IN THIS ISSUE:
HANDS OFF THE B.B.C.!
SPECIAL ARTICLE
WILL REFLEX CIRCUITS COME BACK? By JOHN SCOTT-TAGGART
WIN AN EIGHT-VALVE SUPER-HETERODYNE!
Easy Competition Within

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

Complete satisfaction from a radio receiver depends upon the operator's knowledge of its fundamentals. The R.P. Books listed here are expressly written for the man who appreciates the convenience of home study.

### RADIO PRESS BOOKS

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### CONSTRUCTION

The building of a Radio receiver becomes a most simple job when working from instructions contained in an R.P. Envelope. Every step is explained fully. You cannot go wrong!

### RADIO PRESS ENVELOPES

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**SIMPLEX WIRING CHARTS**

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**RADIO PRESS PANEL CARDS**

| 1 How to Make the W1 Receiver | 1/2 |

**RADIO PRESS PANEL TRANSFERS**

Large Packet of 80 different Labels 6d.
Made in six types, three general purpose and three power amplifying.

**General Purpose**
- R. 4 volts, 0.7 amps. 8/-
- B3. 1.8 0.35 14/-
- B5. 2.8 0.06 16/6

**Power Amplifying**
- B4. 6 volts, 0.25 amps. 22/6
- B6. 2.8 0.12 22/6
- B7. 6 0.06 24/6

Have you entered for the Dubilicon Competition yet?

If not, write to us now for full particulars.

**Cash Prize £200**
You need these IGRANIC RADIO DEVICES NOW

Perhaps you have already felt the need for making certain changes in your receiver. Those distant stations which came in easily during the winter months cannot now be found. It is necessary for you to ensure that the components in your receiver are of the highest efficiency, and possibly the addition of a stage of H.F. amplification will help you to maintain the good all-round reception which is now so difficult to achieve. With the coming of summer, it is more than ever necessary to guard against lightning by fitting an efficient earthing switch. Then, there is the need for a portable set so that you may gain the fullest pleasure from days in the open air combined with the joys of radio music. Igranic Radio Devices will enable you to fill the foregoing needs—and many others—with perfect satisfaction.

Here are a few of the most interesting Igranic and Igranic-Pacent components—your dealer will show you the complete range.

**IGRANIC-PACENT**

- **True Straight Line Frequency Variable Condenser**
  - Build the Igranic-Pacent True Straight Line Frequency Variable Condenser into your receiver, and you may feel confident that the energy in your aerial is being utilised to the best possible advantage, thus ensuring maximum signal strength.
  - Further, the perfect ease of tuning afforded by the even distribution of stations over your condenser dial will make reception a real pleasure.
  - Prices: .00035 mfd., 14/6; .0005 mfd., 18/6.

- **High-Frequency Transformers**
  - Fit these Transformers and be sure that your H.F. amplifier is operating at maximum efficiency. They incorporate the well-known honeycomb duolateral form of winding, and possess electrical features which are conducive to highly satisfactory results. They will enable your set to "reach out" for those distant stations which are now becoming so difficult to receive. Packed with standard 4-pin mounting and made in four sizes, covering wavelengths from 288 to 3,000 metres when tuned by .0005 mfd. condenser.
  - Prices: 8/- to 10/6.

- **XLLOS** (Extra Low Loss) COILS
  - A new Igranic Coils with real low-loss feature.
  - Equally suitable for indoor or outdoor use, because the windings are protected by attractive bakelite covers, which protect them from the harmful effects of dust and damp.
  - Low-capacity mounting, with variable spacing of pin and socket, six sizes—290 to 7,000 metres aerial tuning.
  - Prices: 5/- to 7/-.

- **IGRANIC COMBINED Earthing Switch, Lightning Arrester and Lead-in Tube**
  - A highly efficient "lead-in" device, affording perfect protection against lightning and static discharges, and simplifying connections. The ebony lead-in tube is 20 in. long, and all metal parts are heavily nickel plated.
  - Price: 6/-.

**IGRANIC-PACENT**

- **Jacks and Plugs**
  - A few yards of flex and the appropriate Igranic-Pacent Jacks and Plugs will enable you to place the loud speaker, or any number of 'phones wherever required in the house or garden. There are ten types of Jacks and various Plugs and Adapters with which you can arrange any combination of connections according to the needs of the moment. They are all robust in construction and reliable in action, and are fully guaranteed.
  - Prices: 1/6 to 6/6.

- **Porcelain Rheostats**
  - The Igranic-Pacent Rheostat affords extremely satisfactory filament control for any type of valve. Its robust construction and dependability enable it to stand up to hard wear, while its small size renders it very suitable for use in portable sets. Resistances of 6, 10, 20, 30 and 50 ohms are available at the reasonable price of 2/- each.
  - Write for List S17 of Pacent Radio Essentials.

All reputable dealers stock them.
THIS WEEK'S NOTES AND NEWS

THE terrible power of wireless is being better illustrated every day: at Old Street Police Court recently a woman applied for a summons against several of her neighbours, who were "driving her mad with wireless waves." Does this mean that they were all working loudspeakers on a set with no grid bias? I should think that must be the most effective way of "driving anyone mad with wireless waves"!

This Week's Notes and News

The Exhibition

"BUY British Radio Goods" will be the keynote of the "All-In" Radio Exhibition at Olympia in September. Plans for this Exhibition are going ahead well, and we may look forward to the "best show ever."

From Brighton

On July 17 the B.B.C. is broadcasting the concert from The Dome, Brighton, on the occasion of the Brighton Competitive Musical Festival. We shall hear selections by the winners in each class, and it promises to be an enjoyable evening, complete with "that seaside atmosphere."

A Grumble

I HEAR that the B.B.C. have had quite a number of resentful letters asking why they did not broadcast actual news of the Derby. Some listeners even expected to receive starting prices, a description of the progress of the race, and the results. The arrangement with the Press, of course, precludes the broadcasting of any news before 7 p.m. I must confess that there are times when I would give almost anything for a "lucky dip" in the B.B.C. postbag.

Some Coming Events

On June 24 listeners will hear the speech by Mrs. Hubert Barclay, Central President of the Mothers' Union, from the Albert Hall; on June 26 a new edition of "Winners" will be given, and on June 28 Scala, the Italian banjoist, will give the performance that was previously arranged for July 18.

The Latest

I HEAR that someone has named a motor-boat "I.O." This opens a really excellent field for wags; I think I will call my small dog "Radio-Iberica!"

Tribulations of the B.B.C.

THE B.B.C. have been very badly worried lately by correspondents of the type that send in snatches of some programme or other with the query "What station was it?" as often as not without giving the time or date of their reception. As many of these querists as possible are answered in the official organ of the B.B.C., but they can rarely answer them all satisfactorily.

Incidentally, a small child recently heard his first organ recital from the newly-installed set and loud-speaker and at once asked, "Is that the official organ of the B.B.C.?"

From the Abbey

I THINK the new feature, shortly to be inaugurated, of broadcasting evening song from Westminster Abbey every Thursday afternoon, will be distinctly popular among hospital patients and invalids unable to get to church. The Abbey authorities are being very helpful in their cooperation with the B.B.C. with a view to investigating the acoustics of the building. You may rest assured that the transmissions will be of first-rate quality.

A German Innovation

A NOOTHER new use for broadcasting has cropped up at Frankfurt-on-Main, where the Labour Bureau is making arrangements to broadcast reports for the unemployed, stating areas in which they are most likely to find work from day to day.

(Continued on page 148.)
THE "breakdown gang" seem to have been kept fairly busy lately, judging by the number of gaps in 2L0’s programmes. The general public does not yet realise the enormous amount of complicated apparatus used in connection with a broadcasting station, or they would not be so quick to criticise the B.B.C. when a trivial break occurs. Think of the poor engineers!

In Cologne Cathedral

A CONTEMPORARY states that the day is fast approaching when all listeners will be able to choose a station that is broadcasting a programme that suits their taste. When this happens, I wonder how many will be discovered listening to the station that is giving a speech on some such controversial subject as "Do Winkles Like Flag-Days?" It seems a pity that the B.B.C. will not be able to tell how many are listening in to each station.

High Power Again

THE rumour that the B.B.C. are building another station at Daventry, to work on the ordinary broadcast band of wavelength, is, I am told, not a “scare,” but quite correct. It will work between 300 and 500 metres, with powers between 10 and 20 kilowatts. The position of Daventry was chosen chiefly because the B.B.C. already have land, water and power there, and a good deal of experimenting will be carried out before the new station is put into regular operation.

Why Not?

A CHEERY writer wants to know why the B.B.C. has not yet broadcast the noise of the weekly wash. A far more practical suggestion (not mine) is that they should broadcast heat waves and dry the clothes on Monday mornings.

Those Breakdowns

THERE will soon be yet another addition to the list of European transmitting stations, for building operations for the erection of a large broadcasting station have just been commenced in the Free City of Danzig. The station, it is hoped, will be opened in August.
HANDS OFF THE B.B.C.!

By PERCY W. HARRIS, M.I.R.E., Joint Editor

Do you realise what may happen if broadcasting comes under the control of a body responsible only to the Government? Mr. Harris sounds a grave note of warning in this striking article.

One of the most widely appreciated features of the B.B.C. programmes: broadcasts by famous military bands.

English, a good fat salary. "The commission must be self-supporting," says the report, "and can expect no grant from the public funds."

The Result

Now let us see how far we have gone. First of all we are to have a broadcasting organisation run by commissioners appointed by the Crown. Observant persons have noted that when there are any such positions which the Government have the power to fill, all kinds of political busybodies and awkward persons to whom the Government seems to have certain obligations are forthwith thrust into the position, and when under the suggested scheme there are six or seven posts with "adequate" salaries and which, if the Committee's report is adopted, would last for ever, it will be a great stretch of imagination to see what will happen! As it is there are quite enough people anxious to tell us how to improve ourselves, when they have to give their advice without payment.

What Might Happen

The more I think of these Government-appointed commissioners sitting round a table planning our broadcast programmes the more depressed I become. Can you imagine a joke being cracked by this solemn assembly? You may be sure there will be no young people on it — no Government would ever dream of appointing anybody under 50. By this age, if you are pushing enough, you will at last have succeeded in persuading the Government that you have "rendered valuable services" in some particular field. And of course, having "rendered valuable services," you must be rewarded somehow, and a seat on the broadcasting commission will be a most charming and satisfying way of getting rid of you.

Watch Your Pocket!

But a Government-appointed commission is not the only sinister threat contained in the report; in fact, it may be said to fade into insignificance before the prospect of making money out of you. "The present licence fee is 10s., which we do not consider excessive," says the report. "It is, of course, essential that the Postmaster-General should be completely indemnified against the cost of collecting these fees, and against all other expenditures incurred by him in relation to the broadcasting service." Quite! If the Postmaster-General likes to appoint fifty special civil servants to keep their eye on broadcasting, he can have the money to do it. That will be (Continued on page 150.)
HANDS OFF THE B.B.C. ! (continued from page 149)

"one of the other expenditures" And if half-a-dozen high officials like to tour the United States to see what America is doing, that will also be one of "the other expenditures." There are heaps of ways in which the Postmaster-General could use your licence money to cover expenses "incurred by him in relation to the broadcasting service."

A "Surplus"

And "subject thereto," goes on the report, "it will be the duty of the Postmaster-General to pay the commissioners from the licence fees an income thoroughly adequate to enable them to ensure the full and efficient maintenance and development of the service." That sounds very nice, but listen to this paragraph: "On these conditions, and when the adequate service has been assured, but not until then, it is expedient that the surplus money should be used by the State." Did you notice anything there? Of course you did! If you are a motorist and have occasionally thumped over some very vile roads you have perhaps wondered why some of the surplus money in the road fund has not been used to repair them.

Not So!

In your childish innocence you may have thought that the purpose of the road fund was making roads, particularly as we had been told specifically that it was for that purpose alone. When the Government thinks that the broadcasting commission has an income thoroughly adequate for a full and efficient service they will take the rest. Cannot you imagine some future Chancellor of the Exchequer wrestling with his annual financial problems? "Let me see now," he says to himself, "I must not take any money from the broadcasting funds unless they have a really efficient service! I really think they have! Only last night I heard a most interesting reading from 'The Vicar of Wakefield,' and since the Church Brigade have kindly lent their band we have been able to dispense with several quite expensive orchestras. Yes, I think they could spare a million or so. I need it more than they do!"

Remember!

Notice, too, that it is the Postmaster-General under whom broadcasting in the future will be placed if the Broadcasting Committee's report is adopted. Is the public's memory so short that they have forgotten the innumerable obstacles placed by this official in the way of the progress of broadcasting? Do they remember the pitiful pleadings of the experimenters to be allowed only a quarter of an hour a week of telephony from Writtle? Have they forgotten that even this small concession was time and again refused and the only regular telephony upon which the experimenter could rely came from Holland, and that only twice a week? Have they forgotten that a licence to receive from the shackles of democracy are recommended to lose no time in writing to their Member of Parliament and letting him know their views.

How many readers remember the chimes which used to be sounded at 2LO in the early days? "Uncle Arthur" is seen before the simple microphone employed at that time.

The Post Office regards the erection of high-power stations as its own special prerogative, and does not favour their use for broadcasting.

Write to Your M.P.!

There are plenty of other reasons why the lover of broadcasting should view with the greatest apprehension any move to nationalise broadcasting, and readers who want to feel that this vital new public service shall be free even this had to be forced out of the Government?

Only pressure of public opinion has made them grant the existing facilities for broadcasting, and it is no secret that the scheme for new high-power stations, by which the listener may be provided with an escape from the programme dilemma, of having to listen to a programme he does not particularly enjoy as there is no alternative, a scheme which is receiving widespread reports throughout the country, is regarded very unfavourably by the Post Office at the present time.

AN INTERESTING QUESTION

My two-valve receiver gave me adequate loudspeaker strength of excellent quality when I lived within eight miles of the local station, but now that I am 20 miles away, although I obtain the same volume, quality is not so good. My batteries show their correct voltage on lead, and I should think the valves are correct also, since the quality of certain distant stations, on telephones, is normal.

The symptoms mentioned are indicative of too much reaction being required to give you loud-speaker strength from the local station, now you have shifted out to 20 miles, and the first steps to be taken should be to increase the size of your aerial to the maximum possible, whilst trying alternative earth connections. If improved quality is not obtained by using less reaction a further note-magnifying valve should be added, and here I would suggest that a resistance-coupled stage be employed. For this purpose a suitable design is given in the June, 1925, issue of Modern Wireless.
THOSE who wish to possess a receiver upon which they will be able to obtain really loud signals from the local station, even on a poor aerial, upon the headphones, and also to be capable of receiving other stations with a reasonably efficient aerial, could not do better than construct a simple single-valver such as the one about to be described in this article. Such an instrument may always be relied upon to give good results continuously, which, unfortunately, is not always the case with crystal receivers. In addition to this, the upkeep cost is extremely low: if a .06 valve is used, a 45- or even a 36-volt high-tension battery will give good and efficient service, and will last for many months if of good make. For the low-tension supply two small accumulator cells are suggested as being remarkably economical. Suitable cells, if properly used, give excellent service over a considerable period without recharging. The receiver itself is particularly compact and neat, and gives quite a useful degree of selectivity. The material which was actually used for construction is given, together with the names of the manufacturers, for the benefit of those who wish to actually duplicate the original. This course is advised by the writer, as any deviation may lead to unforeseen difficulties, the components mentioned having been chosen in each case for individual reasons.

Material

One variable condenser .0005 square-law low loss (Utility).
One filament resistance, 30 ohms (C.A.W.).
One variable grid leak with condenser .0003 (Bretwood).
One open circuit plug and jack (Igranic).
One filament "On-off" switch.
One "Clearer-Tone" valve holder (Benjamin).
One three-way coil-holder (short extension handles) (Lotus).
One fixed condenser .002 (Dubilier).

Six W.O. terminals.
Two small pillar terminals.
Six 3/8-in. countersunk wood screws.
Glazite for wiring (L.E.W. Co.).
One ebonite panel measuring 9 by 5 by 4 (Camco).
Piece of wood measuring 3 by 2 by 3 (Camco).
Two small angle brackets.
Some insulated flex (L.E.W. Co.).
Cabinet (Camco).

Construction

The ebonite panel should first be drilled in accordance with the details and dimensions given in Fig. 4, which represents the front of the panel. All the components are mounted upon the panel with the exception of the valve holder and the three-way coil holder. The back of the panel diagram shows clearly the wiring and also the best way in which to arrange the components, and this diagram should therefore be carefully followed when this work is being done. The valve holder is mounted upon a piece of wood of the dimensions specified in a drawing herewith. This (Continued on page 152.)

The three-coil holder is fitted to the side of the cabinet, and the necessary flex leads are brought through the woodwork.
CONSISTENT RESULTS FROM THE LOCAL STATION—(Continued from page 151)

Wood base is in turn secured to the back of the panel by means of two 1 in. countersunk screws. The three-way coil holder is mounted on the left-hand side of the cabinet as shown in the photograph.

Wiring

A few remarks relating to the wiring may be helpful to the constructor. Firstly, keep all the wires well away from the moving vanes of the variable condenser and the valve. In addition to this, keep the wires as well spaced as possible. If the components are placed as shown, the grid connection to the valve will automatically be an extremely short one.

The four connections which go to the three-way coil holder are made with insulated flex. Each of these leads passes through the side of the cabinet to the external points of connection upon the coil holder itself. It will be noticed that a special attachment is made to each of the connections of one of the moving coil sockets. These attachments take the form in each case of a brass bracket, each of which is provided with a terminal. Details are given in a diagram showing how the coil holder is equipped in this manner.

Theoretical Circuit

It will be seen from the circuit diagram that a choice of tuning arrangements is possible. For instance, direct coupling may be employed by attaching the aerial to terminal A, upon the panel and the earth to terminal E, also upon the panel. Inductive coupling is obtained by connecting the aerial to one of the special attachments upon the moving coil socket L, and the earth to the other attachment. Auto-coupling may be employed in each case by merely attaching the aerial to one of the terminal taps upon this style of plug-in coil. Coils of this nature are supplied by Lissen, Ltd.

Coupling Arrangements

Three optional circuit arrangements are shown in Fig. 3. The connections necessary will easily be followed from this diagram, the terminals for aerial and earth connections being lettered to correspond to those given in the other diagrams. Arrangement (a) shows inductive coupling with reaction, using ordinary plug-in coils. Arrangement (b) shows auto-coupling using a centre-tapped coil in the fixed coil socket L. Arrangement (c) shows again auto-coupling using an X coil in the fixed coil holder L. All these arrangements should prove fairly selective. Ordinary direct coupling also may be employed. Reaction is employed in each example given, but this may be eliminated by inserting a shorting link in the moving coil socket L. Other arrangements will occur to the experimenter.

The fixed condenser seen on the extreme left is held in position by the stiff wiring.

Operation

The set should prove quite easy to operate. (Continued on page 174.)
Another great contribution to the Science of Radio by Cossor

Red Top:
For H.F. use.

Plain Top:
For Detector or L.F. use.

15/6
For 2-volt Accumulators.

The new Cossor Point One
—the '1 amp. Valve which utilizes Co-axial Mounting

It was a flash of genius that enabled Simpson eighty years ago to discover chloroform. Genius, too, helped James Watt to read the lesson of the steam engine in the escaping steam from his mother's kettle. Assuredly it was genius that caused Montgolfier to visualise in the floating remnants of a burning paper bag the world's first balloon—the prelude to man's conquest of the air.

And once again a touch of genius has been responsible for an entirely new method of valve construction that bids fair to produce results which, but a year ago, would have been considered impossible.

The new series of Cossor valves employ—for the first time in the history of Radio—a method which, accurately and for all time, ensures perfect alignment for the filament, grid and anode. At the same time it provides a shock-proof support for the filament.

Thus throughout the whole life of the valve its working characteristics cannot alter. Age cannot cause filament sag nor can hard wear disturb the exact relative positions of the filament, grid or the anode.

But this is not all. The improved Cossor filament consumes but a moiety of the current required by other Dull Emitters—its consumption at 12 volts being barely one-tenth of an ampere. A seven-tubes Super Heterodyne, for example, using these new Cossor Point One Valves, would not consume as much current as a little one-valve set using a single bright emitter.

As can be imagined, the filament used in this new Cossor is no ordinary filament. Owing to its exceptional length and its scientific method of preparation a great latitude in working voltages is permitted. Satisfactory results are obtainable at a voltage as low as 12, so that the valve can, if required, be used with dry cells. Further, its operating temperature is lower than that of any other valve on the market. And everyone knows that low temperature means long life.

The Cossor system of Co-axial Mounting has now finally abolished the last bug-bear of dull emitter valves—microphonic noises. Individual movement of either the grid or the anode in the Cossor Point One is utterly impossible. The porcelain insulator holds them both in a vice-like grip which defies the hardest shock.

With its handsome pipeless glass bulb, its re-designed low loss moulded base, and its new positive contact pins the introduction of these new valves represents one of the most important events in the progress of the Valve. See your Dealer about them to-day—we can promises you new delights in radio reception. A greater economy, improved sensitivity, a wonderful richness of tone, with a length of life and uniformity of performance which will positively astonish you.

Cossor Valves

—The new Dull Emitters with the long-life '1 amp. filament.
When the recent Strike muzzled the Press,
We got the news nevertheless.
Great credit is due
To the B.B.C. who
No. 7. — BRAVO !

THE B.B.C.

NOTE.—It is advisable to follow the instructions given below an amusing picture will appear on the chart. Draw this in ink and then complete the limerick with the wittiest line you can think of and send along to “Cartoonigras,” Radio Press, Ltd., Bush House, Strand, to reach here not later than first post Tuesday, June 29. Employees of Radio Press, Ltd., are not eligible. All competitors, by entering, agree to abide by the decision of the Editor, which is final. No correspondence can be entered into regarding this Competition. Follow the directions carefully.

Send this whole page complete with your drawing in ink and your last line of the limerick, with your name and address written in ink (block letters) in the spaces provided.

Name: ____________________________
Address: __________________________
Post to: “CARTOONIGRAS,”
RADIO PRESS, LTD., Bush House,
STRAND, W.C.2.
To arrive first post Tuesday, June 29.
WILL REFLEX CIRCUITS COME BACK?

By JOHN SCOTT-TAGGART

One of the best known reflex receivers—the Three-valve Dual.

No one in this country has a wider experience or has done more to develop reflex circuits than the author of this article. Although reflex circuits have formed only a small part of his contributions to radio yet the extraordinary vogue which some of his reflex designs such as the ST100, 3-valve Dual and others have had, gives a special interest to his views in this article.

RATHER more than twelve months ago I wrote an article in Wireless Weekly entitled "Are Reflex Circuits Worth While?" This article produced the greatest astonishment in all quarters. It was assumed that having been so closely associated with the development of reflex circuits, to decry them in any way would be treachery of the worst kind! I indicated in the article that reflex circuits generally had lost their public appeal, and that people were going to go back to straight circuits. This is very largely what has happened. Although large numbers of people still seem to be building reflex sets, yet even the introduction of permanent detectors has not yet prevented a more simple forms of circuits.

Drawbacks

My own objections to such a circuit as the ST100, for example, are:

(1) It is incapable of getting long-distance stations.

(2) The selectivity is very inferior.

(3) In inexperienced hands buzzing and oscillation are possible.

(4) The crystal is often a source of nuisance.

(5) The amount of high-frequency amplification given by the dual valve is far less than that obtainable under the best conditions.

ST100 Popularity

The ST100 circuit, therefore, became popular because it gave pure and good loud-speaker signals from the local station. It is true that I have received a very large number of letters from those who have built this receiver protesting against the statement that it is a short-range receiver made in the Envelope describing it, and in the original issue of Modern Wireless, which contained the first description of the ST100 circuit.

On the question of range, selectivity and purity of reproduction of wireless receivers, however, I cannot deceive myself. I expect a very high standard, and this standard should be capable of being reached by a novice without any spell-binding adjustments of the receiver.

The "Buzzing" Trouble

In a thorough investigation which I made on reflex circuits in Modern Wireless I showed that there were seven or eight different reasons why reflex circuits "buzzed." These reasons varied from the one that the reflex transformer winding with its condenser acted very much like a grid condenser and leak, to the reason that buzzing was very commonly caused by a peculiar reaction chain in which a complicated modulated high-frequency oscillation took part.
B.B.C. Editorials

Some rather acid controversy has taken place in the public Press on the subject of those editorials which we had for three or four days after the General Strike was over. The objection taken was that they were partisan, but frankly I did not think so, and I imagine no one but the owners could have objected to them, for they only expressed, so far as they expressed any opinion at all, what everyone else in the country was thinking.

What, in my opinion, made them so excellent was that they gave the public some ideas of the questions at issue in the coal controversy, about which most people are quite in the dark. The Editor of the Little Padletten Gazette may say that the Government are a cowardly set of knaves, and should be driven from office, but the skilled staff of the B.B.C. may not impartially marshal a few facts and present them to the public. Is not that rather ridiculous?

Those Battery Plugs

There is a very simple remedy for the ill-fitting H.T. battery plug of which Mr. Kendall complained in a recent issue, which is well worth the small trouble involved. That is to cut upon solid plugs a B.A. thread and to insert the plug with a small right-hand movement, removing it with a left-hand movement. The corresponding thread cuts itself immediately upon the plugs of the battery and a contact can be made solid enough to lift the battery by. Since I adopted this tip I have never had a plug come loose or make a bad contact.

Insulation

An old electrician, like myself, thinks about insulation automatically, and about its alternative short circuits, but, even so, one may be careless, as two events in one day have taught me. I was using a makeshift spliced-end to my aerial, and was much bothered by poor strength, until I noticed that the bare splice was making contact with the stay-bar of the window it came through. On the same set I was experimenting in shielding a large home-wound coil with an earthed piece of perforated zinc, and suddenly got a big deflection on the milliammeter, that trusty sentinel which I always keep in circuit when playing tricks. I discovered that the edge of the bit of zinc was touching a bare wire, but by the mercy of providence I did not burn my valves out, and got a lesson cheap.

A Funny Set

I have tried the mystery set. It is a simple enough circuit, except that it works without a gridleak and ought not to tune to the wavelengths it does. Its great point is the cheapness of the coils and the condensers, which are simply discs opening on a threaded spindle. But it does tune with amazing precision and firmness on to its wavelength, and reception is quite loud for two valves. The sensitiveness of the controls is so great that it is rather difficult to work with, but its really interesting point is that it ought not to work at all.

**From my Armchair**

BY EARL RUSSELL

In these columns Lord Russell expresses each week his own personal views on matters of interest to "Wireless" readers.

**Simple, Accurate, and Easily Adjusted**

Don't experiment! Get a "Lotus" and be certain of better results. The vernier movement comprises three sets of enclosed precision machine cut gears and reduces the speed of the moving coil block by eight times. The moving coil moves in the same direction as the knob, which prevents confusion. It also becomes absolutely rigid in any position, holding the heaviest coil secure. No screws required to tighten it.

**A REAL WIRELESS SERVICE**

We have in stock all the Components and Cabinets for the New Marvellous ELSTREE SIX.

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Why not secure a copy of our latest Catalogue, which is practically a Guide Book to the Industry, for the cost of postage and packing, viz., 6d.

N.B.—Call and see the ELSTREE SIX at our Showrooms.

WILL DAY, LTD.,

19, Lisle St., Leicester Sq., London, W.C.2

WHERE ARE THOSE SUMMER PROGRAMMES?

By C. P. ALLINSON, A.M.I.R.E.

A body with the public responsibilities of the B.B.C. is always open to criticism from those it serves, and when such criticism is reasonable and constructive it cannot but be wholesome.

The kettle boils, tea is made, and we settle down to enjoy the afternoon's programme. In order that all the elements of novelty should give a spice of surprise to the entertainment that awaited us, no paper has been consulted as to the day's programme. It is therefore with a general expectation of pleasure that we switch into the middle of a talk that appears to deal with "What are Fossils?" or may be it was "The Origin of the English Language." It is really immaterial which it was.

No, Thanks!

Having listened to this with earnest attention for at least five seconds we felt that, keen as we all were on the subject, the contrast of bright sunlight and deep leafy green shadows hardly conduced to our devoting our minds to it with the degree of concentration required. We therefore turned the "off" position and listened expectantly.

Try Again

We therefore clicked the switch to the "on" position and listened expectantly. As the last notes of Big Ben boomed to a close and the whine of the land line vanished, we waited with hope for the announcement.

It came. "You will now have a talk on "What it Feels Like to be an Engine Driver," by one of them."

A vicious click of the switch served to express our feelings more eloquently than words.

On another trial being made we were rewarded with tea-time music from the Piccadery, which, together with the rattle of cups and saucers and the clatter of conversation, continued for an hour. A few attempts were made to dance to some of this but proved unsuccessful, the everchanging tempo making it practically impossible to keep in time with the music.

(Continued on page 158.)
WHERE ARE THOSE SUMMER PROGRAMMES?
(Continued from page 157)

Too Late!
Next came the children's hour, during which aunts and uncles dispersed before the microphone with interludes of songs and stories. Then just as it became time for us to pack up and depart the strains of the Radio Dance Band came from the loud-speaker.

When we got back I thought that I would, purely as a matter of interest, make a comparison of that afternoon's programme with that of six months ago. The results were enlightening and are here placed next to each other so that those who have not kept copies of the winter's programmes may compare them for themselves.

<table>
<thead>
<tr>
<th>Time</th>
<th>January</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.15</td>
<td>Transmission</td>
<td>Transmission to schools, Talk to schools, Talk</td>
</tr>
<tr>
<td>4.0</td>
<td>Time-signal and a talk</td>
<td>Time-signal and a talk</td>
</tr>
<tr>
<td>4.15</td>
<td>Music relayed from Radio</td>
<td>Music relayed from Restaurant</td>
</tr>
<tr>
<td>5.15</td>
<td>Children's hour</td>
<td>Children's hour</td>
</tr>
<tr>
<td>6.0</td>
<td>Dance Music</td>
<td>Dance Music</td>
</tr>
<tr>
<td>7.0</td>
<td>Time-signal and news</td>
<td>Time-signal and news</td>
</tr>
<tr>
<td>7.25</td>
<td>G—B— playing Chopin's Etudes, t'a. conc.</td>
<td></td>
</tr>
<tr>
<td>7.30</td>
<td>C— playing pianoforte sonata</td>
<td></td>
</tr>
</tbody>
</table>

This actually takes us past the afternoon's performance, as I think it is usually reckoned that the evening's programme commences at 7 p.m.

Where Is It?
Where, then, is the special summer programme that may reasonably be expected by the listener at this time of the year? Strange it is that out of over four hours' transmission only half was devoted to talk. Surely this is too little! On a fine summer afternoon what is more enjoyable than a series of lectures, talks and educational items on various subjects? Why not cut out the music entirely and give us some really inspiring broadcasts, such as "The Exponential Theorem Illustrated with Advanced Examples", or "What is Ectoplasm?" or again "Are Vitamins Catalysts?"

But joking aside, surely one would anticipate some variation of the programmes (especially as regards reducing the number of talks) to be made in the summer, more particularly as affecting the afternoon's broadcast, even if little or no alteration is made apparently producing any results. Now is surely the time to press the matter. As a matter of fact, in general character there appears to be practically no difference at all either in the afternoon or the evening performances being put out to-day as compared with those given us six months ago. Yet the average listener occupies himself or herself, as the case may be, far differently now than they did in January.

Changed Conditions
During the week those who do not play tennis or other games up to the last moment that the waning light allows, either spend their time on the road (for what is more delightful than a quiet motor run in the cool of the evening?) or else in the garden. After all, the whole population of London, or any of the large provincial cities for that matter, does not consist of flat dwellers. Experiment would doubtless prove that a certain class of music is far more suited to out-of-door reception than others, a point that does not as yet appear to have received any consideration.

Further, large numbers of sports clubs have installed wireless sets in their club houses for the entertainment of their members, one or more loud-speakers being installed as circumstances may require.

"Echo" Out-of-Doors
The subject of outdoor reception brings me to a subject that has (Continued on p. 180.)
A "Two-in-One" Crystal Set
By JOHN PUGH-PRICE

Here is a very handy little instrument which serves two useful purposes; it can be used as a crystal receiver for the local station when your accumulator is away at the charging station, and it can be used as a wavetrap in conjunction with your valve set.

If your local station seriously interferes with your reception of distant stations, or you are experimentally inclined and occasionally rebuild, or at least try suggested improvements with your set, the instrument to be described will serve a two-fold purpose. In my position, which is about ten miles southwards of 2LO, with my ordinary detector and one note magnifier receiver it is difficult to receive any station below about 400 metres. Here is a very handy little instrument which serves two useful purposes; it can be used as a crystal receiver for the local station when your accumulator is away at the charging station, and it can be used as a wavetrap in conjunction with your valve set.

Theoretical Circuit
The details of the arrangement will be grasped readily by inspection of the circuit diagram. L is a fifty-turn coil, wound with 24 gauge d.c.c. wire, on a 3-inch diameter ebonite former, and tapped at ten, fifteen, twenty, and twenty-five turns from the lower end of the winding. The whole fifty turns are tuned by the parallel condenser C of .0005, which permits of the lower broadcast wavelengths being covered when the instrument is functioning either as a wavetrap or as an auto-coupled crystal receiver. For the wavetrap arrangement the aerial is connected to the terminal marked "Aerial," and that marked "Grid" is joined to the aerial terminal of the set, which latter should be arranged for plain parallel tuning, C.A.T. or series tuning not out of operation. A both useful and efficient combination resulted.

Crystal Damping
By tapping the crystal across part of the coil, only, the damping effect which it introduces is minimized, and although only part of the available voltage across the coil is utilised an improvement, both in signal strength and selectivity, may be obtained. To place the crystal across the whole coil "B" is clipped to the lead between the fixed plates of the variable condenser and the upper end of the coil. The four ends of the wires from the tappings to the four Clix sockets are bared near the latter, giving four alternative tapping points for the crystal connection.

The General Layout
The neatness of the general arrangement adopted will be appreciated from the photographs and diagrams, an upright panel and an American enclosed type cabinet being employed.

Alteration of the turn numbers in the coil, which will be seen in the wiring diagram, the spring clip being represented by "B" here.
When wiring up, care should be taken to see that sufficient clearance is left for the moving vanes of the condenser. A wavetrap. The tuning condenser C is placed in the centre of the panel and is of a geared type, allowing of very fine adjustment, since this is necessary when the instrument is employed as a trap.

The Crystal Detector

I have mounted the crystal detector upon the ebonite strip mentioned in the list of components and have arranged the two valve legs at ¼-in, spacing for insertion into the two valve sockets, which are mounted on the panel. The actual position of the two valve legs should be determined when the valve sockets have been mounted upon the panel, and it should be ascertained that there is ample clearance to allow the Clix plug to be inserted into the coil tapping sockets. The two valve legs are joined respectively to the two side clips holding the crystal detector. Where it is desired to use some other type of crystal detector the dimensions will have to be modified accordingly.

Components

To construct the receiver exactly as shown in the diagrams and photographs, the following components are required, and makers’ names are given for the benefit of readers who wish to duplicate the instrument.

One ebonite panel 8 inches by 6 inches by ⅛ inch thick. (Peto-Scott Co., Ltd.)

One cabinet to take above panel and a 9-inch deep baseboard. This latter dimension should be given when ordering. (Carrington Manufacturing Co., Ltd.)

Construction

Fig. 2.—The operation of mounting the finished coil upon the baseboard is simple, three screws and a piece of wood being all that is required.

A quantity of 24 gauge d.c.c. wire. A ½ pound reel should be obtained.

A quantity of Glandite and rubber-covered flexible wire.

One spring clip. (Peto-Scott Co., Ltd.)

Radio Press panel transfers.

A “TWO-IN-ONE” CRYSTAL SET

(Continued from page 159)

One .0005 Colvern selector low-loss variable condenser. (Collinson Precision Screw Co., Ltd.)

One panel mounting crystal detector. (Burndenp Wireless, Ltd.)

One small piece of ebonite, 21 in. long by ⅞ in. wide and ⅓ or ⅔ in. thick.

Fig. 3.—Tappings are made at 10, 15, 20 and 25 turns from the grid, or in the case of the crystal set the earth end of the coil.

Wiring

Before fixing the panel, upon which the condenser, crystal detector, the Clix sockets, etc., have been mounted, to the baseboard, it will be seen that certain of the connections can be made. When these are completed the panel should be fixed into position by means of three No. 4 ⅜-inch brass wood screws. The position of the coil on the baseboard can then be determined, and it may be fixed by screwing a piece of wood, which forms a sliding fit inside the tube, to the baseboard.

(Continued on page 166.)
You wouldn't go to sea without a Compass!

Just as no wise mariner puts to sea without a compass so no real wireless enthusiast should attempt to explore the ether without an equivalent in the "WORLD RADIO," the paper which tells listeners a week in advance about Dominion and Foreign programmes. It brings the outside world's broadcasting to Britain and keeps listeners abreast of the times with interesting and up-to-date information about international broadcasting. Another outstanding feature of this companion paper to "Radio Times" is an accurate table of stations abroad in the order of wavelengths, which makes it the essential paper for the enthusiastic listener.

CAXTON 4-VALVE CABINET
Made for Sets "All Concert Receiver," "Fieldless Coil Three Valve Set," "Any Valve Low Frequency Amplifier."
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 16" by 8" panel to slide out of Cabinet front.
The two beaded front doors as illustrated, placed 2 ins. in front of the enclosed panel at 10/- extra.
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.

FERRANTI LTD., HOLLINWOOD, LANCASHIRE.
**SHORT-WAVE**

**Notes & News**

This summer seems to be an exact replica of the last, as far as "DX" transmitting conditions are concerned up to the time of writing, and there is every prospect that it will continue to be so. The only difference seems to be in the work with the nearer European countries, which is much easier than it was this time last year. Whether this is on account of the different types of aerial systems now in use or simply a peculiarity of the other, it is difficult to say at present.

**Australia**

Australian work in particular is quite lively in the early mornings, particularly from the receiving point of view. GI-6MU received about eighteen Australians between 6 and 8 a.m. on two consecutive mornings, and several British stations with 30 watts or so find no difficulty in communicating with the "A's" and "Z's" fairly reliably. Our high-power telephony stations, however, do not seem so keen on getting their "tone" through to the Antipodes as they were last year, probably because the novelty has worn off, and they are looking for fresh worlds (literally!) to conquer.

**In Ireland**

Mr. W. R. Burne (ex G-2KW) is now the managing editor of the Irish Radio Journal, and will probably start up some day as a "GW" station. He will be pleased to forward cards to Irish experimenters, if they are addressed to the station, c/o Irish Radio Journal, 34, Dame Street, Dublin.

**Twenty Metres**

Several Americans are now working regularly on 20 metres or thereabouts, and the chief difficulty seems to be the absence of good receivers on that wave; although the signals are getting out quite well, no reports are received. U.S.BSK asks us to state that he would be very glad to receive reports on his Sunday transmissions on 20 metres. These should be addressed to Mr. James Grindle, 1143, Garfield Street, Hammond, Indiana, U.S.A.

**Crystal Control**

The advantages of crystal control are felt more than ever on 20 metres, where a slight swing in the aerial or, in fact, anywhere in the transmitter, will cause the note to be quite unreadable unless the receiving operator is skilled in the art of chasing a signal round the condenser. Unfortunately, quartz crystals already seem to be getting rather scarce. Let us hope a new supply is forthcoming soon.

We have received a number of reports of reception of commercial stations round about 20 metres; but, although Brazilians have also been heard, none of the American amateurs' signals seem to arrive here. Mr. G. L. Brownson (G-2BOW) reports reception of WLL on 18 metres and 2XS (Schenectady) on 14.3 metres, and also one of the Nauen stations (AGK) on 21.4 metres. BZ-1AP and 2AB have been heard on 18 or 19 metres, and he reports that U-2XG (another branch of WGY) has started up again on 45 metres and 67.5 metres.

**A Trip to the Coast**

The writer has spent part of the past week on the South Coast with a short-wave receiver, and has had an interesting chance to compare the conditions with those in London. On the whole, perhaps, signals seem slightly weaker, but surprisingly little interference was experienced from Channel shipping, etc. The general impression was that all the stations that could be received in London could also be heard on the coast, but perhaps a little weaker. Freedom from electric train noises and other atrocities usually associated with large towns was evident immediately the set was switched on!

**Scandinavia**

Finland and Denmark are showing signs of increased activity nowadays, in the latter case on account of the granting of transmitting licences. About ten Finnish stations are on the air with fair regularity, and the same number of Danish. They do not seem to have any use for raw A.C., all the notes that are not pure D.C. being well rectified and smoothed. In Denmark "closed hours" between 7.30 and 10.30 p.m. are enforced for the benefit of the "B.C.I.'s." The Danish stations mostly seem to start out after DX about 11 p.m., and have been heard working Brazil at that time, although they all use quite low power.

**"QSL Bureaux"**

The number of "QSL bureaux," through which cards may be sent to foreign amateurs, is now quite large, and in an early issue we will give a complete list of these addresses, together with a new and up-to-date list of "intermediates." These bureaux are extremely useful in the case of countries that have a large proportion of unlicensed transmitters, as cards may be safely sent.
ARE YOU IN A DEAD SPOT?

By E. A. ANSON

This week we commence the publication of the results of an important investigation being made on behalf of this journal. Thorough research is being made into the distribution of signal strength from 2LO, and many remarkable facts concerning "dead" areas are coming to light.

The single-wire aerial consists of 60 ft. of 12/34s phosphor bronze wire stretched between two 20-ft. masts with a single wire counterpoise

"Dead spots" are sometimes produced by extremely "local" conditions.

Shielding

If in some way the island shielded the transmitting aerial, perhaps by rising into a tall hill at one place, points of equal signal strength would not lie on a circle. Where the shielding occurred there would be a dent like the one shown in Fig. 1.

Receivers at A and B would receive equally strong signals, but B is nearly twice as far away from the transmitter as A. In actual practice broadcasting does not take place from an islet to listeners in boats. A hundred and one things occur to make these lines of equal signal strength very irregular, particularly when the transmitting station is located in a large town full of iron girders, smoke, etc., such as is the case with 2LO.

The Experiments

This series of articles is essentially practical; it is intended to measure signal strengths all round 2LO at radii of 10, 20, 30, 40, 50 miles, and to join up by interpolation all points of equal signal intensity so that readers may see at a glance what sort of conditions prevail round them. It must be realised that these "radio contours" give a general idea of conditions, but do not attempt to go into details of local irregularities.

The method of making these measurements has been made as simple as possible consistent with obtaining results easily comparable to conditions under which ordinary listeners receive. The single-wire aerial consists of 60 ft. of 12/34s phosphor bronze wire stretched between two 20-ft. masts with a single wire counterpoise

2 ft. 6 in. above the ground. A counterpoise used in order to avoid varying earth resistances in different localities. The capacity of this aerial is .0001. The H.F. resistance of the aerial-counterpoise system is about normal for a good broadcast aerial and earth.

Valve Details

A DE3b valve is run off a 2-volt accumulator for L.T., and with 40 volts H.T. the filament rheostat is adjusted until the meter indicates 240 microamps. Any H.F. voltage connected between A and B will cause the galvanometer reading to fall in proportion to the H.F. volts impressed. The alteration to the circuit constants which result from connecting up the needle are very small, about the same or rather less than an ordinary H.F. valve with potentiometer control. It must be pointed out that the instrument measures 2LO's actual H.F. voltage across the coil and ignores the modulated components impressed on the carrier. In other words, it does not matter whether music or speech is being transmitted or not, provided the carrier wave is there.

Practical Ranges

In practice it was found that the simple tuned-Dimco coil across the Moullin voltmeter worked admirably up to 20 miles or even 30 miles in places. Beyond this distance it was found necessary to magnify the voltage by means of valves. This was done with a specially constructed valve receiver permitting of fine reaction control by means of a condenser.

This receiver was calibrated to give a magnification of ten. The H.F. voltage was first measured at a suitable distance from 2LO across the tuned coil as already explained. Then the Moullin was put across the tuned
anode coil of the receiver and reaction adjusted until the signal strength was ten times greater than across the simple tuned coil. Results proved quite satisfactory between the small limits required, about .08 to .01 H.F. volts.

What Contours Mean
Perhaps a word of explanation may assist readers to understand how to make use of these radio contours. All points on the same contour line are at the same signal strength for 2LO. The further apart contours lie the slower the change in signal strength and the better the area. The closer they lie the faster the change in signal strength and the worse the area. Complete closed contours either indicate an abnormally good or bad area according to whether the figures marked against the closed contour are larger or smaller than the neighbouring ones.

The South-eastern Sector
As regards the practical results obtained for the south-eastern area (the first one investigated), the first obvious thing is that a large part of 2LO's energy is dissipated in the first 20 miles, for the contours lie close together. East of London is very complex; from about Dartford conditions become bad, and patches of bad areas alternate with good areas. In some places 2LO cannot be said to give satisfactory results. A particularly bad area is situated near Boughton Street, whilst a good area compensates for this in the vicinity of Sittingbourne. Compared to the east, the southern districts would appear to be more fortunate. The contours run evenly at well-spaced intervals culminating in an excellent area between Lewes and Newhaven. There are, however, two bad areas, one at Sevenoaks and the other at Framfield, south of Ashdown Forest. It is perhaps noteworthy that the forty-mile radius appears to become erratic and uncertain as regards receiving conditions.

The following table may assist the reader to understand what the figures marked against the first contour line mean from his point of view. As already explained, they represent H.F. volts across a simple coil and condenser circuit tuned to 2LO on an aerial 60 ft. long and about 18 ft. above a single wire counterpoise similar to the aerial.

<table>
<thead>
<tr>
<th>H.F. volts</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>.02 - .06</td>
<td>Faint on crystal. Two valves good on 'phones using reaction. Three valves fair on loud-speaker using reaction.</td>
</tr>
<tr>
<td>.06 - 1</td>
<td>Crystal fairly clear, and satisfactory in a silent room. One valve good on 'phones using reaction. Two valves comfortably loud on phones. Three valves good on loud-speaker.</td>
</tr>
<tr>
<td>1 - 2</td>
<td>Crystal comfortably clear. One valve loud on 'phones. Two valves uncomfortably loud on 'phones, weak on loud-speaker.</td>
</tr>
<tr>
<td>3 - 5</td>
<td>Crystal quite loud and clear. Any valve set uncomfortably loud on 'phones, weak loud-speaker results even on one valve. Considerable difficulty in cutting out 2LO when trying to receive stations on wave lengths close to that of 2LO.</td>
</tr>
</tbody>
</table>

A 3-valve set is considered to be composed of H.F., detector, and one L.F. A 2-valve set is considered to be composed of H.F. and detector.

Comparative Results

The South-eastern Sector

As regards the practical results obtained for the south-eastern area (the first one investigated), the first obvious thing is that a large part of 2LO's energy is dissipated in the first 20 miles, for the contours lie close together. East of London is very complex; from about Dartford conditions become bad, and patches of bad areas alternate with good areas. In some places 2LO cannot be said to give satisfactory results. A particularly bad area is situated near Boughton Street, whilst a good area compensates for this in the vicinity of Sittingbourne. Compared to the east, the southern districts would appear to be more fortunate. The contours run evenly at well-spaced intervals culminating in an excellent area between Lewes and Newhaven. There are, however, two bad areas, one at Sevenoaks and the other at Framfield, south of Ashdown Forest.

Fig. 3.—These are the results obtained in the south-eastern area. Note the "dead spots" near Westerham and Canterbury, and the area of abnormally good signals between Lewes and Beachy Head.

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<tr>
<td>3 - 5</td>
<td>Crystal quite loud and clear. Any valve set uncomfortably loud on 'phones, weak loud-speaker results even on one valve. Considerable difficulty in cutting out 2LO when trying to receive stations on wave lengths close to that of 2LO.</td>
</tr>
</tbody>
</table>

A 3-valve set is considered to be composed of H.F., detector, and one L.F. A 2-valve set is considered to be composed of H.F. and detector.
The Highwayman

"STAND AND DELIVER!"

—the command of the Highwayman—yes, and the valuables delivered were well worth having. Now, we deliver SIX-SIXTY VALVES, and if you value really good reception, they too are well worth having. With these perfectly designed valves the delicate gradations of music are reproduced in all their original beauty, while the remarkably clear reproduction of speech is a proof of the real contribution which 6-60 Valves have made to modern radio science.

Take the S.S. .L.F. (green disc), for small or medium-sized Loud Speakers. This 3-Volt Valve consumes only .06 amps filament current—which in itself means a big economy in accumulator recharging—and in addition works at such a low temperature that the life of the filament is immeasurably increased. The S.S.3 (red disc) gives excellent results both as an H.F. amplifier and as a detector. Owing to the low current consumption of both types, dry cells may be used.

Then for a real Power Valve—the S.S.7 has no equal. It is absolutely non-microphonic, and when operating at the correct voltage there is no glow whatever from the filament. This valve consumes only .1 amps filament current, and combines remarkable volume with unequalled purity of tone.

Six-Sixty Valves are recommended by all the leading Wireless Journals of to-day. For PERFECTION OF QUALITY insist on SIX-SIXTY VALVES.

SIX-SIXTY VALVES

Better by Six times Sixty

The Electron Co., Ltd., Triumph House, 189, Regent Street, London, W.I.

Leaflet S.S. 17 gives full particulars. Your Dealer will be pleased to order Six-Sixty Valves for you if he is out of stock.

WIRELESS.

COUPON.

QUESTIONS AND ANSWERS.

This coupon must be accompanied by a P.O. for 2/6 for each question, and a stamped addressed envelope when sending queries to the Radio Press Information Dept. for a postal reply. "WIRELESS."

Vol. IV. No. 5.
ANOTHER CLEARTRON PRODUCT

Rotor and Stator, die-cast in one piece, give results hitherto unattainable.

Manufactured, under the Patents of Western Electric Co., and Cleartron Radio, Ltd., and the registered designs of E. A. Lamplugh, Ltd., Tyldesley, Birmingham, exclusively for Cleartron Radio, Ltd. (Sole Proprietors.)

CONDENSERS ONLY:

<table>
<thead>
<tr>
<th>Value</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>0.003</td>
<td>14/3</td>
</tr>
<tr>
<td>0.005</td>
<td>14/9</td>
</tr>
</tbody>
</table>

“Station Selector” Dial (precision movement) 10/6 extra or sold separately.

THE DI-KAST CONDENSER

is a distinct innovation in Condenser design. Avoids the contact resistance losses experienced with separately assembled condensers. Rotor and Stator are die-cast in one, which means positive connexion and perfectly matched characteristics. The specially designed vanes provide straight-line reading, greater range, easy short wave tuning and very low minimum capacity. Another feature of unusual interest is the MICRO STATION SELECTOR, a newly designed dial precision movement, allowing completely selective tuning and ten or more different adjustments between each degree. Play and back-lash entirely eliminated.

Ask your dealer or send for complete explanatory leaflet.

and of course

CLEARTRON VALVES

America’s foremost Valve made in Britain’s newest factory.

12/6 ALL DULL EMITTERS Standard Prices 15/–

Full technical data from your Dealer or from us.

CLEARTRON RADIO LTD

ONE CHARING CROSS, LONDON, S.W.1

COMPONENTS WE HAVE TRIED

Conducted by the "Wireless" Laboratories, Elstree.

"Silverex" Crystal
A "Silverex" crystal made by Messrs. Sylvex, Ltd., has been tested with excellent results at our laboratories. The crystal is of medium fine structure, possesses a large number of sensitive spots, and is of convenient size for mounting purposes. A special cats-whisker is provided with it.

"Quality" Two-Coil Holder
A "Quality" two-coil holder made by Messrs. The Goswell Engineering Co., Ltd., has been tested at our laboratories. Both coarse and fine adjustment are obtainable, the latter by means of an eccentrically mounted head on an auxiliary spindle, which causes the "fixed" coil block to move through a small arc. A switch which allows the reaction coil to be shortened or its connections reversed at will is also provided. The construction and finish of this coil holder are good, and an adequate vernier control is obtainable.

High Resistance Potentiometer
A high resistance potentiometer has been received from Messrs. the Igranic Electric Co., Ltd., for test and report. The resistance element is of graphite, with a sliding carbon brush contact mounted on an insulating moulding. A removable cover and indicating dial are provided. The total resistance of the potentiometer was 50,000 ohms, and it was found to be silent in operation, and well made and finished.

Sterling "Least Loss" Condenser
A Sterling "Least Loss" variable condenser has been submitted by Messrs. the Marconiphone Co., Ltd. It is a brass vaned instrument, the fixed plates being insulated from the aluminium end-plates by means of Pyrex glass. An 8 to 1 reduction is given by special friction gearing. The efficiency was of a high order and the mechanical design excellent, no side or end play being perceptible in the bearings.

"Erla" Balloon Circloid Couplers
"Erla" balloon circloid couplers (right hand picture) are robust in construction, and have a satisfactorily low H.F. resistance.

"Universal" Rheostat
FROM Messrs. the General Electric Co., Ltd., we have received a "Universal" rheostat. The resistance elements are wound on a square insulating rod bent into a circle, a projection being provided at the junction of the two windings. The total resistance was found to be 30 ohms, the dull- and bright-emitter portions having resistances of 23 and 7 ohms respectively. The rheostat is exceptionally quiet in action and robustly constructed.

"M.L." Transformer
THE "M.L." low-frequency transformer made by Messrs. S. Smith and Sons (M.A.), Ltd., has been tested at the Wireless laboratories. A substantial circular core is a feature of this transformer, which is barrel-shaped and partly shrilled. The reproduction was clear and fresh with no sign of roughness and the instrument appears to be stoutly constructed and well finished.

"Erla" Fieldless Coils
TOROIDAL coils have been received from Messrs. C. G. Vokes & Co. They are known as "Erla" Balloon Circloid Couplers, and on test were found to be practically fieldless. One coil was intended for aerial coupling and the others for H.F. stages. It was found that absolute stability was obtained over the whole 500-500 metres band, while a satisfactory degree of H.F. amplification resulted. The coils are robust in construction, have a satisfactorily low H.F. resistance, and are provided with brackets for fixing purposes.

"Camden" Mansbridge Condensers
MESSRS. THE CAMDEN ELECTRICAL CO.'S Mansbridge type fixed condensers are of the usual size and shape and enclosed in grey metal cases. On test their insulation, resistance was found to be infinite, while they stood up satisfactorily to a voltage of 500. These condensers are good specimens of their class, and can be recommended.
This week-end build your own loud speaker!

First of all go to your dealer and satisfy yourself that the "Lissenola" costing only 13/6, really is fully equal in power and tone to any loud speaker on the market. Ask your Dealer to put on the best loud speaker he has in stock—then use the same horn on the "Lissenola" and see if you can notice any difference.

When you get the "Lissenola" home you can build a horn yourself for a few pence, providing you with a powerful instrument which will compare with any expensive loud speaker you have ever heard. Or, if you prefer a cone-principle diaphragm—very simply made—you should get a Lissen Reed as well (1/6 extra). If you have never heard a "Lissenola" there's a surprise in store for you.

Before buying ask your dealer to demonstrate the LISSENOLA

LISSEN LIMITED,
18-22, Friars Lane,
Richmond, Surrey.

Manager: Mr. T. N. Cole.

'Phone Switches in Crystal Sets

In places within a fairly short range of a broadcasting station where signal strength is good there is no reason why a couple of pairs of telephones should not be used with a crystal receiving set so that two people may listen at the same time to the programme. The telephones may be connected either in series as in Fig. 1, or in parallel as in Fig. 2. Which method is the better in any particular case depends largely upon the type of crystal that is in use and the resistance of the telephones. It is best before deciding upon one or the other to experiment with "hook-up" arrangements. Whether the 'phones are in series or in parallel it will usually be found that signal strength is reduced when the second pair is brought into circuit.

A Convenient Switch.

It is therefore very convenient to fit a simple switch which will throw one pair into or out of action, so that normally the set may be used with a single set of 'phones, the second set being brought in when required by a touch of the switch. The diagrams show how this may be done with a simple on and off switch such as can be made in the home workshop or purchased for a few pence. It will be seen that in the series arrangement (Fig. 1) both pairs of telephones are in circuit when the switch is open, but when it is closed the second pair is short-circuited. The telephone condenser C2, if used, should be placed as shown in the drawing, for it is then in circuit whether the switch is open or closed. In the parallel arrangement seen in Fig. 2, closing the switch brings both pairs of 'phones into action, whilst when it is opened the second pair is disconnected. C2 is again in circuit in either position of the switch.

CORRESPONDENCE

Sirs,—In your issue dated June 5, Mr. Reyner mentions the fact that he heard a harmonic of the Croydon Station on his " Magic Five Receiver." You may be interested to know that on several occasions recently I have received this harmonic (450 metres) at good loud-speaker strength on a single-valve reflex set at a distance of about two miles from the Croydon Station.—Yours faithfully, DUDLEY G. BUSTON.

Trinity College, Cambridge.

Sirs,—Referring to the question of precaution against the breakage of aerial halyards, I have seen it suggested, among other things, that two pulleys and halyards should be fixed up, so that if one breaks, the other can be brought into use, thus avoiding the necessity of lowering the mast. But this only puts off the evil day till the second one breaks. Perhaps my own plan may be considered interesting. I do not employ a pulley at all, but merely an eyebolt fixed at the masthead, sufficiently large to take not only the halyard, which I find slips through quite freely enough for the once or twice it is necessary to work it, but also quite independently a length of thin cord tied together into a long loop to lie along and down the mast and secured at the lower end. There is, of course, no strain on this, and until it actually rots, it is always there in the event of the halyard slipping through or breaking, for the purpose of pulling it or a new one up through the eyebolt. I adopted this plan after having "had some". Incidentally, I find the loop of thin cord also useful for hauling up a flag on joy days.—Yours faithfully, E. J. BARDEN.

Bexley Heath.
I see the Post Office is getting busy in prosecuting those who make use of wireless apparatus without paying their license fee. This is as it should be. No intelligent person nowadays can pretend that he does not know a licence is required, but the man who dodges paying the licence is, in my opinion, about as mean as the man who taught his children that the gas meter was a money box for their savings. One of the worst cases I have heard of occurred in a North-East London suburb, where complaints about oscillation drew attention to a particular house in which a Post Office inspector found a single valve set and an amplifier but no licence. Thousands of people will think that the fine of 20s. imposed was not enough, and I have some sympathy with them.

* * *

Have you noticed how cheap and shoddy wireless apparatus is fast disappearing from even the smaller shops? At one time there was a danger of the market being flooded with cheap Continental productions of very doubtful quality, but home constructors soon had enough of this stuff and were led by bitter experience to make sure that the components they purchased were reliable. The best of the American components reach this country, where they are sold in most cases at a price considerably above that of the similar British production, or when there is no equivalent made in this country, at a price which does not in any way suggest "dumping."

* * *

I am very glad to see that several British manufacturers are introducing really good slow-motion dials, a line in which, up to the present, the Americans have excelled. If sets continue to progress as rapidly as they are doing at present along the lines of selectivity, every set in future will need this kind of dial, and the old three-inch moulded affair will pass right out.

* * *

I have thought for some time there has been something missing from the news, and I could not quite make out what it was. I have just realised. What has happened to our annual invention of a wireless receiver no larger than a watch, with which you could hear stations a thousand miles away? This invention has been a hardy annual for about 20 years, and usually the story (it generally turns up as a paragraph in one of the London dailies) reads something like this:

"A Jesuit priest in Turin (or Milan or Naples or some other Italian city) has just produced a remarkable invention which takes the form of a wireless set and it is always "no bigger than a watch.""

It is at least 16 years since I personally saw such paragraphs first appearing, and I am sure we are bound to have another one like it in the course of the next week or two. Watch the papers and see!

* * *

For some mysterious reason it is always an Italian priest who invents this set and it is always "no bigger than a watch." The invention is invariably announced as "revolutionary," and just as certainly it will make all existing apparatus obsolete.

It is at least 16 years since I personally saw such paragraphs first appearing, and I am sure we are bound to have another one like it in the course of the next week or two. Watch the papers and see!

* * *

A Well-Known Contributor

Our artist's idea of Lieut.-Commander Kenworthy in a characteristic attitude.

Before broadcasting came in, the invention was reported to be able to receive messages from all parts of the world. Following the appearance of the paragraph in a London daily, it turns up all over the country in provincial journals which use the London papers as their source of information. We next find it as a small paragraph in all kinds of technical and trade papers, and as likely as not it is used as a text in one of the weekly journals which is always searching for something new:

"A remarkable invention by an Italian priest of a wireless set no bigger than a watch reminds us that . . . and so on.

* * *

Coming out of the Club the other day, I ran across a well-known wireless expert who until recently steadfastly refused to try a portable set in his car, taking the line that as a wireless expert he was entitled to relaxation with "shop." Persuaded at last to break this rule, he took out a portable set made by a friend and was astounded with the results he obtained with it. "What we have most of us overlooked," he said to me, "is that a portable set can be, and nearly always is, used in a location which is far more suitable for wireless reception than that on which the average house is built. The motorist will often stop on a hilltop where there is a view for miles around, and such a spot is usually good for reception, being quite unscreened. I have been astonished with the long-distance work possible with a simple four-valve set, and I think that if the average listener knew how good reception conditions generally are away from town, he would make much more use than he does of portable receivers."

* * *

Speaking of portable sets reminds me that the aerial wire used with them need not be of the (Continued on page 170).
The Week's Diary—continued

heavy type used for home aerials, but this can be as thin and flexible as you like; braided or flexible wire seems most suitable, as it can be rolled up conveniently without springing out of the hands, as is the habit of the phosphor-bronze variety. Even the thread-like No. 36 S.W.G. has been known to give excellent results, and of this you could put enough on a cotton reel to be sufficient for half-a-dozen aerials, although it requires more than ordinary patience to put it up without breaking it!

The publication of reports on the new B.B.C. experimental station at Daventry are very promising, and I do not think it will be long before the listener on the 300 to 500 metre band hears some very good signals from that direction. I believe it was first intended to erect this trial station at Chelmsford, but later Daventry was decided upon as a better site, particularly in view of its existing high-power station and supplies of power.

It is just 27 years since the first wireless station was erected at Chelmsford, although this, of course, was for telegraph and not telephone communication. A month or so later a corresponding station was erected at Dover, communication between the two places being effected in the middle of July. This was quite a considerable distance in those days. I wonder what the engineers of that day would have thought if they had been told that Chelmsford would be the site of a giant station, capable of sending entertainment into a million homes through the medium of apparatus so simple that the proverbial child could work it! Their informant would simply have been called mad and promptly forgotten.

Many of the early wireless engineers were, contrary to what might be expected, intensely conservative in their methods. There is a story told that Senatore Marconi, having obtained certain results by winding a coil of wire round the leg of a table, insisted on seeing the leg off the table to take it away. In case one could not get such good results with a coil wound on a different former!

How many people know that Schenectady (pronounced, by the way, as if it were spelt Skeneetady), which is known to British listeners only as the location of the famous WGY broadcasting station of the General Electric Co., is one of the oldest towns in America, having been incorporated since the year 1700. Mr. Marconi took an active part in the technical work, and has had a great deal to do with the latest shortwave work. Wave-Trap.

An interesting application of television is to use the apparatus in the way illustrated here, to permit two persons to see as well as hear one another at a distance.

Harris, who visited the town last year, tells me he was astounded to find, not a thriving modern city with engineering works, factory chimneys, and all the signs of industrial activity, but a sleepy old-world town, long avenues overhung with trees, and practically no indications whatever of commercialism. Practically the only industrial plant in the neighbourhood is the works of the General Electric Co., and this is situated just outside the town and does not disfigure it.

As one who periodically grumbles at the things he does not like, "Wave-Trap" would like to express his appreciation of the "Street Scenes in Old London," which were so admirably broadcast from the London station on Friday the 11th. Such a broadcast seems to adapt itself excellently to the medium, and would keep me at home on any night, whereas the much-advertised talk by a diver from the bed of the river (I wonder what idiot thought of that?) would probably send me out to the nearest place of amusement. After all, the voice of the diver from the bed of the ocean would sound about the same as the voice of the same diver upon the platform of the Oxford Street Tube Station.

The Wireless Exhibition to be held this year in the smaller hall at Olympia will undoubtedly be the finest show yet. Unlike the previous Exhibition, this year's show will be open to any British wireless manufacturer or distributor, whether or not he belongs to any particular trade association. The British Broadcasting Co. are actively cooperating with the organisers, and I have already heard of two or three special "stunts" being organised which will greatly increase the popularity of the show.

Have you ever heard of the use of metal as an insulator? Neither have I, but the wireless correspondent of a well-known daily paper recently read a paragraph, "Metal Insulation Bad," and then went on to explain that lead-covered cables should not be used for either aerial or earth leads. Some of these daily paper wireless columns are very amusing in reading, and give great joy to the genuine wireless expert.

It is good news to hear that Senatore Marconi has now quite recovered from his recent serious illness, and is back again in London. Unlike many people whose names have been given to big companies, Senatore Marconi takes an active part in the technical work, and has had a great deal to do with the latest shortwave work.
I HAVE BEEN ASKED ....

I want to store my L.T. accumulator away for some months. What shall I do?

An accumulator should not be stored, when filled with electrolyte in the normal way, unless provision can be made to recharge it every four to six weeks. Where this cannot be done the battery should be properly charged and the acid should then be withdrawn. The cells should be washed out carefully with distilled water and allowed to drain dry. When this has been effected the battery may be stored without risk of damage resulting.

I have two pairs of telephones of 4,000 ohms resistance, respectively, and also a telephone transformer. I should like to know whether I can use both pairs of telephones at the same time on my two sets, which is a standard detector and one transformer-coupled note magnifier receiver?

It is quite a simple matter to operate the two pairs of telephones upon your receiver and there are two methods by which this may be effected. The simplest method is to connect one side of the input winding of your telephone transformer to one telephone terminal, the other terminal of this winding to one tag of the 4,000 ohms resistance 'phones, and the other side of the same pair of 'phones to the second telephone terminal, whilst the low-resistance telephones will be joined across the output winding of the telephone transformer.

The other method is, leaving the 120 ohm 'phones connected across the output winding of the telephone transformer, to connect the input winding directly across the telephone terminals of the receiver and to join one side of the 4,000 ohms resistance 'phones to the telephone terminal of the set which is joined internally to H.T. positive whilst connecting a 1 or 2 microfarad Mansbridge-type condenser between the other side of this latter pair of telephones and the other telephone terminal of the set.

This latter set of connections is most to be recommended, since neither pair of phones carry the direct anode current of the note magnifier.

In the first note magnifying stage of my resistance-coupled-amplifier I employ a general-purpose valve, with an internal resistance of 40,000 ohms and an amplification ratio of 8. I intend to substitute a resistance-coupling type valve, with an internal resistance of 30,000 ohms, and an amplification factor of 9. By effecting this change I understand I shall obtain an amplification of 20 instead of 9 from valve to valve. Is this correct?

With resistance or choke coupling it is impossible to obtain an amplification from valve to valve equal to the amplification ratio of the valve concerned, since to obtain this desirable state of affairs, it would be necessary to employ a choke or a resistance of infinite impedance. This it is impossible to do in practice but by utilizing a choke of high inductance or a fairly high value of anode resistance only a small percentage less amplification than that in the ideal case, is obtained.

J. U.

FILAMENT RHEOSTATS AND POTENTIOMETERS.

With the windings carried on a porcelain bobbin and having the contact arm moving on its inner side, the "Cosmos" Filament Rheostat takes up remarkably little space, is strong in construction, and has a very smooth and reliable movement. It is fixed by ONE HOLE, and is provided with a handsome knob and dial. Made in four types, two of which are double wound for Dull OR Bright Valves, and one a Potentiometer, the prices are as follows.

<table>
<thead>
<tr>
<th>Description</th>
<th>Ohms</th>
<th>Carrying Current</th>
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<td>6.0</td>
<td>1.0 amp.</td>
<td>4 6</td>
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<td>20+4</td>
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</tr>
<tr>
<td>Potentiometer</td>
<td>300</td>
<td>—</td>
<td>6 0</td>
</tr>
</tbody>
</table>

METRO-VICK SUPPLIES, LTD.,
(Proprietors—Metropolitan Vickers Electrical Co., Ltd.)
METRO-VICK HOUSE, 145, CHARING CROSS ROAD, LONDON, W.C.2.
PRACTICAL TOPICS

By G. P. KENDALL, B.Sc., Assistant Editor

H.T. Plugs Again—A Neutralising Scheme—Friction-Drive Dials.

A

LITTLE while ago I re-

marked in these columns

that the average wander

plug supplied for use

with an H.T. battery

was a very unsatisfactory

affair, and one of my readers has been

kind enough to write to me and point

out that there does exist a plug which, although perhaps not

specifically intended for use with H.T.

batteries, nevertheless fits the sockets

in question, and has proved in my

hands perfectly satisfactory in practice.

This is the "Gibson" plug, which is made in several sizes, and is

known to me of old as a particularly

well-finished and satisfactory little appliance.

Still Not Satisfied

It is made of good hard brass, well-

finished, and fitted with an insulating

shank of either black or red. As a

matter of fact, I had forgotten that

Messrs. Gibson had produced one of

these plugs in a size to fit H.T. sockets, and I have no doubt that my reader is right in pointing out their suitability, for the material and workmanship are good, and no doubt they would not require that constant opening with the blade of a knife necessary with the cheap and poor variety of plug.

Nevertheless, I still feel that something more positive is needed in the way of contact than that which is provided by a split pin, however good the latter may be, since it is necessarily very small to fit the standard sockets.

Earl Russell's Method

I see that in another column the Earl Russell describes his method of making sure of a really good and silent contact, and this seems a very promising one. Perhaps we shall see something of the sort fitted as standard to H.T. plugs.

Another promising device is the special spiral plug now produced by Messrs. Autovorays, of Clif's fame, a test report of which appeared recently in "Components We Have Tried."

What is Wanted

Although those various devices may, in themselves, be perfectly effective, however, they seem to me merely palliatives. The problem really calls for an approach from the other end, i.e., by the provision by the battery makers of something better than the fiddling little sockets to which we are accustomed.

A Neutralising Tip

I recently described in Modern Wireless a circuit modification for the Tropadyne oscillator of my "Open Air" superheterodyne which appears to have aroused a certain amount of interest. It was a method of making a centre tapping upon a circuit by means of an arrangement of condensers instead of a direct connection to the middle of a coil, which seems capable of application to various neutralising schemes.

AN AERIAL TIP

Is your mast stayed with steel wires? If some of them are of considerable length and run close to the aerial wire itself (or the down-lead, of course), it is quite possible that they may cause trouble, especially in short-wave reception. Try the effect of breaking them up into two or three short lengths.

Friction-Drive Dials

I have just been making up an absorption wavemeter for my own use, and in doing so came across a point about slow-motion dials which seems worth passing on. I had carefully chosen a dial with clear and fine scale divisions, an accurate-reading pointer, and a friction-drive motion which seemed reasonably free from back-lash, and expected to have no difficulties with this part of the instrument.

A Surprise

To my disgust, however, I found when all was finished that the functioning of the slow-motion drive was most erratic—sometimes it would act properly and at others one could turn the knob without producing the slightest movement of the condenser plates. The reason was that the condenser moved somewhat stiffly, and there was not a sufficient grip in the friction mechanism to drive it; the friction surfaces simply slipped. Moral: If your condenser moves stiffly be careful how you choose a slow-motion dial.

What is required is a condenser with the usual moving plates and two sets of fixed ones, so arranged that the moving set engages more or less with one or the other of the fixed ones. Such a condenser is represented in Fig. 2, where M denotes the single set of moving plates, F1 and F2, the two sets of fixed ones.

Simultaneous Variations

The effect is exactly the same as that of the two separate condensers in Fig. 1, except that a single knob now produces a simultaneous increase in the capacity of one of the series condensers and decrease in that of the other. The diagramFig. 2 shows how a complete grid circuit and neutralising scheme could be arranged on the lines of the "Elstree Six" circuit, using one of these special condensers, whose size, by the way, need only be quite small.

Fig. 1.—An electrical centre-point, X, can be obtained by adjusting C1 and C2.

June 26, 1926.

This diagram shows how the neutralising device suggested by Mr. Kendall can be applied to such a circuit as the "Elstree Six."

It was a method of making a centre tapping upon a circuit by means of an arrangement of condensers instead of a direct connection to the middle of a coil, which seems capable of application to various neutralising schemes.

For example, it answers the needs of various people who have wished to try the type of neutralised circuit used in the "Elstree Six" in an existing set where no double condensers are available. The scheme uses what is, in effect, two small condensers in series across the coil, independently of the tuning condenser. If these two condensers are of equal capacity the common point between them can be regarded as a centre-tap on the circuit, and can be so used.

A Simplification

Now, this arrangement can be simplified by using a special condenser to combine C1 and C2, into one component.

BY LT.-COMDR. KENWORTHY, R.N., M.P.

NEXT WEEK

SPECIAL ARTICLE BY
WILL REFLEX CIRCUITS COME BACK?
(Continued from page 155)

various important improvements. In spite of these, however, the article of about a year ago which I have referred to was pessimistic in tone, and this was largely due to the fact that we had reached our limit in reflex designs. Moreover, there were such great prospects for the perfectly straigh
type of circuit that our attention was side-tracked.

A Vital Problem
My great aim recently has been to get the Blettree Laboratories (which serve this journal and Modern Wireless and The Wireless Constructor) on to the greatest problem of modern times—selectivity plus long range. We can say to-day that we have achieved an entirely new standard in high-fre
quency amplification by the use of special neutralising means. The Elstreflex circuit is probably one type of re
ceiver which is the result of a great deal of experimental work on circuits and designs, and while these two aspects of radio are mentioned, I would like to emphasise the extreme importance of design work as distinct from cir
cuit development. Many of these new sets which will be coming along will be the result of months of experi
mental work in transforming a given circuit into a complete receiver.

Possible Developments
Having reached such a high degree of efficiency in straight circuits, and there are many very important facts to give our readers in future issues of our journals, I was determined to encourage the fullest investigation as to how we can apply what we have learnt to the production of entirely new reflex sets.

The work already achieved shows that vast improvements are possible in the direction of:
(1) Selectivity.
(2) High-frequency amplification.
(3) Long range.
(4) Simplicity of operation.
(5) The cutting out of radiation from the aerial while using full radiation.
(6) The development of a reaction adjustment which, while not causing radiation, is easily operated.
(7) The complete elimination of the tendency of reflex circuits to buzz.

These extraordinary developments in reflex receivers have already been attained, although the actual methods will remain private until published in this journal.

"Elstreflex" Circuits
The final circuits will be called "Elstreflex" receivers. The general opinion hitherto held has been that neutralising methods cannot be applied to reflex circuit properly, and

(Concluded on page 173)
operate if the following notes are observed. First connect up the aerial and earth in the manner desired, plug in the coils to be used, plug in the valve, and connect up the batteries to the terminals indicated. Put the filament switch on, having the filament resistance in a suitable position, and the reaction coil at right-angles to the aerial coils. The variable condenser at this stage should read 0 deg. (moving vanes all out). Tune with the variable condenser until signals are heard, and at the same time gradually increase reaction. As soon as a rustle, a click or a hiss is heard, tune hastily, as this indicates that the set is oscillating.

The best results are obtained by adjusting the filament resistance and the variable grid leak. The filament switch eliminates the necessity of making repeated adjustments of the filament control and also of disconnecting the batteries when the set is not in use. Once the best position is found for the variable grid leak, the adjustment may remain fairly constant.

**Consistent Results from the Local Station (Continued from page 152)**

**Author's Test Report**

The set worked excellently on an indifferent aerial situated some seven miles east of ZLO. Signals were overpowered from the local station upon the headphones, and when replaced by the loud-speaker, speech was plainly audible all over the room. This volume was obtained without any noticeable distortion. If the 'phones were to be used comfortably the set had to be detuned for this purpose. A more detailed report will appear next week, with further operating notes.

**Remarkable Results in Finland**

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C. S. Dunham, Radio Engineer
(Announcement by the Bowyer-Lowe Co., Ltd., Leichhardt)
Photographs would not do. A touched-celebrities, gaze portraits of the Little Puddleton sitters themselves, and the fact that lips.

and noses, to cover bald patches with hair move which show a tendency rounding off those whose hook is too pronounced, or by restraining those

up General, a whittled-down Poddleby, or a hirsute Professor Goop might be things of beauty, but they would not be real; there would not be in them that technical accuracy upon which Radio Press has always prided itself.

First Catch Your Artist

This being so, it was desirable to capture an artist man who would draw things and people as they really were. Having caught him I took him down to Little Puddleton in disguise, and introduced him to the wireless club as a distinguished foreigner unable to speak a word of English. The General, of course, tried him in Hindustani, and the Admiral in both Fijian and Chinese. Poddleby asked "Ronmong one do with a fellow who does not recognise his own language?

Portraiture

Well, as I was saying, I took the artist man to the meeting, and as he was apparently unable to understand a word of anybody else but myself, no one bothered him and he was able to make faithful sketches from life of all our members. Luckily there happened to be a full house that night, and the heading at the top of this page depicts the scene as he saw it when the General was about half-way through his most enlightening paper, proving that the presence of coiled-up earth worms round the earth plate in winter time increases enormously the natural

which show a tendency to err and stray in all directions over their owners' countenances.

Technical Accuracy

Other tricks of the trade are to remove wrinkles, to whiten red noses, to cover bald patches with hair and (where the victim is a very young man) to produce a Charlie Chaplin moustache on a virgin upper lip. The resulting portraits are, of course, far less revolting than the sitters themselves, and the fact that there is anything but likeness does not matter in the least. When it was decided to present to your admiring gazo portraits of the Little Puddleton celebrities, it was agreed that mere photographs would not do. A touched-vo porte voo? whilst Snaggby, after taking a few hectic moments to get under way, launched upon him a flood of what he averred to be Russian, though it sounded far more like the remarks of a hen who has just become a proud mamma.

I explained that he was a Czecho-Slovakian, and converse with him airily in French, which nobody recognised. Honestly, I don't blame them. Not long ago I strolled into a wireless shop in Paris, explaining in fluent French that I wanted a variable con- deuser. I did quite a lot of talking about plates and capacities and insula- tion and that sort of thing, and then, if you will believe me, the man said: "Pardon, M'tieu, je ne comprende pas Americain." What can wavelength of the aerial-earth system owing to the added inductance provided by their convolutions.

Distinction

Owing to the presence of the artist man as my guest I had hardly had an hour's sleep all day, so that you will quite understand the attitude of the distinguished member of the audience shown about half-way down the table. You will admit, I think, that taken as a whole we are not at all a bad

(Continued on page 176.)
lectability and of cerebral force. Any-
how, just take a look round your wire-
less club the next time you meet and
ask yourself candidly whether you, as
a crowd, are in the same street. The
answer will, I think, be in the interro-
gative.

Good Intentions

No, I thought that with one exception
the portraits made by the artist
man were very good indeed. I cannot
help, saying that he has hardly
read, justice to one very modest
member of the club, whom it
will not be necessary to name.
I will only add that in his
infancy he was frequently re-
ferred to by dear old ladies as a
beautiful baby, and that except
for one unfortunate accident
that a steam-roller his features
have undergone no change
worth talking about since that
time. However, I am not going
to kick. I only wish I could say
the same of the General and of
other members of the club.

When I strayed in two or
three nights ago with a bland smile
and a strong desire to borrow a couple
of valves from somebody, I was aware
of a sudden frigidity in the atmo-
sphere. As I entered the buzz of
conversation suddenly ceased.
There was a moment's pause, and then every-
body started talking very hard at the
same time. "Twenty past eight," I
said. "Funny how these silences
always happen at twenty minutes past
the hour." I laughed. Nobody else
laughed. I stopped laughing. "Evening,
General," I said. "How are
things with you?"

"Grumph," replied the General.
That's a nasty cold of yours,"
"There is something mysterious about
his voice," I thought, "he is
wonderfully calm to-night.

I possess a true lion's heart if
I were to squash Poddleby when the
lions, then feeding time among
the Zoo animals appeared to
me.

I am sure that you are

I added that I

they were done by one of the most
distinguished wielders of the pencil,
who had actually visited the club in
disguise, and had portrayed its members
exactly as they were. I added that
I thought the exception of my own
they were all jolly flattering portraits,
and that there was not a man in the
room who ought not to be exceedingly
pleased with his picture. I had sim-
ply a dreadful time with them.

Even Professor Goop, my colleague
in designing so many intricate and
dreadful circuits, turned upon me
and denounced me in
incredible terms.

He who jabs and runs away,
Will live to fight another day.

So I jabbed and ran. I just said:
"I think you have all been very
much flattered, but if you have
not to make you can
justly make it to the Editors,
and not to me." After all, what is the
good of having Editors
if you do not make proper use of
them? Editors simply sit in corres-
dent chairs, order people about, and
draw enormous salaries; there is, so
far as I can see, no reason why they
should not bear the brunt of on-
slaughts which they have brought
down on their own heads.

Dignity

For the last few days I have given
the wireless club a rather cold
shoulder. I passed the door of the
club house only the other evening
when Snaggsby and Gubbsworthy were
standing on the doorstep. How my
complete disregard of all of them I
simply buttoned up my coat,
straightened my tie, and drew
a toofer from my gold (rolled)
cigar case, and passed by
with an expressive shrug of my
Douglas Fairbank's shoulders.

Out of the corner of my right
eye I saw both of them with
perceptibly. This strong,
square-chinned hero stuff always
pays in the end.

I got in rather a nasty one,
too, on Winklesworth and
Bumpbley Brown in one of our
wireless shops the other day.
They were there as I walked in,
but except for a majestic nod
I took no notice of them at
all. "Good morning, Mr. Scratch-
hett," I said, "I want a gridleak
of the best quality." This is the first
component that I have bought in
Little Puddleton, and I could see at
once that both of the members of the
wireless club were pained that I
had not borrowed from them.

International Programmes

On the evening of Wednesday,
June 9, a new departure
in radio programmes was
inaugurated. A programme
arranged in Norway, comprising
Norwegian music and litera-
ture, was "S.B." from eleven
countries. 2BD undertook the
job for Great Britain. We
understand that this plan has
found great favour with the
International Radio Office at
Geneva, which is, of course,
aiming to bring about a better
understanding between the
peoples of Europe by Inter-
national Programmes of this
type.
HAVE YOU EXPERIENCED parasitic noises and "mush" marring your reception? Does your loud-speaker whirr and crackle?

Noises such as these are due to fluctuations in the voltage of the H.T. supply, and the slightest variation is magnified enormously.

THE ONLY CURE is the accumulator H.T. battery, and the "DUROS" H.T. ACCUMULATOR IS THE BATTERY BUILT FOR THE JOB.

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THE "DUROS" HIGH TENSION ACCUMULATOR UNIT ILLUSTRATED ABOVE IS THE SOLUTION TO THE ANODE CURRENT PROBLEM.

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LOTUS VALVE HOLDER

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"Lotus" is a registered Trade Mark.
THE LIGHTNING BOGY

By CAPTAIN JACK FROST

It is surprising the great number of people who refuse to install a wireless set because they fear lightning dangers. In this interesting article Captain Frost explains how the aerial when properly earthed acts as a protective device.

A Simple Rule

The presence of a storm can always be detected, even when it is not actually overhead: it is quite probable that you know what an atmospheric sounds like. When you hear atmospherics and they sound continuous enough to interfere with reception, and if you are a little nervous of your set being damaged by any charge finding its way to earth through your set, then at that time, why not connect the two leads that run to your set from the aerial and earth respectively, together? Just take the two wires and either bend the two ends together or arrange some method of switching or plugging by which the connection can quickly and safely be made.

Make it a Habit!

A lot of people have an aerial and earth switch of which I have already given you details, together with a sketch. Another useful method is to get into the habit of always connecting your aerial and earth leads together after disconnecting them from the wireless set. Before retiring at night, even in weather which is not inclined to be all stormy, it is a good habit to get into because, during the hours of sleep, one never really knows when a storm may arise.

(Continued on page 180.)
Why Trouble?

It may be interesting to note why it is so necessary to take precautions so conscientiously: if you are unfortunate enough to have your aerial struck by lightning whilst it is connected to the instrument, the discharge will naturally go by the most direct route—into earth. In other words, via the windings of the coils.

When buying an “earthing” switch, a fairly substantial model should be chosen, and it should be mounted on a porcelain base.

in your set to the earth connection and thence down your earth lead to earth. But what will happen to the windings of your set meantime? Owing to the enormous volume of the electric charge and the “resistance” (speaking rather loosely) of the coils in the wireless set, great heat is generated and the coils fuse—sometimes with a fairly large spark, which might set the inflammable parts of the set alight.

If you take normal precautions you need have no fear. If you find that atmospheric noises are so bad as to interfere with your reception, then just connect your aerial to your earth, either by means of the switch mentioned or by any other method you choose, disconnecting them from the wireless set to do this. This removes the possibility of damage to your set and to anything else. Obviously then, your aerial, connected to your earth will act rather as a safeguard than as a menace.

A “MAGIC FIVE” POINT

A constructor of the “Magic Five” has reported that when he first finished the set he proceeded to test it with the screens removed from the coils, with a view to putting them in place later and noticing whether they made any difference. When he made the test he found that in the case of a weak signal the fitting of the covers caused it to vanish altogether, while a strong signal was very much weakened.

This is perfectly normal; fitting the screens alters the inductance of the coils and necessitates retuning on the condensers before the station will be heard properly once more.

Securing the Coil

If the coil is not steady enough and inclined to move, this can be obviated by one or two washers of celluloid, or shellacked cardboard, being placed in the centre of the coil. No doubt other ways will suggest themselves for fastening the coil, such as a bent strip of celluloid kept in position by a touch of celluloid cement. This method of mounting could also be readily adapted for use with the standard plug and socket.

WHERE ARE THOSE SUMMER PROGRAMMES?

(Continued from page 158)

already received a fair amount of discussion, that is the question of “echo.” It is my personal experience that when a loud-speaker is used in the open music tends to sound flat and dead unless a fair amount of echo is present. The difference between studio and outside broadcasts shows up very markedly on a set being operated in the garden.

There is an old proverb which says that “He who pays the piper calls the tune,” or words to that effect. It is the listener who pays for the broadcast service, but the difficulty is to get him to call. Many people to whom I have spoken on the subject are in agreement with the views I have outlined here, but when I say “Why don’t you write to the B.B.C. about it?” the reply is almost invariably “Oh! it’s too much bother.” or else “What is the use of one person writing up?”

“THE WIRELESS CONSTRUCTOR.”

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This striking article appears in the June issue of THE WIRELESS DEALER which also contains many other important articles on diverse matters of commercial interest.

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