon the second valve, and perhaps a little less upon the first valve, say, 90 volts, the final adjustment of the neutralising condenser

should be performed. It will mostly be found that with valves of the recommended type the receiver will oscillate freely at some readings of the neutralising condenser and the aim should be to find such a reading that the set does not oscillate at any combination of readings on the tuning condenser dials. For the local station it will be found that good results are obtained at practically any setting of the



The arrangement of components at the rear of the latest Elstree "Star" set.

**SHORT-WAVE NOTES  
AND NEWS**



EUROPEAN work still seems to be the order of the day, although the American stations are coming through quite well in the early mornings. None of the United States stations now seem to give calls intended exclusively for the British amateurs, as they often used to do. In fact, with the exception of a mere handful of stations still using it, the old familiar call "CQ gu \_\_\_\_\_" is never heard on the air at all.

**German Activities**

Several of the German amateurs are now apparently working with crystal control, judging from the beautiful notes one hears from them. In the matter of call-signs, however, they are rapidly becoming as bad as the French transmitters. Three of them, 4MOA, 4MFL and 4YAE, are particularly bad mouthfuls. It is probably just as well that they are adopting call-signs of this kind, though, as their others were often apt to clash with those of Belgian stations.

**Low-Power Tests**

The T. and R. Section of the R.S.G.B. is organising a series of tests, to be held in November, with a view to giving the low-power man a real chance to show what he is made of. All stations using powers higher than about 10 watts are to be asked to remain silent, and steps are being taken to minimise the amount of Continental interference, which will, incidentally, cause the greatest amount of trouble. Wonderful things may be anticipated, seeing what has been done by the owners of microscopic powers in the past.

**The Convention**

The recent Convention held by the T. and R. Section was a great success, and will undoubtedly be repeated in future years. A gathering of this description does more towards promoting the "true ham spirit" among the members than anything else could do. The Editor of the *Bulletin* predicted that before long it would be "very similar to QST, but twice as big!" Perhaps when the membership is equal to that of the A.R.R.L. this dream will come true!

**More Commercials**

Still more commercial stations are invading the 30-50 metre wave-band. One evening the writer counted no fewer than 38 of them, all working within this band. There seems little doubt that the amateurs will eventually be "crowded out" altogether from this band which they themselves helped to develop.

(Continued on page 243.)

*Tungstone Accumulator*  
makes another  
**World's Record**  
*Unequivocally Proved*  
by the  
*Impartial and Independent*  
Tests made at the  
*National Physical Laboratory*  
Official Testing Station of the  
**British Government**  
Extra-ordinary convincing results  
**96% Amp. hour Efficiency**  
**88% Watt hour Efficiency**  
Confirms Tungstone's  
*Exclusive Claim to use only*  
**Pure Lead**  
**For plate Grids and Paste**

Sent post free. Copy of the Original British Government's Test Certificate with "Unique Booklet of the Battery Trade" Inaugurating Revolutionary Methods favourable to Users. For the first time in the World's History of Accumulator Manufacture Tungstone as the result of its Original Design and manufacture on Standardised, Interchangeable and Accessible principles can issue a definite Priced Parts List of all its component parts and Plates for fitting in any Tungstone Battery by unskilled labour. No other Accumulator maker in the World has ever issued a complete Parts List for Battery Owners.

T.A.74

TUNGSTONE ACCUMULATOR CO., LTD., St. Bride's House, Salisbury Square, London, E.C.4



**AERMONIC**  
VALVE 1/9 HOLDER  
**DON'T PAY MORE**

AERMONIC cost a shilling less—and they're better. Air-spaced. Anti-phonetic. Beautifully sprung. High insulation. Splendid new design. So don't pay more than 1/9. List free.

If your dealer does not stock apply to—  
**JAMES CHPISTIE & SONS, LTD.,**  
246, West Street, SHEFFIELD.

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**A HOME FOR YOUR WIRELESS SET**  
OUR STANDARD CABINETS

are DUSTPROOF and house the whole apparatus, leaving no parts to be interfered with. All you do is UNLOCK and TUNE IN Made on mass production lines, hence the low price. Provision is made to take panels from 16x7 up to 30x18 in.



Carriage paid and packed free England and Wales. Thousand supplied with full satisfaction.

From £4 15 0 Write to-day for descriptive pamphlet and suggestions for adapting your receiver or panel in our Standard Cabinets. Immediate Delivery. Dept. 4, Melvill Chambers, 50a, Lord St. LIVERPOOL.

**MAKERIMPORT Co.**



*The*  
**Best in the World**  
**HELLESEN**  
**DRY BATTERIES**

Switch off your set and you switch on the No. 7 Recuperating Agent in your HELLESEN H.T. Battery.

This is the secret of the remarkable efficiency and long life of the Helleesen Dry Batteries, and to-day when radio is just a matter of switching on and off, an H.T. Battery which possesses this power is absolutely necessary.

You now have the opportunity of buying at a competitive price dry batteries which have always sold on quality—not on price—with quadruple insulation and sealed cover the GENUINE HELLESEN IS THE GENUINE ARTICLE.

**AT HUNTS' NEW PRICES** you pay no more, but you get the **BEST IN THE WORLD.**

60 volt "WIRIN" 12/6. 99 volt "WIRUP" 21/- (Postage extra.)

All types, voltages, etc., in Double and Treble Capacities Dry Batteries for Low Tension Hand and Pocket Lamps.

*From all Radio, Electrical and General Stores, Harrods, Selfridges, Barkers, Whiteleys, etc., or direct from*

**A. H. HUNT LTD. (Dept. 5), Croydon, Surrey.**

*Write for leaflet No. 155a.*



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STANDARD MODEL (Bakelite-insulated) (Type B) 8d. each.  
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If you cannot get these at your dealers, write us direct. Illustrated Catalogue free on request.

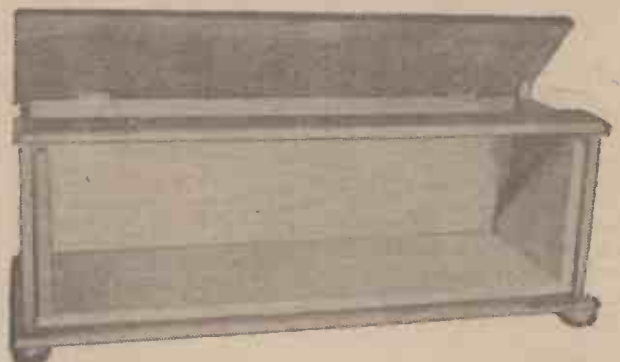
**BELLING-LEE**  
**PANEL FITTINGS**

Advertisement of BELLING & LEE, Ltd., E.P.S. 13  
 Queensway Works, Ponders End, Middlesex.

**CAXTON 4-VALVE CABINET**

Made for Sets, "As good as money can buy,"  
 'Harmony Four Receiver,' "The Melody Three"

Special Cabinets made to Customer's measurements. Prices quoted.



Cash with Order. Fumed Oak	...	£1 5 0
Dark or Jacobean Oak	... ..	£1 10 0
Real Mahogany	... ..	£1 14 0

Detachable 7" deep Base Board to mount 21" by 7" panel to slide out of Cabinet front. Also supplied at 10/- extra with two beaded front doors placed 2 ins. in front of the enclosed panel.

**Ebonite or Radion Panels** Supplied and perfectly Fitted at low extra cost.

All Polished with the new enamel that gives a glass hard surface that cannot be soiled or scratched. **SENT FREE.**—Catalogue of standard Wireless Cabinets in various sizes and woods.

*Packed and delivered free in U.K. 4 No. C3*

**CAXTON WOOD TURNERY CO., Market Harborough**



N thinking things carefully over I have come to the conclusion that next time I attend the Wireless Exhibition I shall go by myself and *not* with the Little Puddleton Wireless Club. It is not that I am unsociable, mark you; it is not that any snobbish feeling makes me dislike to be seen in company with fellows like Gubbsworthy and Bumbleby Brown. It is simply that whenever the club does anything in a body they always seem to get into mischief, despite all my best efforts to keep them out of it. Believe me or not, if they are a handful in the old home town they are a positive nightmare when they go in a drove to such a place as Olympia.

**How It Began**

Trouble started directly we entered the building, for Professor Goop, who was in a cheerful frame of mind, insisted upon demonstrating what one possessed of that Kruschen feeling can do, by leaping over the turnstiles. There was hardly sufficient landing space within for one displaying his fine free action; the result was that his leap brought him to the edge of the first step, and that, on the rebound he landed slap in the middle of a stand covered with loud-speakers. Four commissioners pounced upon him at once, and fearing that our old friend was about to be roughly handled I gave the order to charge. The club stormed the turnstiles in a body, effecting a neat rescue. I need hardly say that we were all promptly ejected.

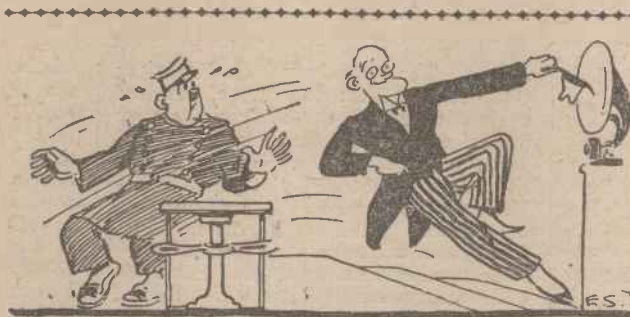
I managed to get back again quite quickly. As I was walking rather sadly down the street a stout man in front of me removed a tall hat in order to mop his bald head. Quick as lightning I borrowed the hat, giving him in exchange the trilby that had stood me in good stead for the past ten years. Before he realised what had happened to him I had disappeared into the main entrance, where I simply went to the turnstile labelled "Officials," said "Afternoon, George," to the man in charge, and passed in unquestioned. I have always felt

The Little Puddleton Wireless Club's visit to the Radio Exhibition ended rather suddenly. "Wireless Wayfarer" has now decided to visit similar shows in the future on his own!

that a countenance stamped indelibly with marks of breeding and brains will carry one almost anywhere.

**They Trickle Back**

I was at the Mullard stand, where I had almost succeeded in convincing the chappie in charge that it would be a fine stroke of business for him to send me down a dozen P.M.'s with his compliments when I heard a sudden uproar coming from the direction of the cigarette stall in the corner. It appeared that Poddleby had tried to sneak in through the staff entrance disguised as a "Nippy" and was being pushed out with enthusiasm. The only member who was really successful in getting in without paying



“. . . That Kruschen feeling . . .”

again was Gubbsworthy, who told the fellows at the door that he was the Wicked Uncle. One look at him convinced them that he was right, and they let him go in without a question.

**The Unlucky General**

They refused utterly to believe the General's tale that he was doing the topical talk; they told him that he was not likely to be wanted—the General was, no doubt, a little worked up, and it was certainly a hot day—unless the B.B.C. thought of putting on a tropical talk. However, they all dribbled back again somehow in the

end, though Bumbleby-Brown never got any further than the annexe, and told people when he got home that there was not a thing to see at the Exhibition. By skilful manœuvring I managed to separate Professor Goop from the rest, so that he and I might make a select tour together; I always think that it is better for the brainy members of the club to go off on their own and for the others to do likewise. Then at the next meeting you have two quite different sets of impressions, which produce a really interesting discussion.

**The Professor is Popular**

Professor Goop won every heart amongst the demonstrators by the helpful attitude that he adopted. His idea was that the demonstrator people were very much overworked, and that he would be doing them a really good turn if he helped to entertain the waiting throngs round their stands and to display the good qualities of the exhibits. At one condenser stand he was sublime. "If you will allow me," he said to the demonstrator, "I think that I can do you a really good turn." He then started to tell the crowd all about variable condensers. "For the best results," he remarked, "it is essential to have brass vanes; this instrument (and here he seized one from the stand) has, as you will perceive, aluminium vanes. It is most important, too, that there should be no end-play in the spindle. If you can do like this (and here he pulled the knob out about a foot and pushed it back again) the thing is simply

no good at all. The slow-motion gearing should contain no backlash; you will observe that I can move this dial four degrees in either direction without anything happening to the plates. It is most important that there should be a positive. . . ." He got no further, for at this point the demonstrator awoke from his stupor and swatted him rather neatly over the ear with an earth tube. Good Samaritans are seldom appreciated properly.

**Coils**

We moved on to a stand where there

## Jottings by the Way—continued

were heaps and heaps of coils. I much regret the lack of compactness in these modern inductances; you could get two or three of the old type into your pockets without their making a noticeable bulge, but I had not borrowed more than one of these new-fangled things before the fellow at the stand observed that it would spoil the hang of my coat and deftly retrieved it. "I see," said the Professor, "that you have a Unimic and a Dimic; why, I ask you, not a Trimic and a Quadrimic? And why should you stop there? Let us have a Quinquimic or even a Undevigintimic?" The demonstrator looked frightened. "But," continued the Professor, "I have something here in my pocket that puts all these in the shade."

He fumbled for a moment and produced a bath bun. "No, no," he said, trying again. Having brought out in turn his spare collar (he had only come to London for a week, and was therefore travelling light), a piece of Chatterton's compound, two files, a rubber hot water bottle, the return half of his ticket, a stick of solder, and a tin of fluxite without a lid, he at last lighted upon the object of his search. "Here it is," he said, with a beaming smile. He drew out one of his famous Slimic coils wound upon a natural starfish former. A sea atmosphere is apparently out of place at Olympia, for the throng round the stand, acting like one man, grasped his nose with the forefinger and thumb of the right hand, and fled incontinently.

### The "X" Circuit

We visited next the display of the new "Z" circuit, in which the Professor was enormously interested. He insisted upon showing the crowd exactly why it would not work and on telling them something of his new "X" circuit, which completely solves the problem of interference by radiation. The "X" circuit is, of course, exceedingly hush-hush at the present time, so that I can hardly give you details of it. The main idea, however, is to use an aerial earthed at both ends and to get your dance music from a gramophone fitted with a number of electric-lamp bulbs and provided with a panel studded with knobs.

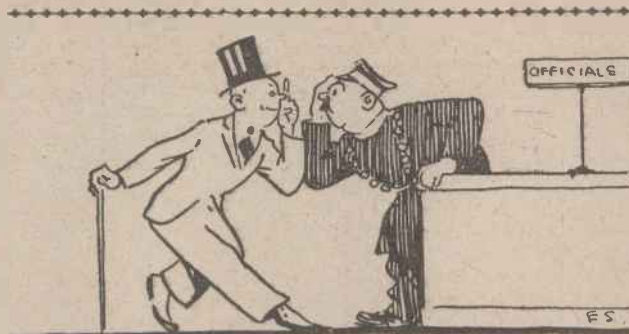
### Worse and Worse

The Professor endeared himself particularly with the transformer makers by proving conclusively to them and the crowds round their stands that resistance-capacity amplification alone could give undistorted reproduction. When we got to the people who make resistance-capacity units he demon-

strated to them and the general public at large that their exhibits would be as right as rain if only they were not all wrong. We passed on to the valve stands. At the first of these the Professor showed that unbreakable valves were quite breakable by cracking one like a nut beneath his heel. At the next he got the demonstrator so tied into knots by talking about Eccles lumped volts that the crowd cheered him to the echo.

### Unfortunate!

Thinking that we had perhaps better retire to the Gallery for a little until things had become calmer down below, I took him upstairs, where we joined the queue that was defiling before the plate-glass window of the studio. As soon as we reached the window I realised at once that things were going to happen, for there before the microphone, topical talking like anything, was his rival, Professor



“. . . . ‘Afternoon, George’ . . . .”

Blimp. The way in which Professor Goop leaped from the queue, brushed aside attendants, thrust open the door of the studio and burst in is beyond any feeble descriptive words of mine. Stupefied, I watched the whole scene through the window. I saw him steal up behind Professor Blimp and administer a box on the ears that must have produced in countless thousands of homes an atmospheric which caused arials to be earthed instanter. In a second Professor Goop was talking hard into the microphone, telling the world, as he afterwards informed me, that all that they had just heard was tripe of the first water. In two seconds a bevy of uncles had descended upon Professor Goop and handed him over to stout commissionaires, who rushed him downstairs, through the hall, and out through the exit door.

### More Trouble

Feeling a little relieved, I made my way down again, proceeding to make a quiet tour of the more interesting stands all alone. I had not done more than three of them when I heard sounds of strife coming from near the middle of the Hall. Guessing in a moment

that some member of the club was involved in a fracas, I made my way there like a flash of lightning, brushing aside the crowd (with the utmost courtesy and a pair of sharp elbows) as I moved.

The trouble, I found, was being caused by the General, who had purchased an enormous loud-speaker with a swan-necked horn which he was carrying about in his arms. It is naturally somewhat difficult to move in a crowded hall with such an encumbrance, and if you'll believe me, the crowd had refused to make allowances for the General's little difficulties. When on turning suddenly to the left he had winded a man on his right, the fellow had grown quite nasty as soon as he was able to speak. Hearing his remarks, the General had swung round to the right, removing the hat of somebody on his left.

Being the most courteous of men, the General naturally turned to apologise, and in doing so delivered yet another blow to him whom he had first smitten. Turning now this way, now that, to say how sorry he was, the General had knocked out about a dozen people who were standing behind, building a kind of rampart of fallen bodies.

### The End

Hearing a roar, the other members were converging from different points as fast as they could, leaving a trail of prostrate forms in their wake. Just as I got there, prepared to explain the whole thing, a large hand gripped me by the scruff of the neck, and I observed similar hands being laid upon other Little Puddleton scruffs. In about two ticks we were out in the street again, and though we protested that it was the rest of the crowd and not us that ought to be ejected, they would not listen to a word that we said. If they must hold wireless exhibitions, I do not see why they should not provide shock-absorbers on the pavement outside.

WIRELESS WAYFARER.

### QRA's Found

G-5IW: International Standard Electric Corporation, Connaught House, Aldwych.

G-6TP: Lord Egerton of Tatton, Tatton Park, Knutsford.

G-2ABL: N. Doble, Jr., 1, Pickwick Road, Dulwich Village, S.E.21.

SAD: Swedish Naval Floating Station at Stockholm.

BZ-1BH: M. Godafredo Damm, Rua da Quintanda, N.137, Rio de Janeiro.

D-7ZG: H. T. Petersen, "Fribo," Ostergade, Norresundby, Denmark.

# THE NEW LISSEN TRANSFORMER

—the transformer for the Elstreflex

Mr. Scott Taggart says: "The only point of the circuit (the Elstreflex) which is at all critical is that the transformer used in the reflex stage should have a low secondary self-capacity."

**The New Lissen Transformer was chosen above all others for this stage.**

Mr. Scott Taggart says: "The whole problem (of parasitic oscillation) can be avoided if the transformer specified is used."—**THAT REFERRED TO THE NEW LISSEN.**

**Use the New Lissen for all stages—too**

Not only the reflex stage, but for the second stage—for all circuits and valves you are likely to use you will not get a better transformer than the new LISSEN. Two or three of these splendid transformers can be used together, if desired.

By cutting out all wholesale profits, due to our new direct to dealer distribution policy, in addition to our big production programme, this new Lissen transformer is available to you at an unprecedented price. You would never pay a high price for any transformer if you knew the remarkable tone purity and power of this new Lissen.

**Compare it against any.**

## DEALERS AT A LOSS

Asked to name the price at which they thought they could sell this new Lissen Transformer, many of the trade buyers who visited our Stand at Olympia named a figure close to £1. Many named 25/-, and many even more than that.

**THE GOOD LOOKS OF THIS NEW LISSEN ARE MORE THAN CONFIRMED BY ITS PROVED PERFORMANCE**

**Tested by a Trade Paper**

Reviewing its performance, this trade paper says: "It is infinitely better than the average transformer around this price. . . . Its strength was only slightly below our standard transformer which is 4:1."—**NO TRANSFORMER HOWEVER HIGH THE PRICE CAN BE MORE THAN "INFINITELY BETTER."**

You can rely that the standard transformer against which the new Lissen was tested was an **EXPENSIVE TRANSFORMER.**

**AND THE NEW LISSEN WAS STATED TO BE NEARLY AS GOOD FOR POWER.** Nothing was said about purity, and we know that for purity and power this new Lissen transformer is not excelled by the very best transformer made—**YET YOU CAN BUY IT FOR 8/6**

*Guaranteed for 12 months.*

**URNS RATIO 3:1 RESISTANCE RATIO 4:1**

Test it for seven days—if you are not satisfied take it back to your dealer's, or send it back to us.



For Elstreflex building you will also want a .002 LISSEN FIXED CONDENSER—the condenser which delivers all its stored-up energy—the LISSEN WIRE RHEOSTAT. Lissen one-hole fixing, of course, price 2/6 (previously 4/-), and the LISSEN VALVE HOLDER, base board mounting, price 1/- (previously 1/8).

### Another Lissen milestone

The new Lissen (Mansbridge type) Condenser (in moulded case, which does away with all risk of condenser short circuit, on to its outer case)—is another improvement to radio parts. Prices no higher than for the ordinary tin-cased type.

#### PRICES:

2 mfd.	..	..	..	..	..	..	4/8
1 "	..	..	..	..	..	..	3/10
.5 "	..	..	..	..	..	..	3/4
.25 "	..	..	..	..	..	..	3/-
.2 "	..	..	..	..	..	..	2/8
.1 "	..	..	..	..	..	..	2/6
.01 .09 mfd.	..	..	..	..	..	..	2/4

Your Lissen dealer will show you every Lissen part you want, and you can build with—you'll find him friendly and anxious to help you. If any difficulty, however, send remittance direct to factory, and the goods will be sent by return. Post free, but please mention your dealer's name and address.

**LISSEN, LTD., 18-22, Friars Lane, Richmond, Surrey.**

Managing Director: T. N. COLE.

*"Give us a better transformer"—and Lissen have responded with a lower price too!*





**SHORT-WAVE NOTES  
AND NEWS**

(Continued from page 237)

Perhaps the "Beam" stations will not be quite so bad as some of the flatly-tuned variety that we hear nowadays.

**SMXA**

The call-sign "SMXA" will in future be used as a kind of Swedish "CQ," and will denote "All Swedish amateur transmitters."

**Transmission in Malaya**

Transmitting licences are now being issued in the Federated Malay States. One of the first has been issued to Mr. Chas. Randall, Amber Rubber Estate, Johore, with the call-sign JM-3AB. JM is the Official Intermediate, signifying Johore, Malaya.

**Screening**

Although amateur transmitters in London have much to put up with in the way of interference by power stations, trains, trams, etc., they are very little troubled by the type of screening that is to be found in several parts of England, notably the North and West, in the form of high ranges of hills several miles long. Some argue that screening of this type is not serious when we are concerned with short-wave work, and quote the Heaviside layer theory. The behaviour of low-power transmissions is always somewhat eccentric in districts of this nature. The chief feature, however, always seems to be that long distances may be covered with ease, whereas local transmissions are very difficult to pick up. Is this a word in favour of the Heaviside layer?

**Favourable Locations**

Those transmitters who live near the sea always appear to be fortunately placed as far as reception is concerned. The writer is not thinking of interference from spark stations, since this never does cause much trouble on the short waves. One does not even know that the short waves travel better over water than land, but the fact remains that reception is generally much better. Can any reader offer an explanation?

**QRA's Found**

P-1AW: Mario Neves, Largo do Directorio 4, Lisbon, Portugal.

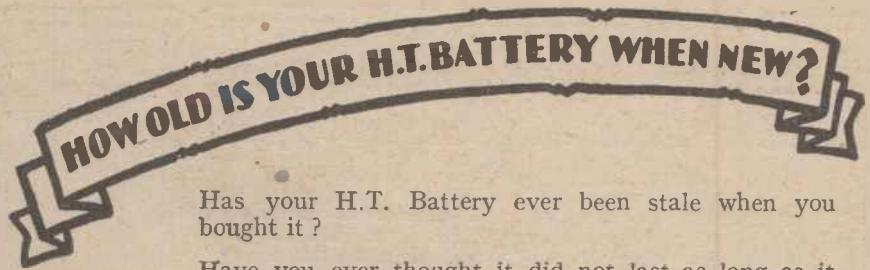
GLYK: M.-Y. "Adventurers," c/o Col. Millard, Royal Thames Yacht Squadron, Knightsbridge, London.

XU-2RV: J. V. Candido, 584, E. 26th Street, Brooklyn, N.Y., U.S.A.

Z-3AJ: Post Office, Rangiora, New Zealand.

Z-3AD: R. G. F. Blake, Blaketown, Greymouth, N.Z.

Z-3AG: W. H. Claxton, 165, Dean's Avenue, Christchurch, N.Z.



Has your H.T. Battery ever been stale when you bought it?

Have you ever thought it did not last as long as it should have done?

This is a risk you need not run. Insist on a Lissen New Process battery. These, thanks to our new direct-to-dealer distribution policy (which also cuts out all wholesale profits), are actually on sale in the London area within three days of being made in our Richmond factory.

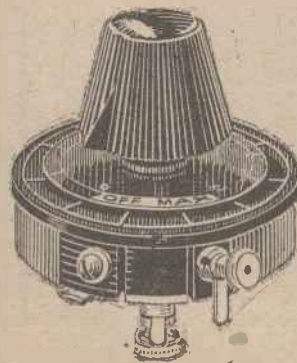
Every battery therefore is brimful of new energy when you buy it, and our secret new process causes them to retain this energy for an unusually long time and also yields far clearer loud-speaker reproduction.

Ask for it at your dealer's, or if any difficulty send direct. No postage charged, but mention dealer's name.

10'6

Price would have been 13/- but for our new policy.

**Quality tells in rheostatic devices**



**Use a Lissen 35 Ohm Rheostat for the Elstreflex.**

Let your wire rheostat or potentiometer be a LISSSEN—the wires cannot shift and short circuit—the contact brush moves firmly yet pleasantly—the heat resisting former cannot soften—there are accessible terminals—and the combined knob and pointer will fit flush with the neat photo-engraved dial when mounted. Lastly note the irresistible appeal of the new prices, made possible by our big production programme and our new direct-to-dealer distribution policy, which cuts out all wholesale profits.

Compare a LISSSEN with any high-priced rheostat—remember that LISSSEN rheostats have themselves been high priced—then think of the new LISSSEN prices, and you will make a quick decision to buy a LISSSEN.

7 Ohms ..	Previously	4/-	NOW 2/6
35 " ..	"	4/-	NOW 2/6
Dual ..	"	6/-	NOW 4/6
Potentiometer, 400 ohms ..	"	4/6	NOW 2/6

**Important to the trade:** Orders for all LISSSEN parts must now be sent to factory and not to usual wholesale dealers. Apply for particulars of new trading policy if not already advised. Every dealer in his own interest should be registered with us.

**LISSSEN LIMITED, 18-22, Friars Lane, Richmond, Surrey.**

Managing Director: T. N. COLE.

## Through Three Counties with a Portable Superheterodyne

By JOHN UNDERDOWN

An account of the reception conditions experienced in the course of a "wireless holiday" taken by the designer of the receiver described in this journal under the title "Simplifying the Superheterodyne."



IN the front cover of this issue a photograph of a portable receiver in use in the open country will be seen. The set actually is the 5-valve superheterodyne, consisting of a modified Tropadyne combined oscillator-detector, two intermediates, a second detector and one transformer-coupled note magnifier, which I described in the issues of this journal for August 28 and September 4.

In the latter of these two articles it was indicated that further results obtained with the receiver would be published and here it is proposed to give particulars of the set's capabilities as evidenced during tests carried out on a 600-mile run. The tour, which extended over one week towards the end of August, started and finished in London. The course taken was through Tonbridge, Guildford, Basingstoke, Andover and Amesbury to Wincanton, and thence south to Dorchester, Lulworth, Bournemouth, through the New Forest to Winchester, Petersfield, Midhurst and Storrington to Shoreham, Hove and Brighton, and back through Tonbridge to London.

### Unfailing Service

Throughout the run, although circumstances, such as late arrival at a stopping place and difficulty in finding accommodation, prevented more than three or four thorough tests being carried out, in no position where it was tried, usually during a roadside stop for refreshments, did the set fail to give at least one station at satisfactory loud-speaker strength.

### Battery Arrangements

The photograph in the heading shows the receiver in use near Midhurst in Hampshire, where during an afternoon stop both London and Bournemouth were heard at satisfactory strength upon the loud-speaker. From this picture it may be observed that an accumulator was carried to provide the L.T. supply, actually a 6-volt 30-ampere-hour battery. This arrangement permits of the set being used within doors

during the evening, which is impossible if the car battery is employed. This latter battery was tried from time to time and proved perfectly satisfactory, excepting for the above limitation. The H.T. supply was a 108-volt Hellesen battery, of small cell type, which, although not really to be recommended on account of the somewhat heavy current taken by five valves, proved perfectly satisfactory throughout the week and is still functioning well, but now upon a 2-valve set only.

### The Frame

The frame aerial was the "Success" portable type, this component packing away in a comparatively small space; a feature of considerable importance where space is limited.



Mr. J. Eccleston, who recently broadcast a talk from 2LO on the subject of "A Day in a Signalman's Life."

On the score of portability a small loud-speaker had to be chosen and an "Ultra" hornless type, which readily packed into a small attaché case, together with the H.T. battery, was used throughout.

The set, frame aerial and batteries were accommodated in the back of the car, and despite the severe jolting



The receiver used on the tour was described in "Wireless," Volume 5, No. 2.

over roads, which in some cases were little better than cart tracks, the whole outfit came through without a single mishap to a valve or a connection coming loose.

### Valve Protection

The valves were not removed from the holders during the whole time, and the method of preventing them from jumping out of the anti-vibratory sockets may be of interest. The cases in which the valves were received were employed to hold them in position, the lids of the cases being removed. Tissue paper was wrapped round the valves so that the cases could be placed over them and arranged at such a height that the lid of the case just held the whole fairly firmly. Thanks to this method of carrying, although a spare valve was taken, it was not required.

The valves used were of 6-volt type, an Electron SS.6 serving for the combined oscillator-detector, two D.E.8 H.F.'s as the intermediate amplifiers, a D.F.A.4 as the second detector and a B.4 as the note magnifier.

### The First Test

Starting from Town in the early evening of Saturday, August 21, the first stop was made at Tonbridge, where it was decided to spend the week-end. The set was rigged up in a house actually in the town itself, which is somewhat low lying and surrounded by hills, the position being located at approximately half a mile on the south side of the River Medway. It was dusk when the receiver was ready, but before 10.30 p.m. nine  
(Continued on page 246.)

# Longer life!



**Duo-triangular filament suspension**



- S.S. 2A., H.F. and L.F.**  
D.E., 1.8 volts, .1 amp.,  
H.F., L.F. and Detector  
14/-
  - S.S. 10.**  
D.E., 2 volts, .15 amp.,  
Power Amplifier .. 18/6
  - S.S. 7.**  
D.E., 3.7 volts, .1 amp.,  
Power Amplifier ... 18/6
  - S.S.8.**  
D.E., 3.4 volts, .1 amp.,  
General Purpose .. 14/-
- These prices do not apply in the Irish Free State.*



**Duo-triangular Suspension affords COMPLETE PROTECTION to the FILAMENT**

**W**ORTHY of the wonderful Six-Sixty filament itself! Our new Duo-Triangular system of suspension affords complete protection to the filament, safeguarding it even when subjected to the roughest handling, and enabling it to function with the highest degree of efficiency.

In this new construction, the filament is supported at each corner of both triangles, with the result that the unsupported length is relatively small. This unique method of suspension eliminates all possibility of sag, and renders it unnecessary either to assemble the filament in tension, or introduce springs or other materials for maintaining it in position. Accidental knocks which would displace or fracture the filament in any ordinary valve have no effect, firstly, because the relative positions of filament, grid, and anode are fixed, and secondly, as the filament is not in tension, all possibility of fracture is practically eliminated.

And remember, the Six-Sixty filament is no ordinary filament. Its current consumption is barely .1 amp., and when operating at the rated voltage, there is absolutely no sign of "glow"; in fact, there are no valves on the market to-day that can boast of a longer life, because there are no valves that operate at a lower temperature. The new Six-Sixty Point One Valves are suitable for operation in all stages of a receiver, whether the L.T. supply be 2, 4, or 6 volts.

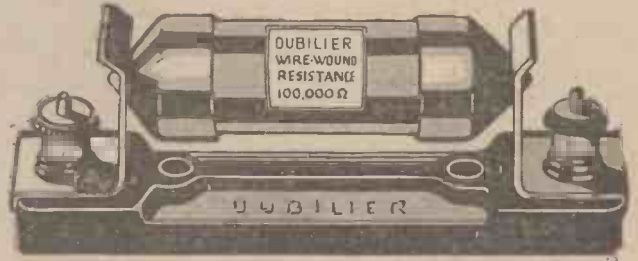
*After exacting and exhaustive tests Messrs. A. J. Stevens (1914) Ltd., have decided to standardise "SIX-SIXTY" Valves in their famous "Symphony" Range of Receivers.*

*Descriptive Leaflet S.S.9-26, giving full particulars of complete range, on application.*

**SIX-SIXTY VALVES**  
*Better by Six Times Sixty*

The Electron Co., Ltd., Triumph House, 189, Regent Street, London, W.1. 4A

*A New Dubilier Product*



## The Dubilier wire-wound resistance

No new Dubilier Product is placed on the market until it has undergone prolonged tests under working conditions.

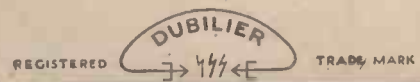
In this manner you can always be assured of the perfect reliability of any product bearing the Dubilier name.

The new Dubilier Wire Wound Anode Resistances will be found to be ideal for resistance capacity circuits.

Self induction and self capacity effects are virtually non-existent, and the resistance values remain constant throughout all variations of climatic conditions.

- 20, 30, 40, 50, 60, 70, 80, 90 and 100 thousand ohms. ∴ 5/- each.
  - 200 thousand ohms .. .. . 8/- each.
- HOLDERS (as shown, extra) 1/6 each.

*Specify Dubilier.*



ADVT. OF THE DUBILIER CONDENSER CO. (1925) LTD., DUCON WORKS, VICTORIA ROAD, N. ACTON, LONDON, W.3. Tel. Chiswick 2241-2-3.

E.P.S. 210.

**THROUGH THREE COUNTIES WITH A PORTABLE SUPERHETERODYNE**

(Continued from page 244)

stations had been heard upon the loud-speaker. The first tuned in was the local station, 2LO, about 35 miles distant, volume being too great for comfort in a room of average size. Hamburg also gave really good loud-speaker strength, and was, in fact, much better than most of the British stations, both here and in other positions in which the set was used. Frankfurt also came in quite well, as did Newcastle, Madrid, Belfast, Ecole Superieure, Dublin, and several unidentified transmissions.

On Sunday little was done with the receiver excepting to listen, upon the hills to the south of the town, to the afternoon transmission from 2LO, which came in at good strength, the set being used at approximately one mile from the nearest aerial, so that there was no question of any pick-up taking place.

**Reception Near Guildford**

The run taken on Monday was a comparatively short cross-country one to Ewhurst, near Guildford, the distance from London being approximately 30 miles. Here again a good opportunity of trying the set presented

itself, and again London and our old friend Hamburg were heard first at similar strength to that obtained on the first stop. Oslo, Breslau, Berlin, Glasgow, and several other stations



One of the new receivers which was exhibited at the Radio Exhibition, the Rotola Baby Grand Model.

were heard ranging in volume from good to fair loud-speaker strength.

**A Poor Locality**

On Tuesday it was somewhat late before the stop for the night was made

at Mere, a small town in Wiltshire about 20 miles west of Salisbury. Mere itself nestles under a very steep hill, upon which a castle was once situated, this hill coming roughly between the hotel at which I stayed and Cardiff, about 50 miles away; 35 to 40 miles to the south-west Bournemouth is located, and this station was first tuned in, and was, in fact, the only station which gave really satisfactory loud-speaker strength, to be heard all over a very large room, whilst Cardiff made only a poor second. Five or six other transmissions were heard, at weak loud-speaker strength only, none being definitely recognised by their call sign. 2LO, which had been so strong on the previous evening, was heard faintly, and was only identified by the condenser dial settings.

**Lulworth**

Continuing on Wednesday morning, the course taken was through Wincanton, Yeovil, and Dorchester to Lulworth Cove, the first halt for reception being made upon the hills above this latter place. Here in full daylight the Bournemouth transmission was received at good loud-speaker strength. Having listened to this station for some time, the journey was continued. Here the roads taken were perfectly execrable, in some cases little better than cart tracks, and we went seriously astray, so that our arrival

(Continued on page 248.)

**? CHOKE COUPLING ?**



**AUDIO-FREQUENCY TRANSFORMERS TYPE AF3**

GIVE ALL THE ADVANTAGES CLAIMED FOR CHOKE COUPLING

PLUS

A STEP-UP OF 3½ TO 1

**25/-**

Ask your Dealer for Leaflet W-401.

FERRANTI LTD., Hollinwood, Lancashire.



Patent No. 244,251

**The Moving Block Cannot Fall**

The vernier movement comprises three sets of enclosed precision machine-cut gears, and reduces the speed of the moving block by eight times.

Side plates, coil blocks, and knobs in artistic bakelite mouldings. All metal parts heavily nickel plated. Made for left as well as right hand.

**PRICES :**  
Two Types :  
For outside panel mounting : Two-way ... 7/-  
Three-way ... 10/6  
For inside baseboard mounting, with 6-in. handle : Two-way ... 8/-  
Three-way ... 12/6

Made by the makers of the famous Lotus Buoyancy Valve Holder.

**LOTUS VERNIER COIL HOLDERS**

GARNETT, WHITELEY & CO., Ltd.  
Lotus Works, Broadgreen Rd., LIVERPOOL.



## Time Tells

USE "HART" Wireless Accumulators in preference to dry batteries—always. You will quickly note the difference, and the longer you use them the greater will be your appreciation of their undoubted merits.

There are models for all low and high tension wireless circuits.

# HART

THE BATTERY OF QUALITY

If you are not already using "HART" BATTERIES write to-day for full list to Dept. W.3.

**HART ACCUMULATOR CO. LTD**  
MARSHGATE LANE, STRATFORD, LONDON, E. 15

Telephones - Maryland 1361, 1362, 1363 and 1364  
Branch Offices - STURTEVANT - BELFAST, BIRMINGHAM, BRISTOL, CARDIFF, DUBLIN, GLASGOW, MANCHESTER, WESTMINSTER & YORK

REIDFERN'S  
**Ebonart**  
NON-METALLIC SURFACE  
RADIO PANELS



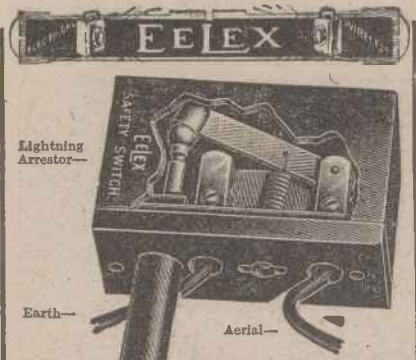
Ebonart has high insulating properties and a leak-free surface. It's highly polished surface, never touched by metal foil, has a sheen like satin, in black or mahogany. Fine S.B. matt is also available.

The homogeneous structure of Ebonart ensures accurate cutting and drilling, with ease of manipulation.

Ebonart, in the 21 standardised panel sizes, is sold in attractive cartons which protect its beautiful surface.

REIDFERN'S RUBBER WORKS LTD  
Hyde, Cheshire

Send for Folder 262A



**SAFETY SWITCH**

The Eelex safety switch, the latest development in Safety First devices, enables the operator to earth the aerial outside the house. By pushing the knob the set is at once connected to the aerial. A pull instantly disconnects the set from the aerial system, automatically earthing the aerial.



The spark gap provides ample means of by-passing any electrical discharge which may occur while the set is in operation.

6" Tube  
**PRICE 5/6**

Sunk Socket to take T14 plug to Aerial of Set.

Write for full particulars to



118, BUNHILL ROW, E.C.

**NEWS IN ADVERTISEMENTS**

Messrs. Ericsson Telephones, Ltd., request readers to send for their literature on the Ericsson valve sets, components, loud-speakers, and telephones.

The Dubilier wire-wound resistance is now available.

Two new cone speakers—the Table-cone and the Ellipticon—feature in the advertisements of Messrs. Brandes, Ltd., in addition to the new Brandeset receiving sets.

Messrs. Igranie Electric Co., Ltd., are offering to send their catalogue No. S31 upon request.

List H. and L.T. 11, issued by Messrs. The Radio Service Co., will prove interesting to readers within a 12-mile radius of Charing Cross.

Messrs. Hart Accumulator Co., Ltd., will send a complete list of their accumulators on application to Dept. W.3.

Two booklets regarding Columbia dry batteries can be obtained free upon request.

**THROUGH THREE COUNTIES WITH A PORTABLE SUPERHETERODYNE**  
(Continued from page 246)

in Bournemouth in the evening was very late, and only after considerable difficulty were we able to find accommodation for the night. This was at last secured in a private house, and the set was connected up in time to hear the last few minutes of the Bournemouth station's programme. It was too late, however, to spend much time searching for other stations in earnest, but one or two Continentals were heard.

**A Wayside Stop**

Leaving Bournemouth in the early morning the journey was resumed through the New Forest and Winchester to Midhurst, where in the middle of the afternoon a roadside halt was made, both Bournemouth and London being tuned in at moderate loud-speaker strength. After leaving Midhurst no opportunity of trying the set occurred until we arrived back at Tonbridge on the Saturday evening and

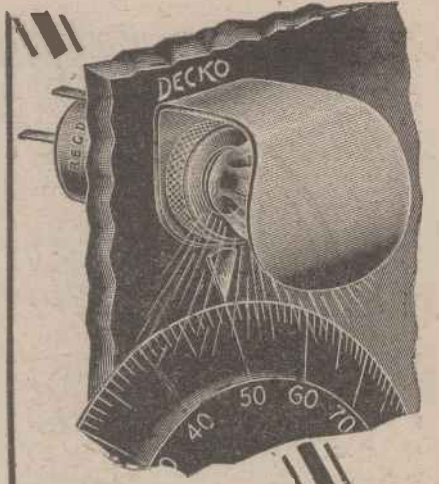
**NEXT WEEK**

Further details of the new Loewe valve and the receiver in which it is used.

again rigged up the equipment, this time in an ideal situation above the hills overlooking Tunbridge Wells. The stations previously logged in the town of Tonbridge itself were again heard, this time at considerably improved strength, the directional effects of the frame aerial being much more noticeable than was the case in the town itself, where most stations seemed to come in from approximately the same direction.

**Conclusion**

Reviewing reception throughout the week, the set behaved very much as was expected, in no position failing to give at least one station at really satisfactory loud-speaker strength, for which purpose it was originally designed. It adequately proved that it was capable of standing up to very rough treatment, and is a very satisfactory receiver for the motorist who wishes for a set which can be used anywhere with very little trouble. The whole trip confirmed the writer's belief that a good five-valve super will give dependable loud-speaker results from at least one station in practically any locality.



**DON'T FIDDLE 'IN THE DARK!**

Ask for a DECKOREM "DIALITE" and illuminate your dials. A necessity for every set. Can be easily fitted and connected to L.T. accumulator supply.

HIGHLY NICKEL-PLATED.

PRICE 2/6 EACH.

Bulbs extra.

New Catalogues Now Ready.

OBTAINABLE FROM ALL DEALERS OR

**A.F. BULGIN & CO.**  
9, HUNTSBOROUGH STREET  
TEL. HOLBORN 2072 CHANCERY LANE E.C.4. WORKS CHISWICK

**Valves Repaired**  
AS GOOD AS NEW!!

HALF PRICE

(Except Weco, S.P.'s and low capacity types.) Minimum D.E. Current 0.15 amps when repaired. ALL BRIGHT & DULL EMITTERS listed at less than 10/-. Minimum charge - - - 5/- LTD. Dept. W., Tabor Grove, Wimbledon, S.W.

**2-VALVE AMPLIFIER, 35/-**

1-Valve Amplifier, 20/-, as new; Valves, D.E. 06, 7/- each; smart Headphones, 8/6 pair; new 4-Volt Accumulator, celluloid case, 12/-; new 60-Valve H.T. Battery, guaranteed, 7/-; 2-Valve All-Station Set, 34. Approval willingly.

R. Taylor, 57, Studley Rd., Stockwell, London.

**GLASS JARS AND ZINGS FOR WET H.T. BATTERIES**

Particulars and Samples—3d. stamps. Paper Diaphragm Type Speaker Parts. **SPENCER'S STORES, LTD.**, 4/5, Mason's Avenue, Coleman St., Lothbury, E.O.2. (Near Bank.)

**CRITERION COILS**

HUGE REDUCTION IN PRICES. 25-1/3, 30-1/6, 35-1/6, 40-1/6, 50-1/6, 75-1/6, 100-1/9, 125-2/-, 150-2/-, 175-2/3, 200-2/6, 250-2/6, 300-2/9, 400-3/3, 500-4/-. Criterion Coils are not of Basket, Honeycomb or Duo-Lateral formation. They are Laterally wound Coils, with an air-space between each layer. TRADE SUPPLIED. SATISFACTION GUARANTEED. **RUNDLE & CO.**, 2, Kingley Street, Regent Street, London, W.1



The Pye portable receiver, which is designed to receive Daventry on the loud-speaker.



O define a receiver as portable is apt to convey the wrong impression that with summer over the apparatus is of little use until next year.

After a lengthy visit to the recent Radio Exhibition, during which I was able to see and hear many of the latest portable receivers, it would seem that in the majority of cases the aim has been to produce a "drawing-room portable" which can be used at any time. Such a receiver contains everything necessary for loud-speaker operation, including a frame aerial and loud-speaker, and it should be produced in such a manner as to be of pleasing appearance.

This, of course, is what has been needed for a long while by flat dwellers and people in the similar unfortunate position of being unable to erect an aerial of any kind.

### Some Olympia Models

It was thought that the information resulting from the visit would form the text of an interesting article, although it should be understood that the limitations of space will not allow of a detailed description of all models exhibited.

The first stall at which I stopped to make inquiries was that of Messrs. W. G. Pye, on which was shown a very compact five-valve receiver for the reception of Daventry only. The circuit consists of two H.F. valves, a detector, and two L.F. valves, a switch being incorporated to cut out the last amplifier, also to switch the instrument off. Visible at the front of the cabinet (which is of walnut) is an Amplion Radiolux loud-speaker, while the frame is internal at the rear. This receiver, the control of which is simplicity itself, is designed only for the reception of 5XX on the loud-speaker, and the makers claim that this is possible anywhere in the British Isles.

# The Vogue of Portability

BY OUR SPECIAL REPRESENTATIVE

A review of some of the latest portable receivers which were shown at the recent National Radio Exhibition.

### A Three-valve Super

I was now moved on, more by the crowd than anything else, until I came to another stall, upon which a portable receiver was shown, this time at the stand of the British Thomson-Houston Co., Ltd., upon which I took refuge to learn a little about their model. It is described as a three-valve superheterodyne receiver, and is entirely self-contained, no external aerial or batteries being required. The loud-speaker to go with this instrument is contained, with a two-valve amplifier, in a separate cabinet. The receiver proper is claimed to give loud results within a radius of 30-40 miles from main B.B.C. stations and 100 miles from the high-power station. A



A four-valve receiver for long or short waves manufactured by Messrs. Hart Collins.

novel feature of the set is a small compass which is mounted on the top of the case to facilitate determination of the best direction for the reception of a desired station.

### A Good Range

Upon the "Alphian Wireless" stand a very complete range of portables was on view. The two-valve model of this make includes everything needful for operation with the exception of the loud-speaker, although even this can be built in if desired. The complete broadcast range from 150 to 3,000 metres is covered by means of a simple switch for high or low wavelengths and the usual tuning condensers. This model is designed to operate a loud-speaker at any distance up to 15 miles from a main station. A very useful feature is the incorporation of a filament voltmeter by means of which the correct amount of resistance to suit each valve can be ascertained. The batteries are claimed to last five months without attention.

### The Igranic Model

"Can I show you anything, sir?" to which I replied that I was interested in portable receivers, was productive of useful information regarding the Igranic model shown on Stand 72. A seven-valve superheterodyne circuit forms the basis of this receiver. The circuit consists of a neutralised H.F. valve, a separate oscillator and first detector valve, two intermediate frequency stages, the second detector, and a power amplifier. A wavelength range of 250-1,800 metres is obtained by using interchangeable oscillator coils, and there are practically only three tuning controls. This receiver, strange as it may sound, has an all-metal panel, and the intermediate frequency stages are screened. The receiver proper does not include batteries, loud-speaker, or frame aerial, although a pair of telephones are ingeniously fitted in the lid. A separate carrying case which matches that of the receiver contains the necessary batteries, and connection is effected between the two units by means of multiple flex cable having a plug and socket at the receiver end. The frame aerial for use with the receiver is also sold separately, and a carrying case can be supplied.

### In Two Parts

On the stand of Messrs. Autoveyors, Ltd., was exhibited a portable receiver known as the "7-valve ultra-sonic." This new model, which is encased in a handsome oak carrying cabinet, has

(Continued on next page.)



The "Celestion Radiofour," a four-valve receiver which employs no L.F. transformers or chokes and no reaction.

# AMERICAN VALVES



Why buy them for your Neutrodyne or Superhet?  
 Use British Made  
**RADION 5.25 15/-**  
**Power Valve**  
 They are supplied in both American and British bases. Specially designed for these circuits on the lines of the best American. Satisfaction absolutely guaranteed. Every valve is practically identical. Can be supplied in matched sets.  
 Fil. 5.5 max. 25 amps.  
 Impedance 8,000 ohms.  
 Amplification 7.2.  
 British Base 525B. American Base 825C. Guarantee in every valve box.



Obtainable from  
**BARKERS, BENEFINKS, GAMAGES, WHITELEYS,**  
 and most other untied dealers.

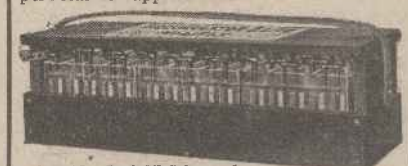
If any difficulty write the sole manufacturers:  
**RADIONS LTD.,** Bollington, Macclesfield, England,  
 List Free on request.

## WIRELESS MASTS

50ft. Complete sections sent anywhere. 26/-  
 Bargains. Few only. ORDER AT ONCE  
 35ft. No lists. Beat your neighbour's height. 21/-  
 Masts, 33a, Elms Road, Aldershot.

## H.T. ACCUMULATORS

**60 Volts.—Price 32/6**  
 DO YOU REALISE that light weight and low cost may be linked up to high efficiency? The inexpensive 60 volt—3 amp hour ELITE—High Tension Accumulator which actually costs under a 1d. to recharge will do all that the more expensive types will do and are never done. Therefore look before you leap at our Descriptive Folders, which will be forwarded per return on application.



Type 02. Semi Oil Submerged.  
**60 volts Complete as illustrated 32/6** or 5/- per 10 volt Unit.  
 Obtainable only from—  
**ACCUMULATORS ELITE,**  
 32, KING CROSS STREET, HALIFAX.  
 Tele.: 1304. Trade Supplied. Telegrams: Elite, Halifax.  
 London Distributor:  
**CECIL POHLMAN, 77, Great Portland Street, London, W.1.**

## VALVES!

Radio Micro Power 3v. 1 amp., 10/9; do. 3v. 3 amp., 9/6; do. D.E. 3v. .06 amp., 7/-. Fama D.E. 4v. .06 amp., 5/9. Fama Power 4v. 2 amp., 8/6; do. D.E. 2v. 2 amp., 4/-. M.R., D.E. 3v. .06 amp., 5/6. Polo 60-volt Batteries, 3-volt Tappings Guaranteed 7/6.

Trade Enquiries Invited. Write for Lists—  
**W. SEGAL,** 8, BRUSHFIELD STREET, BISHOPSGATE, LONDON, E.C.2.

**LIVE TRAVELLERS WANTED,** calling upon Wireless Dealers in the following districts: South Midlands, Eastern Counties, North & South Wales, Lancashire & Cheshire. Exceptional opportunity for good men. Liberal commission, good selling novelties. Apply by letter to Box No. A.47, WIRELESS, Bush House, Strand, London, W.C.2.

# The Vogue of Portability

(Continued from previous page)

a total weight of 14 lbs., and the dimensions are 16½ in. by 7 in. by 9 in. The weight given does not include that of the batteries and loud-speaker, which are incorporated in an oak cabinet exactly similar, but quite apart from the receiver box.

### A Station Log

The Curtis portable superheterodyne 8, which I had an opportunity of viewing on Stand 159, is sold complete with self-contained loud-speaker, aerial, valves and high and low-tension batteries. This is the product of Messrs. Peter Curtis, Ltd., and with each instrument sold a log is supplied giving the tuning condenser settings for all principal European broadcasting stations. A master switch is provided to cut off or switch on the entire current supply.

### The Neutron Exhibit

Employing a modified Silver-Marshall circuit, the Neutron portable model, which can be supplied as a six- or seven-valve receiver, is very compact. The receiver is contained in a carrying cabinet 5½ in. x 15 in. x 13¼ in., and the total weight, which includes an 81-volt H.T. battery, an unspillable accumulator, and also a loud-speaker, is given as only 23½ lbs. The loud-speaker, a Brown, has a specially designed wooden horn, the opening to which is situated at one side of the cabinet. A tapped frame aerial, which can be used on high or low wavelengths, is fixed inside the door. Access to the inside of the receiver for the purpose of adjusting the loud-speaker, etc., is effected at the back of the cabinet, which is in reality a large door.

had just been placed on the market. The complete equipment, comprising a seven-valve set, loud-speaker, H.T. and L.T. batteries, and frame aerial, is housed in one cabinet, quite a handsome looking affair measuring 21 in. x 15 in. x 9¼ in. Two wavelength ranges are obtainable with this instrument, the first 230-645 metres and the second 725-2,800 metres. A switch is employed for changing the range of wavelength, and when this is in the central position it breaks the battery circuits. The panel layout of the present instrument is very symmetrical, and strength of signals can be regulated by means of a volume control.

### The M.P.A. "Self-contained Four"

The only model I saw in the show with an expanding frame aerial was that exhibited by Messrs. M.P.A. and



The "Rolls" portable, a handsome three-valve model exhibited by Messrs. Detex Distributors. The frame aerial and loud-speaker are built into the lid.

known as the "Self-contained Four." The novel manner in which the frame expands is claimed to be a special feature of this portable receiver. The loud-speaker built upon the cone principle and employing a "Brown" base, occupies the lower half of the cabinet. Possessing a very simple layout, the panel is situated above the large diaphragm. Only 26 lbs. is the all-in weight of the M.P.A.

model. For covering, dark blue or red morocco leatherette has been used to suit individual requirements.

### The "Radiofour"

The "Celestion Radiofour" exhibited on the stand of the Celestion Radio Co. has some points worthy of note. It is a four-valve receiver which employs no L.F. transformers or chokes and no reaction is introduced. Daventry or the local station can be

### A Handsome Model

An inquiry at the General Electric Co.'s stand elicited the information that a new portable supersonic set

(Continued on page 253.)



## BURNDEPT TYPE 750 LOUD SPEAKERS.

FROM NOTES BY FRANK PHILLIPS, M.I.E.E., CHIEF ENGINEER.

SOME months ago I made up my mind that the so-called "high resistance," (2,000 ohm) Loud Speakers were no longer suitable for modern valve sets, because all such sets use a low impedance dull-emitter power valve for the last stage, and the 2,000 ohm Loud Speaker was designed for the obsolete bright "R" valve . . . it stands to reason that what was right for one cannot be right for the other. Accordingly, I decided that all 1926-27 models of Burndept Loud Speakers should be of 750 ohms resistance, and I want to explain why they give better results than those of higher resistance. (The detailed explanation is contained in Mr. Phillips' report sent free on request.)

. . . I desire to give you my assurance that with any receiving set using a modern power valve in the last stage, Type 750 Loud Speakers will give better, purer and louder reproduction than is obtainable from 2,000 ohm Loud Speakers, and further, Type 750 can be substituted for 2,000 ohm without any change in wiring, as both go straight in the plate circuit of the last valve, no transformer being required.

Send for a complete copy of Mr. Phillips' notes and for full particulars of Burndept "Ethovox" and "Etho-Cone" Loud Speakers.



No. 963.  
"ETHOVOX"  
(Type 750) with  
Metal Horn; for  
use direct in the  
plate circuit.

PRICE  
£4 10 0



No. 966.  
"ETHOVOX"  
(Type 750) with  
Mahogany Horn;  
for use direct in  
the plate circuit.

PRICE  
£5 5 0

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AGENTS AND BRANCHES EVERYWHERE

RH

## Second and third prizes in American Amateur competition won by users of Copex Copper Coil Screens and Copex "O-C" Coils



In the recent American Amateur Competition the 3rd Prize was awarded to a set using COPEX "O-C" COILS AND COPPER SHIELDS. This was the highest award given to any European entry. Also 2nd Prize awarded to the "Mewflex" (section for entrants under 16 years of age), using COPEX COPPER SHIELDS AND COPEX COILS.

The principal advantages of COPEX "O-C" COILS over all other screened coils are:—

1. Oscillation is rendered perfectly under control.
2. High Amplification. These factors are due to an improved and patented method of construction.

Here are the prices of COPEX COILS. COPEX COPPER AND SCREEN and 6-pin base **15/-** COPEX "O-C" Type Split Secondary Transformer, 250/550 N. **10/6**

Full details of Copex Coils and Screens appear in the Copex Folder "W.S." Send a 2d. stamp for a copy to-day.

Patentees and Sole Manufacturers:

PETO-SCOTT Co., Ltd., 77, City Road, E.C.1.

Branches at 62, High Holborn, W.C.1, Walthamstow, Plymouth and Liverpool.

**Don't Experiment—Fit Copex!**

P.S. 5943





**A MONUMENT IN THE MARCH OF PROGRESS.**

The Formo Shrouded Transformer is the universal favourite.

10/6 Made in Ratios 1-1, 1-2, 1-3, 1-4 and 1-5. 1-3 and 1-5 for First and Second Stages.

SEND FOR CATALOGUE AND DESCRIPTIVE LITERATURE OF COMPLETE FORMO RANGE.

**THE FORMO COMPANY,**  
CROWN WORKS, CRICKLEWOOD, N.W.2.  
'Phone: Hamp. 1787.  
Manchester: Mr. J. B. Leves, 23, Hartley Street, Leyenshulme. 'Phone: Heaton Moor 475

See page 258 for Formo S.L.F. Condenser.



**Frelat the best Dull Emitter costs less, lasts longer.**

There is not a better Valve made, yet it costs only 4s. 11d. Next time you are buying valves, whether for experimental station work or better entertainment from home programmes, fit Frelat and note improved results. If your Dealer cannot supply send r.O. 4s. 11d. (post free), or request delivery C.O.D. and send td. in stamps.

THE CONTINENTAL RADIO IMPORT CO., LTD.,  
8, SPITAL SQUARE, LONDON, E.1

2 volt .3 amp.  
**4/11**



Specify Type "R"

# NEXT WEEK

## GREAT "POPULARITY" COMPETITION

VALUABLE PRIZES WHICH ANY READER MAY WIN

### SPECIAL CONTENTS

Next week appears a special issue of WIRELESS, which has been announced as the "Mystery Number," and details can now be given of the great "Popularity" competition, which is a feature of the issue. A list of common types of sets and their circuits will be given, and readers will be invited to arrange these in what they consider to be their order of popularity. The correct order, as revealed by the entries, will be determined by means of special adding machines, and the winners of the first, second and third prizes will be those competitors who approach most closely to the order thus discovered.

In addition to the three fine prizes

announced last week, there will be one hundred consolation prizes, each consisting of a valve, for the next hundred competitors, so adding another attraction to this already fascinating competition.

A very special list of contents has been prepared for this issue, the contributors including Captain H. J. Round, M.C., M.I.E.E., J. H. Reyner, B.Sc. (Hons.), A.C.G.I., D.I.C., A.M.I.E.E., a certain prominent radio personality whose identity we will leave our readers to discover in due course, G. P. Kendall, B.Sc., and others well known to readers of this journal.

The complete prize-list for the competition is now as follows:—

#### FIRST PRIZE.

An "Elstree Solodyne," the wonderful one-knob five-valve set described in *Modern Wireless*.

#### SECOND PRIZE.

An "Elstreflex Two" receiver.

#### THIRD PRIZE.

A "Razorsharp" wavemeter, designed by Mr. J. H. Reyner.

Consolation Prizes: One hundred valves.

**In view of the probable great demand for next week's special number of "Wireless" readers are recommended to order early.**

**Why not place a standing order with your newsagent?**

#### CATALOGUE RECEIVED

From Messrs. Pettigrew & Merriman, Ltd., we have received a catalogue in which is described the "Newey 4-Point Condenser," which possesses the characteristic feature of lateral motion and a 360° calibration range. This catalogue can be obtained direct from Messrs. Pettigrew & Merriman (1925), Ltd., 2 and 4, Bucknall Street, New Oxford Street, London, W.1.

TABLE 1			TABLE 2			
Coil	Inductance in microhenries	Self-capacity in micro-microfarads	Coil	Parallel capacity in micro-microfarads	Wave-lengths in metres	Effective resistance in ohms.
35	61	15	35	30C	264	2.8
40	90	15	40	"	318	2.9
50	150	9	50	"	406	3.3
60	200	13	60	"	472	4.4
75	295	12	75	"	573	5.3
100	540	11	100	"	774	6.6
150	1,410	12	150	"	1,250	15.8
200	2,220	17	200	"	1,580	19.7
250	3,070	17	250	"	1,860	24.9
300	4,800	14	300	"	2,320	28.2

Results of independent H.F. tests made by the N.P.L.

## Here are the figures — judge for yourself!

The National Physical Laboratory figures fully bear out our claim that the LEWCOS Coil is the most efficient produced. In the design of radio inductances, the smaller the R/L value for any circuit, the greater is the selectivity and the signal strength. This fact has predominated over all other considerations in producing Lewcos Inductance Coils with the



result that we can publish without fear the R/L values for LEWCOS Inductance Coils as obtained from the N.P.L. measurements together with the wave length at which measurement was made. LEWCOS Coils make all the difference in reception. Ask your wireless dealer to demonstrate the Lewcos Coil on his set. Descriptive leaflet gladly sent on application.

# LEWCOS Inductance COIL

The LONDON ELECTRIC WIRE COMPANY and SMITHS, LIMITED  
 Phone: Clerkenwell 1388      Playhouse Yard, Golden Lane, London, E.C.1      Telegrams: Electric, London

## THE VOGUE OF PORTABILITY

(Continued from page 250)

received on the "Celestion" loud-speaker fixed in the lid of the leather suit case. One H.F., one detector and two low-frequency amplifiers comprise the circuit, and very faithful reproduction is claimed to be a feature. Another special point is that the closing of the lid automatically operates a switch to cut off the batteries.

### A Range of Portables

Possessing only one tuning control, the four-valve model shown by Messrs. Hart Collins comprises one H.F., one detector and two transformer-coupled low-frequency valves. It is an all-in portable instrument of handsome appearance, and reproduction is effected by an Amplion loud-speaker base and a specially designed horn. From 300-500 and 900-2,000 metres are the wavelength ranges covered by this set, which is claimed to receive main B.B.C. stations on the loud-speaker up to 30 miles and 5XX up to 150 miles. Although a frame is included, an outside aerial and earth can be used if desired.

### In the Gallery

The gallery contained exhibits of still more portable sets, and my next visit was to the stall of the Cantophone Wireless Co., where I found exhibited a very neat all-in three-valve set. One of the main features of this receiver is the special loud-speaker diaphragm, which is the subject of a patent. The only controls to operate the set are three small knobs on the top of the case.

### The Rees-Mace Range

Whilst in the gallery I also called at the stall of the Rees-Mace Manufacturing Co., Ltd., to see still another range of portables. Here the array included a four-valve receiver of interesting design, having for the circuit a tuned-anode H.F. valve, detector and two transformer-coupled L.F. valves. The size of the instrument is 14 in. x 14 in. x 7 in., and it weighs 30 lbs. High or low wavelengths, three or four valves, on or off position, are all carried out by switches, and it is quite easy to replace the frame included by an outside aerial.

### Down Below Again

There were still many stands to be visited on the ground floor; for instance, on the Rotax stand a very neat and entirely self-contained three-valve set was to be seen. Possessing all the useful features of a portable, this model also includes a horn of special design which is composed of impregnated cloth. It is known by the name of the Rotola portable, and is operative upon both short and long

(Continued on page 256.)



## DRY BATTERIES ARE SAFER

THINK of the perfect ease with which dry batteries are handled — and especially COLUMBIA. They are safe, clean and convenient. They can be tucked away in a cabinet and no care need be given to acid and glass casings. COLUMBIA give better, longer and more economic service, and dispense with the trouble and expense of frequent accumulator renewals. Use dry batteries for every radio need and always COLUMBIA.

The right battery in the right place naturally means a great deal to your reception. Therefore "How to get the most out of your radio batteries" is a little book which will be most useful to you. It is packed full of really practical and interesting information. These booklets are sent free on request.



Send for "How to get the most out of your radio batteries" and "Choosing and using the right radio batteries." It is astonishing what will result in marked economy in operation and improved quality of reception when you have a little definite knowledge as to the correct use of your radio batteries.

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Ask your Dealer for COLUMBIA High Tension Battery, No. 4780, 60 volts, a special size with large radio cells. Or COLUMBIA High Tension Battery, No. 4770, 45 volts (extra heavy duty) for long service and economy. COLUMBIA "A" Dry Cell Batteries for Dull Emitter Valves will meet heavy current demands and give much longer service than other batteries. All COLUMBIA Batteries are fitted with spring clip terminals to ensure quick and secure connections.

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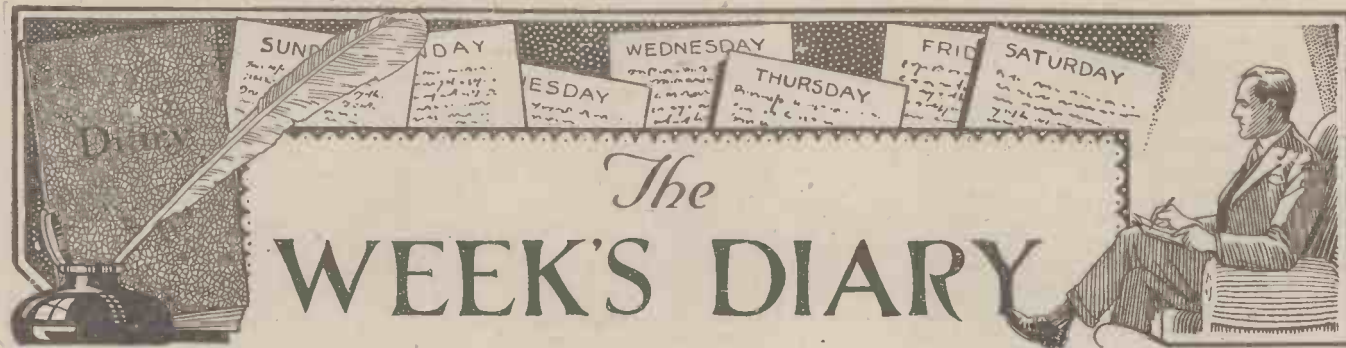
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# The WEEK'S DIARY

WHEN first I heard that the new European wavelengths were being arranged on a frequency basis, thus assuring that stations are separated by the narrowest possible margin, I wondered what steps were going to be taken to ensure that none of the stations "slipped" off its correct wavelength. Now I hear definitely that some of the stations, at least, will use "luminous frequency indicators." I do not know whether these will be of the same design as those recently used in America, but the latter consisted of quartz crystal resonators used in conjunction with Neon tubes. Three or four of these were placed upon a little stand, arranged so that their wavelengths were separated by a quarter of a metre or so. When the station is operating on its correct wavelength a certain tube should be glowing. If, however, it moves up or down, one of the others will glow. Thus a station will have a visual indicator of its wavelength, as simple in operation as those floats that indicate the S.G. of your accumulator acid.

\* \* \*

MY impressions of the Exhibition were, on the whole, very favourable, but I could not help noticing the usual lack of qualified demonstrators. It has always been the case since the first Exhibition of the kind, and is very discouraging to those visitors who have a fairly advanced knowledge of the subject. One salesman I approached during the recent show had apparently not the slightest idea of the advantages of the S.L.F. condenser; he had not much of a notion as to the difference between this and the S.L.C. type! The only exceptions seemed to be certain of the larger firms, where one could, on occasion, obtain really detailed and interesting information. When are our shows going to improve in this direction?

\* \* \*

I AM wondering what future developments we may expect to follow on the heels of the B.B.C.'s taking over of the Albert Hall for

their first great series of "International Concerts." With the growth of broadcast entertainment there has, of course, been an increasing tendency to remove the actual performance from



The microphone and part of the studio of station WOC, Davenport, Iowa. The former is mounted on a stand made of rustic wood to obtain an artistic effect.

the studio and to hold it in some much larger place possessing acoustic properties more suitable for the broadcasting of a large orchestra or choir. The absence of echo in a studio, though very favourable for solos, is not always pleasing when concerted items are broadcast.

The B.B.C. cannot, however, be always hiring the Chenil Galleries, much less the Albert Hall, so that I am very much inclined to think that there will, before long, be a large hall specially devoted to broadcast works, to which the public will probably be admitted. Optimists prophesy that a huge "radio theatre" will exist before long, large enough to shelter the entire staff and transmitting plant, with all the necessary apparatus for the arrangement of special broadcast plays, and which, at the same time, will also be adaptable for the performance of operas and musical plays of the ordinary description.

\* \* \*

I THOUGHT the recent broadcast of Gilbert and Sullivan was particularly successful. While the major part of the credit goes, of course, to the B.B.C., one must always realise that the fact that one has seen a play like "The Mikado" several times always makes for greater appreciation of the broadcast performance. Moral: More and still more of it!

\* \* \*



The scene at the opening of the Belfast Wireless Exhibition. The Lord Mayor, who performed the opening ceremony, is in the centre of the front row.

WHY, I wonder, is it such a favourite claim for certain makes of loud-speakers that all harmonics are eliminated, thereby enabling the true purity of tone to be heard? Do the manufacturers not realise that it is solely the harmonics and overtones that are responsible for the fact that we can distinguish the tone of a violin from, say, an oboe? Without them all instruments would sound the same. Perhaps the loud-speakers in question make a piano sound like a flute! Certainly that could be called "purity of tone," but it would hardly be natural reproduction!

WAVE-TRAP.

# THE NEW LOEWE VALVE

## INTERESTING TESTS AT ELSTREE THREE VALVES IN ONE

Readers will remember that a recent issue of WIRELESS contained a description of a new German valve, and on the evening of the 20th of September, at the Radio Press Laboratories, in the presence of Mr. John Scott-Taggart and members of the staff, the inventor, Dr. Loewe, demonstrated the capabilities of a receiver employing two of these new valves.

Lack of space in this issue as we close for press will not allow of a detailed description of all the apparatus used in the tests, but a few words regarding the receiver prior to describing the results obtained should prove of interest.

### A Simple Receiver

Built on the upright panel system, the receiver has a strong superficial resemblance to those of British manufacture. On the panel are three main dials and one small knob and one or two switches. Lifting up the lid at the top of the receiver revealed what

appeared to be an amazing thing, for apart from the valves and their holders there was nothing else to be seen inside with the exception of three variable condensers and one or two connections. The components completing the receiver were a two-way coil holder on each side of the cabinet. A glance at the circuit revealed that the first valve (which was really two valves resistance-coupled in one bulb) amplified at H.F. by means of the well-known T.A.T. system. The second valve (in reality three valves in one vacuum) consisted of the detector and two resistance-coupled note magnifiers, the great feature being, of course, that all the auxiliary apparatus, namely, resistances and condensers, were contained inside the valve.

### Some Results

And now for the results obtained. Using one of the valves only (the detector and two resistance-coupled amplifiers), London was received at

Elstree at full loud-speaker strength, the quality of reproduction being excellent. It is interesting to note that no reaction was used in the loud-speaker reception of 2LO.

### Using Two Valves

The other valve was now switched into circuit (the two H.F. amplifiers), and in the course of the tests ten stations, including main British and Continental, were tuned-in on the loud-speaker.

There can be little doubt that the receiver was very sensitive, although there is room for improvement in the matter of selectivity. Next week's issue will contain further details of these interesting tests, with photographs of the receiver and the circuit.

### NEW CALL-SIGNS ALLOTTED

G-5HL: H. B. Elliott, 11, Kensington Gardens, Brighton (for Brighton Electric Supply Co.).

G-5RD: A. R. Gardner, "Ashleigh," Abbots Road, Abbots Langley, Watford (ex 2BAV).

G-6AP: A. C. Porter, 1a, Manor Road, Brockley, S.E.4 (ex 2BOC).

G-6DG: S. E. Dowding, 6, Champion Road, Upminster, Essex.

G-6LM: R. A. Hiscocks, "Sylvandale," Malmesbury Road, Chippenham, Wilts.

G-6YI: E. Whaley, 50, Clementson Road, Sheffield.

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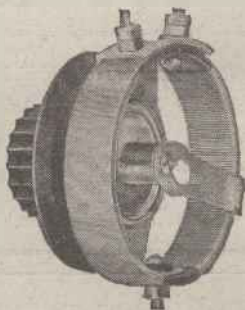
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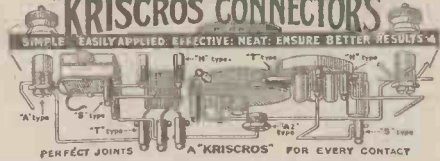
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**THE VOGUE OF PORTABILITY**  
 (Continued from page 253)

wavelengths. As is the case with most other models, the frame is incorporated in the lid and provision is made for the use of external aerial and earth.

**Superheterodyne Popularity**  
 There can be little doubt that superheterodyne portables are in the majority, and on the stand of the Radi-arc Electrical Co., Ltd., I came across another one, the "Liberty" seven-valve model. The standard set produced by this company is complete, with the exception of the loud-speaker, but if desired one can be included for an extra charge. To quote the makers' claims for this instrument, "It will receive all main British and Continental stations between 250 and 3,000 metres."

**For Motorists**  
 Designed chiefly for motorists, the next model that I inspected, also a superheterodyne, was exhibited on the stand of the Peto-Scott Co., Ltd. Contained in a strong leather case, it can be had as a seven- or eight-valve model. A filament voltmeter, which by simple switching can be used for testing the voltage across each valve, is mounted on the panel of the finished receiver.

**TRIUMPH**  
**CUSHION ANTI-MICROPHONIC VALVE-HOLDER TEST**  
  
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**NO METAL SPRINGS. VIBRATIONS QUICKLY DAMPED**  
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**WIRELESS.**— Capable, trustworthy men with spare time who wish to substantially increase income required where we are not fully represented. Applicants must have practical knowledge of installation of Set and Aerial, be a householder or live with parents, and be able to give references; state age and experience. Address: Dept. 38, GENERAL RADIO COMPANY, LIMITED, Radio House, Regent Street, London, W.1.

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**"BULLPHONE NIGHTINGALE" LOUD SPEAKER**

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**GREAT VOLUME**

**POST** your deposit of 5/- now and get by return the famous "Bullphone Nightingale" Loud Speaker. Individually tested and guaranteed to be superior to any other Loud Speaker regardless of price, for finish, purity and strength of tone and value. Cash price 60/-, post free United Kingdom.

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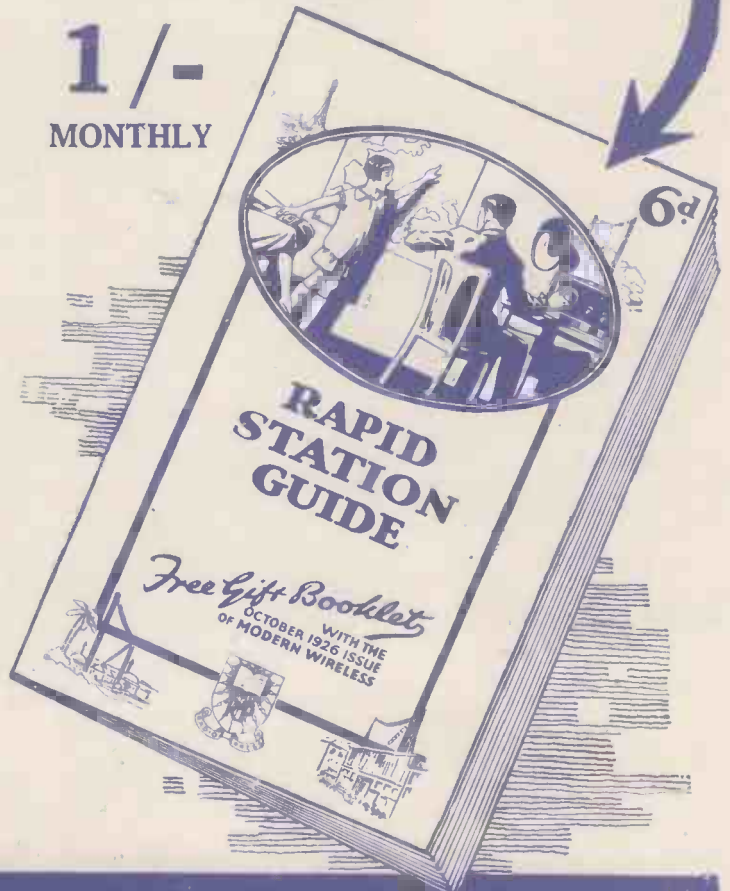
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J. H. REYNER, B.Sc. (Hons.), A.C.G.I., D.I.C.,  
A.M.I.E.E.

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MONTHLY



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By G. P. KENDALL, B.Sc.

**MODERN DESIGN IN SIMPLE SETS**

By J. H. REYNER, B.Sc. (Hons.), A.C.G.I.,  
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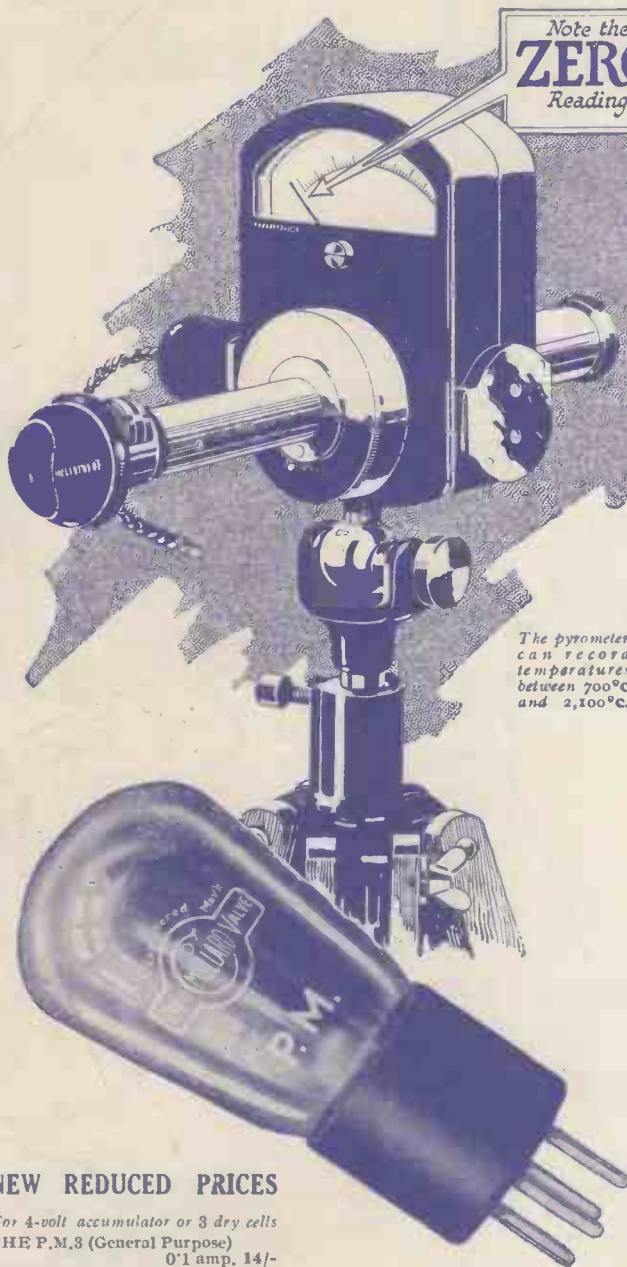
By CAPT. H. J. ROUND, M.I.E.E.

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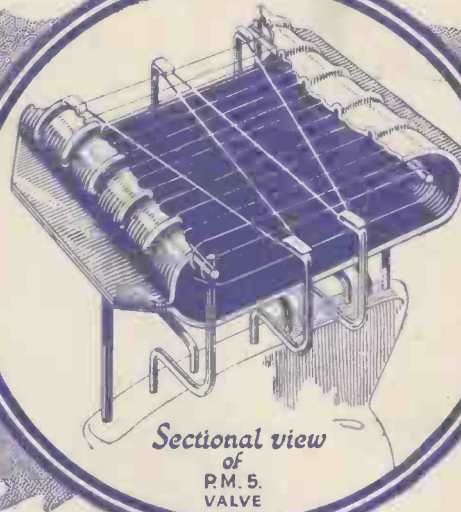
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