WIRELESS, incorporating 'Wireless Weekly,' SEPTEMBER 18, 1926

WIRELESS

INCORPORATING

WIRELESS WEEKLY

2D WEEKLY

Vol. V.] SEPTEMBER 18, 1926 [No. 5

FIRST DETAILS OF THE 'ELSTREFLEX' RECEIVER

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

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PERCY W. HARRIS, M.I.R.E.

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INCORPORATING
WIRELESS WEEKLY
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THIS WEEK'S NOTES AND NEWS

A Treat to Come

GILBERT and Sullivan lovers are promised a treat on the 20th of this month, when portions of the opening performance of "The Mikado" by the D'Oyly Carte Company will be relayed from Princes Theatre. There will be two extracts, and each will last for thirty minutes.

The "Aquarium"

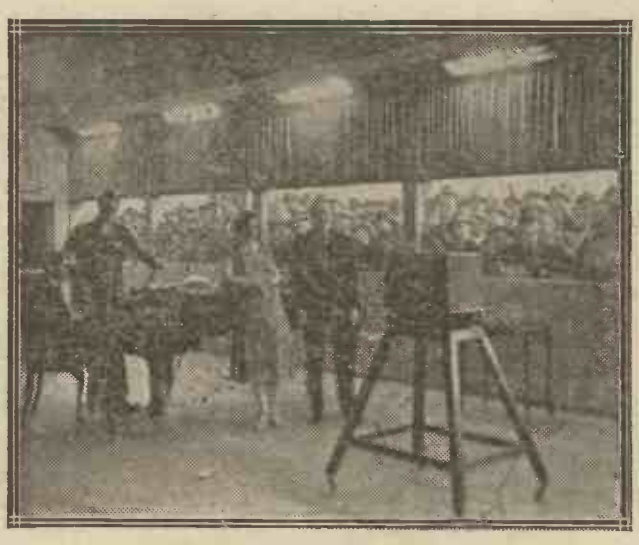
A VERY popular item at Olympia is the Exhibition version of the 2LO studio, where visitors may watch through large windows the actual work in progress during the production of a programme. The audience thereby provided seems to have been rather a trial to some of the artists, who appear to have felt that there was a sort of "aquarium" effect about the whole business!

The Opening Ceremony

THE opening ceremony was performed by Vice-Admiral Sir Alfred Chatsfield, Third Sea Lord, who made a strong appeal to visitors to confine their purchases to British goods. It is to be feared that many of the early visitors missed the opening speeches, because they did not realise that the ceremony was in progress, and many people seemed to feel that a little more "advance publicity," so to speak, on the public address system would have been useful.

The Sitwell Affair

A FURTHER development in the affair of the withdrawal from broadcasting of Mr. Frank Wilson Barrett and Miss Helen Wilson Barrett as a result of the remarks of Mr. Osbert Sitwell concerning the theatrical profession, takes the form of a statement by Mr. Oswald de Bear. Mr. de Bear states that, in view of the fact that the British Broadcasting Company had failed to support the theatres against "a most unwarrantable attack," the veto against broadcasting will now be extended indefinitely to the whole of the artists appearing under his independent management.



The "Aquarium" referred to on this page is a very popular item at Olympia, judging by the crowds "looking-in" outside the "studio."

Homeward Bound

CAPT. PLUGGE is now on the homeward journey, at the conclusion of his interesting tour of Europe with his very elaborately wireless-equipped car.

Leaving London on August 1, he has visited thirteen European countries, and he has apparently been able to receive the British stations without interruption. I wonder whether he will be pleased to see himself described in a prominent daily as "an engineer employed on the London Underground Railways"?

Chess and the Antipodes

TO celebrate the occasion of the removal of the Australian seat of Government to Canberra, a wireless chess match has been arranged between the House of Commons and the Australian Legislature. The final arrangements have not yet been made, but it is hoped that the Postmaster-General will assist, a promise of co-operation having already been secured from the wireless authorities in Australia.

Registered Repairers

WE learn that the Radio Society of Great Britain and the Wireless League have just launched a comprehensive scheme for the registration of wireless traders and repairers. The scheme appears to be something like that run by the motoring associations, and the idea is that every registered trader can exhibit a sign.

The New Wavelengths

WE understand that there will probably be some slight delay before the new European wavelengths come into operation. In view of this, the article upon the new wavelengths which was to have appeared in this issue will be reserved for a later number.

CALL-SIGN.

The NATIONAL RADIO EXHIBITION

OUR ARTIST'S IMPRESSIONS.

JUDGING BY THE TYPES ONE SEES AT THE EXHIBITION IT IS A NATIONAL SHOW WITH AN INTERNATIONAL APPEAL.

THE "LITERATURE" FIEND

THE CENTRE OF ATTRACTION? WHY - THE "ELSTREE SIX" OF COURSE

THAT "JUST BOOKED ANOTHER ORDER" EXPRESSION.

A DAINTY LITTLE MISS YOU CAN'T MISS.

JONES WAS ONLY GOING TO ENQUIRE THE WAY TO THE BAR: AND BEFORE YOU COULD SAY "SUPER-HETERODYNE" THIS ENTERPRISING SALESMAN HAD SOLD HIM HALF-A-DOZEN VALVES!

REN SWAN '26 OLYMPIA.

Simplicity of construction and operation are features of the new receiver.

The "ELSTREFLEX TWO" RECEIVER

FIRST DETAILS OF THE CIRCUIT.

By JOHN SCOTT-TAGGART, F.Inst.P., A.M.I.E.E.

This receiver is representative of the most up-to-date practice, and is intended to give powerful results, selectivity and range.

THE developments in connection with neutralised circuits have not unnaturally altered technical ideas with regard to reflex receivers. The neutralised circuit has, in fact, brought in its train several advantages quite apart from the one originally intended. Merely stopping a set oscillating is not the sole advantage; fortunately we are able to use more selective circuits and gain greater range.

In a Single Stage

Both of these advantages apply particularly to multi-stage high-frequency circuits, but the neutralising scheme is also very effective even where only a single stage of high-frequency amplification is used. Modern up-to-date valves are undoubtedly more inclined to make the old type of receiver oscillate, for the simple reason that they are more efficient and usually have a higher internal capacity.

Early Difficulties

The ordinary reflex circuit possesses the great disadvantage that buzzing due to high-frequency reaction is often set up, and to prevent this buzzing some scheme, such as a resistance of 100,000 ohms, is used. This was done on the ST100 circuit, and I cannot think of a better way of introducing the present set than to criticise the ST100 and show how completely out of date it has now become in view of the recent work we have been doing at Elstree, which has now become the centre of Radio Press technical development work.

Fig. 1 shows the ST100 circuit with a few notes attached which show some of the criticisms which can be directed against the circuit.

Series Capacities

Some effort at selectivity is made by the C.A.T. condenser, C_1. This condenser, however, does cause some sacrifice in signal strength, and the condenser C_3 across the iron-core transformer secondary T_2 is also in series with the circuit. This condenser C_3 possesses a disadvantage in that it reduces the total low-frequency voltages across T_2. If, on the other hand, we had not the condenser C_3 in circuit, the operation of the receiver would be very unsatisfactory. There can, however, be no doubt that from the point of view of quality and signal strength, it would be better if we could have the secondary T_2 absolutely open, as in the case of the ordinary low-frequency part of a receiving set.

Damping

In Fig. 1 there is the ordinary parallel condenser tuning method in the aerial circuit, and this in itself is not good for selectivity. As regards the anode circuit of the valve, it will be seen that the crystal detector is connected across the whole of the tuned anode circuit. This makes for heavy damping in a tuned anode circuit and greatly reduces selectivity and also range. The filament-to-anode path of the first valve, moreover, is connected directly across the anode inductance coil. This again introduces considerable damping into the circuit.

To obtain reaction, the coil L_2 is coupled to L_1, but the moment you begin coupling the two magnetically by bringing the two coils together, you increase the capacity coupling,

(*Continued on next page.*)

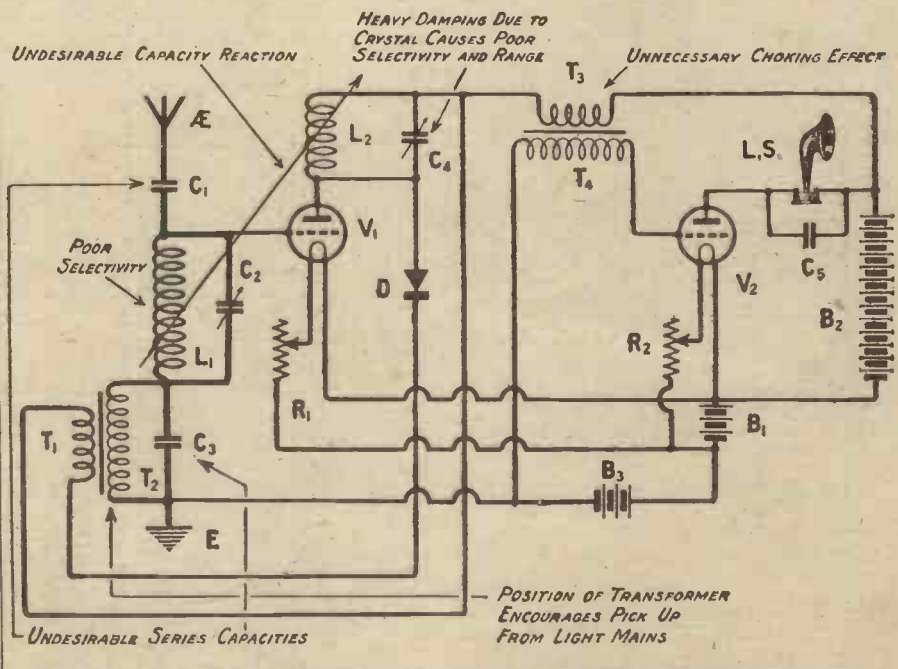


Fig. 1.—The original ST100 circuit drawn to illustrate Mr. Scott-Taggart's explanation of the defects of the early reflex circuits.

THE "ELSTREFLEX TWO" RECEIVER

(*Continued from previous page*)

and so the first valve will often oscillate even when the reaction coil L_2 is reversed. The anode circuit of the first valve contains the primary T_3 of the iron-core transformer T_3, T_4. The fact that this primary is not shunted by a condenser does not help to make the first valve amplify well as regards high-frequency currents. If, however, in the ST100 circuit we put a condenser across T_3 to get over this trouble, the whole circuit buzzes unmercifully. Another trouble which may arise is due to the impossibility of preventing high-frequency currents from the anode circuit getting back into the grid circuit, through the transformer T_1, T_2, which, although an iron-core transformer, has a capacity coupling between primary and secondary which will conduct the high-frequency currents.

Reaction Troubles

This has always been one of the great troubles in reflex receivers, and Fig. 2 explains a little more clearly what happens. This is an ordinary single-valve reflex circuit, in which transformer coupling L_2, L_3 is employed. The circuit L_3, C_2 responds to the incoming signals and therefore contains high-frequency currents. These are bound to

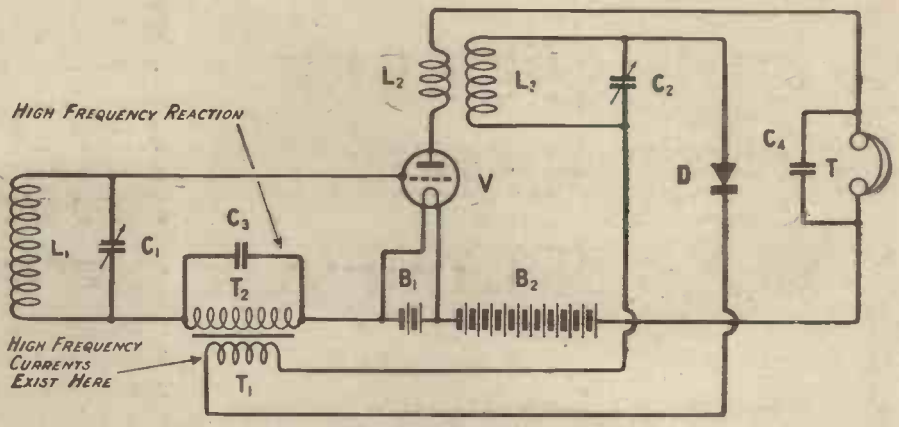


Fig. 2.—A typical single-valve reflex circuit possessing several serious drawbacks.

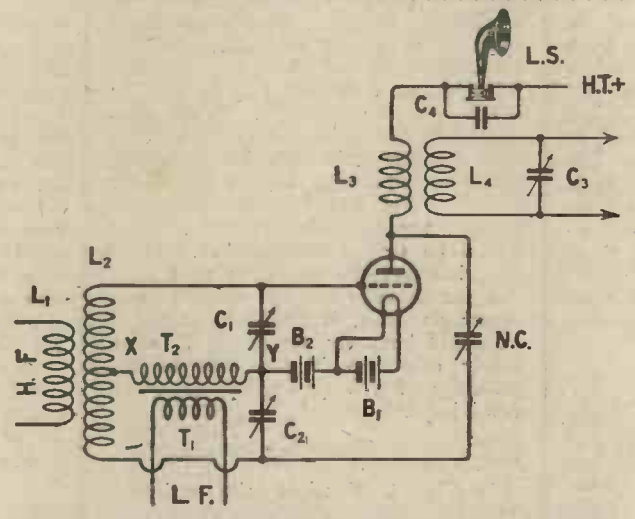


Fig. 3.—The special method of feeding back the rectified signals into the grid circuit of the dual valve is illustrated here. The basic neutralising arrangement from which this is derived is illustrated on p. 171.

get round to the primary P_1 of the iron-core transformer T_1, T_2, and from T_1 some of the high-frequency currents must be passed on to T_2, and are very liable to give the form of reaction which may set the whole circuit oscillating. The Elstreflex circuit gets over this and many of the other troubles mentioned.

"Chain" Effects

The Fig. 2 arrangement, then, suffers from the disadvantage that the high-frequency currents are liable to be communicated by means of the transformer T_1, T_2 into the grid circuit of the valve. There is also the additional trouble that the secondary T_2, which has connected across it the condenser C_3, acts somewhat like a grid-leak and condenser, thereby making the valve act as a detector.

This causes distortion, which itself has such a tendency towards buzzing, as a chain of modulated high-frequency current reaction is produced. It is impossible to go into detail at the present stage, but the reader may rest assured that a transformer secondary with a condenser across it is always liable to produce a grid-condenser and leak effect in a reflex circuit. In fact, an ordinary straight circuit can be arranged with a detector valve using a choke coil instead of a resistance, and excellent results may be obtained.

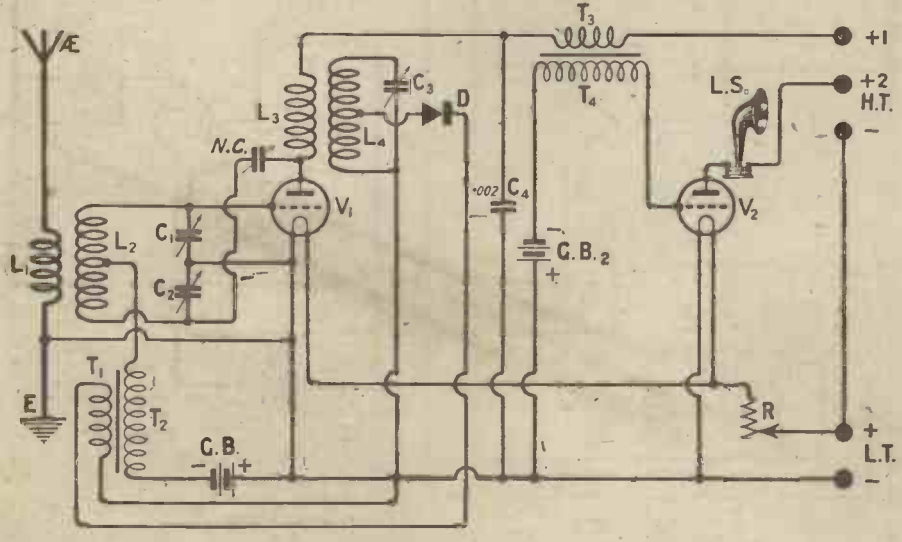


Fig. 4.—This is the actual circuit of the new receiver. Full constructional details will appear next week.

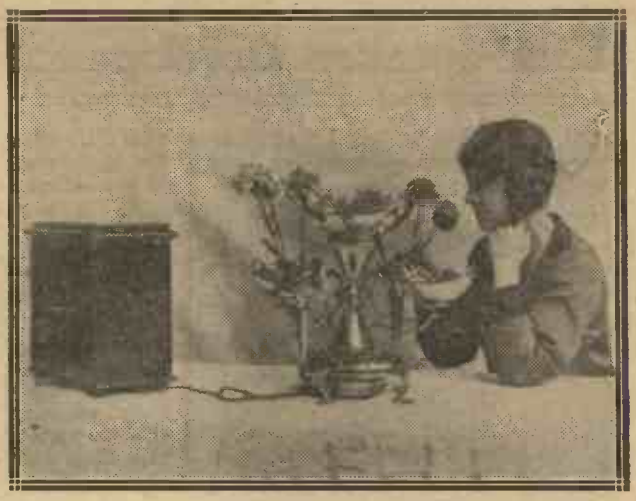
The Remedy

All these troubles are got over by using the Fig. 3 arrangement, which is really a development of the scheme used in the Elstree Six. High-frequency currents are now fed from the primary L_1 into the secondary circuit, which consists of the inductance L_2 shunted by two variable condensers

(*Continued on page* 171.)

LOUD-SPEAKER DEVELOPMENTS SEEN AT OLYMPIA

A review of some of the new models of interest.



QUALITY of reproduction is a matter which is assuming greater and greater importance in the eyes of the wireless listener of to-day, and, in the search for really pure and natural reproduction, the loud-speaker is naturally one of the most important links in the chain, and every visitor to the Exhibition will look with particular interest for the usual new models of reproducing apparatus.

General Impressions

The general impression which one gains upon completing a tour of inspection of the loud-speakers is that there are rather fewer new models this year than usual, but that such new models as there are appear to be definite attempts to secure better reproduction, rather than an unusual or particularly artistic appearance.

For example, the great majority of the really new instruments are of the large open diaphragm type, which state of affairs is a distinct contrast to the crop of new horned instruments seen at previous Exhibitions.

The New B.S.A. Model A Loud-speaker.

Open Diaphragms

It is interesting to note the great variety of ways in which the large open diaphragm has been utilised by the different manufacturers; in some instruments, for example, the diaphragm is open on both sides so that sound may be heard from both surfaces, whereas in others the back of the instrument is closed in.

Of unusual appearance is another of the B.S.A. new models (Type C).

In the first category falls the new C.A.V. loud-speaker, which is of the conical diaphragm type, rigidly mounted round the edges and provided with an actuating mechanism at the centre. This loud-speaker is mounted in a trunnion bearing, so that it can be adjusted to any elevation, or mounted upon the wall in any suitable position. A diaphragm of medium size is used, its actual diameter being 12 inches, while the resistance of the standard instrument is 2,000 ohms. Known as the "Musicola," this instrument is an example of the general tendency towards a lower level of prices for the newer loud-speakers, being listed at £2 2s.

The Open Brown Loud-speaker

It is interesting to note that one of the pioneers of loud-speaker manufacture, namely, Messrs. S. G. Brown, Ltd., have now also turned their attention to a true open-diaphragm type of instrument. This loud-speaker, which they refer to as a "Disc" type, is also of the kind in which both sides of the diaphragm are more or less open, being enclosed merely by an openwork metal screen of artistic appearance.

The diaphragm in this case consists of a rather sharply pointed cone, the concave side of the cone being towards the front of the instrument. This instrument is also of medium size, and it is being shown in two finishes, one being oxidised silver and the other black and gold.

The Amplion Range

There is a complete range of Amplion loud-speakers to be seen on Messrs. Alfred Graham & Co.'s

(*Continued on next page.*)

One of the latest versions of the Kone loud-speaker on view at Olympia.

Loud-Speaker Developments Seen at Olympia—*continued*

Stand, but it will be found that there are no very striking departures here from the existing models. Detail improvements will be noted, alterations of finish, and so on, only one actual new model being on show. This latter, which is of the horn type, is the Model A.R.65.

A product of Messrs. S. G. Brown, the new Disc loud-speaker.

A Rose Bowl Instrument

An interesting combination of the highly-ornamental type of construction with one of the later forms of open diaphragm arrangements is to be found in the "Beco" rose bowl loud-speaker. This instrument is illustrated on this page, and it will be seen that it consists of quite a large flower bowl, with a fretted series of openings round the lower curve of the bowl, a standard Beco loud-speaker being mounted in the base. This bowl, it is interesting to note, will actually hold water, and can be used for the purpose which its name suggests, thus giving the loud-speaker the place of honour in the centre of the table.

The "Beco" rose bowl loud-speaker seen on the left of this picture will actually hold water, and can be used for the purpose its name suggests.

The Peto-Scott "Clock" loud-speaker is an example of the "dual purpose" type.

B.S.A. Novelties

Messrs. B.S.A. Radio are showing three special models of Kone loud-speakers, of which two bear a general resemblance to the original Kone loud-speaker, the third, known as "Model C," is a smaller model, in which a hemi-spherical body contains a conical diaphragm of the single-surface variety. This instrument is also illustrated on these pages, and in this model the diameter of the opening is approximately 8 inches, the finish being a grained leather effect in black and gold in the specimen seen by our representative.

Celestion Models

A complete range of Celestion loud-speakers is to be found on the stand of Messrs. The Celestion Radio Co., consisting of three principal models. The smaller of these is 12 inches square, and the two larger ones 14 inches, a high resistance winding being standard in each case. In all these instruments, a special built-up diaphragm is used, the whole instrument being enclosed in a handsome wooden case with an openwork front. A special Celestion model on exhibition is a giant version of the standard models, with a 20-inch diaphragm, which it is stated will give intelligible speech at a distance of 100 yards in the open air.

A Radial Departure

An interesting loud-speaker which is something of a radical departure from existing practice is the Donotone instrument, for which very high claims are made. It has not yet been heard on test, but the fact that it consists of a complete series of tuned reed mechanisms covering the range of audible frequencies, suggest that interesting results should be obtained.

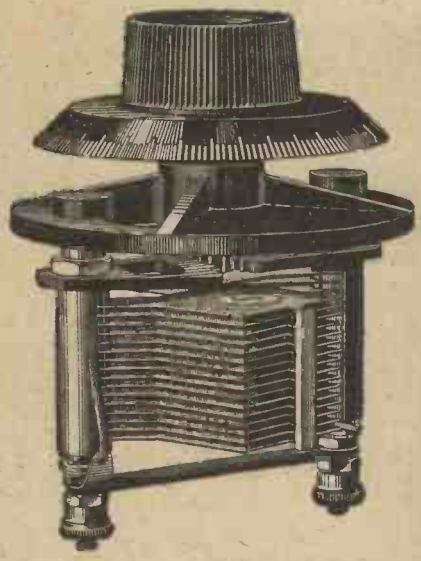
Known by the name of the "Musicola" loud-speaker, this model is manufactured by Messrs. C. A. Vandervell.

Brandes' Novelties

Messrs. Brandes are exhibiting quite a range of loud-speakers, including several new open-diaphragm models, some of which were illustrated last week. One of the larger models is provided with a paper diaphragm of elliptical form, placed behind a wooden grille. A smaller model has a circular diaphragm in a sloping-front cabinet.

The latest in the Celestion range of loud-speakers is a special exhibition model with a 20-inch diaphragm.

THE Newey "4 Point" Condenser



4 Revolutionary Points.

(1) NO HAND CAPACITY :—The Bakelite mounting plate is specially designed to minimise self-capacity and eliminate dielectric losses and isolate the vanes from control.

(2) ZERO LOSS :—All plates are bonded into a slotted equaliser bar to secure true zero loss conditions. No rubbing contact is employed.

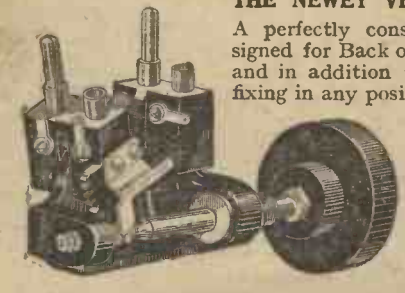
(3) 360° CONTROL :—No vernier is necessary since the condenser drive is calibrated over a range of 360°.

(4) NEGLIGIBLE MINIMUM CAPACITY :—The lowest capacity position gives only .000003 mfd. as certified by the National Physical Laboratory.

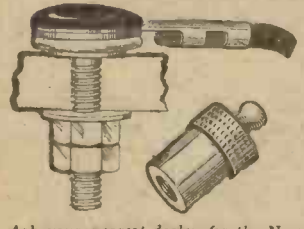
The complete condenser operates on the square law principle, is beautifully finished and made by all British Labour in all British Factories from the finest available materials.

PRICE complete with knob and dial. .0005 mfd. **17/6**
.0003 mfd. **15/-**

THE NEWEY VERNIER COIL HOLDER



A perfectly constructed coil holder, designed for Back of Panel One-Hole fixing, and in addition provided with lugs for fixing in any position on panel. Bakelite moulding throughout. Worm geared by means of metal segment and worm and fitted with patent stop plate to prevent overwinding in extreme positions—gearing ratio 8 to 1, giving fine critical tuning and permitting the use of the heaviest coil. **PRICE 7/6**



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VALUES—.0005 mfd. and .0003 mfd.

Price, with plain dial and knob ... ... 13/6 each

The Centroid Slow Motion Dial.

(A) Simple, straightforward friction drive.
(B) No special drilling of panel, fixing being done by the one-hole fixing nut of condenser.
(C) Ample sized knobs and dials.
(D) Scale of engraved aluminium with wide divisions, very easy to read.
(E) Reduction ratio 10 : 1.

Price of Slow Motion dial only ... ... 4/9 each
Price of Condenser Complete with Slow Motion dial 17/6 each

Other items shortly ready :

(A) The Centroid combined lead in earthing switch and lightning protector.
(B) The Centroid anti-vibration valve holder.
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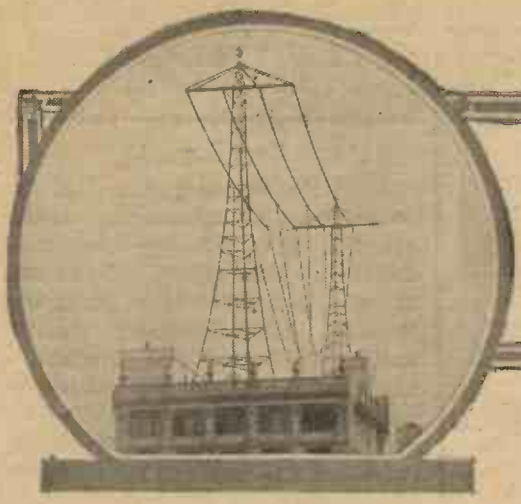


HOW WE HAVE BEATEN AMERICA

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

There was a time when America was regarded as being much ahead of this country in wireless development, but the position is now definitely reversed, and Mr. Harris' discussion of the way in which it has been done will be found of great interest.

YOU will notice that the title of this article contains at once a statement and the suggestion of an explanation. The statement is one which many might dispute, and indeed would rightly have disputed a year or more ago. It is that we, the people of the British Isles, have beaten the citizens of the United States in the development of the radio art, and particularly in broadcasting.

While I have been asked in this special number to explain *how* we have beaten America, I would like to make it plain at the very start that I do not wish to imply that in *all* matters we have taken the lead. In certain directions our cousins across the Atlantic are still ahead of us, but the distance separating the runners in the race is rapidly diminishing, so that before long I have no doubt that in all matters pertaining to radio Great Britain will be the acknowledged leader.

The Transmitting Position

Space does not permit me within the limits of a short article to deal with all the aspects of wireless, and as the main interest will naturally be the practical application of radio telephony to broadcasting this branch of the subject will be dealt with exclusively. We will therefore get down to "brass tacks" by considering the transmitting side.

At first pooh-poohed, being the subject of many jests in American journals as a scheme that would not be tolerated in any democratic country, the British system of broadcast monopoly has steadily lived down the criticisms levelled at it. Indeed, only a few weeks ago I was notified from the United States that one of the recognised leaders of the industry had gone on record as advocating a system for the United States on the lines of that so successfully operating in Great Britain.

The Future Solution

Probably the ultimate solution of the broadcasting distribution problem will be settled along lines not quite so severe as those taken in this country, but much less haphazard and slipshod than those for which America is becoming famous. The indiscriminate licensing of any person or organisation willing and able to put up the necessary capital to purchase standardised plant has resulted in a position which, however favourable it may be to those who have the good fortune to supply the apparatus at twelve or twenty thousand dollars a time, has in recent months become a source of continuous exasperation.

Before the crowd arrived! The Radio Press stand during the opening ceremony at Olympia.

For a time and up to the beginning of this year, a system now in force worked with moderate smoothness, for a fairly firm hand was kept on the use of wavelengths by the Government Departments concerned, and although they were not completely successful the jamming problem was not particularly serious. Then like a bombshell came a challenge from a station which had been ordered not to use a certain wavelength as to whether the Government Department issuing orders had the authority it claims. Result—an action in the Courts—to establish the fact that the Government's powers were severely limited, and, pending the passing of new laws, all and sundry began to commandeer the wavelength they wanted, irrespective of the trouble they caused to others. In seeking to frame legislation to overcome the many difficulties, the attention of the American public has been drawn to the smooth working of the British system, which thereupon has taken on quite a new light in their eyes.

Superior Quality

So far as the actual transmitting apparatus is concerned, it is definitely acknowledged that in quality of reproduction the British stations are unequalled. Furthermore, it is not generally realised that the elaborate studio technique—the "fading-in," blending and sound effects, which we have now come to accept as a routine affair in our broadcasting system—are, to a large extent, unknown in America, where crude throwing in and out of a switch is frequently the chief means of control. Only in a few stations, organised and controlled by the bigger concerns, are "effects" used comparable with those at all our stations.

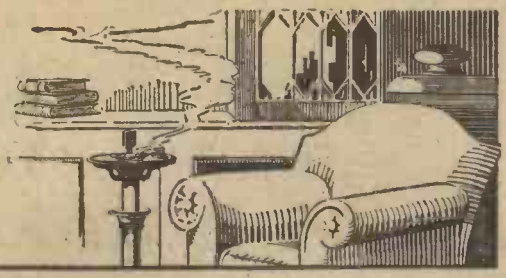
Rapid Receiving Development

I could go into many details of the transmitting apparatus to prove that this time we stand well ahead of our American rivals. In receiving apparatus the position is not quite the same, but is fast developing into one similar to that on the transmitting side. So far as valves are concerned, we are definitely ahead, although it must be admitted that to obtain that position we have very exhaustively studied the American valves and

(*Continued on page* 176.)

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.

Induction Extraordinary

Some time ago I was trying two of those ingenious Dimic coils, and they pretended there was no induction between them. I didn't believe this, but I was in a hurry and passed on. Last night I had the leisure, and connected one in place of the aerial and one in place of the secondary in a three-valve set, and stood them end to end. Result excellent. I turned the second one at right-angles; result almost the same. I lifted it 1 ft. away, then 2 ft.; results still excellent, so I tried to see where it would stop, and made it 6 ft.; slight retuning, but undiminished volume.

Finally I put the coil at the maximum distance possible, 15 ft., coils end on, and still received 6BM at R6! I have come to the conclusion that I might as well keep my secondary in the next room! One is always hearing about loose coupling; next time some friend says, "I always keep my coupling loose, seldom less than 3 in.," I shall airily reply, "Oh, really! 3 in.? My usual distance is 6 ft."

Further Experiments

Fired by these results, next day I took the set to a larger place and received 5XX with 31 ft. between the coils, using a 150 and 200 plug-in coil, at a rather wobbly R3 to R5. At 7 ft. I worked two loud-speakers audibly. I feel sure that with proper leads, a sensitive set, and no extraneous conductors about, coils could receive Daventry even 100 ft. apart, not loud, no doubt, but intelligibly. This energetic re-radiation opens one's eyes to the immense amount of mutual interference that must be going on in the ordinary set, and emphasises the importance of screened coils.

THE "TEN GUINEA NEUTRODYNE"

Test Report.

After the final adjustment of the neutralising condensers the author obtained the following results:—London, Birmingham, Newcastle, Glasgow, Belfast, Munster, Hamburg, Brussels, San Sebastian, Bournemouth, Madrid (Union Radio), a number of German relays, and several unidentified stations were heard on the loud-speaker, although they were not all at full loud-speaker strength.

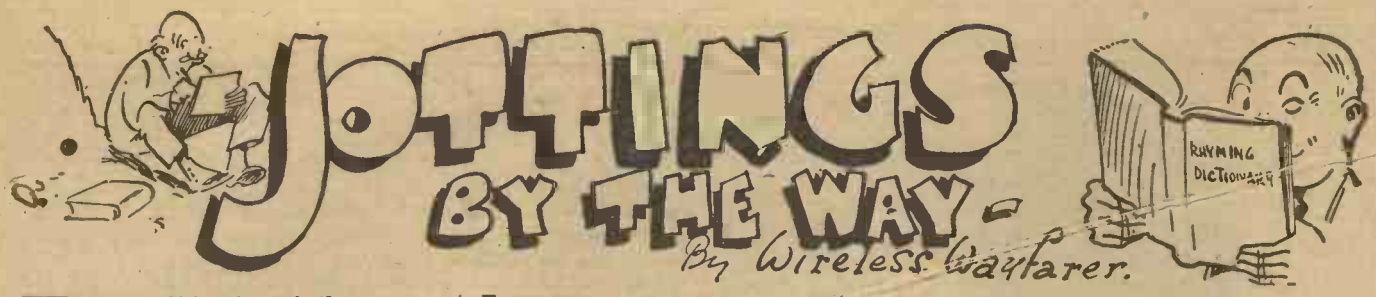
NEXT WEEK.

How to build the "Elstreflex Two."

More Secrets of Modern Radio Efficiency.

Special Free Gift Sheet of Panel Transfers and

MANY OTHER FEATURES

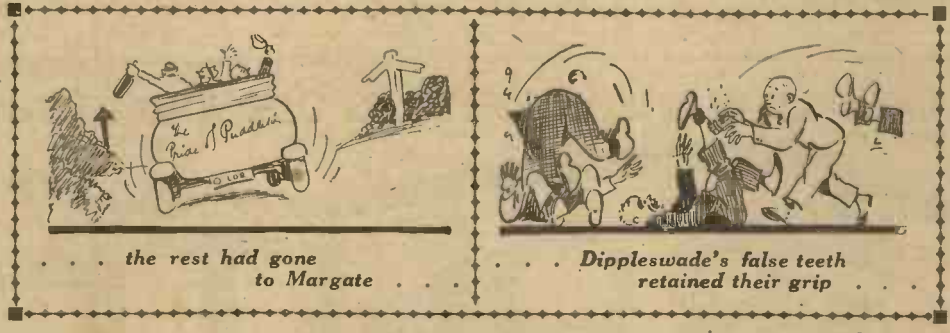


IN spite of the success of our garden fête, or perhaps because of it, the Little Puddleton Wireless Club has recently found itself very hard up once more. When I say that this state of affairs was possibly due to the fête, I mean that so much money flowed into our coffers then that at the next meeting of the club it was duly proposed, seconded and carried unanimously that all members' subscriptions should be remitted for the current year. As a matter of fact, the only people present at this meeting were myself (in the chair) and Bumpleby Brown (the rest of the club having gone for the day in the *Pride of Puddleton* to Margate in order—so they said—to have a look at GNF), and I doubt if any meeting has ever been so heartily unanimous as we were.

The General's suggestion of a "Limerick" competition in Little Puddleton revives all the enthusiasm we have come to associate with "Cross-words."

Veto!

An amendment was also proposed, seconded, and carried to the effect that only those members who had attended this meeting should be excused from paying their subscriptions; this, however, was negatived at the next meeting of the club, which was attended by every man of the strength. Anyhow, we felt so prosperous that we decided to launch out a little in various directions. A proposal was made by me that a quarterly grant of a hundred pounds apiece should be made to Professor Goop and myself in view of the fine work that we have done in wireless, but this was thrown out by thirty-five votes to two. If you'll believe me, it would have been thirty-five to *one* if I had not happened at the critical moment to look through the window and see Professor Goop just outside.



. . . *the rest had gone to Margate* . . .

. . . *Dippleswade's false teeth retained their grip* . . .

A Sad Awakening

When, after the orgy of spending, during which I managed to sell a transformer of Snaggsby's and a loud-speaker of Gubbsworthy's to the committee, the horrible discovery was made that the item "balance at bankers" had moved to the negative side of the zero line, a full meeting was called, at which the General presided. All sorts of ideas for raising the wind were put forward. Poddleby suggested that Professor Goop should be sent on a lecturing tour, but after some discussion it was agreed that he would probably lose himself on the way, or be taken in the midst of a lecture with an inventing fit, during which almost anything might happen.

Personally, I offered to give the proceeds of one day's work to the funds if everyone else would do the same. Poddleby, who sometimes forgets his manners, said that he would lasso the moon, sell it as green cheese, and present what he received to the club. He stated that it was even more likely that he would be successful than that I would do a day's work. I happened at the moment to be sitting within easy reach both of a nice fat high-tension battery and of a nasty fat Poddleby. It was really a beautiful shot, the point of impact being precisely upon the thickest part of Poddleby. . . . In about half an hour's time, when the chairman had at last restored order by throttling Admiral Whiskerton Cuttle till he released his hold of Breadsnapp's ear (which he thought was mine) and by prising off Gubbsworthy's leg Dippleswade's false teeth, which, though parted by the width of the club room from their owner, still retained their grip, we settled down to business once more.

The General to the Rescue

"I believe," roared the General, "that I have an idea which will solve all our difficulties." Everyone tried to look like a question mark. In this Poddleby was the most successful, for he was still somewhat doubled up. "I propose," said the General, "that we have a limerick competition." "A splendid idea," I cried. "I know I shall win, for I once got the first prize when the limerick craze was on." "What was the prize?" shouted the members in chorus. "Ten thousand pounds," I said, trying to look modest. They gazed at me with renewed respect. My natural love of truthfulness compelled me to explain that I tied with 480,000 other competitors, and that my share of the prize-money, though invested in gilt-edged securities, never produced what one could really call an income.

After a little discussion it was decided, without a single dissentient vote, that the competition should be inaugurated at once. The entrance fee was fixed at a shilling, and the prize at ten pounds. The conditions were that the subject must be a wireless one, and that you could have as many shots as you liked at a shilling a time.

Dire Consequences

Not only Little Puddleton, but the whole of the surrounding district promptly went limerick mad. At the club house, in the train, in the bus, or even in the High Street you would meet men murmuring:

Ti-tum tity tum tity tum,
Ti-tum tity tum tity tum,
Ti-tum tity tum,
Ti-tum tity tum,
Ti-tum tity tum tity tum,

and beating time with the forefingers of their right hands. Everyone you met asked if you knew a rhyme for anode, or frequency, or impedance. Professor Goop, who is no poet, confided to me that his entry was to be:

There was a young man of Bath,
Whose earth had a very high resistance because it was in a path.
He talked it all over,
With a young friend from Dover,
And one day when his wife was out he made a big hole in the asparagus bed and buried the baby's bath.

Jottings by the Way—*continued*

When I mentioned that even limerick lines must scan he got so huffy about it that I did not pursue the subject.

The Judging

At last, when all the entries were in, it was decided that they should be whittled down to four by the Committee, that a mass meeting should be held in the Town Hall, which seats twenty-five, provided that most of them sit on the curbstone in the High Street outside; that the selected

. . . *selling the General's raiment* . . .

limericks should be read to them; and that the audience should decide who was the winner. So far I had sent in no entry, for it is extraordinary how short of small change people always are when you want to borrow a shilling.

It had, however, been laid down that late entries might be sent in at the meeting itself on payment of a fee of half a crown, and, having provided myself with the necessary coin by selling General Blood-Thunderby's raiment to an old-clothes merchant whilst our respected chairman was bathing in the Pud, I went to the meeting full of hope. Despite the comment which his progress through the town earlier in the afternoon, clad only in a swimming suit, had created, the General presided, P.C. Bottlesworth standing beside his chair to make sure that nobody went off with any of his garments or possessions. Rising to his feet, the General, after a few apposite opening remarks, read the first limerick, which had been submitted by Snaggsby:—

There was a young fellow named Cholmondeley,
Who regarded his wireless set ghlolmondeley,
For it kept rectifying
The noises of frying—
In fact, it behaved very rholmondeley.

This was greeted by rounds of applause, after which quite a good reception was accorded to Poddleby's:—

Because all his neighbourhood stated
That his single-valve set radiated,
They fell upon Jones,
Tore the flesh from his bones,
And the subsequent mess was cremated.

So great was the cheering when Dippleswade's effort:—

Said an expert whose surname was Wymondham,
"Never solder your joints till you've tymondham,"
Here he paused for a spell,
For some hot solder fell
On his finger-joints—tymondham and skymondham,

was read that my heart descended to the neighbourhood of my boots. Gubbsworthy had a fine reception with his:—

For his panels, a wireless fan, Marjoribanks,
'Stead of ebonite always used larjori planks;
When they asked: "Don't they leak?"
He replied: "So to speak,
But I cured that by dressing with starjori, thanks."

The Victor

For a moment it seemed that the prize would go to Dippleswade, but at this juncture I stepped forward, falling on the way over Bumpleby Brown's feet, and handed to the chairman a slip of paper and a silver coin. Opening the folded paper, the General read:—

"There was a transmitter at—um—ah—ah ——"

He grew redder and redder in the face; his jaw worked in the most amazing way, though no sounds but the weirdest came from it. "I think," he said, after a brief consultation with the Committee, "there can be no doubt that this late entry wins the prize. I will not read it, because the winning limerick is to be printed in the *Gazette*. When the meeting had dispersed the chairman summoned me to the platform, and,

. . . *stuffing my ten Fishers into my pocket* . . .

after shaking me warmly by the hand, handed me my paper, upon which was written:—

There was a transmitter at Clzklwrpstrz,
Whose right hand sometimes got the jzklwrpstrz;
Of his dots and his dashes
He made fearful hashes,
Whilst his numbers were nearly all wzklwrpstrz.

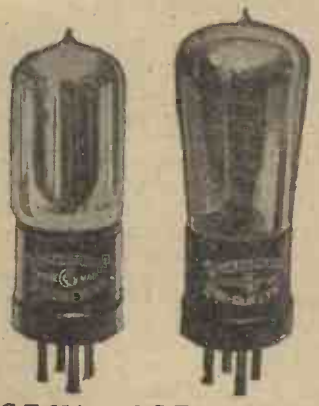
"We had to give you the prize," he said, a little grudgingly, I thought, "because I did not want to risk breaking my jaw in reading it aloud." "It is the simplest thing in the world," I smiled; "you see, 'Clzklwrpstrz' is pronounced 'Clumps.'" "Is it really?" asked the General. "It is when I write it," said I, stuffing my ten Fishers into my safest pocket, and making hastily for the door.

WIRELESS WAYFARER.

No. 46. **An Awful Warning.**

NEW VALVES AT OLYMPIA

The C.T.08+, a new addition to the Cleartron range of valves.



The C.T.15+ and C.T.25+, as well as the Cleartron valve shown on the left above, are intended for power amplifiers, following the C.T.08, the C.T.15 and the C.T.25.

The Benjamin S.P.18/G is intended for early stages of L.F. amplification or for detection.

IN addition to the recent and very welcome reductions in the prices of valves, there is further good news for the valve user in the fact that several interesting new types are being shown at the Exhibition for the first time. It is significant that the majority of these are dull-emitter power valves and general-purpose valves of abnormally low consumption.

New Cleartron Range

Among them are three new Cleartron power valves—the C.T.08+, the C.T.15+, and the C.T.25+. In each case these valves are intended for use as power amplifiers following valves of the C.T.08, C.T.15, and C.T.25 types.

The C.T.08+ works with a filament current of .15 ampere at 3 volts, and is therefore suitable for use in a receiver that normally employs the .06-ampere type of valve. It has an amplification factor of 4, and an impedance of 8,000 ohms.

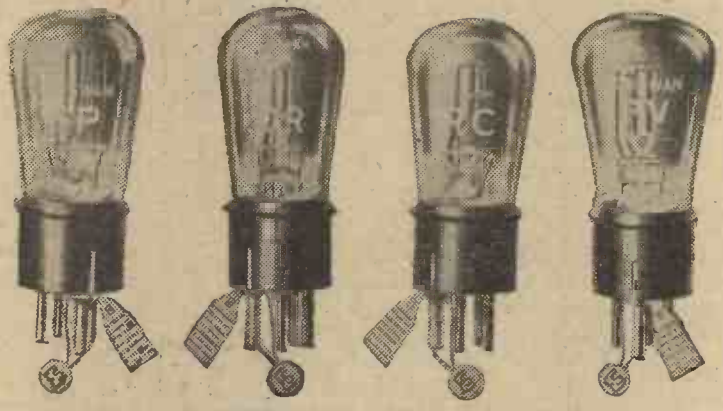
The C.T.15+ consumes .3 ampere at 2 volts, has an impedance of 5,000 ohms and an amplification factor of 3.5. This valve is recommended in receivers normally employing the standard general-purpose 2-volt valves.

The last of the series, the C.T.25+, is intended to follow the ordinary 5-6-volt type of dull emitter, and consumes .5 ampere at 5 volts. Its impedance is very low, of the order of 4,000 ohms, and its amplification factor 5.

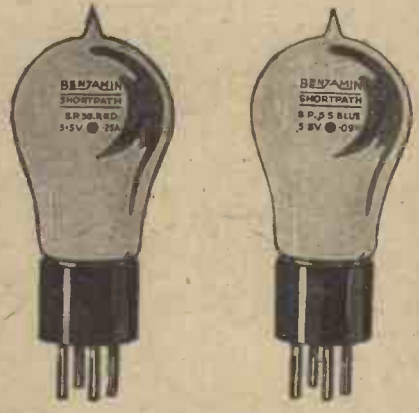
The S.P.18/R is an all-purpose valve consuming .3 ampere at 1.8 volts.

Ediswan Additions

Some interesting new types of Ediswan valves are on show, a new "2-volt family" having been introduced. This consists of the G.P.2, the D.R.2, the R.C.2, and the P.V.2. The functions of these valves are fairly obvious from their nomenclature.



Four interesting additions to the Ediswan range of valves. They are, from left to right, the G.P.2, the D.R.2, the R.C.2 and the P.V.2.



These two new Benjamin 6-volt valves are the S.P.55/R (left) and the S.P.55/B.

The first three all consume .1 ampere at 2 volts, and their impedances are as follow: G.P.2 (general purpose), 16,500 ohms; D.R.2 (special detector), 27,000 ohms; R.C.2 (specially for resistance-capacity amplification), 150,000 ohms. The power valve (P.V.2) has the slightly higher filament consumption of .15 ampere, and an impedance of 9,000 ohms. Thus a valve for any purpose may be worked from a 2-volt accumulator, and the total filament consumption for a four-valve set need not be greater than .45 ampere.

The Benjamin Series

The new range of Benjamin "Shortpath" valves (six in all) includes valves intended to work only from 2-volt and 6-volt sources. The former valves are the S.P.18/R, S.P.18/G, and S.P.18/B.

The S.P.18/R (Red Spot) is an all-purpose valve consuming .3 ampere at 1.8 volts. The S.P.18/G (Green Spot) is recommended for early stages of L.F. amplification or for detection. Its filament current is the same.

The Blue Spot valve has the very high impedance of 70,000 ohms, and is intended chiefly for resistance-coupled amplifiers, although the makers also claim for it great stability in use as an H.F. amplifier. Its filament current is much lower than that of the Red Spot and Green Spot valves, being only .09 ampere.

The S.P.55/R (Red Spot) is a low-impedance power-valve for use in the last stage of an L.F. amplifier. Its consump-

Intended chiefly for resistance or choke-coupled amplifiers, the S.P.18/B consumes .09 ampere at 1.8 volts.

NEW VALVES AT OLYMPIA

(*Continued from page 164*)

tion is .25 ampere at 5.5 volts. The S.P.55/B (Blue Spot) is intended for resistance or choke-coupled amplification, and consumes .09 ampere only at 5.5 volts.

The last of the series, the D.E.55, is the general-purpose 6-volt dull-emitter, consuming .09 ampere.

Burndept Additions

Among the new range of Burndept valves is the LL525, a "super power valve." This valve has the very low impedance of 3,000 ohms, and is recommended to work with an anode voltage of 120-150. Its filament characteristics are apparent from the name (.25 ampere at 5 volts). The

The Benjamin D.E.55, a general-purpose 6-volt dull-emitter, consuming .09 ampere.

"LL" signifies that the valve is particularly suited to low-frequency amplification.

The HL425 is, of course, a general-purpose valve which is claimed to be very efficient also as a power valve. Its impedance is of the order of 10,000 ohms, making it quite suitable for low-frequency amplification.

The last of this series is the L240, a 2-volt power valve designed for use with anode voltages as high as 120. Its impedance is 6,500 ohms.

The makers of these valves claim that their filaments can be over-run to an astonishing degree without any loss of emission, and also absence of microphonic noises.

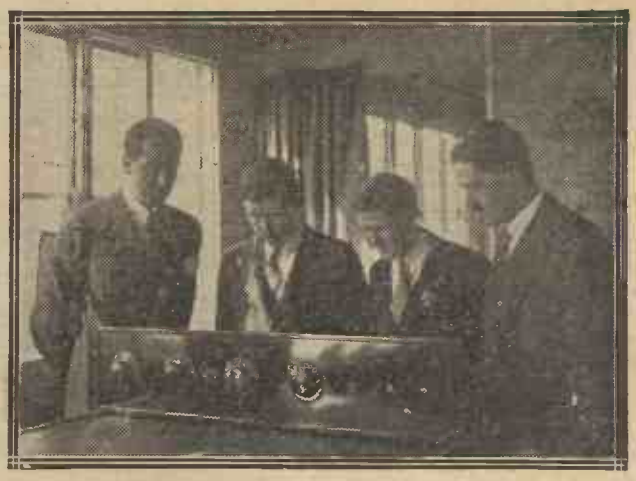
PRICE CORRECTION.

Owing to a printers' error, on page 121 of our last issue the price of the Benjamin D.E.55 valve was given in an advertisement as 10/6. Readers are requested to note that the correct figure is 18/6.

SECRETS OF MODERN RADIO EFFICIENCY

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

This week Mr. Reyner commences an important series of articles which has been specially prepared to enable "Wireless" readers to obtain a thorough grasp of the latest developments in modern receiving practice.



PROGRESS in any art follows mainly in the wake of popular demand. When broadcasting first started the very novelty of being able to hear music which had appeared in some mysterious manner from the air, as it were, was sufficient to arouse and maintain the popular interest for some considerable time.

"Station Hunting"

After this initial burst of enthusiasm there came the period when the reception of distant stations became of interest, and in its wake came the craze for logging as many distant stations as possible. We all know the games which were played in America in which the total distances of the stations logged were added up, and if you could not "travel" 20,000 miles in a night in this manner, you did not consider that you had really started. This hunt for more stations caused the development of more efficient receiving apparatus, culminating in a reasonable state of efficiency in the art of radio reception generally. Just about this time, however, the novelty of the reception of broadcasting began to wear off, and listeners generally became much more critical.

Quality

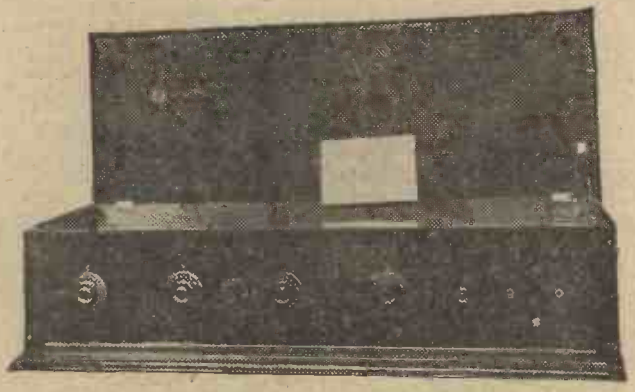
The question of the quality of reproduction began to be considered. Radio "fans" would come home with an air of mystery and a flash-lamp battery and would insert the latter into the interior of the set, producing an astonishing difference in the naturalness of reproduction.

Nobody nowadays, of course, would dream of omitting grid-bias from his low-frequency valves except in special cases when adequate precautions to produce good quality are taken in other directions. Quality of reproduction is a *sine qua non* in any modern receiver, at any rate as far as the local station is concerned.

We have not by any means solved this problem satisfactorily, but we have at any rate devised methods for giving satisfactorily good reproduction. The difficulty lies not only with the receiver itself, but with the loud-speaker also, and I am inclined to think that the principal advance to be made in the science of radio acoustics rests with the loud-speaker at the present time. Meanwhile, however, we have attained a fair standard of quality, sufficient for the time being.

Quality and Distance

Obviously, however, when reasonable and pleasant quality has been obtained from the local station, it is only natural that some demand shall be made for good quality on distant stations. Now a comparatively short time ago some sets would give very good quality on the distant stations which they received, and other receivers, possibly capable of a greater range of reception, would nevertheless not give such pleasing quality. Indeed, two receivers having almost identical low-frequency components might still give totally different results as far as quality was concerned.



The "Liberty" version of the "Elstree Six," which is on view at the Radio Exhibition.

Selectivity Achieved

Now, the modern circuit is capable of giving us not only considerable selectivity, such that we are enabled to cut out a station operating on one wavelength, and to receive another signal having a signal strength considerably less than one-fiftieth and separated by 8 or 9 metres only (which is the condition obtaining when receiving Cardiff during London's transmission, at a distance of about 10 miles from the latter). Not only can we achieve a selectivity of this nature, but also we can obtain the distant stations with a really pleasant quality.

It is true that there are certain sources of interference which have not yet been overcome. Anyone listening in at the present moment may laugh at the bare suggestion that quality of reproduction is possible on any distant station. The number of stations working at present in Europe is so large that almost complete chaos is the result, and at any given moment there may be only some eight or ten stations on the 200-600 metre band which are at all worth listening to. This, however, is due solely to the fact that the stations are working with too small a frequency separation between them, so that the well-known heterodyne whistle is produced, and this condition of affairs will be considerably improved when the frequencies of the various stations are controlled by international agreement.

I have raised all these points with the object of showing that the demand nowadays is for quality of reception, even on distant stations, and the principal developments in the modern receiver have been towards this end. In this series of articles, therefore, I propose to outline some of the principal features of the modern radio receiver, to indicate why various things are done, and how such actions affect the efficiency of the whole arrangement.

A Striking Difference

One of the most striking differences between the receiver of to-day and

How Recent Developments have Revolutionised Radio Reception

that of yesterday lies in the number of tuned circuits which are employed to-day. In the old days a receiver having two tuned circuits was considered quite complicated. In addition to all these tuned circuits we admittedly had all sorts of other contrivances, such as filament controls, potentiometers, swinging reaction-coils, and as often as not various switching devices.

Nowadays, however, the real DX receivers of the straight H.F. type all possess at least three tuned circuits, and sometimes more. This at first sight would appear to be a little more difficult to handle, but with the increase in the number of tuned circuits we have also produced a reduction in the number of controls in other directions. For example, the variable filament resistance is often replaced by a fixed resistor. The reaction is either replaced by a simple capacity-controlled arrangement or else omitted altogether. In any case, the reaction is often not necessary in picking up the stations, and is only used as a subsidiary adjustment.

Why it is Done

One immediately wonders why this number of tuned circuits is employed, and whether some simplification could not be achieved in this direction. For example, the Elstree "Solodyne" which I have just finished developing, and which was described in the September issue of *Modern Wireless*, achieves a considerable measure of simplification by coupling three tuned circuits together on the same spindle. Would not the energy and research which have been expended on this receiver have been better spent in trying to accomplish the same result with one or two tuned circuits only?

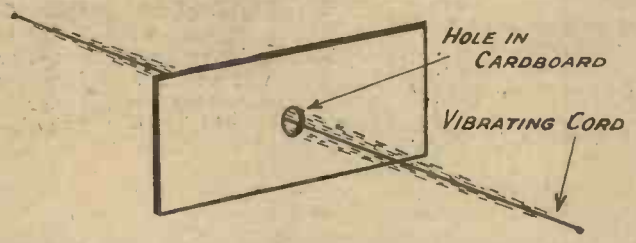
The answer to this is quite definitely No. A certain minimum number of tuned circuits is absolutely essential in order to maintain adequate quality. This is due to the peculiar form of wireless telephony transmission. As my readers will know, this consists of a carrier-wave at a very high frequency which is modulated or caused to vary at a much lower frequency.

Composite Frequencies

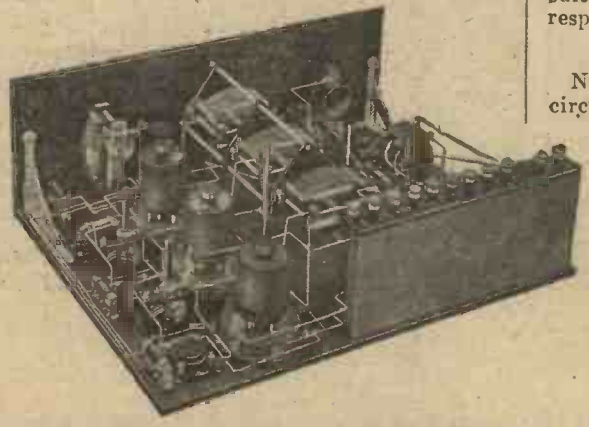
Now, these modulations on the carrier-wave result in the production of other frequencies nearly the same as that of the carrier, but slightly different, and these occupy a band on each side of the carrier. These various frequencies are known as the side-bands. We can obtain a very simple analogy to give some idea of the necessity for these side-bands as follows.

Suppose we have a tightly-stretched cord running from one side of the room to the other. As long as we do not transmit any vibrations along that cord it remains taut and straight. If we pluck one end, however, we cause a vibration to travel down the cord, with the result that the wire will vibrate and will belly out in parts, so occupying a certain space on each side of its normal equilibrium position.

In a somewhat similar manner the fluctuations caused by the speech and music on the carrier-wave occupy a certain space on either side of the actual carrier-wave. The analogy in many respects is an imperfect one, but it serves for the moment to give some idea of the mechanism.



"If the hole in the cardboard is made too small, then some of the vibrations will be cut off, and the motion of the cord on the other side of the hole will not be a faithful reproduction of that at the transmitting point."



One of the latest Elstree successes, the "Solodyne," a five-valve receiver with one-dial control which has received 50 stations on the loud-speaker.

A Simple Analogy

Now, if we consider again the cord stretched across the room and we make it pass through a small piece of cardboard with a hole in it, then the size of the hole must obviously be large enough to allow the cord to vibrate to the fullest extent. If the hole is too small, then some of the vibrations will be cut-off and the motion of the cord on the other side of the hole will not be a faithful reproduction of that at the transmitting point.

If the cord were not vibrating at all, then we could have a very small hole just sufficient for the cord to pass through, but as long as it is vibrating we must allow sufficient clearance for the vibrations to pass through unimpeded.

Now, in the case of a wireless receiver we have to tune to the wave which we are receiving, and this is done by varying the inductance and capacity of the receiving circuit until they respond to the actual frequency which is being transmitted.

This principle of tuning will be familiar to everyone. Most circuits containing an inductance and a capacity have a certain natural frequency, as it is called, and any current started in the circuit will oscillate backwards and forwards at its frequency. In a wireless receiver we adjust the inductance and capacity so that the natural frequency of the circuit corresponds to that of the transmitting station from which we are receiving signals. The very small impulses which we receive on the aerial then produce a building-up effect, with the result that appreciable current flows in the circuit. Until this is done no appreciable response is obtained.

Controlling Selectivity

Now, according to the design of the circuit, we can make the response of the tuned circuit more or less sharp. In other words, we can control the selectivity of the arrangement. If we have a coil having a very low resistance (or provided with a considerable amount of reaction which produces a similar effect to lowering the resistance) we can obtain a circuit which is extremely sharply tuned, and would correspond to a very small hole in the piece of card in the mechanical analogy just considered. The disadvantage of such an arrangement is that it would not allow all the side-bands to be received, and distorted speech and music would result. We must therefore stop the reduction of resistance at some definite point such that all the side-bands are received at satisfactory strength.

Need for Multiple Circuits

Unfortunately, if we design a tuned

(*Continued on next page.*)

Secrets of Modern Radio Efficiency

(Continued from page 167)

circuit to have these necessary characteristics we find it is impossible to obtain the high degree of selectivity which is necessary to cut out the local station at a distance of a few miles only and receive stations only a few metres different in wavelength. What then are we to do? As it happens, we can get over the difficulty by employing more tuned circuits. If we use a succession of tuned circuits, then we obtain a filtering action which increases as the number of tuned circuits is increased. The first tuned circuit will cut down the strength of the local station relative to the distant one, the second tuned circuit will produce still greater selective action, and so by including a sufficient number of tuned circuits we can obtain the necessary selectivity.

At the same time, if we make each of the tuned circuits with a sufficiently

Among the many receivers on view at the Exhibition there are many really compact portable models to be seen.

wide "aperture," as it were, we shall obtain all the side-bands we require and so maintain adequate quality. This is the reason for the adoption of the train of tuned circuits which is found in a modern receiver, and the question arises as to where this train should stop.

Actual Requirements

If the matter is worked out mathematically we obtain the following results. For a receiver which has to operate at a distance of 10 or 12 miles or more from the local station, then good quality can be obtained with three tuned circuits. It does not follow that three tuned circuits will give the necessary selectivity, and, in fact, they will not do so unless they are very carefully designed. The point is that if we do obtain our selectivity in three stages instead of trying to do it in one, we shall still obtain sufficient side-bands despite the effective selectivity to render the quality good.

Better results are obtainable using four tuned circuits. Not only is it easier to obtain the selectivity required, but also the quality is very slightly better. Particularly if it is desired to operate the receiver at very short distances from the local station, then four circuits are essential.

This is because the local station is much stronger in the latter case, and a greater selectivity is required. We cannot obtain this by making the existing circuits more selective, because this would cut off some of the side-bands. It is necessary, therefore, to add a fourth circuit, which may be another tune, or may take the form of a wave-trap.

In the next article I shall discuss how we incorporate these tuning circuits in the receiver proper, and I shall deal with some of the difficulties which are encountered in so doing.

NEWS FROM ADVERTISEMENTS

The introduction of the Colvern low-loss inductance former is the subject of an interesting announcement made in the advertisement of Messrs. Collinson Precision Screw Co.

Messrs. Will Day, Ltd., have on view at their showrooms a complete Elstree solodyne receiver—the wonderful one-dial receiver described in the September issue of *Modern Wireless*.

Messrs. J. R. Morris will send post free to any reader who applies a useful and instructive booklet, "How to Get the Most Out of Your Radio Batteries."

A large fully-illustrated 48-page catalogue (R/114) may be obtained from Messrs. Ward & Goldstone, Ltd.

A postcard will bring a copy of Messrs. J. H. Taylor & Co.'s Reliability Wireless Guide No. 2.

Readers are invited to apply for full particulars of the extended payment system announced by Messrs. W. Bullen in connection with the Bullphone Nightingale loud-speaker.

Messrs. Benjamin Electric, Ltd., advertise suitably designed grid-leaks and grid condensers for mounting direct on to the Benjamin valve holders.

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AT HUNT'S NEW PRICES, HELLESEN BATTERIES WILL COST YOU NO MORE, THEY ONLY GIVE YOU MORE.

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

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

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Write for leaflet No. 155a.

Allow for Microstat space only

When you are "laying out" your panel for your next home-made set—let the Microstat solve your space problem.

The underpanel space required for the

See that the patent Nos. 218523 and 584825 are stamped on each Microstat

MICROSTAT

Filament Resistance

(manufactured by Lifford Eng. Co.) is negligible.

Its noiseless action and delicate graduation of resistance will add to the efficiency of any set. When you adjust your filaments it is impossible to hear the Microstat in action.

Use the Microstat on one valve only, just to try it, and you will speedily replace all other types of Rheostat.

The old price of **2/9** *now includes the Dial.*

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The whole wireless world knows that the "L. & P." Universal Coil Holder gives the finest control of coupling ever achieved.

Thanks to the new "L. & P." Indicating Dial, you can now keep a record of the exact degree of coupling between the two coils, from 0 to 90°.

The Dial is easily fitted to any "L. & P." Coil Holder—without even the need of drilling a hole.

It is an accurate scientific instrument, beautifully made, and working without a trace of backlash.

The one thing needed by the experimenter who believes in keeping a log of all stations received.

The "L. & P." Indicating Dial, 5/6 each

The "L. & P." Universal Two-coil Holder, 8/6

See STAND 6 at the National Radio Exhibition - Olympia.

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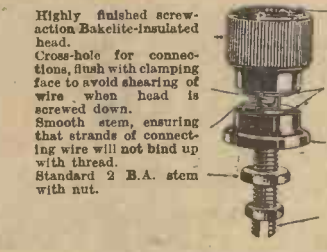
LONDON & PROVINCIAL RADIO CO. LTD.,

'Phone: 94. COLNE, Lancs. *'Grams:* "Reception."



Highly finished screw-action Bakelite-insulated head.

Cross-hole for connections, flush with clamping face to avoid shearing of wire when head is screwed down.

Smooth stem, ensuring that strands of connecting wire will not bind up with thread.

Standard 2 B.A. stem with nut.

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Beautifully finished in genuine Bakelite, the Belling-Lee Terminal eliminates soldering, is completely insulated, and made in 28 different engravings.

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REACTION

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BELLING·LEE

PANEL FITTINGS

Advertisement of BELLING & LEE, Ltd.,
Queensway Works, Ponders End, Middlesex. E.P.S. 12

The "Elstreflex Two" Receiver

(*Continued from page 154.*)

C_1 and C_2 in series. These two condensers are operated from a single knob, and as far as the circuit L_2, C_1, C_2 is concerned, act as a single condenser, having half the capacity of each.

Between the middle point X of the inductance L_2 and the point Y in between the condenser C_1 and C_2 is connected the secondary T_2 of the iron-core transformer T_1, T_2. The anode circuit of the valve contains the primary L_3 of the high-frequency transformer L_3, L_4, and the loud-speaker LS, shunted by a condenser C_4. A neutralising condenser NC is connected between the anode of the valve and the bottom end of L_2, as shown.

(*Continued on page 181.*)

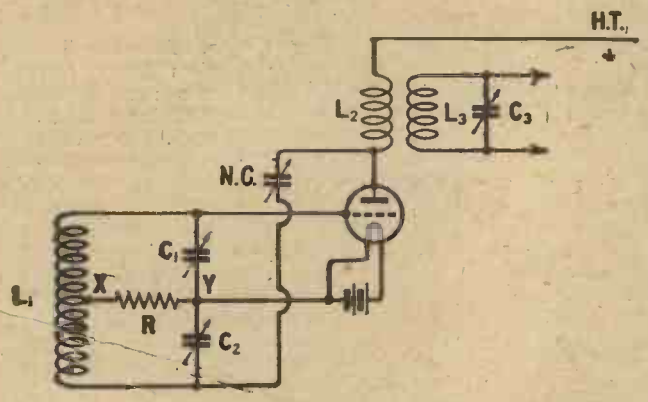


Fig. 5.—The basic neutralising circuit from which the "Elstreflex Two" has been developed.

DO YOU DANCE BY RADIO?

By JACK HYLTON

In this special article Mr. Hylton gives his views on a subject on which he is recognised as an authority.

Mr. Jack Hylton.

THE amazing increase in the popularity of dancing during the last few years is due, I believe, to three main causes. First must be mentioned the simplification of dancing itself, which has been brought about by the invention of the fox-trot and other modern dances, and second, the greater facilities for dancing now available. But the other and no less important reason is the familiarity which the general public now enjoys with the newest dance music, made possible principally by the magic of radio. I would like to explain why the changes in our modern music have rescued dancing from its former position of an occasional pleasure to one in which every person to-day can indulge. But I must confine my remarks to the practice of radio dancing.

A Real Advantage

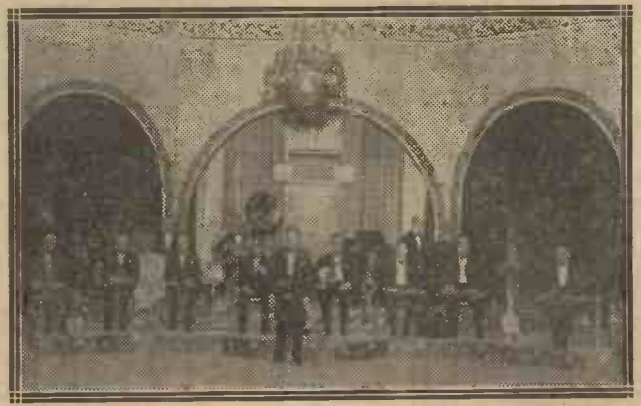
Perhaps the greatest advantage of dancing to radio music is that it brings the exhilaration of the finest ball-room into the care-free atmosphere of the listener's own home. At various times I have danced to the music of several bands received over the wireless, and it has really seemed to me that I was listening at close quarters to the real thing. Thus does wireless overcome the barriers of distance.

Some time ago, the only way that you could enjoy a little dancing without trouble and expense was by means of a gramophone. I have often done this myself, but, somehow, I cannot say that it is entirely satisfactory. To begin with, the music is hardly loud enough in a reasonably-sized room; and the timing of the dance, which every dancer will appreciate as a most important matter, is regulated by the person working the instrument and, quite often—although I may be super-critical—is all wrong! On the other hand, by dancing to radio music you hear not only the finest music but you can be sure that it is played in correct time.

The Cost Question

The most telling argument, I suppose, is the one of £ s. d. Once you have installed a good radio receiving set and loud-speaker, the upkeep costs are comparatively negligible, and you hear the very latest music played by the very best orchestras. But to maintain a gramophone library up-to-date is an expensive matter.

Let nobody think that I am disparaging the gramophone, for I remain of the opinion, in spite of the wonderful advances made by radio, that considerable further technical research is necessary before radio music, as usually heard from a loud-speaker, can be considered comparable, from a strictly musical point of view, with that produced by the best gramophones.



"Perhaps the greatest advantage of dancing to radio music is that it brings the exhilaration of the finest ball-room into the care-free atmosphere of the listener's own home."

Strange!

Of course, it is silly to compare them, because the two instruments are of different ages. And besides, I am assured by wireless friends that my criticisms of radio music, based upon those annoying buzzing and twittering noises which appear as a background when the loud-speaker plays loudly enough for dancing purposes, are not fair, because the disturbing matters I mention are generally due to imperfections in the set or in its manipulation. I wish I could believe this to be the case, but strangely, although I am told repeatedly that wireless music can be as good as that from the best gramophones, always, when I have chanced to be present, something appears to have prevented a completely satisfactory demonstration. As the poet says: "Man never is, but always to be blessed!" Nevertheless, I am fully convinced that radio dance music is a great joy to thousands of folk to-day.

The Requirements

To be entirely satisfactory radio music reproduced for dancing purposes must be amplified to a considerably greater extent than is necessary in the ordinary way. It was surprising to me to notice how much volume appeared to be lost when a loud-speaker capable of fulfilling its duties effectively in a small room was put at one end of a larger hall and used for dancing.

If the room in which the dancing is to take place is a long one, I am told that it is a good plan, and a really desirable one, to employ two loud-speakers, one at either end. A curious fact struck me the other day when listening to two loud-speakers working in conjunction in this manner. One was a small instrument with a flare of no more than six inches, whilst the horn of the other seemed to be about eighteen inches across. Just as the natural tone of a cornet is much higher than that of a trombone, I noticed distinctly that the high notes came from one end of the room, and most of the low notes from the other!

Worth Remembering

Now I surmise that most amateurs begin their radio careers by purchasing

(*Continued on page* 174.)

Do You Dance by Radio?

(*Continued from page 172*)

one of the midget loud-speakers or making one themselves with a small horn, and that the next step in the amateur's evolution is to invest in one of the super-magnificent instruments with large horns now on the market. If the installation of loud-speakers is contemplated for dancing purposes, it is worth bearing in mind, in order to distribute the music evenly throughout the room, that an excessive difference in the size of loud-speakers is distinctly objectionable, for at one end of the room the rhythmic undercurrent, chiefly on the lower notes, is not reproduced well.

A Test

Listening to some radio dance music the other night at a friend's house, I also made a few notes on types of amplifiers, which, no doubt, will be of interest to readers. My friend first allowed me to hear dance music which had passed through a transformer amplifier. Then, before the music had stopped, he switched in a resistance amplifier, at the same time requesting my observations on the difference in the music.

I confess immediately that I know nothing whatever about these technical matters, or, indeed, what the difference is between these two amplifiers, and can advance no reason for the noticeable change in the music, though doubtless some scientific explanation is possible. I gave my verdict definitely that the music produced when the resistance amplifier was working was greatly to be preferred. The difference appeared to me to be that, when the transformer amplifier was working, notes in the upper register were amplified in a manner quite out of proportion to those in the lower. The piano, for instance, was noticeably poor, and the saxophones—so important in a modern dance band, for they are the principal melodic instruments—were not reproduced faithfully.

Preserving Rhythm

When the resistance amplifier was switched in, however, the lower notes bore a satisfactory relation to the high ones, and, if anything, seemed to me to be slightly over-emphasised. As everyone knows, the most important

DO YOU DANCE BY RADIO?

(*Continued from previous page*)

feature in our modern syncopated dance music is the insistent rhythm, and, in a room where people are dancing to radio music, even if the music is not loud enough to fill the room as might be desired, it is possible to get along satisfactorily, provided this insistent rhythm is well carried. The instruments which provide this rhythm in modern dance bands are principally the piano, banjo, and the drums or tympani.

The rhythmic background thereby created is low in the scale, and, therefore, for dancing purposes it is preferable that these notes should not be obscured in the chain of amplification which precedes the loud-speaker. I stand open to correction by those versed in radio technicalities, but my observations lead me to suppose that

One of the many novelties at the Wireless Exhibition is a clock which can be set to switch on the receiver at any desired time.

resistance amplifiers are almost essential for satisfactory dancing to radio on anything but a small scale.

The Future

Many people have written to me complaining that so little dance music is transmitted by radio. It is often necessary to wait up until 10.30 p.m., they tell me, before a chance for a little dance occurs. I am sorry if this is the case, but I feel convinced that symphonic syncopation will find an increasingly large place in radio programmes, and that this difficulty will soon be removed. The public want syncopation, and even the officials of the B.B.C. must bow to public requirements, sooner or later.

Dancing is the natural way that normal human beings express joy. More syncopated music in radio programmes will make this happiness possible in ever-widening surroundings.

copied many of their features, improving them in the course of so doing. The ¼-ampere small power valve, working at 5½ to 6 volts on the filament, was at first practically a Chinese copy of the American UY201A, and a similar remark applies to the .06 ampere type. We have now, however, definitely improved them, and several makers have completely removed the microphonic defects which are so characteristic of the average American valve, and have still further reduced the filament consumption.

This microphonic trouble was soon tackled by a British manufacturer, and the valves had not been long in use before several firms produced excellent anti-vibratory holders. It is surprising how the average American will willingly overlook microphonic troubles in his set, believing them, apparently, to be insuperable. Relatively few American receivers have any means of checking the microphonic effects in their valves.

An Established Lead

In audio-frequency transformers we have always led, and incidentally the prices at which these instruments are obtainable in this country are very reasonable compared with those ruling in the United States. I have before me an American radio magazine in which are listed a very large number of audio-frequency transformers. I know many of them, and have used them, and for the leading make 10 dollars is the standard price, or translated into our own currency £2. Many quite inferior types—comparable with our cheaper grades—sell for 5 dollars or £1.

HOW WE HAVE BEATEN AMERICA

(*Continued from page 159*)

The building which houses the transmitter at the Helsingfors, Finland, broadcasting station.

Low-Loss Condensers

Then again, take variable condensers of what are generally referred to as the "low loss" type. America was the first to introduce the modern type of condenser, which is distinguished not so much for its reduction in losses as for its sound mechanical construction. Frankly, we copied them for a short time, but the British manufacturer soon found means of producing condensers just as sound mechanically, often neater and certainly at a far more reasonable price.

To-day high-grade condensers suitable for any modern circuit can be obtained of British manufacture certainly in no way inferior to the best of the American and often far superior to the general line of trans-Atlantic production. So far as prices are concerned, these run as high as $7.50 (30s. in our money), $5 is quite a common price. It must be remembered that these prices generally do not include dials,

(*Continued on next page.*)

HOW WE HAVE BEATEN AMERICA

(*Continued from previous page*)

which are generally provided with the British condensers.

H.F. Developments

High-frequency transformer design along the lines which have been explored so carefully within the last twelve months is forging ahead rapidly in this country, whereas in America there are few signs of progress. Now that we in Great Britain have seriously tackled the high-frequency side of our receivers, very rapid developments are taking place, and the first fruits of this work are available in the designs for the remarkable new series of receivers put out by Radio Press, Ltd., in their journals.

AT THE SHOW

Giant models are a feature of this year's exhibition. The view shows a coil of the "air-spaced" variety nearly five feet in diameter (not for short-wave work!).

In closing, I would like to draw attention to one very important factor in the development of radio in this country. The mechanical construction of our receivers has, on the whole, always been good, whereas many of the sets of American manufacture which indeed give excellent results, due to the electrical design, are so badly made mechanically as to cause a shudder to pass through the frame of any reputable British manufacturer. However, poorly-made apparatus can never survive long in any country, and there are many signs of improvement in the apparatus of the leading manufacturers on the other side of the Atlantic.

The WEEK'S DIARY

I AM not particularly interested in the quarrel which has arisen between the Sitwell family of poets and the theatrical profession, although some hard words have been passing. I am, however, amazed that the British Broadcasting Co. should have allowed, the other evening, the use of the microphone for the rubbishy nonsense—unintelligible I should imagine to any sane person—put out by the Sitwell's themselves to the accompaniment of all kinds of weird noises. The sketch in question, which was called, if I remember rightly, the "Wheel of Time," began quite pleasantly with the singing of some old-time favourites, including that memory of my early youth "After the Ball was Over," and "At my Time of Life."

The rendering of these songs was quite normal, save for the occasional rushing sound from what I suppose was an imitation water wheel, but which was much too suggestive of someone's attempt to find the soap in a deep bath. When, however, the modern alleged poetry began I thought my brain had at last given way from the effort of writing this diary, or, alternatively, that bats had entered the belfry of some overworked announcer. Seriously, I should like to know whether any reader of these columns could make sense of the stuff? I have not yet found anyone who could!

* * *

THERE is no need to comment here on the success of the great Wireless Exhibition, which, of course, by now so many readers of this paper will have visited, and which in any case is being fully dealt with elsewhere in this journal. It is, however, refreshing to find that the industry is at last getting down to common-sense developments in radio, much as happened in the case of the motor-car industry. For some years English people turned to France for their cars, for the French were very early in the development of the practicable automobile, and, indeed, one has only to look at such words as garage, chassis, and the like to find the French influence. Just as France was ahead of us in many directions until we caught up in the motor industry, so the Americans have been in front of us in the past in the development of commercial sets. This year the public have had a taste of the joys to come of home radio sets, and the season's apparatus, so far as factory-built receivers are concerned, is a revelation when compared with the complicated multi-knob affairs of a year or two back. In the component market and in the design of sets for the home builder, we have without question "caught up" and more.

* * *

THE horn type of loud-speaker seems to be disappearing, its place being taken by the open cone, disc and similar types, not counting, of course, the freak affairs which turn up at every exhibition with a certain amount of variety by resemblance to something which they are not. It may be ingenious to disguise a loud-speaker as a flower pot, lamp shade, clock, cruet, or sewing machine, but it cannot be said that such a device supplies any "long felt want." A particularly pleasing feature possessed by so many of what may be termed the "open type" of loud-speakers, is the much more faithful reproduction of the lower tones, such as proceed from drums, the cello, and many of the wind instruments. I am told that very large cones, some 4 and 5 feet in diameter, are still better, but are not marketed owing to their awkward size and shape and the difficulty of handling.

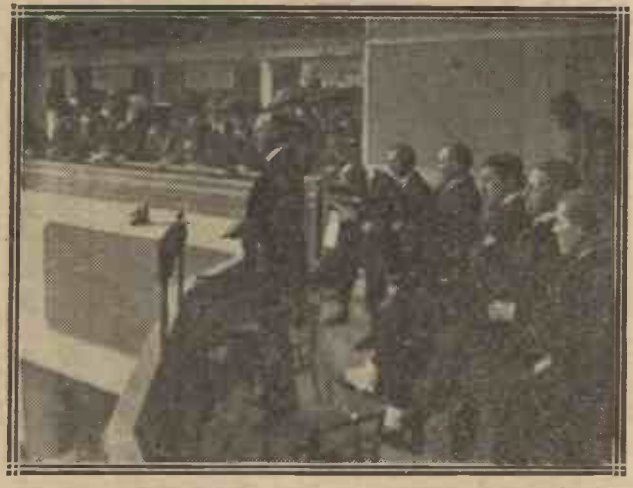
* * *

HAVE you ever fumbled about in a dark corner of a room, trying to read the condenser dials of your set when it has not been really dark enough to "light up" and yet is too dark to see clearly? Have you ever found your set against the light in a position where you could not very well alter it, because of the convenience to the aerial and earth connections? If so, you may be interested in a new dial which has been invented. It consists of a special fitting for the front panel of your set, and contains a small window through which dial readings can be observed. The dial material itself is translucent, and a concealed electric light behind it shows up the black letters on an illuminated ground. The light can be switched off when desired, and the knob is geared to give a good vernier movement. To save correspondence, I may say that the dial is not on the market in England yet, and I have no information as to whether or not it will be sold here.

* * *

IT is not always realised that it is convenient devices such as this which convert the operation of a radio receiver from a tedious business to a real pleasure. In any case a surprising number of people seem quite unable to give you a correct dial reading when looking at it, particularly when 180-degree dials are used in which one division means 2 degrees and not one as so many people seem to think. One-hundred-division dials, on the other hand, are usually calibrated in 100 separate divisions, giving actually a finer reading than

THE OPENING SPEECH



The scene at Olympia as the opening speech was being delivered. A public address system was used to carry the voice of the speaker to various parts of the building, and the microphone may be seen immediately in front of the speaker.

The Week's Diary—*continued*

the 180-degree dials, which have only 90 divisions marked. Personally, I vote for the 100-division dials every time, and perhaps it is one of the things which will be standardised in the near future, if, indeed, special indicating dials do not replace those arbitrary figures altogether.

* * *

IF, as I expect is the case, you are furbishing up your receiver which you feel guiltily you have neglected during the summer, do not forget to make sure that your high-tension battery or batteries are in good condition. High-tension batteries deteriorate steadily, whether they are used or not, and the fact that your battery was in perfect condition before you went away for your summer holidays is no sign of indication that it will be ready for work now. Heat and sun play havoc with such devices, for which reason I usually choose a spot for my high-tension batteries where the sun's rays do not fall upon them.

SO the wavelength changes which are to do so much to clear up the European ether (and judging by the sensitivity of modern receivers, Asiatic and American ether also!) are postponed for a while. The postponement does not surprise me, for anyone acquainted with the technical difficulties in making exact adjustment of wavelengths knows that such changes are not a matter of a few moments, hours, or even days.

If all the broadcasting organisations throughout Europe were as well organised and equipped as the British Broadcasting Co. all would be well, but unfortunately many of the companies have a great deal to learn. Indeed, much of the trouble which has so far arisen in the ether has been due, not so much to a bad choice of wavelengths, as to the impossibility of being able to rely on a group of stations to maintain their relative wavelengths for more than 24 hours on end. If, as has been the case in the past, these erratic wanderings go unchecked, how can we expect that constancy on which the success of the new scheme depends? I am sure the genial Captain has done a great deal during his trips abroad to impart the necessary knowledge to those in charge. Whether or not they were grateful is another matter! WAVE-TRAP.

A general view of part of the great wireless exhibition now being held in the New Hall at Olympia.

OPERATING THE TWO-VALVE RECEIVER FOR CENTRE-TAPPED COILS

By L. H. THOMAS.

Some practical notes on the receiver described in full last week.

THERE are various points in connection with the receiver described last week that should be watched if the best possible results are to be obtained. First, the writer has, since writing the full description of the set, been using a Lissen "X" coil in the aerial circuit. Selectivity seems slightly better than that obtained with the .0001 condenser and centre-tapped coil in use.

In Bad Conditions

Where the reader is in a position in which he suffers from severe interference from some outside source this is particularly useful, and a further improvement may probably be effected by slightly loosening the coupling between L_2 and L_3, also by reducing the size of L_2. The latter expedient, however, usually reduces signal-strength to a rather great extent.

Reaction Control

If the reaction control on the detector tends to be at all "ploppy," an improvement generally results from an increase in the resistance in the value of the grid-leak. Usually, however, one does not need to use one of higher resistance than 4 megohms.

Neutralising Settings

It should, of course, be remembered, when testing out the set with different types of valves, that the neutralising condenser proper (N.C.1) will need readjustment. The positions for correct neutralisation of a valve of the D.E.5 type and one of the .06 ampere type are very different indeed.

AMATEUR TRANSMITTING NOTES

Corrections and Additions

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

G-5SZ: (Change of address.) J. W. Riddiough, "West Point," St. John's Park, Menston, Yorks.

G-6BN: A. E. Bond, 3, Havelock Terrace, Welshpool.

G-6BZ: W. Burrows, 11, Cunliffe Walk, Garden Village, Wrexham, North Wales.

Calls Heard

We have received from Mr. Frank R. Neill (GI-5NJ) the following lists of calls heard by GX-6MU when at sea between Dublin and Montreal:—

G: 2KZ, 2NM, 2SZ, 2XY, 5JW, 6KO, 6NF, 6YD.

GI: 2IT, 5NJ, 6YW.

F: 8OS, 8HU, 8TBY, 8CT, H-9XD, I-1AY, B-4ZZ, YS-7XX.

THE "ELSTREFLEX TWO" RECEIVER

(*Continued from page 171.*)

The neutralising method given in Fig. 3 is simplified in Fig. 5 for the benefit of those new readers who are not familiar with the "Elstree Six" type of circuit. The condensers C_1 and C_2, as before, are mounted on a single spindle and act in series. The anode of the valve is connected to the bottom end of L_1 through the neutralising condenser NC, so that the effects of the capacity of the valve may be completely neutralised.

This arrangement has several advantages and has a special merit in eliminating the parasitic oscillations which I have previously described in this journal. In the Fig. 5 arrangement, the point X will always be at the same potential as the point Y; the position is rather similar to that which exists when two resistances are connected in parallel. If you take the middle point on each resistance and connect a wire between the two middle points, no currents will flow through that wire. In the same way there are no high-frequency potentials across the points X and Y in Fig. 5.

In Fig. 3 the transformer secondary T_2 is connected between the points X and Y, and therefore no high-frequency currents pass through this secondary. There is consequently no need to connect a condenser across T_2, as no high-frequency currents get mixed up in the windings of the transformer. The result is a very effective arrangement, and even if high-frequency currents get to the primary T_1 of the transformer T_1, T_2, no ill-effects are caused.

The "Elstreflex Two" Circuit

The actual circuit is shown in Fig. 4. It will be seen that the transformer secondary T_2 is connected in the equivalent position shown in Fig. 4. The high-frequency transformer L_3, L_4 serves as a means of communicating the high-frequency currents to the crystal detector D, which is of the permanent type. The original ST100 circuit did not use a permanent detector, so that here again we have a definite advantage. The primary T_1 of the step-up transformer T_1, T_2 is connected to the middle point of L_4 through the detector D.

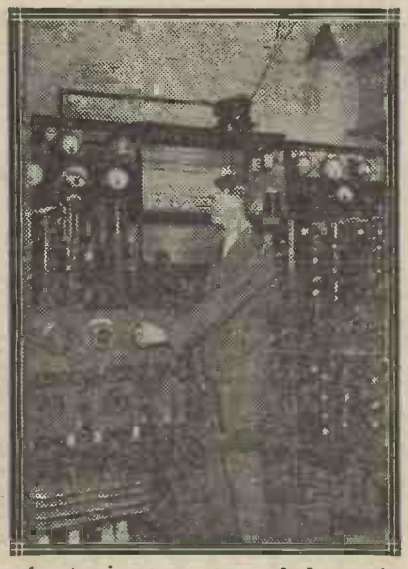
This means that there is a great reduction in the damping effect with consequent increase in selectivity and range. The second valve acts purely and simply as a power amplifier, and the condenser C_4 of .001 capacity may be used for by-passing high-frequency currents into the anode circuit of the first valve, whereas in the ST100 circuit it was found that such a condenser could not be used because it caused buzzing.

In the next issue full details of construction will be given.

SHORT-WAVE NOTES AND NEWS

STILL the Americans are making themselves heard for eight solid hours each night. They are first heard at about 11 p.m., which is normal for this time of year, but they are still received at quite good strength at about 7.30 a.m.! Meanwhile other countries come and go, but the "U" stations go on for ever.

Quite a fair amount of Transatlantic work is going on. GI-6YW informs the writer that the suggestion made in the last instalment of these notes, to the effect that he would probably reduce power still further, is quite correct! He hopes to work DX on considerably less than 1 watt. All the low-power men seem to be agreed



An interesting view of the main oscillator at the Glasgow station.

that those who use high power are by no means the *fortunate* ones; they are rather to be pitied, as having had no experience of the *real* thrills of radio!

Super or Reaction Set?

Once again the "superhet *v.* detector and L.F." controversy has sprung up in connection with short-wave work. The majority of transmitting amateurs have never tried the superheterodyne, and yet seem to be most emphatic on the subject that nothing could possibly beat the plain detector and one stage of L.F. The writer was certainly impressed with the performance of a superheterodyne of somewhat novel design that he was able to test recently. Long-wave interference is no longer a source of trouble, and to reduce signals to comfortable headphone strength it is, of course, only necessary to dispense with

(*Continued on next page.*)

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"WIRELESS." Vol. V. No. 5

SHORT-WAVE NOTES AND NEWS

(Continued from previous page)

note-magnifiers. The set in question consisted of a "straight" autodyne followed by three tuned I.F. stages and the second detector. Valves of the .06-ampere type were used throughout, the total current consumption thus being only .3 ampere, and the total cost of the set was surprisingly low.

A Common Failing

Several owners of transmitting stations have at various times expressed their surprise at the apparent improvement in their reception when the transmitter has been unavoidably out of action for some time. It appears to be more than fancy; it is quite logical to suppose that one *can* get more out of a receiver when there is no transmitter standing nearby to distract one's attention. Too many transmitters spend all their time at the key, without giving a thought to the receiver, which is every bit as important as the transmitter itself.

NEXT WEEK.

Full constructional details of the "Elstreflex Two."

ANOTHER FREE GIFT.

B.B.C. NEWS

National Concerts

It is reported that the B.B.C. has engaged the Albert Hall for a series of 12 great "National Concerts," which will be broadcast from every main and relay station in the kingdom.

The special orchestra, composed of instrumentalists from the chief orchestras of the country, will consist of 150 performers, and a chorus of 250 voices is being organised.

The first of the series is fixed for the 30th of this month, at which concert Sir Hamilton Harty will conduct and Mme. Maria Olczewska is to sing.

An Eastbourne Night

An Eastbourne Night will be broadcast on September 24. The programme will consist of the story of Eastbourne in brief by the Mayor of that town, the Municipal Orchestra from Devonshire Park, "Pier Revels of 1926" from the Pier, Albert Sandler from the Grand Hotel, Eastbourne, and dance music from the Devonshire Park Pavilion.

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WIRELESS

PANEL TRANSFERS

Mr. J. H. REYNER, who in this issue gives full constructional details of how to build The "Elstreflex Two"—the first two-valve reflex receiver with selectivity and range.

Part II of the series of articles on "Secrets of Modern Radio Efficiency," and an article by Jack Frost—"Should There be an Audience in the Studio" also appear in this issue, together with many other articles and features of interest.

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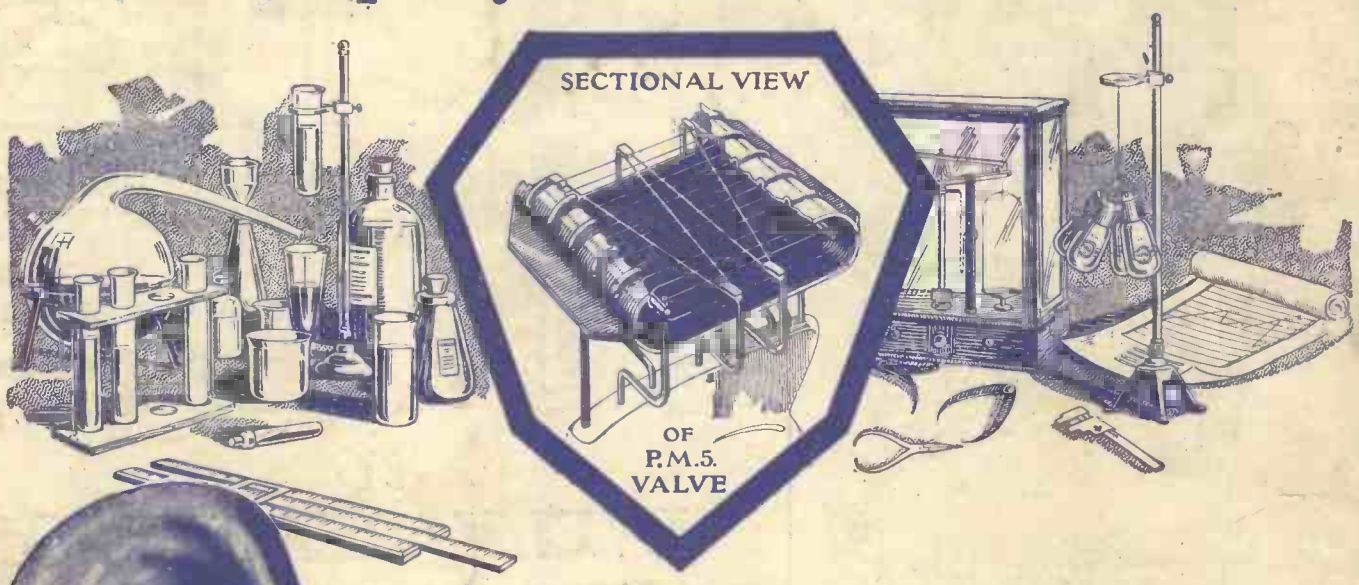

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