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Popular Wireless

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FEB 13TH 1937
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G.P.O. AS A NEWSPAPER

and TELEVISION TIMES



Britain's Leading Designer

JOHN SCOTT-TAGGART

PRESENTS HIS

CORONATION

★ **SET** ★

THE SUPER CENTURION

In this number

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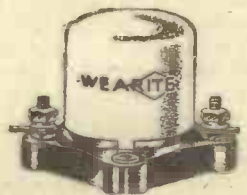
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Asst. Editors: A. Johnson-Randall, A. S. Clark.

ARABIAN NIGHTS
NIGG-LING
WELSH CRY

RADIO NOTES & NEWS

BAND OF HOPE
O.K. FOR SOUND
U.S.A.'s FLOODS

The First Wireless Prophecy

"WHAT'S all this about wireless being prophesied in 1700 and something?" asks W. T. L., of the C.T.O., on reading my recent Note about the first wireless prophecy.

"John Baptista Porta," he says, "described a 'sympathetic' telegraph in 1558. In 1665 Joseph Glanvil foretold communication by means of a 'sympathetic' telegraph."

Moreover, he continues: "Re your correspondent's reference to a Biblical quotation, Porta's idea was to use the Lodestone (natural magnet) and two needles. Well, the Chinese were acquainted with the stone's properties some 2,500 years B.C., and they actually used it at sea about A.D. 300. Wha' 'ja know about that?"

To which I rejoin that the wily Orientals are credited with having used the lodestone for a navigational magnet, but never, so far as I can learn, for any kind of wireless. So what?

Arabian Nights

SPECIAL broadcast programmes and news directed to Arabs in Syria, Palestine and Iraq are to be included in the forthcoming transmissions from the Turkish radio stations. Other interests, say the Turks, have been misrepresenting the Turkish point of view to these Arabs, and the new policy is intended as a counterblast.

Few of us had supposed that radio receivers were among the camp impedimenta which are nightly folded up by the Arabs when they silently steal away. But that great benefit will be derived from the new scheme is confidently averred by the Turkish ruler, President Ataturk.

Atta Boy, say I. Mustapha go, anyway.

Filleted Felicity

WRITING from "Hollis," Pointon, Sleaford, Lincs., Mr. C. B. Raithby, who is known on the air as G 8 G 1, makes a sporting offer.

He says: "I have for disposal two or

three hundred "P.W.'s" and a few other wireless books. I should be pleased to post them in lots—no particular order—to anyone (or ones) who cares to send me the postage for them. (Parcel rate would not cost much.) It seems a pity to waste them."

BUT—there is one snag! Every free copy of "P.W." will be found to have its "W. L. S.'s" page—or two pages—neatly removed! And nothing you can say will persuade Mr. Raithby to part with them! It seems to me that all unwittingly this has turned itself into a pretty com-

rejoiced exceedingly at this cryptic rejoinder, for they knew what "Nigg" meant. It is the name of a place just outside Aberdeen, where there is a fine site for a 5-kilowatt station, soon to be erected. Five kilowatts for Nigg are better than one niggling kilowatt in Aberdeen.

Third Network for U.S.A.

AS you know, the broadcasting system of the U.S.A. is not a Government controlled monopoly like ours, but is a profit-making competitive business, paid for by radio advertising.

Until recently there were two big coast-to-coast networks, belonging to the National Broadcasting Corporation and to Columbia Broadcasting System respectively. Now the Mutual Broadcasting System has acquired the Don Lee Network of California as well as the Iowa and Central States network, thus making a third big system extending from the Atlantic to the Pacific.

The Mutual folks are very pleased at having acquired equal status with Columbia and National. This pleasure, however, is not mutual!

Cry From a Welsh Heart

JUST a postcard, received not long ago at the B.B.C.'s Cardiff station:

"Will you kindly give us something lively in music as we are melancholy enough now without your chambers music in four movements, etc., violin and piano, etc. Give us some brass, and also not so much of news. I am paying you to liven me up a bit, not to kill me in slow motion. If you keep on the stuff as you giving us this last few days between the crises of the country you will be issuing coffins with that duff you broadcasting now and if you do send anything good you comments when it is on and enjoying yourselves and not the listeners for the love of mike give some pep into it."

This proves that it's not essential to punctuate in order to discriminate!

(Please turn to page 610.)

WITHOUT HIS BLACK-FACE MAKE-UP



NOSMO KING, the well-known radio artist, with his Cossor set. The name Nosmo King was derived from the words "No Smoking" seen in an hotel lobby.

pliment to my colleague "On the Short Waves." It is a true believer who will literally "take a leaf out of his book" every week!

Nigg-ling

CITIZENS of Aberdeen were not altogether enthusiastic about the transfer to the new Burghead station of the radio supremacy of the north, hitherto held by Aberdeen. So they asked the B.B.C. what about a few more kilowatts for the city of Aberdeen.

The B.B.C., not in any niggling mood, said "Nigg." And the Aberdonians

THE SUPER CENTURION-OVERLEAF



MY CORONATION SET



THE question: "How many valves should a set have?" is as old as broadcasting itself. This may be a useful opportunity for considering the pros and cons of the various types of receivers. The Super Centurion has three valves, while the S.T.800 has four. Why should there be a difference in the two sets? The obvious reply is that they are intended to cater for different publics, and different performances. But the detailed reply is by no means as simple as all this, and in any case no one wants to feel that he is getting poorer results because he is paying less. Unless the receiver were frankly a local station set, and this were made very clear at the time, I should not offer a receiver with poor performance as regards foreign stations merely because there was a public which did not want to pay the full price of a good set.

It is an old saying that you pay for what you get, and this no doubt applies to a very large number of products, but I am not at all sure that price is a reliable criterion of a wireless receiver. We all have our suspicions, sometimes, that some of the low-priced commercial sets are just as good as the same firm's more expensive models and that the extra price is calculated to rope in snobbish people who feel that they must have the best at literally all costs. Of course, there may be a few modifications as regards the cabinet and insignificant details, but frequently the same circuit and perhaps even the same chassis is incorporated.

Choosing a Set

The designer's attitude towards his prospective set is governed by the requirements of the public for which he is catering. The lazy thinker may imagine that price considerations are almost entirely the only ones in radio receiver design. As regards the majority of commercial sets, I think price is almost entirely the governing factor; very few people who buy a ready-made wireless set know anything about its features. They buy on the strength of the name, the publicity (which is often the same thing), and the price. A higher priced set must, they think, be a better set. All this is rather deplorable. I should like to see people buying ready-made wireless sets for special purposes, as no set can provide all the best features unless it is really expen-

THE SUPER

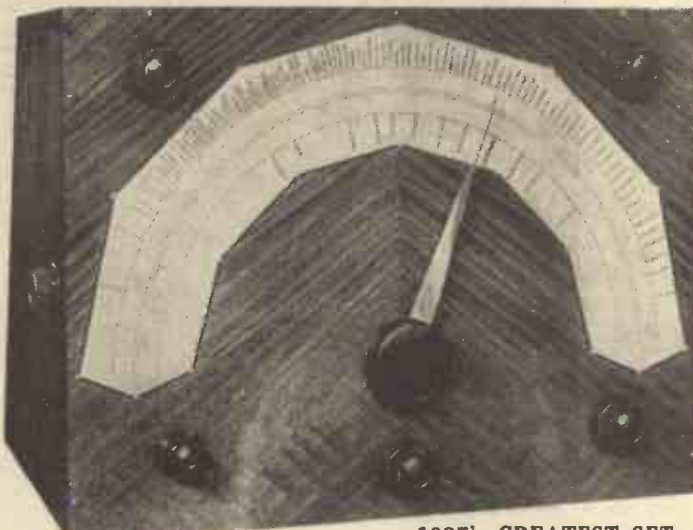
REMEMBER THE TERRIFIC SUCCESS OF THE FIRST CENTURION? WELL, HERE IS AN ENTIRELY NEW VERSION, JUST AS ECONOMICAL AND EASY TO BUILD AND USE, BUT EVEN MORE WONDERFUL IN ITS PERFORMANCE

sive. A receiver designed to give superlative quality on the main stations and where very large volume is desired is almost essentially a special job. On the other hand, a receiver for the reception of short waves is a more highly specialised piece of work. Sets which will receive only the medium and the long waves and sets which are so-called all-wave models involve considerable differences in design and, given a certain amount of money to spend, a better set could be produced for simply the two wave-

bands.
There are one or two firms who go in for particularly high-grade quality, and think nothing of sticking on another twenty pounds for this feature.

Special Features

The home constructor is a much more shrewd person. He knows what to look for even if he doesn't know quite what he wants. If I leave out audio reaction on the S.T.800—a feature which was so praised and starred in the S.T.700—he wants to know why. If high-frequency reaction is used on two circuits in the



1937's GREATEST SET—
By the introduction of aerial reaction, enormous amplification is achieved without the expense of an extra valve.

S.T.600 but not in the S.T.700 or S.T.800 he again wants to know why. What about reaction equalisation—which was a feature of the S.T.400—although I honestly do not believe that anyone got it to work. The fact that if it didn't work the set could still give good results, is perhaps the best argument in favour of leaving it off in later sets, although I still think that it is a valuable feature.

Here we have to consider the difference between essential features and those which add to the convenience of operation or are in the form of luxury additions. Now, obviously, if I sat down and planned to give you

!!! A TRIUMPH OF ECONOMY AND SIMPLICITY !!!

by JOHN SCOTT-TAGGART

CENTURION

IT HAS DOUBLE REACTION GIVING IT EXTREMELY HIGH SENSITIVITY AND UNIPANE CONSTRUCTION AND AN EASY-CABINET, AND AN AUTO-DIAL—THE BIGGEST AND BEST DIAL EVER INVENTED

what I thought was the set de luxe, you would have a score of gadgets. Each would add to the price and some would add to the perplexity of operation. There are seven knobs on the average television set and they are all necessary. The squealers about complexity of operation have simply got to lump the seven adjustments, whether they like them or not. I experience a certain amount of malicious glee at the thought of the ignorant general public having to twiddle seven knobs instead of one, but at the same time there is in all these matters a sensible mean.

Simplifying Construction

Although I have made no attempt to produce a set having one knob intended for construction on a large scale, yet I have definitely moved in the direction of simpler construction and without sacrificing performance. It is always a very astonishing thing to me that perhaps the most popular of all my sets—the S.T.400—was (or rather is, because there are huge numbers still giving good service) the most difficult of all my sets to operate.

The fact that there must be a limit to the adjustments on a set prevents the designing of the ideal receiver. My own idea of the best simple straight set with luxury attachments would be the S.T.600 circuit with a triple extractor, audio reaction and reaction equalisation. And how many people do you think would build it? About a dozen. People's tastes are comparatively simple in these matters, and just as a royal guest at a banquet may consume twelve courses without batting an eyelid, although he would really much prefer steak and chips, so the average constructor is willing to sacrifice certain features. What feature does the average listener regard as superfluous and tending to complicate the construction and operation of a set? No one can say, because each man has different ideas. The result is that one year I will try to appeal to one class and another year to another.



—BRITAIN'S LEADING DESIGNER
John Scott-Taggart, M.I.E.E., F.Inst. P., M. Am.I.E.E.
M. Am. S. Mech. E., Fel.I.R.E.

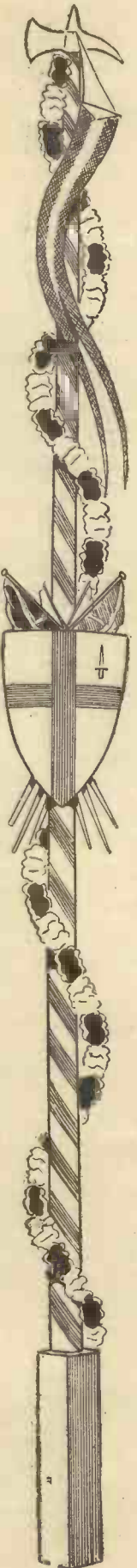
Frankly, as regards the main set of the year, I try to please as many people as possible. Some readers have asked me why, if I used Class B output on the S.T.500, did I not employ it on all subsequent sets. Well, here again the reply is simply that Class B adds to the number of valves required, gives unnecessarily loud volume for the average listener, and in general is not worth the expense.

There are three main classes of receiver. Those that concern themselves with selectivity, those with sensitivity, and those with output volume. The first question I have to ask myself is what am I to give constructors in each department? Only in one set, the Super-Gram De Luxe, did I go "full out" under all these headings—and the cost was somewhere around £75. It is, of course, no use asking the public what it wants. The answer always is "everything." This highly intelligent reply puts designers on their mettle. They know they cannot give everything to the full, but they have a very good try. But the best solution is not to give as much as you can afford under each of these headings, because requirements are so different, even though the individual is inclined to ask for everything.

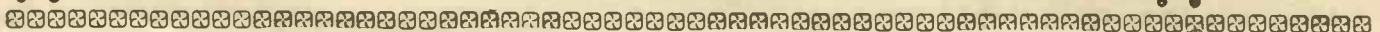
The Question of Volume

A large section of the public likes to have very loud signals. I do for one, provided the quality is as near perfect as doesn't matter. But such a high grade of quality costs a lot of money to produce, and so we are concerned, especially in battery sets, to give good quality at a much lower volume. Amongst the noise merchants, we have those who want a great output and want it not only on the local stations, but on practically every other station as well. Now that really does cost a lot of money if it is to be done well, and is outside the scope of the average constructor's ability and pocket. Another more reasonable section of the public likes to have the local station loud, specially for brass bands and symphony concerts, for example,

but is quite content to receive foreign stations at moderate volume. This calls for a very much simpler set, because sensitivity is not nearly so great. It may take two stages of push-pull amplification to give good quality, and this involves four valves. How many constructors are willing to pay for the extra valves and components when a single output valve will give them all they want? That therefore brings us to the third class of listener, the man who does not want a large output, either on a foreigner or the home station. He is content with good room-strength signals which will not cause the



!! A MIRACLE OF EASE AND EFFECTIVENESS !!





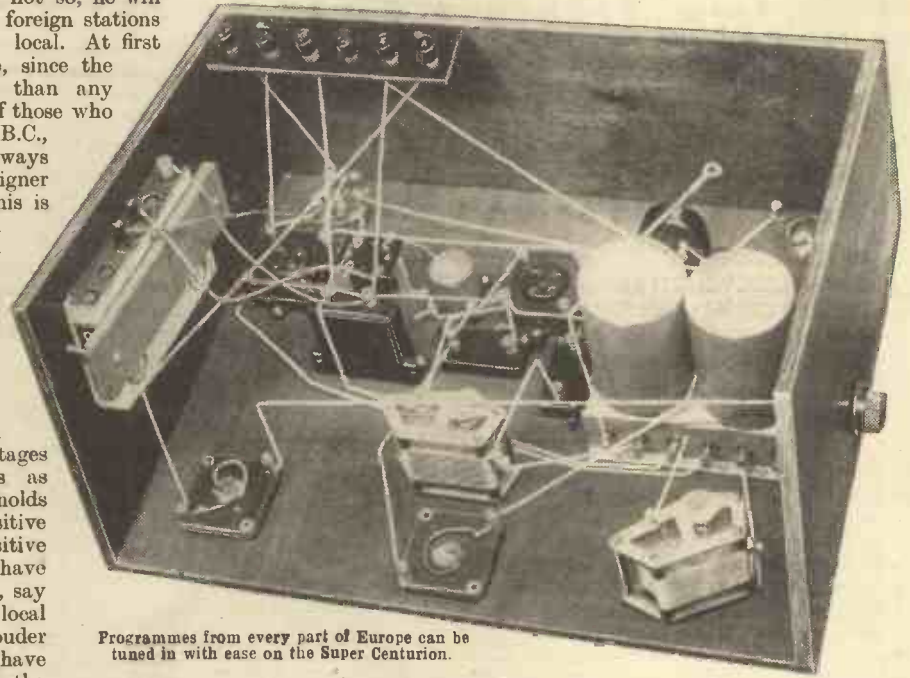
neighbours to knock on his wall. But he likes the quality of reproduction to be good, and since he is content with a low output volume, this can be given to him at low cost. Nearly all sets distort due to over-loading, and therefore the man with modest ideas of output strength enjoys better quality of reproduction.

The question of sensitivity is not such an easy one to decide. The constructor rightly feels that his set should be sensitive because if it is not so, he will be unable to receive many foreign stations at the same output as his local. At first thought one might imagine, since the local is so much stronger than any foreign station in the case of those who live fairly near to the B.B.C., that the B.B.C. should always be very loud and the foreigner never able to compete. This is utterly erroneous. On a good set scores of foreign stations will load up the last valve of your set and so give excellent signals. The local station cannot do more because if it did it would be distorted. Therefore, though the local signal may be very much stronger in the aerial, it has no advantages over any foreign stations as regards loudness. This only holds good if you have a sensitive receiver or rather a sensitive receiver-cum-aerial. If you have an insignificant size of aerial, say six inches of wire, your local station may certainly be louder than a foreigner, but if you have a fairly good outside aerial the chances are that on quite a medium-sensitivity set a large number of foreign stations will give you all that the set can handle as regards loudness. If you want still louder signals, you have to go in for a bigger output valve, at the same time increasing no doubt the size of the aerial or the sensitivity of the set by the addition of, say, an extra stage of low-frequency or high-frequency amplification.

No Compromise Possible

As regards selectivity, no compromise is really possible here. There are probably only two grades of selectivity, namely, good and exceptional. No one wants less than good selectivity, even if the set is given away with a pound of tea. This did not used to be the case. The astonishing number of very simple det. and two L.F. receivers bears witness to the low standard of selectivity which once satisfied the listening public. But I should like to say here that good selectivity does not mean good under all circumstances. The real test of selectivity is where one station is coming in very loudly while the desired station is considerably weaker. If the position is reversed, selectivity may become extremely good. Good selectivity may therefore mean that you get exceptionally good selectivity on the main stations, British and foreign, and rather poor selectivity where a weak foreign station is to be received in the face of a very powerful neighbour. The selectivity may be called "good," but in one direction this may flatter the set, while in the other direction it does not do justice to the excellent results that may be

obtained. There is a very sensible body of listeners who argue that very weak stations are not really worth listening to anyway, but that the main foreign stations which come in at good strength should certainly be received clear of interference. It is therefore hardly fair to judge a set by its performance under the most difficult conditions of reception. It is better to decide whether it performs the duties which its constructor asks of it.



Programmes from every part of Europe can be tuned in with ease on the Super Centurion.

If we agree that a medium output of good quality is satisfactory, we can do surprising things with only three simple valves. Obviously four valves will be more sensitive than three, provided the same systems of reception are employed. Where only very small indoor aerials can be arranged, four valves are obviously desirable. But where a reasonable aerial can be put up, a good three-

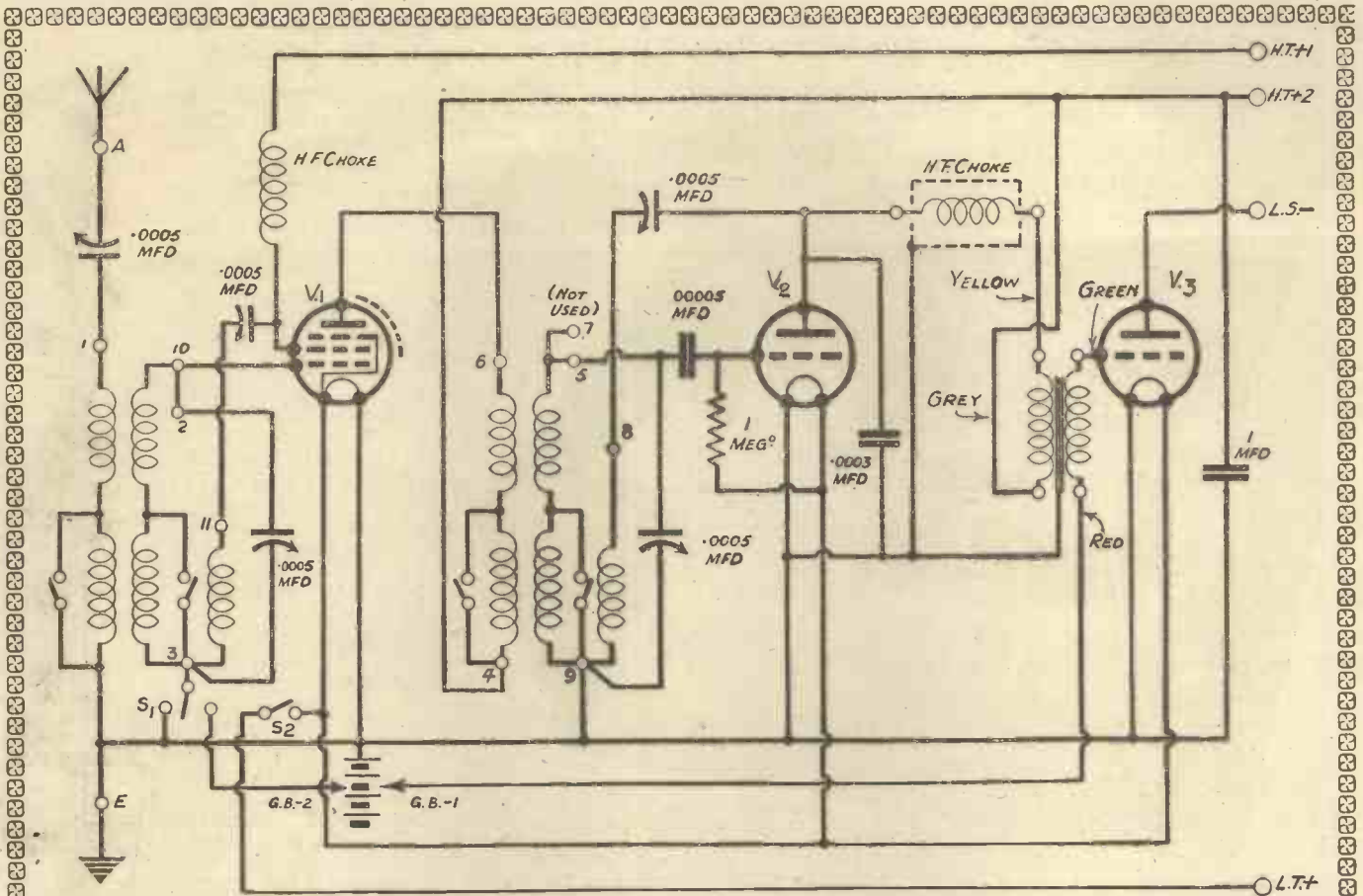
FOUR STAR FEATURES

- 1. AMAZINGLY SIMPLE CONSTRUCTION GIVEN BY THE UNI-PLANE SYSTEM
- 2. CHEAP TO BUILD, COUPLED WITH VERY LOW RUNNING COSTS
- 3. ADJUSTABLE SELECTIVITY CONTROLLED BY SWITCH
- 4. AERIAL REACTION, SAVING COST OF EXTRA VALVE

valve set can perform prodigies of sensitivity. Every year brings the three-valve set more into its own. There have been annual increases in power of a large proportion of the broadcasting stations of Europe and this has made sensitivity a less important ingredient in a receiver. Here the three-valve man greatly scores. This increase in power has greatly lessened the need for four valves; where a couple of years ago I should have hesitated to recommend a three-valve set at all, I can now do so wholeheartedly knowing that a large number of stations can be received. On the Super Centurion it is possible to get excellent results on a hundred stations, which is the reason for the name "Centurion."

This assumes an outdoor aerial of average proportions. Half this number can be received on very poor aerials, while a score at the very least should be capable of being received with only a couple of feet of wire as aerial. This astonishing sensitivity is attributable to the use of "double reaction," a system to which I am enthusiastically committed. The difficulty of incorporating the short waves on the S.T.800 is the only reason why this system was omitted on that set, although, of course, double reaction

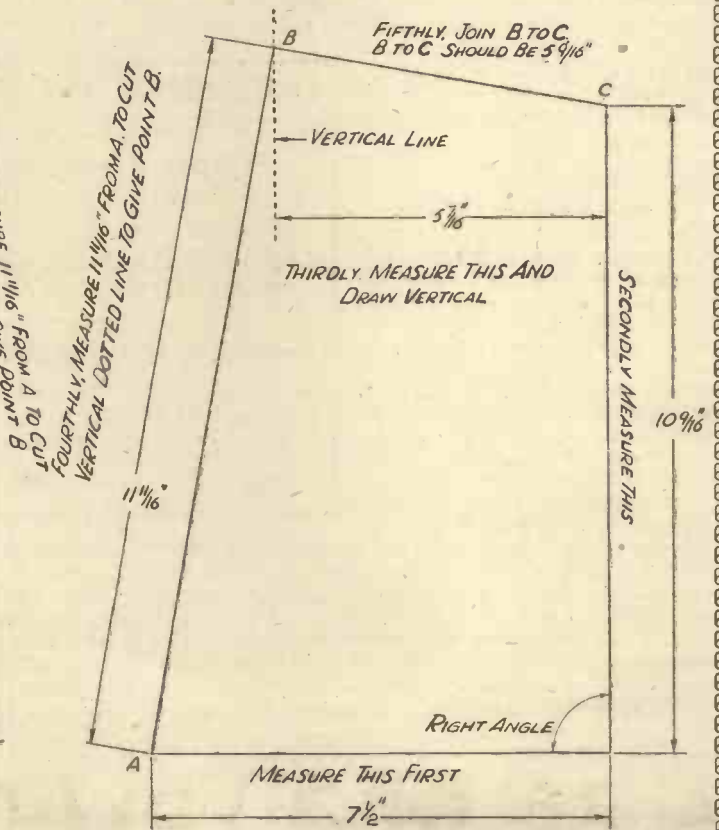
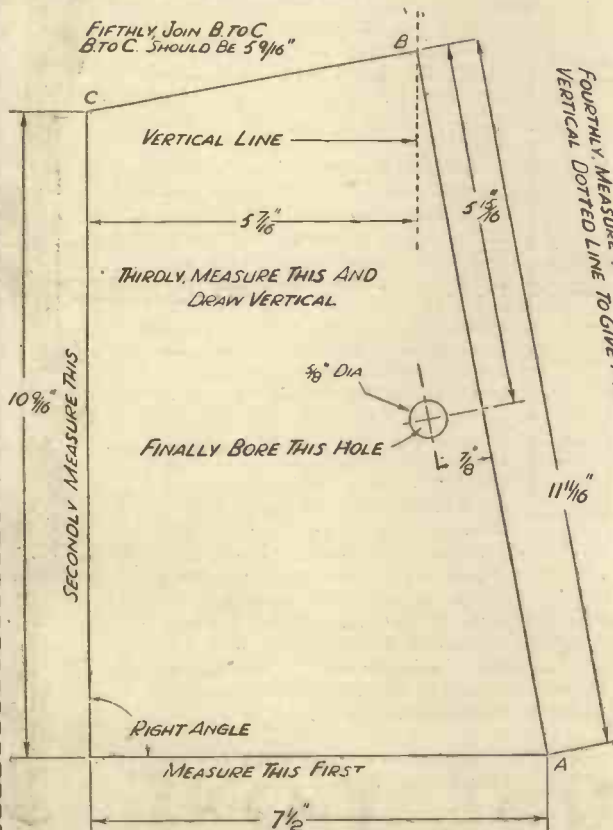
SUPER CENTURION—THE SET



The theoretical arrangement of John Scott-Taggart's Coronation Set. Remarkable sensitivity is given by the Double-Reaction scheme, the use of aerial reaction saving the cost of an extra valve. Below are the details of the two sides of the Easy-Cabinet. These two pieces of wood, together with the top (see page 598), form an inexpensive and attractive design.

LEFT SIDE - PIECE
(FOR WAVE-CHANGE SWITCH SIDE)

RIGHT SIDE - PIECE



As regards simplicity of construction, the Uni-plane system which I have introduced makes it possible to put all the components on one sheet of wood, while the Easy-Cabinet system gives you nearly everything that an ordinary cabinet does at a cost of 3s. . . , as against nearly £1 for a cabinet which is really quite unnecessary and not recommended. Any constructor who buys the Easy-Cabinet and also a normal cabinet is certainly duplicating matters and spending money unnecessarily. The set as it stands is a handsome job, and I certainly do not advise spending money on more conventional cabinets.

The price of the Super Centurion is very low, and it must be remembered that the valves used—certainly the

aerial reaction winding has been provided. The calibration of the coil is similar to that of the S.T.700, so the S.T.700 celluloid dial may be used with it. There are one or two stations which have changed position or altered their names, but otherwise the celluloid dial would be quite in order to use. The paper dial in the middle pages of this issue of POPULAR WIRELESS may be affixed to the front of the panel, either as it stands or, preferably, pasted on cardboard. Extra copies may be obtained by the simple process of buying extra copies of POPULAR WIRELESS.

The calibration of the receiver is child's play and extremely accurate. The system has been used on the S.T.700 and the S.T.800, and consists in having "dot lines" for both

medium and long waves. When you identify a station, you simply put a dot under the long pointer where the pointer crosses the line, and this dot is then joined to the end of the station name. The inner dot line is for putting dots which are subsequently connected to the names of the long-wave stations.

The operation of the set is again very simple. There is an aerial coupler which governs the selectivity of the first of the two tuned circuits. The selectivity of this tuned circuit is governed by the aerial coupler which, if turned to the left (anti-clockwise), weakens signals but improves selectivity on that circuit. This aerial coupler is also used as a volume control. It is an old but extremely important rule that you should never apply reaction to a signal which is already strong because you will not improve selectivity, and you will only get distortion. When requiring maximum selectivity you should have the aerial coupler turned as far left as possible, so that signals are weak, and, when the normal anode reaction and the aerial reaction are applied, full but not unnecessarily large loudspeaker signals are obtained.

Tuning-In the Stations

A separate article on operation will be given next week, but it may be stated here that there are two tuning controls, one with the long pointer, which is the main tuning control, and the aerial balancer, which is a variable condenser which tunes the aerial circuit. The method of operation, once you have picked up a station and logged it by placing a dot on the dot line, is to turn the main pointer to that dot and then, having applied anode reaction, turn the aerial balancer knob until the desired station is heard. It is all extremely simple, and has proved itself as the best method of getting one-knob two-knob accuracy of tuning and good



KEEP STRICTLY TO THESE PARTS

Component	Make used by Designer
1 Coil Unit	Colvern—specify for "Super Centurion."
1 Main Tuning Condenser, .0005 mfd.	J.B.—as for S.T.800, but with S.T.700 knob and pointer.
1 Aerial Balancer Condenser, .0005 mfd.	J.B.—as for S.T.800 but with small knob.
1 .0005-mfd. solid dielectric Variable Condenser (Vol. control)	Graham Farish Littlos log mid-line as used in S.T.800.
1 .0005-mfd. Anode Reaction Condenser	Graham Farish Littlos log mid-line as used in S.T.800.
1 .0005-mfd. Aerial Reaction Condenser	Graham Farish Littlos log mid-line as used in S.T.800.
1 On/Off and Change-over Switch	Graham Farish Turret (with flanged nut as used in S.T.800).
1 Anode Reaction Choke	Wearite type HFJ.
1 Aerial Reaction Choke	Lissen type LN 5092.
1 .00005-mfd. Grid Condenser	Lissen mica.
1 .0003-mfd. By-Pass Condenser	Lissen mica.
1 1-mfd. Condenser	T.C.C. type 50.
1 1-meg. Grid Leak	Erie 1-watt.
1 L.F. Transformer	B.T.S. Midget.
3 4-pin Valveholders	Benjamin "Clearer Tone" (or "Vibrolders.")
6 Terminals ("A," "E," "H.T.+1," "H.T.+2," "L.S.," "L.T.+")	Belling-Lee type R.
1 Panel (plywood) 16 in. x 12 in. x 7 mm.	Peto-Scott.
1 Easy-Cabinet, with G.B. battery spar.	Peto-Scott.
2 Aluminium Brackets	Peto-Scott.
1 Ebonite Terminal Strip 6 in. x 1 1/2 in.	Peto-Scott.
3 Wander Plugs ("Grid+," "Grid-1," "Grid-2")	Belling-Lee Midget 1019.
"Maxamp" Wire, Screws, Flex, etc.	Peto-Scott.
VALVES. V1, Hivac VP 215. V2, Gossor 210 RC. V3, Gossor 220 PA.	

COMPONENTS FOR THE TRIPLE EXTRACTOR.

1 Triple Extractor Iron-core Coil	Wearite.
3 .0005-mfd. Air Variable Condensers	Polar No. 4 with knob (mention S.T.800). J.B. "Popular Log" (without dial or slow motion, but with small knob). Ormond R.483 (log condenser) with small knob.
1 Wooden Box—5 wood pieces	Peto-Scott.
2 Terminals, A1, A2	Belling-Lee type R. Clix. Bulgin.

For constructional details of the Triple Extractor, readers are referred to "Popular Wireless" dated November 14th, 1936.

NOTE: Wearite supply the complete Triple Extractor, wired-up, for 24/-, the cost of the individual parts.

last two valves—are very cheap. In addition, there is the low upkeep cost, both as regards accumulator and H.T. and the very much greater certainty of good performance. In this connection experience has shown that the simpler the set the more certain it is to work well in all cases. It is certainly our experience that the three-valve set is almost entirely trouble-free as regards construction. The coil unit is of excellent make and completely free from any break-through on the long waves. Constructors in the North of England may therefore build the set with every confidence. Of course, the Triple Extractor will in any set cure all break-through, but a large number of people will not want to use the Triple Extractor, and may, in fact, not need it.

The coil unit is similar to the S.T.700, except that an

simplicity with selectivity.

The aerial reaction is truly miraculous in its improvement of the whole set but, of course, you can use the knob turned fully to the left so that very little aerial reaction is applied, and the set then becomes quite a normal three-valve receiver of good type. But aerial reaction enables one to use more aerial coupler, and therefore use the set in a more sensitive condition. This is a point very often overlooked. In order to get selectivity on the aerial circuit (even in the case of the S.T.800) you have to reduce the aerial coupler to reduce the losses inflicted on the first tuned circuit. In the case of the Super Centurion, however, the losses are wiped out

(Please turn to page 620.)

A RECORD LOW-COST THREE



G.F. Turret Switch

Grey LF Trans.

Yellow

Green

Red

1 Mfd

Moving

Fixed

Moving .0005 Mfd
Volume Control

.0005 Mfd
Conda

G.B+

G.B-1

-3V

G.B-2

-4 1/2 V

L.T.
+

L.S.
-

2 H.T.
+

1 H.T.
+

E

A

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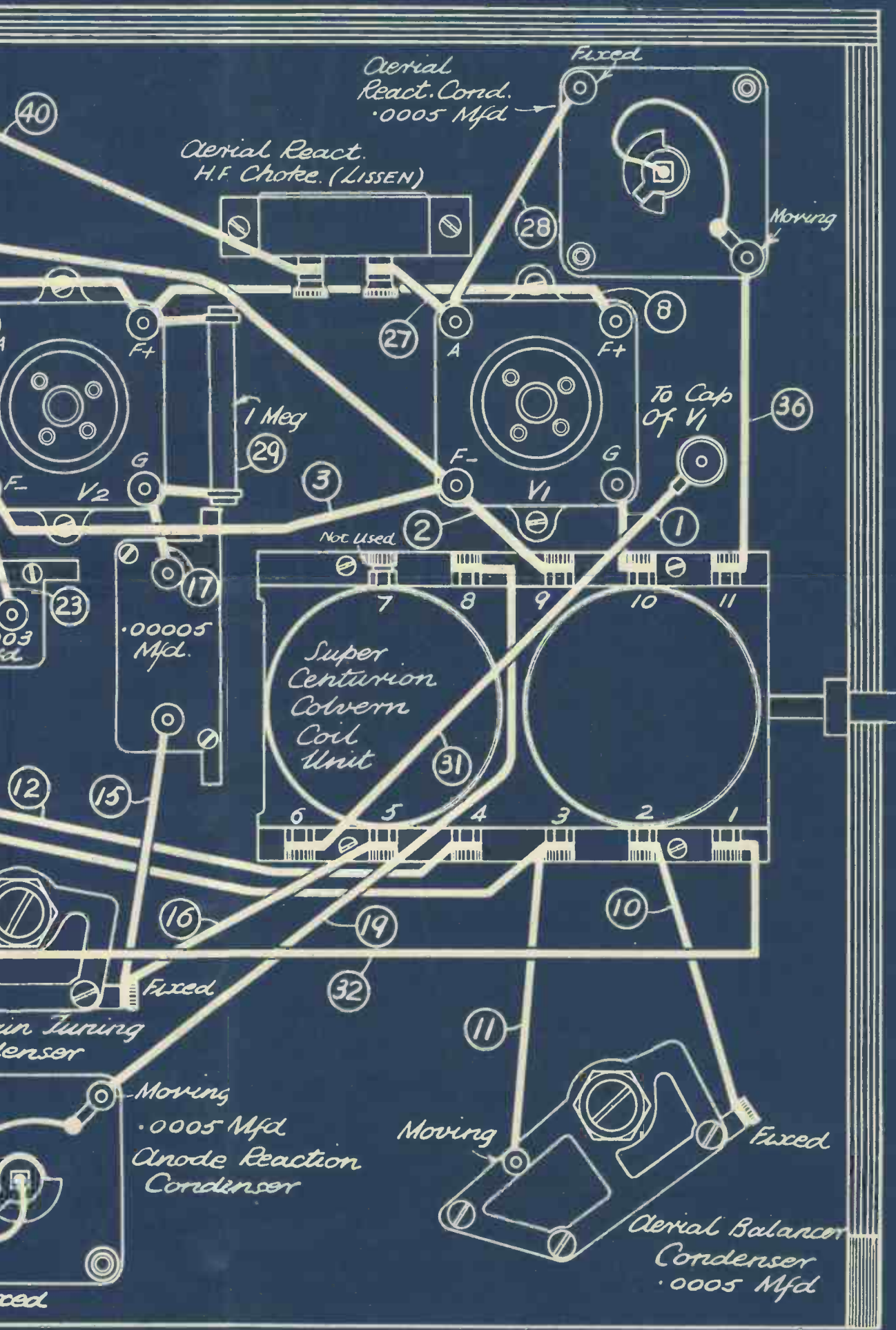
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SCOTT-TAGGART'S CORONATION SET

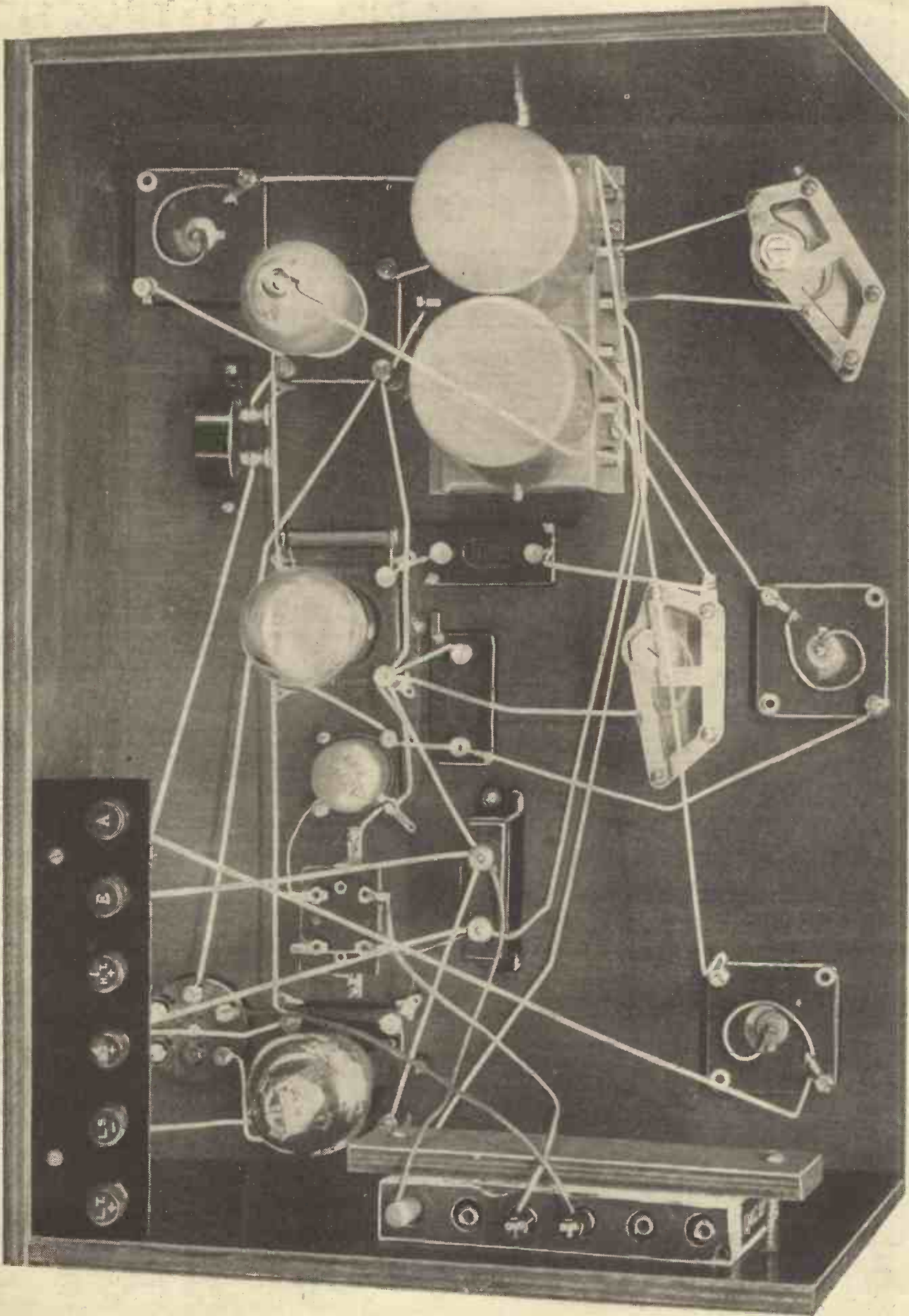
SIZE
PRINT

The SUPER CENTURION

POPULAR WIRELESS
FEBRUARY 13th 1937



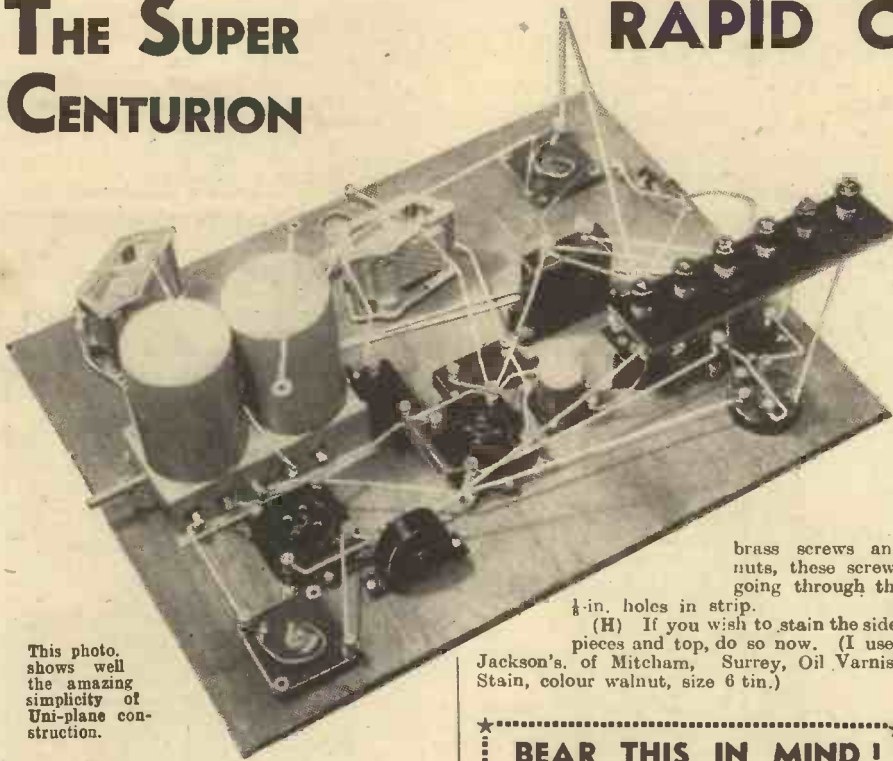
THE SUPER CENTURION—MAGNIFICENT IN ITS SIMPLICITY!



THE SUPER CENTURION

RAPID CONSTRUCTION GUIDE

The Easy Way to Certain Success



This photo. shows well the amazing simplicity of Uni-plane construction.

brass screws and nuts, these screws going through the $\frac{1}{4}$ -in. holes in strip.

(H) If you wish to stain the side-pieces and top, do so now. (I used Jackson's, of Mitcham, Surrey, Oil Varnish Stain, colour walnut, size 6 tin.)

BEAR THIS IN MIND!

The method of construction used in the Super Centurion is the simplest it is possible to achieve. In the Uni-plane system all components are screwed down on to a single straightforward wooden panel. The blueprint is therefore a true picture of the wires and tells you all you need to know.

You CAN'T go wrong if you follow the blueprint and this Rapid Construction Guide.

(J) Cut out, drill and stain the spar (see Fig. 5), which holds grid-bias battery in place.
 (K) Lay the panel face downwards on a cloth-covered table (to avoid scratching veneer).

THIS Guide is as detailed as previous ones of mine, although the set is much simpler to construct. The absolute novice is told where to start and what to do, even to the best way of pushing in a pin! If you prefer, YOU CAN BUILD THE "SUPER CENTURION" FROM BLUEPRINT ALONE. But tens of thousands have reported that my Rapid Guides save them time and guarantee success.

If you have bought a complete kit, including my "Easy-Cabinet," cross out sections C, D, F, J, K.

(A) Collect and examine required components. Check each item to see that it corresponds to my list of parts actually used. Handle J.B. tuning condensers with care, keeping moving vanes closed. Bending of vanes would affect calibration of station names.

(B) Tighten terminal securing nuts (not terminal heads) on components where necessary.

(C) Using Fig. 1 mark out on the front (not back) of panel the positions of the holes. With a fine-pointed bradawl prick all the hole positions. Using a $\frac{1}{8}$ -in. twist-drill, start each $\frac{1}{4}$ -in. hole carefully, using light pressure and turning the drill in a reverse direction at first: this is to avoid splitting the veneer. Continue drilling these $\frac{1}{4}$ -in. holes in ordinary way. Centre-bits are recommended for all the remaining larger holes in panel, but twist-drills may be used. Drill these holes.

(D) If you are going to use my Easy-Cabinet system and have not bought the pieces ready prepared, carry out instructions in this section (D). If you have bought the pieces ready prepared, skip this section (D). Cut to size and drill cabinet top (Fig. 2), drilling $\frac{1}{8}$ -in. holes as advised above. Using the diagram on page 594 and keeping to the order of drawing the lines shown, mark out the cabinet side-pieces on the sides which will show.

(E) Take the left-hand (looking from front) side-piece and top-piece and hold them together and resting on a flat surface. Prick with a bradawl through the prepared holes in the top-piece into the top of the side-piece. Insert two $\frac{1}{4}$ -in. No. 4 round-head brass screws and screw top-piece to side-piece.

Now do the same with the other side-piece. Lay the assembled top and sides aside.

(F) Mark out and drill the terminal strip as Fig. 3. Prepare two mounting brackets as Fig. 4.

(G) Fit two mounting brackets to inside of the terminal strip using $\frac{1}{4}$ -in. 6BA round-head

Lay blueprint right way round on back of panel. Keep blueprint steady with a weight. Using bradawl, prick through to panel the fixing holes of all the components that go on the back of the panel. If in doubt about any holes, check by laying component over its picture. Remove the blueprint. Using blueprint as check for their positions, screw down the following in order given: Super Centurion coil unit with extension piece, $\frac{1}{4}$ -in. No. 4 round-head brass screws being used: three Clearer Tone Valve-holders (get them right way round), using $\frac{1}{8}$ -in. No. 4 round-head brass screws; two Lissen mica condensers, using $\frac{1}{8}$ -in. No. 4 round-head brass screws, taking extreme care that the right capacities are put in the right place, as these condensers look alike from the top; B.T.S. Midget transformer (right way round), using $\frac{1}{4}$ -in. No. 4 round-head brass screws; Wearite screened choke (marked H.F.J. although catalogued H.F.P.J.) with its earthing-tag to correct side as shown in blueprint, using $\frac{1}{4}$ -in. No. 4 round-head brass screws; Lissen H.F. Choke with $\frac{1}{8}$ -in. No. 4 round-head brass screws; 1 mfd. (T.C.C.) condenser, using $\frac{1}{8}$ -in. No. 4 round-head brass screws. Fit turret switch without knob. Fit volume control condenser without knob. Fit anode reaction condenser without knob. Fit aerial balancer condenser without knob. Taking care that the whole panel will not rest on the spindle of the J.B. main tuning condenser (whose moving vanes should be closed), fit the J.B. condenser (without knob and pointer) to panel, putting its bush washer on the front side of panel under fixing nut, which should not be too tight. THIS COMPLETES THE FIXING OF COMPONENTS.

Now you are going to wire the components, and for this you need the blueprint.

Lay panel face downwards resting it on two (Continued overleaf.)

FRONT VIEW OF PANEL

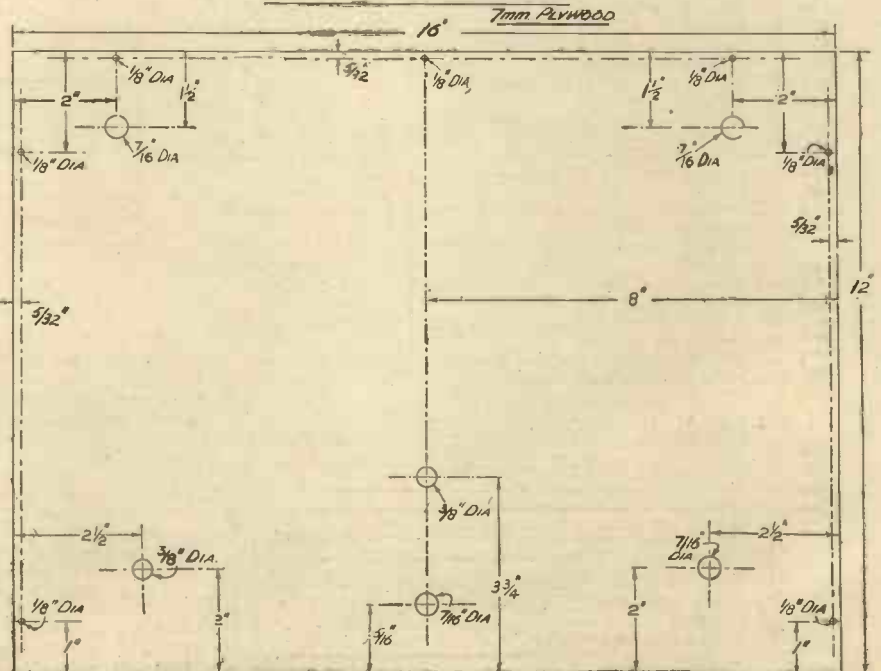


Fig. 1.—With the aid of this diagram, which it will be seen gives sizes of holes as well as their positions, drilling the panel is made as simple as the other constructional work.

(Continued from previous page.)

books or cloth-covered blocks of wood; this is to prevent scratching of veneer and to prevent pressure on control spindles.

The recommended wire is of the kind that permits the insulating covering to be slipped back, revealing the bare end of the wire. "Maxamp" wire by Peto-Scott is about the best I have tried, and is also of suitable thickness. It is strongly recommended as being very much easier to use than bell-wire or similar stiffish wires. My advice is to use it as follows:

Cut off 6-ft. lengths at a time from the coil as required. Push back insulation about 1 in. and, without increasing this inch, slide the bunched-up fullness of the insulating covering well back along the wire. Using only about 1/4-in. of the bared end, connect the wire looping it (preferably clock-wise) round under the terminal-head of the component to be wired up.

Shape wire along route indicated in blueprint with a reference, if desired, to the photographs.

Allow an extra 1/4-in. on the length of the wire for connection to the terminal it is going to. Cut through the insulated wire, slip insulation back 1/4-in. and, without increasing this 1/4-in., work the bunched-up fullness back along the wire, thus covering the bareness at the starting end. Now loop the finishing end (preferably clock-wise) under its terminal-head. This detailed account is of a process which actually takes only a few seconds and will enable you to do the wiring more neatly and in double-quick time.

(L) USING BLUE-PRINT, WIRE UP THE BASEBOARD COMPONENTS. Do not finally tighten any terminals until all the wires are on.

- (1) Coil unit terminal 10 to V1 valveholder terminal G.
- (2) Coil unit terminal 9 to V1 valveholder filament negative terminal.
- (3) V1 valveholder filament negative terminal to V2 valve holder filament negative terminal.
- (4) V2 valveholder filament negative terminal to anode reaction choke screen (fixing screw).
- (5) Anode reaction choke screen (fixing screw) to transformer fixing screw.
- (6) V2 valveholder filament negative terminal to 1-mfd. condenser.
- (7) 1-mfd. condenser to V3 valveholder filament negative terminal.
- (8) V1 valveholder filament positive terminal to V2 filament positive terminal.
- (9) V2 valveholder filament positive terminal to V3 valveholder filament positive terminal.

(10) Coil unit terminal 2 to aerial balancing condenser fixed vanes terminal.

(11) Coil unit terminal 3 to aerial balancing condenser moving vanes terminal.

(12) Coil unit terminal 4 to 1-mfd. condenser.

(13) Coil unit terminal 3 to turret switch terminal A.

(14) Turret switch terminal C to V1 valveholder filament negative terminal.

(15) Main tuning condenser fixed vanes terminal to .0005-mfd. grid condenser.

(16) Coil unit terminal 5 to main tuning condenser fixed vanes terminal.

(17) .0005-mfd. grid condenser to V2 valveholder grid terminal.

(18) Main tuning condenser moving vanes terminal to V2 valveholder filament negative terminal.

(19) Anode reaction condenser moving vanes terminal to coil unit terminal 8.

(20) Anode reaction condenser fixed vanes terminal to .0003-mfd. fixed mica condenser.

(21) .0003-mfd. fixed mica condenser to anode reaction choke.

(22) Anode reaction choke to V2 valveholder anode terminal.

(23) .0003-mfd. fixed mica condenser to V2 valveholder filament negative terminal.

(24) Yellow lead of L.F. transformer to anode reaction choke.

(25) Grey lead of L.F. transformer to 1-mfd. condenser.

(26) Green lead of L.F. transformer to V3 valveholder grid terminal.

(27) V1 valveholder screen-grid terminal marked A to aerial reaction choke.

(28) V1 valveholder screen-grid terminal marked A to aerial reaction condenser fixed vanes terminal.

(29) V2 valveholder grid terminal via 1-megohm to V2 valveholder filament positive terminal.

(30) Turret switch terminal D to V3 valve filament positive terminal.

(31) Coil unit terminal 6 to lead for subsequent connection to anode of H.F. pentode V1.

(32) Volume control fixed vanes terminal to coil unit terminal 1.

Two grid-bias leads are prepared as follows:

Take a suitable length of "Maxamp" wire, and prepare it as usual to have 1/4-in. of bare wire at each end. Bend one of the ends 1/4-in. from the end back on itself and push the loop so formed into the hole in the side of the Belling & Lee Midget wander-plug, having loosened the head of wander-plug. Tighten head of wander-plug. Fit other end of wire to correct component.

(33) An 8-in. lead connected to the 1-mfd. condenser and having at the other end a wander-plug marked Grid +.

(34) Connect red lead of L.F. transformer to G.B. -1 wander-plug.

(35) An 11-in. lead connected at one end to

turret switch terminal B and fitted at the other end with a wander-plug marked Grid -2.

(36) Coil unit terminal 11 to moving vanes terminal of aerial reaction condenser.

(M) If you have built the Easy-Cabinet frame (as I assume), fix the completed panel on the frame as follows:

Slacken grub screw on coil unit switch extension piece. Slip extension piece close to coil unit.

THE EASY-CABINET

The Super Centurion is built into an "Easy-Cabinet," which consists of three pieces of wood—a top and two sides. All the constructor has to do is to screw these three pieces of wood to the panel, a matter of a few minutes' work, and then he has an absolutely complete receiver.

Take the panel and slip wave-change spindle through hole prepared for it in cabinet side-piece. Screw panel to frame, using 1/4-in. No. 4 round-head brass screws. Slip extension piece into position as shown on blueprint. Tighten the grub screw in the extension piece.

(N) Fit terminals in terminal strip. Fit strip to underside of cabinet top, using two 1/4-in. No. 4 round-head brass screws.

(O) COMPLETE WIRING AS FOLLOWS :

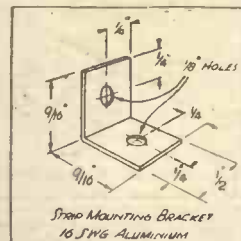


Fig. 4.—Two of these brackets are used to fix the terminal strip to the top of the "Easy-Cabinet."

(37) L.T. + terminal on strip to turret switch terminal E.

(38) L.S. - terminal on strip to V3 valveholder anode terminal.

(39) H.T. +2 terminal on strip to 1-mfd. condenser.

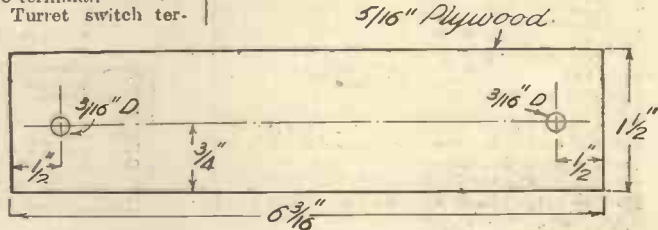
(40) H.T. +1 terminal on strip to aerial reaction choke.

(41) Terminal E on strip to 1-mfd. condenser.

(42) Terminal A on strip to volume control moving vanes terminal.

This completes the wiring.

(P) Mark in following manner the fixing holes for grid-bias battery spar, which clamps the battery to the left side of the Easy-Cabinet looking from the back. (Fig. 6.) Prick with Bradawl the lower-fixing hole, which is 1-in. up from the bottom edge of the side-piece and 2 in. from the back edge (farthest from panel). Slip a



G.B. BATTERY CLAMPING SPAR

Fig. 5.—The grid bias battery is held in place against one end of the "Easy-Cabinet" by means of this simple clamping strip.

1 1/4-in. No. 8 round-head brass screw through the hole in one end (either end will do) of the grid-bias battery clamping spar and insert the point of the screw in the fixing hole just pricked. Give the screw one turn to prevent its falling out. Swing the spar round until it is parallel to the back edge of side-piece. Holding spar against side-piece, prick through the other hole (in spar) into cabinet side-piece with Bradawl.

Insert a second 1 1/2-in. No. 8 round-head brass screw through the upper hole in spar into pricked hole in side-piece. Give this screw one turn to prevent its falling out. Slip spar along the screws and insert the 9-volt grid-bias battery between spar and side-piece of cabinet, with the battery sockets facing towards the back (away from panel) and the positive end of battery nearest top of cabinet.

(Please turn to page 620.)



Fig. 2.—Details for preparing the top of the "Easy-Cabinet." Dimensions for the side pieces are given in the diagram on page 594.

TERMINAL STRIP (VIEWED FROM EITHER SIDE)

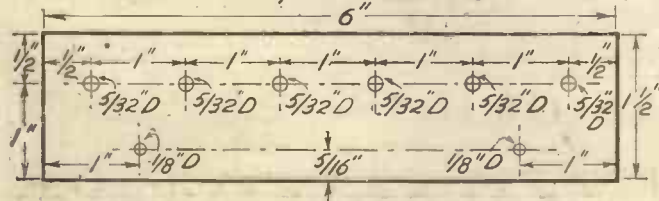
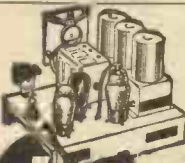


Fig. 3.—The number of terminals is kept to a minimum by making some of the battery-connections direct between the batteries themselves.

Peto-Scott 1937 ALL-WAVE S.G.3 KIT



World-wide programmes on all wave-lengths. Every constructor should build his own all-wave set and enjoy the thrill of All-Wave listening that will bring programmes from all over the world. Peto-Scott offer you a Kit which is, in the words of a famous designer, "An amazingly efficient yet simple to build Kit set."

5/- DOWN

- NO COIL CHANGING. LOW LOSS ROTARY SWITCH. PRESSED STEEL DRILLED CHASSIS. S.G. DETECTOR and PENTODE CIRCUIT. FULL INSTRUCTIONS and DIAGRAMS.

and 11 monthly payments of 7/3 **KIT "A"** Cash or C.O.D. Carriage Paid **£3. 17. 6**

Complete Kit of components, less valves and cabinet. **KIT "B."** As for Kit "A," but with 3 recommended Hivac valves. Cash or C.O.D. Carriage Paid **£5/0/3**, or 9/- deposit and 11 monthly payments of 9/3.

PETO-SCOTT SUPER SINGLE VALVE SHORT-WAVE KIT

NO COIL CHANGING



- Wave range 13-74 metres. Easy to Build. Panel and chassis ready drilled.
- Slow motion 100 to Tuning
- Series Condenser eliminates blind spots.
- Plug in a pair of headphones and listen to broadcast programmes and amateur transmissions from all over the world. This splendid little valve short-wave set will delight and entertain you at all hours. Ample room on chassis for converting to a two or three-valve if desired.

KIT "A" comprises complete Kit of parts with ready drilled Crystalline finish steel panel, grey stove enamelled steel chassis and all necessary screws with working drawings and operating instructions. Less valve and cabinet and headphones. Cash or C.O.D. Carriage Paid **£1/15/0**, or 2/6 down and 8 monthly payments of 4/6.

2/6 DOWN

● If required with valve and headphones **£2/6/3**, or 4/3 down and 11 monthly payments of 4/3.

CONNECT THIS Peto-Scott SHORT-WAVE A.C./D.C. PRE-SELECTOR



TO YOUR EXISTING SET and tune-in to America and the whole World on Short Waves. Only a few simple connections necessary and NO ALTERATIONS to your receiver. Incorporates special coil unit covering 13 to 74 metres, and is equipped with an arrangement whereby just a turn of the switch by-passes the Pre-Selector so that your set is then available for reception on normal broadcast wave-lengths. **SUITABLE FOR ALL RECEIVERS, A.C., D.C. OR BATTERY.** Providing electric supply is available. For A.C. or D.C. only. Complete with valves and cabinet illustrated **£4: 17: 6** Cash or C.O.D. Carriage Paid.

9/- DOWN

- ABSOLUTELY READY FOR USE.
- DUAL RATIO SLOW-MOTION DIAL (8-1,100-1)
- WAVELENGTH CALIBRATED SCALE.
- B.V.A. VALVES.

BEAUTIFUL WALNUT VENEER CABINETS



RADIO CONSOLE

This latest Peto-Scott production is an outstanding example of the best cabinet craftsmanship, offered at a price that would be impossible but for our huge production and policy of selling direct. The illustration herewith can give but a poor idea of the truly lovely appearance of this exquisite cabinet. The cross banded and contrasting inlaid walnut veneered panels are relieved by narrow ebony inlays. Every cabinet hand French polished. Complete with shelf for receiver, and loudspeaker baffle board. The Cabinet is supplied undrilled. Drilling quoted extra. **Cash or C.O.D. 57/6**

Overall Dimensions: 31" x 18" wide x 11 1/2" deep. Takes panel 14" x 7" and base-board 14" x 11". Speaker compartment 14" x 14" x 11". **Or 5/- down and 11 monthly payments of 5/3.** Carr. & Pkg. 2/6 extra.

PETO-SCOTT PILOT AUTHOR KITS Exact to Specification SUPER CENTURION IMMEDIATE DELIVERY-CASH-C.O.D. or H.P.

These are the parts SPECIFIED by Mr. JOHN SCOTT-TAGGART and CONTAINED IN KIT "A." Any items supplied separately. Orders over 10/- sent carriage and post charges paid.

- | | |
|---|--------|
| 2 Peto-Scott ready drilled and polished cabinet side pieces, cabinet top and grid bias battery spar with 6 screws | 3 6 |
| 1 Peto-Scott ready drilled and polished panel, 16" x 12", with screws | 3 3 |
| 1 Peto-Scott drilled terminal strip, 6" x 1 1/2" | 8 6 |
| 2 Peto-Scott brackets with nuts and bolts | 12 6 |
| 1 Colvern super Centurion Coil Unit | 5 6 |
| 1 J.B. main tuning condenser with S.T.700 knob and pointer | 4 6 |
| 1 J.B. aerial balancer condenser with small knob | 5 3 |
| 3 Graham Farish .0005-mfd. log mid line condensers, S.T.800 type | 2 0 |
| 1 Graham Farish turret switch | 2 0 |
| 1 Wearite anode reaction choke, type H.F.J. | 2 0 |
| 1 Lissen aerial reaction choke, type LN.5092 | 6 6 |
| 1 Lissen mica grid condenser. .00005-mfd. | 6 6 |
| 1 Lissen mica by-pass condenser, .0003-mfd. | 2 6 |
| 1 T.C.C. 1-mfd. condenser, type 50 | 4 6 |
| 1 B.T.S. Midget L.F. transformer, skeleton type | 1 0 |
| 1 Erie 1-meg 1-watt grid leak | 4 6 |
| 3 Benjamin 4-pin valve holders, Clearstone type | 1 6 |
| 6 Belling Lee type "R" terminals, A, E, HT+1, HT+2, IS- LT+ | 6 6 |
| 3 Belling Lee Midget wander plugs, Grid +, Grid-1, Grid-2 | 1 7 |
| Maxamp wire, screws and flex | 2 18 9 |

KIT "A," Cash or C.O.D. Carr. Paid **£2 18 9**

● **SUPER CENTURION EXTRACTOR** is available, either built up or as a kit of parts, at **£1/4/0**. If required with either of above kits add 2/- to cash prices, or 2/3 to deposit and each monthly payment. Please state when ordering whether kit or ready-built Extractor required.

● SUPER CENTURION FINISHED INSTRUMENTS
TABLE MODEL Assembled and built by Peto-Scott experts exactly to specification and housed in S.T.800 type table model cabinet (illustrated below). Tested on broadcasting before despatch. Complete, but less batteries and **£5.16.6** speaker. **CASH or C.O.D. Carriage Paid** **Or 10/9 down and 11 monthly payments of 10/9.**

KIT "A" CASH or C.O.D. Carriage Paid £2:18:9

Complete kit of components exactly as specified by Mr. John Scott-Taggart, with ready-drilled panel and Easibuilt cabinet parts, but less valves, cabinet and Extractor Kit.

5/- DOWN

or 5/- down and 11 monthly payments of 5/4

- | | |
|---|---|
| KIT "B." As for Kit "A," but including set of 3 specified valves. CASH or C.O.D. Carr. Paid £3/19/0 , or 7/3 down and 11 monthly payments of 7/3. | KIT "CT." As for Kit "A," but including set of 3 specified valves and S.T.800 type table model cabinet. CASH or C.O.D. Carr. Paid £4/16/6 , or 8/9 down and 11 monthly payments of 8/9. |
|---|---|

KIT "CC." As for Kit "A," but including set of 3 specified valves and S.T.800 type Console cabinet. **CASH or C.O.D. Carr. Paid £5/14/0**, or 10/6 down and 11 monthly payments of 10/6.

KIT "A," Cash or C.O.D. Carr. Paid **£2 18 9**

● SUPER CENTURION FINISHED INSTRUMENTS
CONSOLE MODEL Assembled and built by Peto-Scott experts exactly to specification and housed in S.T.800 type Console cabinet (illustrated below). Tested on broadcasting and supplied complete with Peto-Scott model 101 speaker, less batteries. **CASH or C.O.D. Carriage Paid** **£7.15.0** **Or 14/3 down and 11 monthly payments of 14/3.**

S.T. 800 KIT "A" CASH or C.O.D. 70/- OR YOURS 7/-

IMMEDIATE DELIVERY Complete Kit of Components exactly as FIRST specified and used by Mr. J. Scott-Taggart with Konectakit (Gratis with Complete Kit) but less wander plug, accumulator connectors, valves, Extractor Kit, Cabinet and Speaker.

- | | |
|---|--|
| KIT "B." As Kit "A," but including set of 4 FIRST specified valves only, less cabinet and speaker, etc. Cash or C.O.D. Carr. Pd. £4/16/6 , or 9/- down and 11 monthly payments of 8/10. | KIT "CT." As Kit "A," but with valves and Peto-Scott Table Cabinet only, less speaker, etc. Cash or C.O.D. Carr. Pd. £5/14/0 , or 10/6 down and 11 monthly payments of 10/6. |
| KIT "CC." As Kit "A," but with valves and Peto-Scott Console Cabinet only, with speaker baffle and battery shelf, less speaker, etc. Cash or C.O.D. Carr. Pd. £6/11/6 , or 12/3 down and 11 monthly payments of 12/3. | KIT "CLL." As Kit "A," but with valves and Peto-Scott Type "LL" Console cabinet only, with speaker baffle, less speaker, etc. Cash or C.O.D. Carr. Pd. £6/14/0 , or 12/3 down and 11 monthly payments of 12/3. |

S.T.800 EXTRACTOR is available as a kit of parts or ready built at the same price, **£1/4/0**. Cash or C.O.D., or add 2/3 to deposit and each monthly payment. Please state which is required when ordering.

—S.T.800 FINISHED INSTRUMENTS IMMEDIATE DELIVERY

EXACT TO MR. JOHN SCOTT-TAGGART'S SPECIFICATION

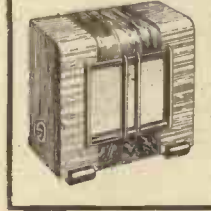


TABLE MODEL
Battery Version
Built by Peto-Scott's expert technicians. Complete with **FOUR FIRST SPECIFIED** valves and Peto-Scott walnut table cabinet (illustrated on left), less batteries. **OVER-ALL DIMENSIONS:** Width 18 1/2", Height 14", Depth 12". **Cash or C.O.D. Carriage Paid £7:5:0**
Or 13/3 down and 11 monthly payments of 13/3.

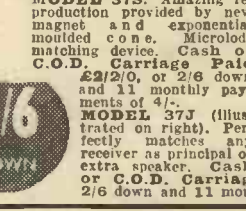


CONSOLE MODEL
Battery Version
Complete with **FIRST SPECIFIED** valves, Peto-Scott Type 101 matched speaker and walnut Console cabinet with Australian walnut-veneered front and wings (illustrated on left). Dimensions: 20in. wide, 24in. high, 12in. deep, less batteries. **Cash or C.O.D. Carr. £9:2:0**
Or 16/9 down and 11 monthly payments of 16/8.

W.B. SPEAKERS



MODEL 37SC (illustrated on left). A cabinet instrument giving superb reproduction, with power handling capacity of up to 5 watts undistorted. The turn of a switch adjusts it to match any set made. With volume control. **Cash or C.O.D. Carriage Paid £3/3/0**, or 5/- down and 11 monthly payments of 5/9.



MODEL 37S. Amazing reproduction provided by new magnet and exponential moulded cone. Microloade matching device. **Cash or C.O.D. Carriage Paid £2/2/0**, or 2/6 down and 11 monthly payments of 4/-. **MODEL 37J** (illustrated on right). Perfectly matches any receiver as principal or extra speaker. **Cash or C.O.D. Carriage Paid £1/12/6**, or 2/6 down and 11 monthly payments of 3/-.

All Postal Orders should be crossed and made payable to Peto-Scott Co., Ltd. All currency must be registered. Head Office: 77 (P.W.17), City Road, London, E.C.1 Telephone: Clissold 9875/6.

PETO-SCOTT CO. LTD. West End Showrooms: 62 (P.W.17), High Holborn, London, W.C.1. Holborn 3248.

Buy by Post—its Quicker—CASH—C.O.D.—EASILY

£3,000,000 WON'T GO FAR!

Says ALAN HUNTER

Although this sum, representing seventy-five per cent of the total licence revenue, may seem fully adequate for the B.B.C.'s needs it must be remembered that in order to meet the constant expansion and progress, necessitated by the desire to provide a still better broadcasting service, a very large expenditure is called for.

THANKS to Lord Ullswater and his Committee, the B.B.C. now enjoys under its brand-new Charter an income representing 75 per cent of the total licence revenue. When, as will shortly happen, the eight-millionth licence is reached, the B.B.C.'s income will be the almost astronomical sum of £3,000,000!

A lot of money, you will murmur. Surely, with such an income, the programmes MUST get brighter and better! Assuming, of course, that it is lack of money and not lack of showmanship that has so far been the reason for so many dull items.

I have been looking into some of the outstanding commitments of the B.B.C. And as a result, I must confess to a sinking feeling. Even £3,000,000 won't go far on the present basis of expansion.

Building the Framework

The trouble seems to be that the B.B.C., like the Universe itself, will keep on expanding. While the framework of the system is still being built up, there is precious little time—or money—to fill in the existing structure with the bricks and mortar of sheer programme improvement.

And yet, who shall blame the B.B.C.? Lots of people would blame it—have done so—if it called a halt to expansion. For lots of people, even to-day, are still without the elementary right of a reliable local signal, free from night-time fading.

That is why, on the present engineering schedule, I find so much development work that will have to be paid for during the coming year.

To begin with, there is the North Wales relay. Admittedly, it is only a 5-kilowatt station—but its station building, power supply, anti-near-fading aerial and engineering staff will add up to quite a pretty penny.

Not that I would deny the Welsh a place in the broadcasting sun. On the contrary, they have far too long been ignored, with only a fitful mead of attention from Droitwich National.

New Short-wave Stations

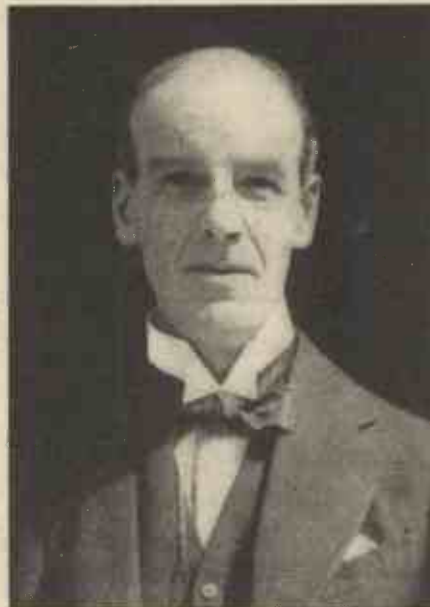
Then, before the Coronation in May, the B.B.C. hopes to open three high-power short-wave stations at Daventry. These, with a vast array of new aeriels for semi-beam radiation to all parts of the Empire, will make a big hole in the Corporation's coffers.

We must have a "Voice of Britain," I suppose. Once admit the need for an Imperial broadcasting link, and you must go the whole hog in combating the fearful competition of other more propaganda-conscious countries.

Then, a little later, the B.B.C. will open the North-eastern Regional station at Stagshaw. This is to be a full-blown 50-kilowatt affair, with anti-near-fading

aerial of the mast-radiator type and all the other refinements of modern technique. Again, we must admit that Newcastle and Gateshead and all that highly populous district deserves every kilowatt it is shortly to receive.

NEW ADVISORY COUNCIL CHAIRMAN



The Rt. Hon. the Lord MacMillan, new Chairman of the B.B.C. General Advisory Council. Lord MacMillan succeeds His Grace the Archbishop of York, who recently intimated that he could no longer continue to serve as chairman. The council's functions are, briefly, to advise the B.B.C. on any matter relating to its programmes, its publications and its general policy, and to promote among listeners a fuller interest in and understanding of the constitutional problems, policy and practice of the B.B.C.

But it represents yet another large capital expenditure, which as usual the B.B.C. will have to meet out of current income. If this were all, perhaps the huge licence revenue would be able to stand the loss. Unfortunately, it is by no means all.

In the current year television will make great encroachments upon the revenue. Exactly how great, no one—not even the B.B.C.—dares to estimate.

Here it might be argued that there is something inequitable in financing a television service for plutocratic Londoners with licence money paid over by millions of listeners who will not—for years, anyway—get the faintest chance to "look-in."

Some people suggest—rather fatuously, I think—that a separate licence should be issued for television. But it is absurd to

suppose that this would produce any immediate revenue for the development of the service. It is putting the cart before the horse, entirely.

Television cannot develop without large financial resources. If these are to come from special television licences it will never develop. No one knows which came first, the chicken or the egg; but it is a moral certainty that finance must come before television.

Besides, just as the B.B.C. has been given the responsibility for conducting the Empire Service, it has been charged with the sole responsibility for setting up a country-wide television service.

Radio and Television Similarity

For the first years there is bound to be inequity, however rapidly stations for television may spring up. The position is entirely analogous to sound broadcasting, where, as I have said, there are even now listeners who—paying their licence money the same as everyone else—are without a really first-class local signal.

Meanwhile, all these developments are disquieting—not to say disappointing—to those who imagined that the new Charter would mean lots more money to improve the existing service in terms of better programmes.

The technical network is the means to the programme end; and while the network is still in process of construction—as, indeed, it is, after all this time—the means must tend to obscure the ultimate end.

Technical progress has always absorbed a large amount of B.B.C. revenue. It probably always will. Especially as London Regional—the first of the twin centres under the Regional Scheme—is now definitely obsolescent and will have to be replaced within two or three years.

Lack of Accommodation

Quite apart from such capital expenditure that seems to have continually offset an ever-growing revenue, the B.B.C. has to face a chronic lack of administrative accommodation.

Having bought Broadcasting House lock, stock and barrel from a syndicate that started the phenomenal pile at Portland Place, it now has to envisage the expense of doubling the size of the present building.

Demolition work on the Regency houses adjoining the Big House is almost due to begin. It will take two years, says the B.B.C.'s Civil Engineer, to erect the extensions, which will contain huge suites of offices for the overflowing broadcasting bureaucrats, as well as still more studios.

Taking everything into account, then, it is obvious that the blessing of an increased revenue as bestowed upon the B.B.C. by a benevolent Government is—to say the least of it—a very mixed one.

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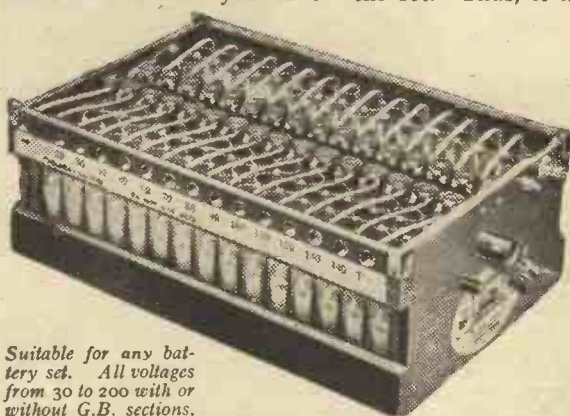
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TELEVISION TOPICS—Collected by A. S. Clark

A weekly feature which will keep the reader au fait with all the latest news and developments in television science. It will appeal alike to the newcomer to television and the advanced experimenter.

"CAUGHT BY TELEVISION"

"CAUGHT by Television" is the name of a film that lives well up to its title. It is one that holds much of appeal to the television enthusiast, for the technicalities of the television apparatus are by no means based on the impossible.

The only point not clear, and it is one that can be forgiven in a film produced for entertainment, is that there are no signs of any aerial being employed either at the transmitter or the receiver. At the same time it is quite evident that a radio link of some sort is presupposed.

The parts in which a television camera is used to pick up scenes from a football match in a crowded sports arena are vividly reminiscent of photographs taken at the Olympic Games in Germany last year, and showing the television camera used then. Whether the "staging" of these parts of the film was inspired by the television at the Olympic Games it is difficult to say without knowing the dates when these scenes were shot.

A Very Interesting Film

Though the receiver used a small cathode-ray tube, the pictures were produced on a screen somewhere about two feet by one foot six inches. So a cathode-ray projection system could be supposed.

Two comments, one made by the inventor and one by a non-technical director of a broadcasting firm, provided a wonderful satire on inventions as seen from different angles in real life.

The inventor, explaining his apparatus to a

friend, turns to the receiver and remarks: "This is the simplest form of television receiver." And later in the film, at a demonstration, the director just mentioned, casually looking over the gear, comments: "Complicated" in a knowing manner.

On the whole a most interesting film, well worth seeing.

"TELEFRAMES"

Items of general interest

PIONEER HONOURED.

MR. JOHN LOGIE BAIRD was recently presented with the medal of the international Faculty of Sciences, "in recognition of outstanding contributions to the science of television." He is the first British subject to whom the Faculty's medal has been awarded.

THE DIFFERENCE.

A good way of explaining the fundamental difference between ordinary broadcasting and television to the non-technical is to draw a comparison between the eye and the ear.

The latter accepts all sound waves, however complicated, as a single wave, pressure varying on the drum of the ear. The drum is connected to the brain by a single nerve.

In the case of the eye it deals simultaneously with millions of little sections of the picture it sees. Each little section is communicated to the brain by its own nerve, all these nerves together being like a



The final stage in the preparation of G.E.C. television cathode-ray tubes. One is seen being fitted into the metal container which protects it mechanically and also acts as an electrical screen.

multi-wire cable. Scanning has to be introduced into television to make it possible to do away with the multi-cable effect and to transmit a similar effect over one "wire," as in the case of the ear or sound.

MULTIPLE CONNECTORS.

Television experimenters will be interested to learn that Messrs. Bulgin have introduced some high-voltage multiple plugs and sockets for joining together the various units.

There is a six-way one for voltages up to 5,000 and a twelve-way one for voltages up to 2,500. The plugs in both cases cost 5s. 9d. each, and the sockets 1s. 9d. Both models are non-reversible.

TABLE TENNIS BROADCAST.

Table tennis champions will take part in a television broadcast on February 16th, when there will be an exhibition replay of the finals of the English Open Championships as played at the Empire Pool and Sports Arena, Wembley, a few days before.

In the afternoon, the present holder of the Men's Championship, A. Ehrlich (Poland), will be seen defending the title, and it will be interesting to note whether the same results will be achieved as at Wembley.

Table tennis is particularly suitable for television, it being possible to show the whole action without covering a wide area.

TELEVISION FOR BEGINNERS

In this article G. Stevens explains in which way a vision receiver differs from an ordinary broadcast receiver.

WHAT is there special about a vision receiver? We might start a little earlier and say in what way does a short-wave receiver differ from a broadcast receiver? In the short-wave sets that you have seen described in "P.W." and elsewhere, there does not appear to be much difference except that the coils have less turns and the whole set looks a little neater than the usual run of "hook-ups." The reason for the coils is, of course, obvious, because the wavelength of a tuned circuit is proportional to the number of turns in the tuning coil, among other things, and you will find that the coil which tunes to about 7 metres has only four or five turns.

The neatness of wiring is an indirect sign of the difficulty in getting satisfactory results with short waves according to the conventional practice. If we wired up a short-wave set in the way that an ordinary receiver is wired without taking a special trouble, the chances are that it wouldn't work, or if it did, the results would be very poor. The reason for this is the extraordinarily high frequency of the radio signal which we are receiving. An ordinary radio broadcast signal of about 300

metres wavelength has a frequency of 1,000 kilocycles, i.e. a million cycles per second. Now a 30-metre signal, which is on what we usually call the short-wave band, has a frequency ten times this, or 10 million cycles, and a 6-metre wavelength on the "ultra-short" band has a frequency of 50 million cycles.

Every receiving set has capacity in it, either in the form of the tuning condenser or in stray capacity, that is, the small condensers which are formed by running a conductor near another with a thickness of insulation between.

Capacity Leakage

There are also the capacities between the electrodes of the valves—a very important factor because they are unavoidable and set a limit to the efficiency of the valve as an amplifier. Now you probably know that the "reactance," as it is called, of a condenser is inversely proportional to the frequency of the current through it. Reactance is another name for the effective resistance so far as the flow of current is concerned; and this varies with the frequency in such a way that the higher the frequency the lower the reactance.

Now let us see what happens when a high frequency potential is applied to a condenser. The capacity is, say, '00001 microfarads, a very low figure in ordinary practice. At 1-megacycle frequency the equivalent resistance to this capacity is only 16,000 ohms. But at 10 megacycles the resistance drops to 1,600 ohms, and at 50 megacycles it is only 320 ohms.

Leaving aside the tuning of the circuit, think of a lead running from one condenser to another close to a metal chassis. It is quite possible that the capacity of this length of wire is '00001 mfd., which means that at 50 megacycles we are in effect connecting a resistance of 300 ohms between a live point and earth.

No wonder the wiring of a short-wave set has to be carefully carried out.

Some of these stray capacities can be avoided, but those due to the valve electrodes are inseparable from the valve, and could only be got rid of by taking the valve out. From the practical point of view this means that there is always a lower magnification from a given valve on the short waves, and as the frequency goes up the amplification of the set decreases. This in turn may mean that we shall have to employ more valves to do the job. The only way in which we can make sure that the set is giving reasonable results is to make the connections between the component so short and space them so neatly that the stray capacity is kept down to a minimum. So when you wire up your short-wave set, think, as

you solder a wire in place, "another 100 ohms to earth," and you will remember to keep it short and well clear of the chassis.

In the case of the vision receiver we have these troubles with us right through the set. In the broadcast receiver it is easy to draw a line between the radio side at fairly high frequency, and the audio side which comes after the detector and which has to handle currents of only a few hundred cycles. In audio frequency amplifiers we do not have to worry much about the losses, but only need concentrate on keeping the valves from oscillating or otherwise misbehaving themselves.

All Radio Frequency

Now in the vision receiver it is all radio. The band of frequencies for reproducing the half-tones of the picture requires at least two megacycles, so the radio frequency troubles are with us right up to the tube itself. In other words, the stages after the detector are radio frequency stages at only a slightly lower frequency than the original input stages, and we cannot use the word "audio" correctly. Instead, we usually refer to them as "video" stages, which is rather a neat word. The tuned circuits of the receiver will have to respond to this very wide range of frequency instead of the 10,000 cycles to which we are accustomed, and this will mean a special arrangement of tuner, which we can deal with next time.

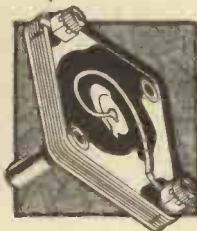


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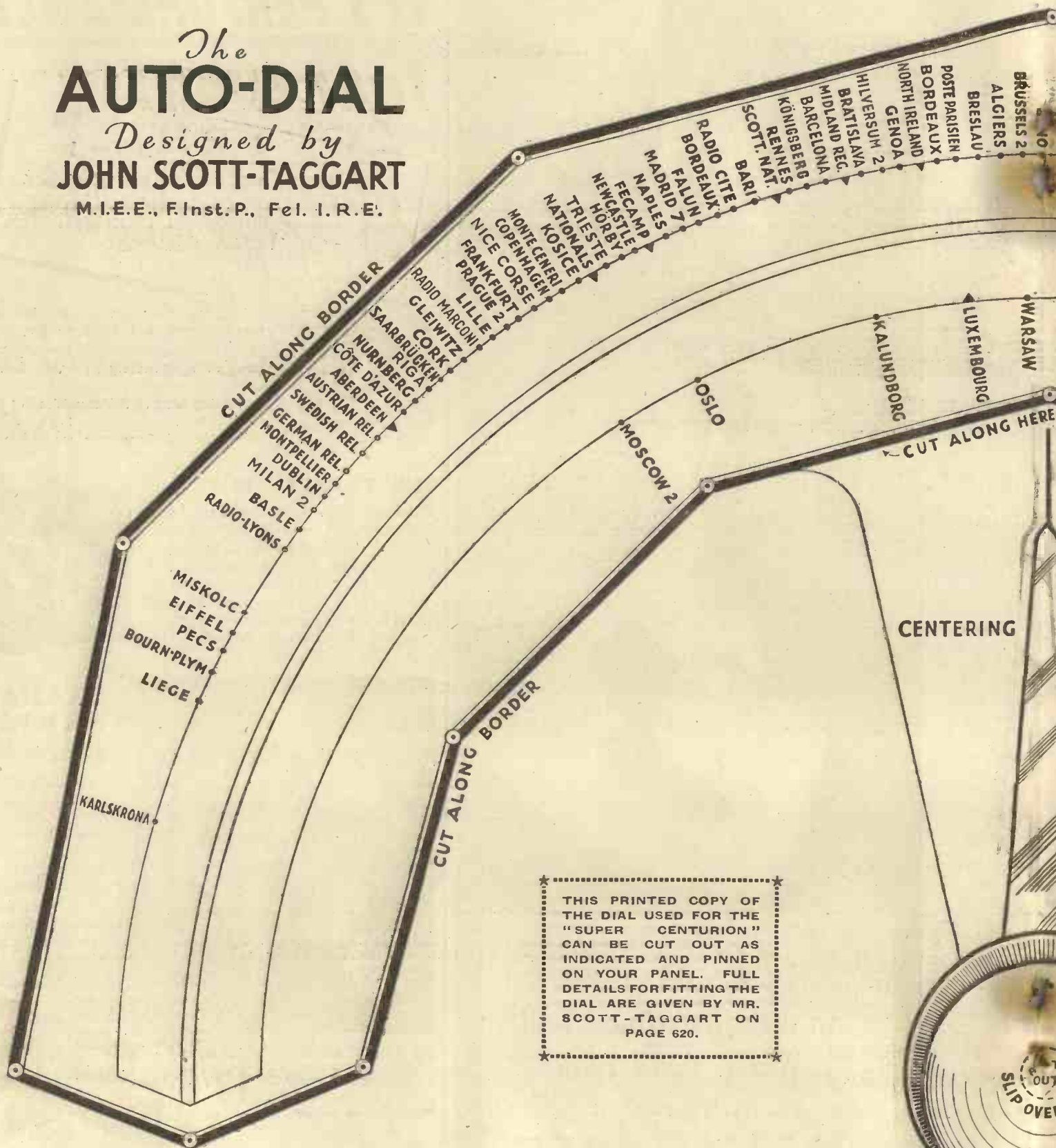


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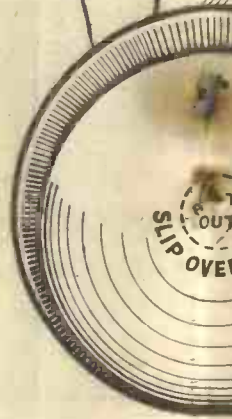
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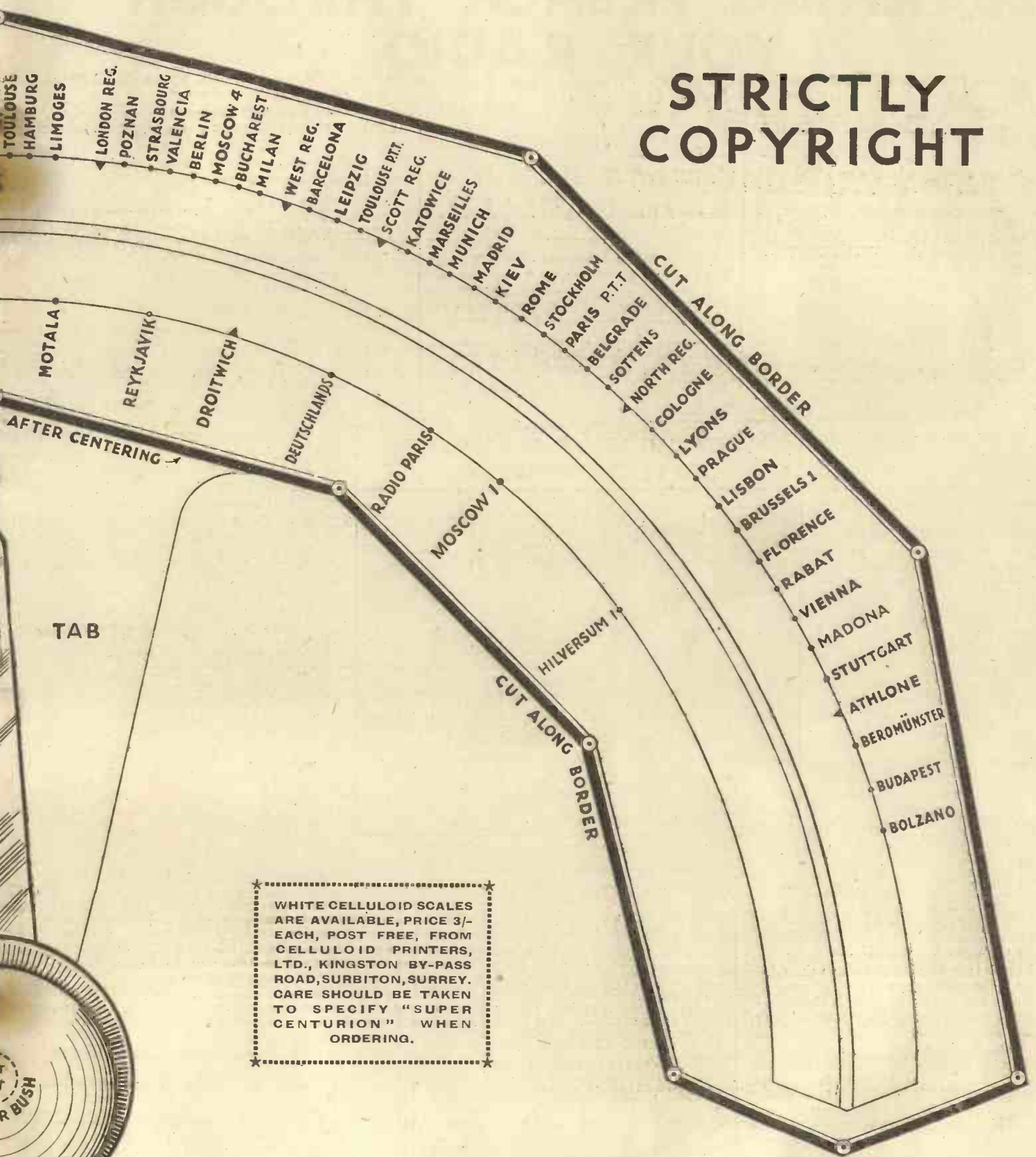


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LEARNING FRENCH THROUGH YOUR RADIO

WE will begin with DEVOIR. As I told you last week, this verb is conjugated just like RECEVOIR. The difficulty with DEVOIR isn't the French verb itself, but rather the English translation of it. We use so many odd English words here—which could be aptly described as ORPHAN words—that at best they can only be equivalent words and not translations.

I will give you the NINE TENSES of DEVOIR first, and then the English for the same. Remember, DEVOIR is like RECEVOIR.

PARTICIPLES: DEVANT D'ÊTRE

- TENSE No. 1
dois, dois, doit, devons, devez, doivent
- TENSE No. 2
devais, devais, devait, devions, deviez, devaient
- TENSE No. 3
eus, eus, dut, dûmes, dûtes, durent
- TENSES Nos. 4, 5, 6, 7
J'ai dû, etc.
J'avais dû, etc.
J'aurai dû, etc.
J'aurais dû, etc.
- TENSE No. 8
devrai, devras, devra, devrons, devrez, devront
- TENSE No. 9
devrais, devrais, devrait, devrions, devriez, devraient

Now to grapple with the translation question. The first essential, I think, is to give the INFINITIVE the three meanings:

1. To have to
2. To "am to"
3. To "must"

Yes, I know that Nos. 2 and 3 do not exist in English. But we will take the liberty of coining them. Starting off, then, with these 3 English INFINITIVES, we get as adequate translations of:

- TENSE No. 1
I have to, I am to, I must, etc.
- TENSE No. 2
I had to, I was to
- TENSE No. 3
I had to, I was to
- TENSES Nos. 4, 5, 6, 7
I have had to (I MUST HAVE)
I had had to
I will have had to
I would have had to (I OUGHT TO HAVE)
- TENSE No. 8
I will have to
- TENSE No. 9
I would have to (I OUGHT TO)

I think that most of the above should be clear, although the three phrases in brackets will puzzle you. It is these three phrases that make DEVOIR difficult. They are all very common expressions in English, and they are used just as frequently in French. That is why you MUST learn how to translate them. The three TENSES in which I have placed them above are just equivalents—the nearest equivalents. Try to remember this, then:

THERE IS ONLY ONE WAY OF TRANSLATING "I OUGHT" IN FRENCH, NAMELY, TENSE NO. 9 OF DEVOIR, i.e. JE DEVRAIS, etc.

From this it follows that "I OUGHT TO HAVE" IS TENSE NO. 7 OF DEVOIR, i.e. J'AURAIS DÛ.

Part 47 of the special language series contributed exclusively to "Popular Wireless" by S. C. Gillard, M.A.

TENSE NO. 4 IS THE BEST WE CAN DO FOR "I MUST HAVE."

I know from experience that DEVOIR is a terribly puzzling verb, but if you will learn how to translate I MUST HAVE, I OUGHT, I OUGHT TO HAVE, I am certain your main difficulties will vanish.

The next big thing to learn about DEVOIR is that IT IS ALWAYS FOL-

AMERICAN SINGER BROADCASTS HER FLYING EXPERIENCES



Miss Joan March, the well-known American singer, has been engaged by the N.B.C. to give special broadcasts on flying. She is seen here just about to give one of her microphone talks.

LOWED BY AN INFINITIVE. DON'T LET THE ENGLISH MISLEAD YOU HERE! Look at the following nine sentences:

- Je dois PARLER—I have to speak, I am to speak, I must speak
- Je devais ALLER—I had to go, I was to go
- Je dus PROMETTRE—I had to promise, I was to promise
- J'ai dû PARTIR—I have had to leave, I must have left
- J'avais dû RÉPÉTER—I had had to repeat
- J'aurai dû INFORMER—I will have had to inform
- J'aurais dû INTERROGER—I would have had to question, I ought to have questioned
- Je devrai EXCUSER—I shall have to excuse
- Je devrais ESSAYER—I would have to try, I ought to try

Learn these nine sentences by heart, and APPLY THEM!

Now for the FAIR COPY of the sentences I gave you last week:

1. Je reçois des amis chez moi
J'ai reçu des amis chez moi
Je recevrai des amis chez moi

2. Vous ne nous décevez pas
Vous ne nous avez pas déçus
Vous ne nous décevrez pas
3. Il aperçoit mon erreur
Il a aperçu mon erreur
Il apercevra mon erreur
4. Conçois-tu des espoirs?
As-tu conçu des espoirs?
Concevras-tu des espoirs?
5. Les recevons-nous?
Les avons-nous reçus?
Les recevrons-nous?
6. Cela nous déçoit
Cela nous a déçus
7. Ils reçoivent tout mon argent
Ils ont reçu tout mon argent
Ils recevront tout mon argent

8. Ne concevez-vous pas d'autres plans?
N'avez-vous pas conçu d'autres plans?
Ne concevrez-vous pas d'autres plans?
9. Vous l'apercevez
Vous l'avez aperçu
Vous l'apercevrez
10. Le reçoit-il?
L'a-t-il reçu?
Le recevra-t-il?

The test this week will be on DEVOIR. Translate into French:

1. You must imitate the pronunciation of the French announcers.
2. We had to listen to the station orchestra till 8 o'clock.
3. She had to do it immediately.
4. I have had to stay at home all day.
5. He had had to repeat it often.
6. They will have had to say it several times.
7. She ought to have isolated the patient.
8. We shall have to leave before midnight.
9. You ought to permit him to do it.

Fair Copy next week.

I am going to give you another list of words and phrases. Let us go for a stroll along a main thoroughfare of a big city. What shall we see?

- Une grande place—A big square
- Les carrefours—The cross-roads.
- Une grappe de places—A cluster of squares
- Le centre d'animation—The centre of animation
- Le trafic—The traffic
- Une cohue de voitures—A solid mass of traffic
- Les lumières—The lights, illuminations
- Les buildings—The buildings
- De grande taille—Of big dimensions
- De petite taille—Of small dimensions
- D'autres édifices—Other buildings
- Les chefs-d'œuvre de la nouvelle architecture—The masterpieces of the new architecture
- Les silhouettes blanches, le jour—The white silhouettes by day
- Les silhouettes flamboyantes, la nuit—Flaming silhouettes by night
- Les autobus—The buses
- Les tramways—The trams
- Les stations de Métro—The Underground stations
- Toutes sortes de boutiques bordent les trottoirs—All kinds of shops line the pavements
- Les devantures étroites—The narrow shop fronts
- Les badauds qui se garent ou s'attardent—Shop-window-gazers who stand about or loiter
- Les magasins de modes—The milliners' shops
- Les magasins d'accessoires de toilette—Shops for toilet requisites
- Les magasins de beauté—Beauty parlours
- Les chemiseries pour hommes—Men's shirt shops

(Please turn to page 619.)

PROGRESS IN TELEVISION

Technicians are constantly endeavouring to discover methods of simplifying television transmission and reception. One of the biggest advances would be the elimination of scanning, and below Carden Sheils discusses this problem, describing also a new and very novel scheme.

"TELEVISION," as the schoolboy said, "is much the same as ordinary wireless, except for scanning, which makes it a lot harder." And he certainly said a mouthful.

The difference between wireless for the eye, and wireless for the ear, is that the eye can only look at television signals on a surface having length and breadth, whilst the ear is satisfied to receive broadcast signals as a simple sequence of sounds. This is why in television we have to cut up the picture into small pieces at the transmitting end, and send the fragments one after the other through the ether. At the receiving end they must, of course, be re-assembled in their original order on the viewing screen.

Doing Without Scanning

Hence, too, the need for transmitting two sets of synchronizing impulses in order to separate the picture signals into "lines" and "frames," as well as the necessity for using filtering-circuits at the receiver to keep all the different kinds of signals where they belong. Finally, it explains why a complicated time-base circuit is required to arrange the picture properly on the viewing screen.

Altogether it is no wonder that inventors have tried their best, ever since television first arrived on the scene, to improve or simplify the process of scanning. Some of them have even tried to get rid of it altogether.

The last idea may seem a bit too good to be true, yet it has, in fact, been tackled by those who are not in the habit of chasing will o' the wisps.

Without using any rotating disc, or rapidly-moving beam of electrons, the picture is first focused, as a whole, on to the flat cathode of a special type of transmitting valve.

The Transmitting Tube

As shown in Fig. 1, the cathode C is made of photo-sensitive material. The grid G and anode A are also flat, and both are made of wire-mesh, so as to allow an image of the picture P to be focused through the lens L on to the sensitive "cold" cathode.

There are two special features about this valve. In the first place both the grid and anode are set slightly "askew," as shown in cross-section in the figure. Actually they are also inclined to each other in a plane at right-angles to the paper. The result is that for every point on the surface of the cathode C there is a different "spacing" or electrode-distance between itself and the grid G and the anode A.

The second point of interest is that the valve operates as a short-wave oscillator of the Barkhausen-Kurz type. That is to say, a high positive voltage is placed on the grid, and only a low positive (or zero) bias on the plate.

Now a valve biased in this fashion will generate continual oscillations, but—and this is the point—the wavelength it generates is determined chiefly by the spacing between the grid and anode.

Since, as already explained, this distance varies from point to point over the whole cathode, it follows that the valve will produce a band of different wavelengths simultaneously. Further, since the cathode is coated with photo-sensitive material, the number of electrons emitted will also vary from point to point, according to the light-and-shade value of the picture that is focused on it.

AT THE RECEIVING END

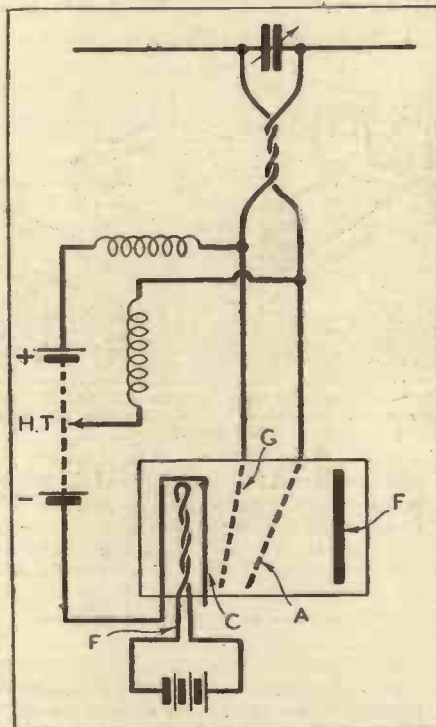


Fig. 2.—The scheme used at the receiving end. The incoming signals are applied across the grid and anode, these being inclined to each other as in the transmitting valve.

In other words, the valve generates a different carrier-wave for each point on the cathode, and at the same time modulates that wave with the appropriate picture signal. The complete picture is, therefore, radiated instantaneously, without any time-interval, however small, between one picture element and the next.

It is true that a wide band of frequencies is required to convey the picture through the ether, but this applies equally to any other system of television.

Fig. 2 shows how the signals are handled at the receiving end. In this case the flat cathode C is indirectly heated by the filament F, so that it normally emits electrons

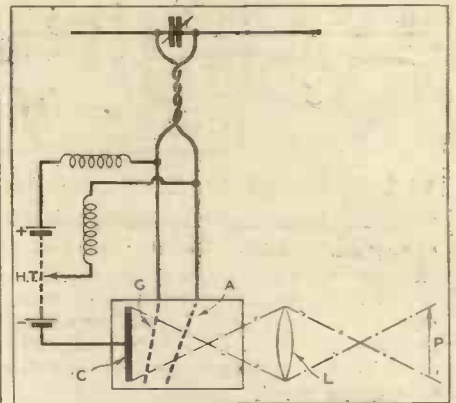


Fig. 1.—In this special transmitting valve the grid and anode are set slightly askew. The cathode is coated with a photo-sensitive material, and the number of electrons emitted varies according to the light and shade value of the picture focused on it.

at a uniform rate over the whole of its surface. The grid G and anode A are inclined to each other in the same way as in the transmitter valve, and the electrodes are similarly biased.

Building up the Image

The incoming signals are applied across the grid and the anode, and each carrier wave automatically selects the point on the grid where the "spacing" favours its own particular frequency. In this way it controls the cathode emission at each point, in accordance with the received signal strength, with the result that the electrons form an image of the original picture on the fluorescent screen F.

Naturally there are difficulties still to be overcome before we can expect to see "television without scanning" in practical operation. But it is comforting to know that the problem is, at least, being tackled.

The method of projecting the picture, as a whole, on to a photo-sensitive electrode is also a feature of the Iconoscope system of television. There is, of course, no attempt made to radiate all the picture signals at the same time, but a definite advantage is gained by allowing the photo-electric voltage to build up simultaneously, over the whole surface, until it is collected piecemeal by the rapidly-moving electron stream used for scanning.

An Accumulative Effect

In ordinary "spot-light" scanning, the picture voltage is generated by the swift passage of a single ray of light over the photo-electric cell. Naturally the photo-electric current so liberated is almost fantastically small, and requires enormous amplification. But by letting the picture "stay put" for a comparatively long time on a sensitive surface, and then sweeping up the accumulated charges by a rapidly-moving stream of electrons, a larger amount of signal energy is made available in the same scanning time.

Something of the same idea is also to be found in the latest form of light-valve used for building-up the picture at the receiving end. Instead of throwing each spot of light singly, and in turn, on to the viewing screen, a number are collected and projected together, so that they produce a more intense or brighter picture than is obtained by the ordinary method of scanning. This is one of the features of Scopphony television.

ON THE SHORT WAVES

POINTS from the POST-BAG

W. L. S. Replies to Correspondents

THE whole bag seems to be full of letters on this terrifically important subject of QSL cards! Little did I know what I was doing when I spread myself on that tender subject. It has produced letters of all kinds; some sympathising with the poor amateur transmitter, who is so over-worked answering his mail; some calling me all sorts of names for belittling the craze for the transference of bits of paper from one part of the world to another.

Incidentally, my remarks have evoked from one reader the only really abusive letter that I ever remember to have received through "P.W."—a distinction, indeed. I can't attempt to repeat its contents here, but I will pass them on if you'll come so close that I can whisper in your ear. I imagine the reader in question must be an old seafaring man. If he isn't, he's done pretty well for a land-lubber.

Four-pin or Six-pin Coils?

K. N. (Castlereas) is buying some short-wave coils in the near future, and asks whether the four-pin or six-pin type are the better investment. Of course, everything depends upon the circuit one decides to use; but the six-pin coils, obviously, will do all that the four-pin variety will do, and the third winding is there if one ever wants to use it for something else. For all-round experimental use and for playing about with different circuits there is no doubt that the six-pin coils give one more scope.

G 5 P B, of Barton-on-Sea, thanks me for "bursting into print about the QSL ramp." G 5 P B puts out phone on 40 and 20 metres, and, candidly, doesn't want reports from British listeners. He used to say so over the air, but, even so, his hall was full of letters every morning. He's been driven off 40 metres in sheer self-defence!

W. R. H. (Cardiff) has a "Simplex" Two to which he has added another resistance-coupled L.F. stage, and he now gets some twenty or thirty stations at full loud-speaker volume. He asks me whether I can recommend a book which explains all about radio, gives hints on fault finding, set construction, and information about components. Candidly, I'm afraid I haven't come across one that fills all his requirements and still can be recommended.

Adding to The "Simplex" Two

W. J. W. (S.W.8) also has a "Simplex" Two, but he has added a buffer stage and a pentode output stage. He uses a moving-coil speaker for everything, and in the last three months of 1936 he received 177 short-wave broadcast stations from forty-three different countries in six continents. He adds that the set is entirely made up of junk (but I presume that it is "good junk").

To read about some of these superhets nowadays leads one to suppose that the cult of the straight set is dead. But it doesn't look much like it, does it?

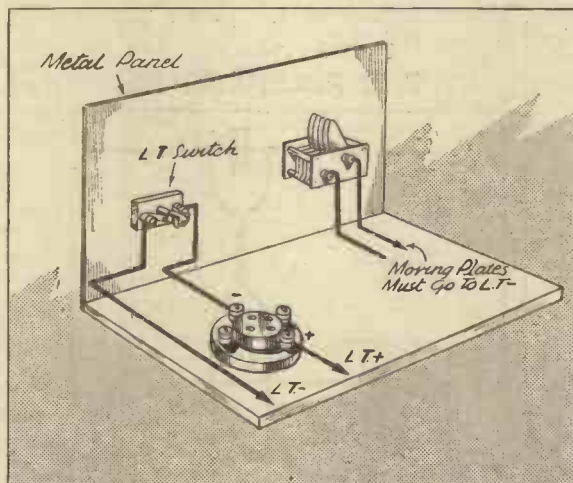
I should be interested to hear from other readers who are still using the "Simplex" Two. We might set about modernising it.

E. R. C. (W.1) tells me about some improvements he has made to his receiver by changing valves and by using a potentiometer return for the grid leak. He gets down to the television band with a straight receiver, and has received over 600 different stations (phone only, I presume). He wants a circuit of an H.F. unit (real 1937 fashion) in the near future.

A Reader's Hartley Circuit

L. E. C. (Nottingham) has rigged up the Hartley circuit that I described recently, and seems to be properly tied up with it. He has three variable condensers in it; all three of them tune, and two seem to affect

A SWITCHING TIP



When using a metal panel make sure your L.T. "on-off" switch is connected in the negative L.T. lead, otherwise you may short your battery.

reaction as well! But since one of them is in series with the aerial, and should be left severely alone, once its most suitable value has been decided on, I don't think he can be too badly off. At all events, his circuit values seem correct. I will try and cover this more fully in an early issue.

B. C. (Garstang) reports the old, old phenomenon, which crops up from time to time—two broadcasting stations coming in together when the coil of a short-waver is removed. This only happens when the H.T. is parallel-fed—otherwise the removal of the coil breaks the anode circuit and nothing can get through. With a broken grid circuit, in the old days, we used to hear Rugby piping away on his very long wavelength. Nowadays, with the broadcasting stations using so much more power than they used to, we generally get Droitwich and the nearest of the Regionals, together with any other local transmissions that are strong enough.

It's quite normal, so don't worry! Incidentally, I often get queries about these "quite normal" affairs, such as this: "When I touch the grid terminal of my detector I get an awful hum all mixed up with a kind of musical hum. What is the cure?" Only one cure, my lad—don't touch it!

Short-Wave News

SO five metres has "broken out" at last! G 5 B Y, of Croydon, who has done so much pioneer work in the past, is reported to have been heard by W 2 H X D of Bronxville, New York. I seem to remember saying, about this time last year, that 5 metres was going to repeat the kind of performance that 10 metres was putting up then. This is the beginning. If there hasn't been a crop of 5-metre Transatlantic contacts by this time next year, I shall be more than surprised.

We are now in the thick of the B.E.R.U. Contest—that annual event that makes the amateur bands in February sound like the parrot-house at the Zoo! Every amateur in the British Empire seemed to be sitting on one weak signal that I was trying to resolve last week-end. Australians galore, a smattering of South Africans, and the usual crop of "Yanks" who think they're in the British Empire and reply to every call, are in evidence as usual.

D.X. on 40-Metres

The 40-metre band is carrying a surprising volume of the DX traffic. It just shows what an excellent band "40" really is; for most of the year it's cram-full of locals, but when there is a real inducement to try it for DX work, it never fails to turn up trumps.

There's no doubt that 20 metres is the wavelength for all-round long-distance working, though. Ten metres runs it very close, but only when conditions are favourable, and when we are down in the next trough of the sun-spot cycle I have no doubt that "10" will be as dead as a door nail.

The news that W 3 X A L will very soon have a super-efficient beam aerial in action will cheer up European listeners, towards whom the said beam is directed. A tremendous increase in his power over here is anticipated, and this should be particularly noticeable on his 16-87-metre wave. W 2 X A D continues to be stronger and more consistent than W 8 X K; I imagine that the aerial system accounts for this.

Strong American Amateurs

For real strength from across the Pond, though, we still have to fall back on some of the 10-metre amateurs, who really are fantastically powerful considering their equipment and inputs. Quite a dozen of them produce stronger transmissions in this country than the best of the American broadcast stations. If only someone would start up some high-powered broadcast on about 11 metres we should hear something.

It's rather late to mention it, by the way, but the R.S.G.B.'s 10-metre Trophy, awarded for the best work on the band during 1936, was won by Mr. D. W. Heightman, G 6 D H, of Clacton. G 6 D H was one of the most consistent stations on the band, and his signals could often be heard when there was apparently nothing to work with.

W. L. S.

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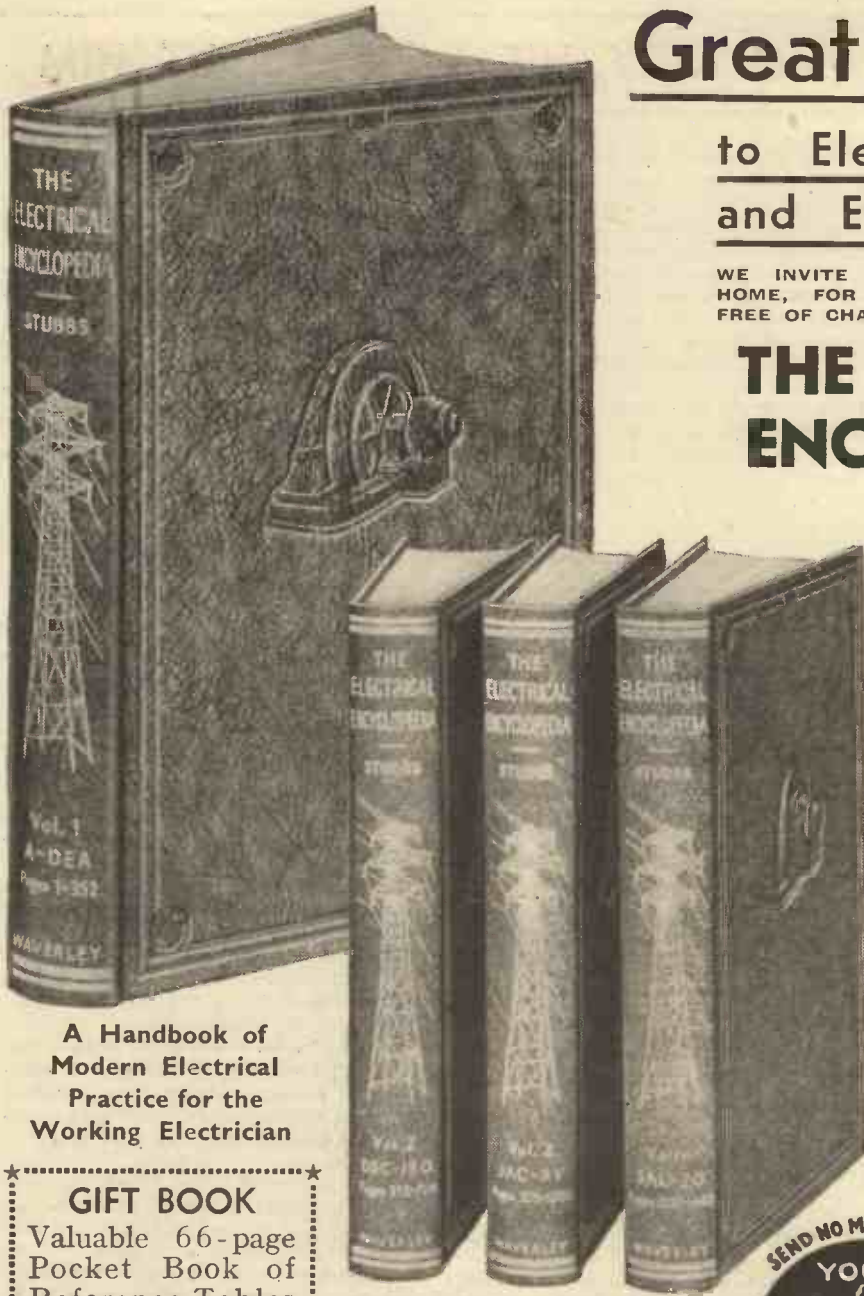
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THE ANNOUNCER WHO KEPT HIS WITS ABOUT HIM

(Continued from page 589.)

600 Radio Sets Given Away

THE Dowager Empress of Japan—to whom be peace—has just made one of the most handsome gifts ever recorded in the list of radio benefactions. With a royal disregard of the cost she has given away 600 radio receivers.



Moreover, with unusual understanding, she has bestowed her bounty in the precise place where it will do most good, for the lucky recipients are all lighthouse keepers.

When he has trimmed the lamp and made his bed, the lighthouse-keeper has few distractions, and a spot of wireless is unto him as balm and honey. No matter how the tornadoes blow or the gales shake his sea-girt rock, he will always be able to hear the weather forecast.

"P.W." Contributor Joins B.B.C.

THAT popular "P.W." contributor and radio journalist, Mr. Leslie Bailly, who has been Radio Editor and correspondent of many newspapers, has now gravitated to a post which promises well for us, for he has been appointed Assistant in the B.B.C.'s Variety Department.

Leslie Bailly is probably best known to the public for his "Scrapbook" successes, with Charles Brewer, but this is but one of L. B.'s many activities. I always had the feeling that one day we should B-B-see him on the staff, and now that the day has come we listeners can congratulate ourselves as well as him.

Let's hope he finds work congenial—and plays possible! We could do with some more from his pen.

Band of Hope

SWOPPING experiences with a Surrey enthusiast the other day I nearly made myself promise myself to get myself an ultra-short-waver. For tuning there on the ultra-shorts seems to be the sort that crowds every hour of listening with expectation. It is often an exciting waveband, and always band of hope.



On several occasions the American ultra-short stations

have broken all the rules and arrived in this country, and one chap in the Midlands has reported that he has picked up the Moscow television transmissions on the ultra-shorts.

As Old Moore appears to have overlooked this particular subject I hereby prophesy that before the end of 1937 we shall hear a lot about this waveband, and that there will also be disorders in China. (I'm sure of the last part of my prophecy coming true for I have seen the casual manner in which the Chinese cook slaps up a meal!)

The Koran From Cairo?

IN some American cities, and especially in Detroit, Mich., there are large communities of Moslems who are eager to hear the Koran read by the holy men of the Old World. For a long time there have been vague hopes, but now a scheme is being considered by the Egyptian Government which promises to fulfil the need.

The proposal is for a station of fifteen kilowatts or so, to be situated at Cairo, and to work on the short waves. It is calculated that reception in America should be reasonably reliable, and the Rector of El Azhar University, Cairo, is interesting himself in the scheme. A 100-kw. long-wave station is also being considered.

MIKE SLIPS AND QUIPS

During an interview before the "mike":
And in Hungary do the young people marry early or late in life?

Advertiser speaking of beauty preparation in sponsored programme:
So remember, ladies, if you want a beautiful face you'll have to step on it.

Australian cricket commentator:
Farnes played that ball to mid-off, where there was no batsman—er—fieldsmen, and they steal one.

During Children's Hour:
Has anyone got a rocking horse that the children have grown out of?

Just before the beginning of the broadcast of a wrestling bout:
B—— is wearing no gown at all—just a towel round his head.

Commentator describing an opening ceremony:
A lot of large—um, a large lot of people have assembled.

During a sponsored programme:
and if your eyes need the attention of an optimist, you will be well informed of the fact.

O.K. for Sound

DESPITE the theories and the pessimists the transatlantic route on five metres has now been proved possible for amateur communications.

Honour of being the first across goes to our old friend, H. L. O'Heffernan, who operates station G5 BY at Croydon, Surrey.

His American *vis-à-vis* was Victor Riebhausen, station W2HX D, of Bronxville, New York, who was using a seven-valve superhet when he nearly fell off his chair on hearing a Britisher chirping away at 3.10 p.m. on December 27th.

Mr. Riebhausen's report tallied in every way with the transmitted programme, the time, the frequency, the matter sent, the method of keying (carrier-keyed) and the tone modulation frequency all checking up correctly. Congratulations to these modern Columbia!

Radio's Rôle in U.S. Floods

IN the tragic story of the flooded Ohio, the dark record of loss of life was relieved again and again by instances of heroism—often connected with radio.

In communities where all normal means of communication had broken down, the radio link brought assistance again and again. There were some poignant messages to be heard on short waves while the floods swept down relentlessly, and the American

Radio Relay League (A.R.R.L.) has some wonderful new entries on its roll of honour.

May I hereby thank all the readers who sent me particulars of messages heard from the flooded areas? I hope that somebody in America will keep a record of the radio side of the 1937 floods; it would be an inspiring story.

Nimble-Witted Announcer

IT was a lovely spring day in Havana, Cuba, and the announcer was sitting near the open window getting some of the morning radio advertisements off his chest. He was trying to put some pep into that thankless task, and he had just read out, "This wonderful new tonic is—" when a vagrant breeze whipped the paper from his desk and sailed it round and round the room.



Not having heard of the wretched tonic before, he could not improvise, so he had to retrieve the paper from under a corner piano. A minute later he reached the mike and said, rather breathlessly, "I had to pause a moment, folks, from sheer excitement at finding the very thing I have been looking for. You'll be just as excited when I tell you. This truly wonderful new tonic. . . ." and so on.

It takes an incident like that to prove if an announcer is captain of his fate.

Look on the Bright Side

WE all know that the glowing impulse of Generosity should be tempered on the anvil of Tact. Remember that, and sort this story out for yourself.

A bedridden invalid was visited by a hearty neighbour, who bawled at the sick man that what he needed was a wireless set to cheer his lonely hours. The invalid, too dazed to protest, smiled wanly, and hoped to hear no more of the project. Next week-end, however, in came the good neighbour with coils of wire and what-not. He placed a set by the bed, asked the poor bedridden chap to "Hold this aerial wire for a moment," passed the other end of the wire out of the window, and climbed on to the roof.

Somewhere on that roof there must have been a mains lead, for suddenly the invalid, who had not left his bed for years, was capering on the carpet with 240 volts tingling at his fingers!

No, sir. It didn't kill him. On the other hand it gave him a new lease of life. Though he had never expected to stand on his feet again he had actually danced while the juice was on! He is now having electrical treatment, and hopes one day to be able to carry his own batteries to the charging station.



ARIEL

AN "O.B." IN THE MAKING

Mr. S. J. de Lotbinière, B.B.C. Director of "O.B.'s." reveals some fascinating "behind the mike" facts about this most important branch of broadcasting.

WITHIN a few short weeks Room 251 at Broadcasting House will be exceptionally busy, perhaps the busiest in the whole of the great building. For it is the nerve-centre of broadcasts from the places where things are happening—big fights, the circus, fires, and so on—the office, den and conference room, in fact, of Mr. S. Joly de Lotbinière, Director of Outside Broadcasts; and the Coronation is going to give him and his department extra hard work.

Tall, quiet-voiced, fair-haired "Lobby," as he is to most B.B.C. folk who know him well, discussed in an interview some of the "behind the mike" scenes of an outside broadcast. "Firstly," he said, "it is necessary, and in most cases possible, to have two high-quality land lines from the control point of a big 'O.B.' to Broadcasting House. One of them will convey, in turn, the successive output of anything from 2 to 30 microphones; the other, used for maintaining contact with headquarters, and for cueing purposes, is also a useful reserve line.

Different Types of Microphones

"On the occasion, for instance, of a Royal wedding, ten to fifteen microphones of types varying to suit conditions are distributed at key-points. One or two are for commentators and the rest for the service itself, or for outside atmosphere and effects. Each is connected by a special line to the control point, usually a hut or a room where the engineer in charge has a control for every 'mike.' One man alone must operate them, mixing and blending the incoming speech and 'atmosphere.' It is expedient, at times, so to synchronise the knobs that one pair of hands can, in fact, do the job. Thus one control knob may become the master of half a dozen, operating the other five. Actually, there is no limit, beyond the human capacity for control, to the number of microphones that could be used simultaneously, or successively. It is simply like adding books to a library.

"Now and again a situation occurs which makes a single outside control point impossible. For the broadcast of the funeral of King George V microphones were used at Westminster, in Hyde Park, at Windsor Castle and elsewhere. It was then essential to take the lines direct from each local control to Broadcasting House for final 'mixing.'

The Crystal Palace Fire

"Although I should say that ten weeks is the ideal time allowance in which to arrange an outside broadcast, we obviously have often to work to a much 'tighter' schedule. When the Crystal Palace fire was at its height it took just two hours in which to make an 'O.B.' of it from the scene. The engineers tumbled into a taxi with their gear and, once there, they were lucky enough to find someone nearby who allowed them to use a private telephone line. The 'phone was disconnected and amplifiers,

a microphone and other apparatus installed. As a second line was not available for contacting Broadcasting House we had to do our cueing by listening to a radio set.

"Effects play a great part in enabling listeners to picture the scene of such a broadcast. Even the scream of the fire-pumps or, better, the roar of the flames eases the job of the commentator considerably. Sounds easily recognisable like the barking of a dog, the rumble of a train, the tearing crash of a plane propeller help listeners to get a vivid picture of many a feature. A broadcast from an observatory in which an astronomer is studying the moon through a giant telescope is very interesting to watch but difficult to describe so that listeners may enter the scene. Here even the monotonous ticking of the observatory clock, or the hum of the machinery that keeps the telescope trained

on its object, is invaluable 'atmosphere.' "Do people often try to gate-crash on the microphone? No, that very seldom happens. Everyone is very helpful as a rule. Sometimes a person will yell 'Send a message home to mother,' but that is all. No one could intrude for more than the few seconds it takes to realise what's happening.

Finding Human Ghosts

"I remember that during an outside broadcast from a haunted house one microphone was twenty yards away from the building, and the person listening for 'sounds' suddenly caught faint whisperings. It might be the ghost, he thought. So, with torches, we went to investigate. We found two individuals overcome by curiosity lying full length on the ground. They were as surprised to find the cause of our visit as we were to find them.

"Wind is perhaps the greatest enemy of 'O.B.'s.' On the day before the last Grand National it was dreadful, and during the tests caused an insistent drumming noise. We had various protectors for the 'mike' but their use would have minimised the value of effects. So we were thankful that on the day of the race there was only the lightest of breezes!"



R. Heath Bradley; Principal of T.C.R.C.

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RANDOM RADIO REFLECTIONS

By VICTOR KING

MINNIE—THE SINGING MOUSE :: THOSE RADIO
PLAYS WITH MUSIC :: VIOLET RAYS AND INTER-
FERENCE.

MICE—AND WHAT NOT

IS it a beautiful thing that a mouse should be able to sing like a canary? Now wait a minute, don't answer that question until I've put forward A Point of View. You will know that all this mouse business started in America and that an ounce of teeth and whiskers in the form of an ordinary rodent with an extraordinary squeak—sorry, voice—is earning £7 a week giving recitals on the films and radio in the United States.

You will also know that an English "Mouse Melba" has been caught, but went all temperamental and wouldn't warble for the be-spatted boys of the B.B.C. (Perhaps she, it or he missed the homely environment of wainscoting and floorboards, or was dazzled into dumbness by such an array of Old School Ties.)

But you may not know that the poor singing Minnie has had all its glamour debunked out of it by a biological gentleman who states that the "singing" is merely a squeak gone wrong—through asthma. Not so good! We should sympathise with the wretched rodent and not admire it.

What about singing humans? May not those crooners and singers popularly held to possess "gifted voices" be regarded as abnormal? May it not be that their eppi glotti, tonsils, larynxes, and other bits and pieces are, I won't say diseased, but *abnormal* or *deformed*? May it not be a cause for congratulation if one's singing tones resemble those horrible noises which float from out of next door's bath-room windows on Saturday night?

I put it to you as an interesting speculation that the tenor, alto, or soprano of the future might find himself or herself in a medical laboratory for scientific investigation instead of receiving the plaudits of a bunch of bow-tied gentlemen in a concert hall.

JUST SUPPOSE . . .

SOME intriguing fantasy reaches me from Mr. C. R. Jones, of Worthenbury, near Wrexham. He says:

"I have been looking over my old 'P.W.'s' and I came across your note about interplanetary radio in May 9th issue. Then in December 26th issue you told us about the experience with your television receiver. The magnified mothballs. The flashes. The smiling face. (The B.B.C. Drama Dept. should have done those last three sentences all in rising emotion and a crash of cymbals at the end.)

"Just suppose you were the first person on earth to see someone from another world. Very unlikely, certainly—but just suppose.

"Now, long and medium waves (sky waves) are reflected by the Heaviside Layer, and short waves go through that and are reflected by Appleton's Layer. Just suppose the reason that ultra-short waves are only received within a short radius from the transmitter is that the sky wave penetrates Appleton's Layer,

and there being nothing to stop it it wanders off into space, perhaps to be picked up by some other planet. If so, just think what a few thousand (or even million) kilowatts and a specially constructed aerial might do.

"Well, after that I expect you think I should be in the nearest asylum, or that I'm an old crank who gets messing around with dangerously high voltages and what nots. Well, perhaps I am and perhaps I'm not, but it seems to me as though television has brought up to something big at last. If so, won't the B.B.C. be proud? Why, they may not even condescend to broadcast to us at all. At any rate, who cares?"

Quite right, Mr. Jones, who cares? But, I say, *do they* broadcast to us, you and me and old Fred and his missus?

RADIO PLAYS

ONE of my pet abominations is the average radio play with music. Usually the music is so poor that it isn't worth listening to, and the words just plain piffle. Apparently the way they are made (I can't use any other word) is that an idea is thought of, one man writes the "book" and someone else is brought in to compose the music.

But really good musical comedies cannot be built to order in such a way. The result is bound to be second-rate—unless first-rate writers and composers are employed. And, in my opinion, the B.B.C. hasn't got any.

If we have got to have musical comedy on the air (but I don't see why we should) then past stage successes should be used. But it isn't the right sort of material for broadcasting. Stage settings and choruses mean so much in musical comedy. O.K. for television, but not O.K. for sound only—unless it is good enough to hold by its music and words alone, and only masterpieces reach those heights.

Remember "Money For Jam," and "Mariana"? Crikey! Them was musical comedy, them *wasn't*. I'd rather listen to singing mice—providing they didn't sing.

ROOM FOR THE DOCTOR

I HAVE just heard the details of an ELECTRICAL INTERFERENCE adventure. A listener in West London suffered simply horribly with burbs and burps. His neighbour did likewise, thought it must be his set and so sold it and bought a new one. The new set, being more sensitive, had the burbs and burps even worse.

Listener No. 1 wrote to Uncle P.M.G., who at once sent a squad of sleuths to investigate. And what did they find? They found a doctor plying violet ray,



Here is Herbert Geusch signing the radio contract for Minnie—whom you see in her glass-fronted case—while Robert Kendall of the N.B.C. looks on.

X-ray, and all sorts of things. So they managed to get the doctor to buy himself a metal-shielded room in which to conduct his necromancies. And they all lived happily ever afterwards. Moral: A sleuth in time saves nine pounds (or more) for a new set.

WHAT AN ADVERTISEMENT!

THE quality of that telephony from an R.A.F. plane which was put on the air in a recent broadcast horrified me, as I expect it did many others. It showed up particularly badly against the first-class B.B.C. quality, and should never have been heard. One can only hope that some fault had occurred, for it seemed too bad to be true.

WHAT'S THE IDEA?

EVERY day for over a week I have received an anonymous letter bearing a London postmark and containing nothing but a piece of paper inscribed "DD" in large block letters. Seems a foolish waste of pence and paper on the part of someone.

THE TELEVISION TRANSMISSIONS

ISN'T it about time the B.B.C. let us have some official details about their television transmissions? I mean the way they are getting over. You may remember that in the earlier days of broadcasting they used to publish very full technical information about the radiations of the various stations.

Well, they ought to do that for Alexandra Palace. We should then know how these ultra-short waves are behaving. I fear that the absence of information is rather symptomatic of the present-day policies of the B.B.C. Engineering Department. It is drawing into its shell. Going all aloof from the public it is supposed to serve.

At one time it used to maintain a much closer contact with listeners by means of frequent talks on the air and friendly little publications. For an all-too-brief period the relations it preserved were almost ideal. I refer to the time when Capt. P. P. Eckersley was in charge.

It was a great loss to British broadcasting when P. P. E. left the Big House, for he is not only a first-class engineer but also a great personality.

FROM OUR READERS

LET THEM SAY
WHAT THEY LIKE!

An opinion on the question of
the censorship of talks.

The Editor, POPULAR WIRELESS.

Dear Sir,—As a nation we have always boasted of our right of free speech. Why is it, then, that directly someone broadcasts his own opinions from the B.B.C. there is immediately an outcry from a certain section of the Press because his speech has not been sufficiently censored?

The sermon broadcast by the Archbishop of Canterbury on December 13th last is a case in point. I am not concerned here with what the Archbishop said or whether he was right or wrong, but apparently it is considered by many people, and quite a large section of the Press, that even the head of the Church in this country must have his sermon "vetted" before we are allowed to hear it. To my mind this is an intolerable attitude to adopt. Surely we are capable of judging what is right and what is wrong, and if we do not agree with the speaker—well, there is the end of the matter.

Every newspaper I pick up contains quite a quantity of matter that gives me a pain in the neck, altogether apart from political opinions. Am I then to be an advocate for a censorship of the Press?

The fact of the matter is that we are spoon-fed far too much by the B.B.C. Why on earth should we not be allowed to listen to controversial subjects? It is only by hearing every side to a question that we are able to form our own opinions, but evidently it is considered that we should not have opinions of our own and should be treated as if we were a lot of infants.

The same papers that are making such a to-do about the Archbishop's speech not being censored, a short time ago were making a fuss because a Socialist's speech was said not to be his own because it had been censored. Do the Press really think they voice the opinion of the public? The man in the street doesn't really care twopence what the speaker's views are. He wants to judge them for himself. Evidently the Press think that nothing should be broadcast unless it is acceptable to everybody, which, of course, is the height of absurdity.

Yours faithfully,

A. H. SIMPSON.

Ward No. 4, Essex County Hospital, Colchester, Essex.

A GUINEA FOR
SOMEONE

Each week we present a guinea to the reader who, in the Editor's opinion, sends us the best letter on any radio subject. So why not drop us a line?

Mr. A. H. Simpson, gets the guinea this week.

THE "BOW BELLS" RECORD

The Editor, "Popular Wireless."

Dear Sir,—The statement made by your correspondent, Mr. A. H. Barram, in his letter ("P.W." January 16th) concerning the "Bow Bells" record is correct. The B.B.C. inform me that the original recording, i.e., Columbia 4082, is still in use as the interval signal, but the Central Record Information Bureau say that this disc has now been withdrawn from the Columbia catalogue, and is replaced by Columbia DB.1637. Therefore, the original disc is no longer obtainable by the general public.

Yours faithfully,

D. W. ALDOUS.

Ilford, Essex.

AMERICA ON MEDIUM-WAVE TWO

The Editor, POPULAR WIRELESS.

Dear Sir,—I have recently become a reader of your excellent paper.

A short while ago I made a simple two-valver for the medium waves, winding my own coils and using my own layout. My aerial consists of about 15 feet of wire running diagonally across my bedroom. My earth, which runs about 25 feet, is attached to an upstairs portion of the water pipe.

About two weeks ago, I happened to wake up about 1 a.m., and, as the set was by my bed, I thought I would see if there were any stations still broadcasting. To my surprise I got several stations, and on two of these the announcer was speaking English with a very strong American accent. I heard these at moderate strength through the speaker, which is a W.B. Stentorian "Baby" (1935 model). I concluded that these must be American stations, and my belief was proved correct when the announcer

said something, which I did not completely catch, about the N.B.C. network.

I am, yours faithfully,

West End, Bruton, Somerset. A. QUINEY.

HOW LONG IS A RESISTANCE?

The Editor, "Popular Wireless."

Dear Sir,—Although I am only a baby as far as experience is concerned a rather amusing incident occurred in the local radio shop. I entered the shop to ask if the owner would oblige me by measuring a resistance which was causing a considerable amount of trouble in a set. The young man in charge took the resistance, straightened the ends to about at right angles to the body, placed it along a ruler and measured it. I know that it sounds a bit tall but it is perfectly true.

Incidentally I noticed that in a one-valver, connecting the 'phone lead remote from the anode to L.T.+ makes a little one-valver that works quite well without any H.T.

Yours truly,

A. L. GRAY.

26, Eaglesfield Road,
Shooter's Hill, S.E.18.



Although of course some are keener on listening than others, of this you may be sure—the proud 1937 Stentorian owner can be lured from his radio only with the greatest difficulty. The new Stentorian (it is new—and remarkably better) gives the radio artist a better chance than ever before; for it brings his voice or instrument alive in the listener's home. Yet this triumph of technique costs no more than its predecessors.* From 23/6 to 42/- for the chassis (or 29/6 to 63/- for the Cabinet Model) brings you a new radio delight and a new source of pride. Ask your dealer —to-day.

* Models from 39/6 are available on hire purchase through your dealer — from 7/6 down.



The designers of the 'Super Centurion', following the new universal practice, have exclusively specified a "Stentorian."

1937 STENTORIAN

The NEW Speaker

With the NEW realism



QUESTIONS AND ANSWERS

By K. D. ROGERS

"SINGING ROUND THE RING" —A COMMON MICROPHONE TROUBLE

MUSIC GOES ROUND AND ROUND

E. G. (Tottenham).—We wish to use a microphone and two loudspeakers in the same room. So far we have only succeeded in getting a howl, though the scheme works when the "mike" is taken into another room. We can get it to work if we turn down the volume control of the microphone to such a degree that we have to shout into it. How can we cure the trouble—it is an ordinary carbon "mike"?

That's a nasty one. You are asking for singing round the ring, as it is called, by having the microphone in the same room as the speakers. This is a very difficult thing to arrange, especially when the microphone is of the carbon variety.

Still, we will have a go at curing the trouble. Try fixing the microphone on elastic inside a box which is packed with cotton wool and covered with thick felt. It may make the "mike" sound a little dead, or even woolly, but it may also stop the trouble.

You could also try placing the speakers in the room so that some portion of the room is a dead spot, but this will be a difficult matter to carry out and will need a lot of experiment. The microphone would then be placed at the dead spot—still in its box, of course.

I won't ask what you want the microphone in the same room as the speakers for—that is your business. But it does not make sense to me unless you want to hear for yourself what your voice sounds like on the speaker. In that case, why not have one speaker instead of two, and so assist in the problem?

What you have got to do is to block the sound waves from the microphone as far as possible. If you yourself want to hear the speaker while you are speaking into the "mike," you are certainly giving yourself a problem.

CUTTING OUT HETERODYNES

L. G. F. (Liverpool).—I am troubled with heterodynes on my set since I bought a new speaker. It is obviously better in the high notes than my previous make. How can I cut out the heterodynes without upsetting the rest of the high notes?

It is very difficult to do so without reducing the other adjacent high notes to some considerable extent. Personally, I prefer the type of heterodyne filter that can be tuned and is inserted in the anode circuit of one of the L.F. valves of the set. I assume that one of the valves in your set is resistance-coupled? If it is the filter will probably be more efficient, though it can be used in a transformer-coupled circuit.

The method I suggest is to join a .001 variable condenser and a .5 henry choke in series, and connect them across one of the L.F. valve anode resistances. Most of the trouble you mention will probably be found to be round about 5,000 cycles. If it is higher you will have to alter the series condenser or the value of choke.

Any good make of choke will do, but it should have as low a D.C. resistance as possible, and the condenser should be of good, reliable make. A mica preset will be quite satisfactory, and the capacity is adjusted until the whistle disappears or is reduced to a minimum. If it is very strong you may not be able to make it go completely, though you should be able to reduce it to such an extent that it no longer spoils reception.

TOO MUCH HUM

J. W. (Sheffield).—I built the Paraphase Amplifier which you published last May. It

is an excellent amplifier and the quality is very fine. I find, however, that there is rather too much hum when the volume is turned up towards maximum. How can that be eliminated?

In the first place, I hope you are using a screened input lead to the amplifier. That, I have found, is necessary. Twisted flex does not do the trick anywhere near so well, and the input leads should be kept as short as possible—don't let them be more than 18 inches.

You can attack the hum from another angle, too. Try the effect of inserting a good, low resistance choke in series with the pot of the loudspeaker. The choke should be inserted on the rectifier side of the speaker feed in the positive lead and should be accompanied by a large condenser—4 to 8 mfd.

Make sure that you have the amplifier properly balanced by means of the resistance on the chassis. The control is critical and the rotation of the resistance, or potentiometer rather, is very small. You quickly go into and past the silent point when adjusting. If the amplifier is not adjusted properly you may get quite a lot of hum.

As regards your other question, I am afraid the issue of "P.W." you mention is not now

available. We have, however, other designs in mind which would suit your purpose, though it is not yet decided when they will be published.

You can attach practically any set to the amplifier by using a resistance shunt-feed method after the detector, but do not forget the importance of the screen leads into the amplifier.

Re the list of parts for the power pack you mention, you can obtain them by writing into the Query Editor of "P.W.," though he may not be able to provide you with the circuit and wiring diagram.

HOME CHARGING

P. J. H. (Salisbury).—I run my set from the D.C. through an H.T. power pack. I have an accumulator for the L.T., keeping a spare one at the charging station. Could I insert this spare accumulator in series with the H.T. feed to the set and so keep it fully charged? Would this entail any damage? Would it run down by discharging through the eliminator? If I use a charger in series with

the electric light mains, will it cut down the light?

I am afraid you would not derive any benefit from placing the accumulator in series with the H.T. feed. The current passing in that feed is so small—perhaps only 20 milliamps, or at the most about 50—that it would not make any difference to the state of charge of the battery under a matter of several weeks or even months.

Just think of this. Suppose your battery is of the 30-ampere-hour type. It takes about 25 to 30 hours to bring it up to charge at one amp. Now place it in a circuit passing 50 milliamps or 50 thousandths of one amp. It will take one thousand divided by fifty times as long, or a matter of 500 hours at least!

It would not do any damage to itself or to the power pack, and it could be connected with the positive pole of the battery towards the H.T. + on the pack, but as you will see, it would be quite a useless thing to do.

The better plan is to have fitted a charging switch and fuse in the mains input to the house, on the house side of the meter, and to insert your battery there. It will reduce the voltage of the mains for house use by the maximum voltage of 2, so it will not make the slightest difference to the lights, except in theory of course.

That is why the scheme is called "free" charging. The reduction of electricity power for household purposes is so small that it is negligible—you cannot see any reduction of light, and you cannot detect any reduction of power as supplied to things like vacuum cleaners, sewing machines, electric irons and so forth.

Yet the whole of the electric current consumed in the house by these things has to go through the battery and so charges it up. But before you fit it make sure that you are not infringing any rules of the electricity supply people, and get an experienced electrician to carry out the fitting, making sure that it is quite safe.

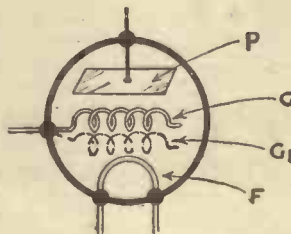
THOSE AMERICAN VALVES

I seem to have raised quite a lot of interest by my recent paragraph concerning the efficiency of American valves. So far the majority of my correspondents agree with the statement that British valves are more efficient than American ones, valve for valve. But only one writer has pointed out the price discrepancy in the two makes of valves, and how that difference in price evens things up.

This is what he says: "There is no doubt about it, that valve for valve British valves are more efficient, but this may be a mixed blessing. On average it takes three American valves to do the work of two British, but since the American ones cost about half the price of the British ones the American valves are the more efficient. The actual amplification per stage is however less, and this is probably why the Americans manage to make their midget receivers reasonably stable."

TECHNICALITIES EXPLAINED—No. 39

Microphony



The term usually used to denote a noise being produced by a valve, the noise being in the form of a howl or buzz. It is due to slight movement of the electrodes of the valve, mechanical movements caused sometimes by vibration from external sources such as trams passing the house, or to the sound waves from the loudspeaker impinging on the valve.

Microphony is not nearly so prevalent to-day as it was years ago when the electrodes of the valves were not so rigidly fixed.

The sketch shows the main cause of microphony—movement of the grid G in relation to its spacing between filament F and anode P. Such movement causes a mechanical control of the electrons in the valve, for the grid's influence on the electron stream is dependent on the position of the electrodes in relation to the anode and filament. The nearer the grid to the space charge in the valve—round the filament—the more control has the grid on the electrons. G1 shows position (in exaggerated form) during one limit of the mechanical vibration.

FOR YOUR BOOKSHELF

A Valuable Guide for the Service Man—Wireless Engineering: An Authoritative Work — Nativity Plays.

HERE are two recently published radio works.

First, the "Wireless Servicing Manual," by W. T. Cocking, of "THE WIRELESS WORLD." This is a well-written handbook covering all aspects of fault-finding and the adjustment of wireless receivers.

The book commences with a chapter on testing equipment without which no service man can hope to carry out the necessary fault-locating tests expeditiously and logically.

Following on this is a comprehensive treatment of the methods of procedure for tracking down all the troubles likely to be met with in practice.

There is a chapter on the adjustment of ganging—a most useful feature in a book of this nature, and another chapter on short-wave receivers as well as valuable information on loudspeaker faults.

The "Wireless Servicing Manual" is published by "The Wireless World," Dorset House, Stamford Street, London, S.E.1, and costs 5s. It is a reliable guide which will be found of great value by both amateur and professional.

"Wireless Engineering," by L. S. Palmer, D.Sc., Ph.D., F.Inst.P., M.I.E.E., is the title of a revised and enlarged edition of "Wireless Principles and Practice," by the same author. It is intended mainly to meet the requirements of electrical engineers who wish to become conversant with wireless and also to cover the ground required by students preparing for university degrees and for the wireless examinations held under the auspices of the City and Guilds Institute.

As is only to be expected, in a work of this nature a certain amount of mathematical treatment is included. Generally speaking, the standard of mathematical knowledge required is that which would be attained by a third-year engineering student.

There are over 500 pages of reading in this authoritative work, and the theory of radio is covered in a very thorough manner.

For those who have had some initial training in the basic principles of electrical engineering this text-book is excellent. It must be understood that this is a book on wireless in its broadest sense, and this includes directional wireless and beam transmission.

The price of "Wireless Engineering" is 21s., and it is published by Longmans, Green & Co., 39, Paternoster Row, London, E.C.4.

THE INN AT THE END OF THE WORLD and Other Plays of the Nativity. By J. Howard Whitehouse (Humphrey Milford, 5s. net.)

This volume comes from the Warden of Bembridge School, and is the crystallisation of an interesting experiment. Four years ago he wrote a Nativity Play for the boys of his school to perform at Christmas. Each year since, he has written another play, and four of them are now published.

In the stage production of each play he invited the collaboration of the head boy of the school. The Warden's object was to encourage interest in the drama and to give the boys practical experience in the writing of plays.

With the publication of this book, which is tastefully printed and includes certain carols, and woodcuts as illustrations, the experiment may now have a wider scope. Other headmasters and teachers, seeing this review, may resolve to buy a copy of the book, and either use these plays for production at their own schools or make them the basis and inspiration of other and original plays.

Throughout, the little dramas are couched in simple but vigorous Anglo-Saxon, and the treatment is imaginative, the author having filled in the historical background

with details which if they are not history might easily be so.

There is a picturisation of the journey of Mary and Joseph to Bethlehem and events that befell them as wayfarers. There is colourful treatment of the innkeeper, the shepherds and the wise men in relation to the birth of the Christ Child in the stable. The book is a reverent, imaginative and artistic piece of work.

NEXT WEEK

Another article by

JOHN SCOTT-TAGGART

on the

SUPER CENTURION

HIVAC

**VP215
(4-Pin)**

Chosen by Mr. J. Scott-Taggart

FOR THE "SUPER CENTURION"



This is the valve which was specially developed for S.T. Receivers. It is unquestionably the most perfectly shielded valve of its type on the market. Thousands are in use in the "S.T.600," "S.T.700," "S.T.800" and the "Centurion."

Ample stocks of the HIVAC VP215 are available for all builders of Scott-Taggart's "Super Centurion." Dealers can secure additional stocks from us by return of post.



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Details of all Hivac types free for postcard.

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SEEN ON THE AIR

News and Views on the Television Programmes by our special radio-screen correspondent

L. MARSLAND GANDER

A READER of these notes challenged me the other day. "You constantly criticise the television programmes," he said. "What constructive ideas have you to offer?"

He went on to observe that a great deal of listeners' money was being spent on these programmes which were at present for the delectation of the few. Listeners in Yorkshire, Scotland, and Lancashire were, in fact, contributing to the cost of an entertainment which they could not share.

In any case, he said, television is a rich man's hobby, with sets costing £100 each. Why should the artisan be mulcted to provide further delights for the jaded palates of the wealthy classes? And so on.

Well, to take the last point first, I well remember the day when a good 8-valve superheterodyne, with its innumerable knobs, cost from £80 to £100. To-day a far better instrument with one main control covering a wavelength range, short, medium, and long, costs about twelve guineas. But if we had never had the £80 to £100 curiosities of 1922-26, we should never have had the twelve-guinea marvels of to-day.

Evolution Cannot Be Skipped

Television cannot skip any of the stages of evolution.

The £100 set of to-day is beyond doubt the forerunner of a £12 set of the future. We cannot see how this is to be done. But neither could we see way back in 1926 how the £80 sets could possibly come to be sold for £12.

If the artisan of a few years hence is to have his cheap set the programmes must be made sufficiently attractive to keep the wheels of the industry turning, to create a demand which in turn will lead to mass production and lower prices. The artisan listener, the listener in Scotland, Yorkshire and Lancashire is, in fact, investing for the future.

Is television worth all this money and effort? I can only say that when I have a television set to hand and an ordinary radio set alongside I never dream of looking in the programmes to see "what is on the radio." My first mental question is always: "What is on television?" Watching television, like many other occupations, is a habit. It will be slower to establish itself than the listening habit, but that it will in the end be stronger, I have no shadow of doubt. A television programme is already 50 per cent more entertaining than a sound programme. In a year or two it will be 100 per cent better value.

Price Fall Will Be Gradual

I do not, by the way, wish to encourage the idea that television prices are going to drop with a bump. This is not so; they will fall gradually over a period of years.

I see that Mr. J. L. Baird has been reported as stating that the prices of sets would fall in a very short time. He tells me that the sense of his speech was that they will fall in "not too long a time." He did not mean that they would decline in the immediate future. So that on this point I find myself in agreement with the most prominent figure in the television world.

And now for the constructive ideas. I admit it is not easy to devise the ideal tele-

vision programme. But it happened that the other day I saw one. It was a film, the American feature "The March of Time." Here was a topical magazine of absorbing interest. Take two of the items—one told the story of King Zog and his little country, Albania, of his financial difficulties and how he solved them. The other concerned the growth in Britain of the football betting pool system until it reached the dimensions of a national problem. The subjects do not sound enthralling but they were handled so adroitly that the film became a human document holding my attention more firmly than many an "all star" romance.

Cabaret Features Are Good

I have already said that in my view the bright cabaret entertainment with star performers is the best studio feature, and that one-act plays must be sought. Tod Slaughter in "Heard in Camera" made an excellent transmission.

The B.B.C. must exploit to the full the "outside" television broadcast. I am aware that Mr. Gerald Cock is already alive to these possibilities. My hope is that he will not only use television for the obvious occasions such as sport and the Coronation procession, but that he will also take the television camera to show viewers "This London" in the many original and unexpected ways that may suggest themselves.

I demonstrated television the other day to a fellow journalist, and on the screen appeared the figures of John Piper and Serge Chermayoff discussing the picture in the modern home. The discussion was interesting to a point, but on the whole too long-winded and slow. My friend's criticism was that there was not enough movement

in the programmes. That is one fundamental error which the programme producers at the Alexandra Palace are making. Still objects could be conveyed by still photographs. These are moving pictures. Well, let them move!

These *objets d'art* are not sufficiently well defined to be appreciated fully. The glowing colours do not show. Art exhibition programmes, frankly, are not a success as now presented. Some new method must be found. The programmes should be shortened and speeded-up.

An Enjoyable Item

I enjoyed the ice hockey programme in which two British Olympic players appeared, chiefly because a length of film was included with a commentary by Bob Bowman who still remains for me the finest exponent of this elusive art. What a grand, gay inconsequential babble flows from him! No time to talk about "square 8"—on with the game, on with the commentary. He is one of the few commentators I know who seems actually to enjoy himself while giving a full flowing description of every phase of the game.

Strange, but I did not even recognise Claire Luce in the "Starlight" programme, although I saw her twice in her last Cochran show. My wife and I are still discussing reasons for our curious joint failure to identify this attractive star—without, I fear, arriving at any very satisfactory conclusion.

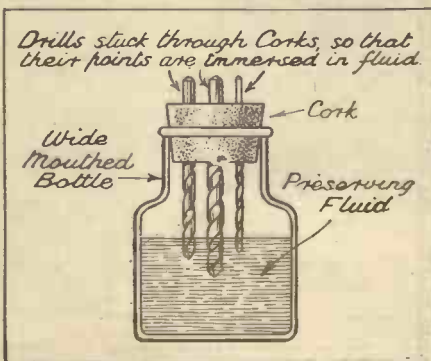
Howard Rogers was an outstanding success in the Thursday cabaret programme. His impersonations in the one-man sketch "P. c. Hoppitt's Retirement" were most suitable for close-up work, and consequently made effective television material. Like the irritating character in so many current anecdotes I laughed and laughed; there's no more!

Russell Swann, the American conjurer, gets better and better. I rather wish that he wouldn't say "Isn't that silly?" quite so frequently, but apart from that, I sincerely endorse the view of Mr. Gerald Cock that he is a first-class television artist with the friendly, intimate and amusing style that suits the home screen so well.

A DRILL PRESERVER

IT pays to keep drills and similar cutting tools in good condition, not only on account of the expense of procuring replacements, but also on account of the valuable time which is saved by having

PROTECTS CUTTING EDGES



The cutting edges of the drills are protected from corrosion effects due to the atmosphere.

such tools at hand in first-class working condition.

The following preparation will be found to be an excellent one for keeping the keen edge of a chisel or the business end of a drill in good order when it is not in use.

Mix well together in some convenient bottle which can be easily shaken the following ingredients:

Castor oil, $\frac{1}{4}$ oz.; pure soft soap, 1 oz.; methylated spirits, $\frac{1}{2}$ pint. Shake the bottle well until the ingredients have dissolved in the methylated spirits.

Drills which are not in use should be immersed in the above liquid.

Simple to Arrange

A convenient way of effecting this is to pour the liquid into a wide-necked bottle, and to slip the drills through the cork so that their tips are continually immersed in the fluid in the manner shown in the diagram.

Similarly the cutting edges of chisels should also be immersed in the liquid when such tools are not in use. The liquid, on account of its nature, preserves the cutting edges of these tools from atmospheric deterioration, and it thus prolongs their working life. No longer need you find tools spoilt by rust after a longish period of non-use.

TECHNICAL JOTTINGS

Some items of interest

By Dr. J. H. T. Roberts, F.Inst.P.

A Curious Fault

A READER tells me of a fault which he had with a valve, which was very puzzling at first, but which fortunately is comparatively rare. What happened was something like this: When the set was first switched on everything went quite all right, but after a few minutes the efficiency would gradually go off and distortion begin to make its appearance, these two effects getting rapidly worse and worse until conditions were quite hopeless. But if the set was switched off and left for a few minutes and then switched on again, it worked properly, but the same cycle of events was gone through.

Comes on Gradually

The fact that what took place was gradual, suggested the heating-up of something or other and, in fact, this was exactly what was happening, the "something or other" in this case being the grid of one of the valves. In the ordinary way the grid is so spaced in relation to the filament that although, of course, it gets fairly warm, it never gets to a temperature anything like that which is necessary to cause it to act as an electron emitter. It is, as I say, very unusual for the spacing of the electrodes to be such that the grid gets overheated and begins to emit; when it does happen it is probably due to some accident, or to the relative positions of the electrodes having got out of adjustment in some way.

You can see now why it was that the valve acted quite all right when first switched on and gradually went wrong, and also why it was that on being switched off for a few minutes it recovered its composure and acted normally again.

Replace the Valve

If you should experience this trouble there is really nothing that you can do to put it right except to take out the defective valve and replace it by another one. Should it occur, however, it is worth while to return the valve to the makers with the request that they should try it out, and I am sure that any reputable valve manufacturer would not hesitate to replace such a valve. It is, however, as I say, a very unusual fault but when it does occur it is so mysterious that those who suffer from it are generally quite mystified.

Short-Wave Reception

Interest in short-wave reception continues to increase, and a great filip has been given to it by the advent, at last, of television. People often ask me what sort of aerial is necessary to receive very short or ultra-short waves as low as, say, seven metres or less. Some people actually receive waves of these short lengths on more-or-less ordinary outside aerials of as much as thirty feet long, whilst others prefer a very short aerial of only a few feet in length, which is sometimes more efficient for receiving these very high frequencies.

(Continued overleaf.)

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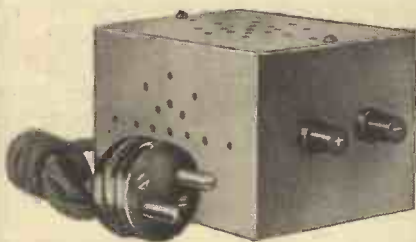
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TECHNICAL JOTTINGS

(Continued from previous page.)

The point with regard to an ordinary aerial used for medium-wave reception is that if you want to use it for very short-wave reception you will have to reduce the capacity; this can be done by inserting a small condenser in series with it.

Employing Rough Tuning

This condenser, by the way, may be a fixed one, but it is very much preferable to have a variable condenser so as to give a rough tuning to the aerial. The capacity of the condenser, that is the maximum capacity, may be 0.0005-microfarad, and it is a simple matter to calibrate this condenser for different wavelengths. But, as I say, most people prefer a separate short aerial for short-wave or ultra-short-wave reception, of suitable capacity.

Special Short-Wave Aerial

With regard to the condenser used in series with the aerial, as mentioned above, if you are using an ordinary type of aerial it is a simple matter to arrange so that this condenser can be put in or out of circuit.

The special short aerial for ultra-short-wave reception may consist of a few feet of wire rigged up indoors, so that really there is very little point in going to the trouble of making one aerial serve both purposes.

Receiver Range

The range of a receiving set, what is rather vaguely called its "sensitivity," depends a good deal upon the amount of high-frequency amplification which is provided before the detector. Of course, the sensitivity or range of the set does not depend *entirely* upon this; it depends upon other things, upon the efficiency of the receiving aerial and various other factors, but generally speaking the amount of high-frequency amplification is the predominating factor.

It is easy to see why this should be so, because the detector can only deal with what is delivered to it, and although there is often a small amount of amplification taking place in the detector stage itself, the detector has to rely practically—almost entirely—upon the incoming signal strength being boosted up before it arrives there.

H.F. Amplification

Some people think that the high-frequency amplifying stages are mainly concerned with the loudness of the reproduction. Well, naturally anything which increases the signal strength delivered to the detector will, other things remaining the same, increase the volume of reproduction, but when you are searching for weak stations (or for powerful stations which are so far away that the signals are weak by the time they reach your aerial) you are not likely to overdo it in any way in regard to the strength of signals actually delivered to the detector. In other words, the primary purpose of the high-frequency amplifying stages is to bring up the signals to a value which the detector can adequately and efficiently deal with. After that, it remains for the low-frequency stages to do all the real boosting up of the sound volume.

Properly Designed Couplings

In order to get really efficient high-frequency amplification it is necessary that properly designed couplings should be used between stages, and also that properly adjusted tuned circuits should be employed.

If a number of tuned circuits are used, not only does this improve the *sensitivity*, but also it has a very marked influence on the *selectivity*.

How Tuned Circuits Work

People sometimes wonder why there should be this effect on the selectivity, but you can easily understand it if you think about it in the following way: The first tuned circuit rejects frequencies at either side of a comparatively small band or, if you like, confines itself to a comparatively small region around the actual resonance frequency; the second tuned circuit does the same sort of thing and so the chances of a signal beside the wanted signal getting through *two* tuned circuits are very much smaller—very much less than half the chance of getting through the first circuit. The same thing applies in increasing degree to further tuned circuits.

Doing Away With Reaction

Another advantage of high-frequency amplification, altogether apart from the question of the selectivity or sharpness of tuning, is that it is generally possible to dispense with reaction. We know that reaction is a very good servant, but is also a very bad master, and although it has served us in good stead for many years now, I think you will agree that if it can be done away with, and the same result obtained without it, so much the better, because in getting rid of reaction you also get rid of the great liability to distortion.

The Time Base

Many people who understand broadly the *modus operandi* of television reception are a bit confused as to what is meant by the term "time-base."

As a matter of fact this is really very simple and it refers to the "scanning" of the receiving screen of the cathode-ray tube. In order to explain what it means, let me just run over what actually happens in a cathode-ray television tube. As you know, a beam of electrons shoots through a very fine hole and passes on to hit a fluorescent screen, but in the early stages of its journey it travels between two pairs of parallel metal plates, the plane of one pair being set at right angles to that of the other. Electrical potentials are applied across these two pairs of plates and the stream is deflected and made to traverse the screen by means of the variations in these electrical potentials.

Deflecting the Beam

Now one pair of plates has the effect of shifting the spot where the beam hits the screen up and down (or left to right, it doesn't matter for the moment) whilst the other pair of plates shifts the beam *across* the screen. The result of the combination of these two types of motion is that the spot of light covers the whole area of the screen in much the same way that your eyes scan a column of type. The time-base is the arrangement by which the potentials of these plates are controlled so as to make the spot traverse the screen in the desired way.

**FOR THE
CONSTRUCTOR**

Two practical hints worth knowing.

A SOLDERING TIP

THE greatest bugbear in soldering is the dirty condition into which the copper bit gets every time it is heated.

A piece of block sal-ammoniac, with a small hollow scooped out and filled with solder, will be found to be the best cleanser that one could wish for. It keeps the iron thoroughly clean and coated with solder, and has the additional advantage that when it becomes slightly charred the solder is easily removable from its bed, which a moment's work with a knife will restore to a fine whiteness.

This will not, unfortunately, prevent the formation of the ugly black scale which is bound to appear on the iron before it is in use very long. A piece of old file, which has been softened and screwed to the bench, is very useful for removing scale, as a light rub along the rough surface will take off the hardest deposit. To soften the file, heat it to a cherry red and allow it to cool.

ACCUMULATOR POLARITY

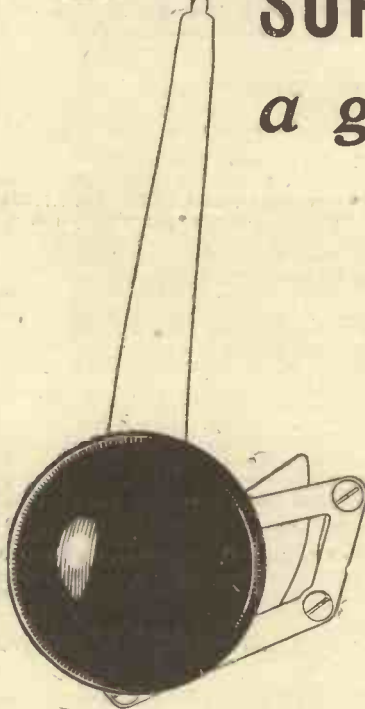
IF you are ever in any difficulty in the determination of the polarity of the plates of an accumulator, it is well to remember the fact that the positive plates in a healthy accumulator are generally of a dark-brown colour, whilst the negative plates of the accumulator have a greyish appearance.

It is easily possible to tell which is the positive and which is the negative plate grouping of an ordinary accumulator, provided that more than two plates are present in the cell. In such cases, the positive group of the accumulator has always one plate less than the negative group.

**LEARNING FRENCH
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(Continued from page 606.)

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- L'étranger—Foreigner
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- lis maraudent—They crawl along (sare-hunting)



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THE SUPER CENTURION RAPID CONSTRUCTION GUIDE

(Continued from page 598.)

Taking care that the voltage figures on side of battery remain in view, screw up spar fixing screws until battery is firmly clamped into position. (If you have used screws that are too long, you will need to put cardboard or a wad of paper between spar and battery, otherwise screws would go right through cabinet side-piece.) Fit G.B. + plug in positive (plus) socket, G.B. - 1 in 3 V. socket, G.B. - 2 in 4 1/2 V. socket.

(Q) The dial (or scale, as it is often called) may be of paper, card, or white celluloid, and is similar to that used on the S.T.700. The S.T.700 celluloid scales (which are very slightly out of date as regards station names), are obtainable for 3s. post free from Celluloid Printers, Ltd., Kingston By-Pass Road, Surbiton, Surrey.

The following applies to the fitting of the paper dial. Leaving the centering tab attached, cut out dial along borders. Cut out (razor blade essential) the hole for slipping over bush, where marked on the tab. Stand the set up in its normal position, front of panel facing you. The moving vanes of the main tuning condenser should be "closed." Put your left hand round the back of the set and gently hold the rear end framework of main tuning condenser. Do not touch the vanes. Remove the fixing nut and washer from the main tuning condenser's spindle portion, which can be seen from the front of the panel.

Slip the hole in the centering tab over the spindle bush (the threaded brass collar), and hold centering tab against panel by fitting washer

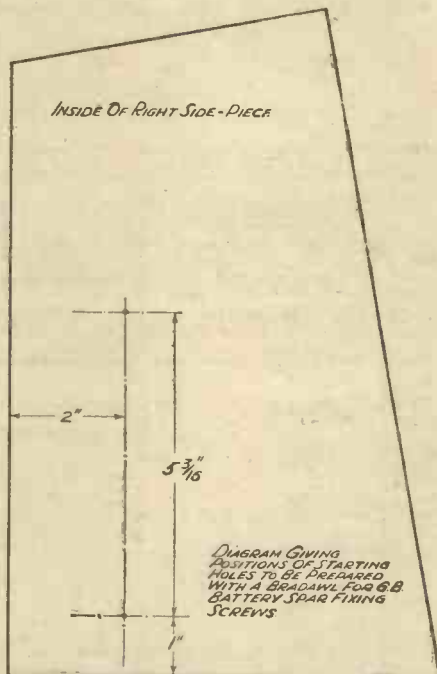


Fig. 6. The G.B. battery clamping spar is screwed into the position shown here.

and then nut loosely. Lay set (in Easy-Cabinet) on its back, front of panel uppermost. Centre the dial into its correct general position; as a guide it may be noted that the top point should come opposite the middle fixing screw of panel (i.e. half-way along top edge).

Ensure dial is in correct position by measuring the distance from the lowest point on the left-hand end of dial to the bottom edge of panel; this distance should be the same as that from the right-hand end of dial to bottom edge of panel.

(R) Prepare 16 ordinary plated brass pins (if a pin is of a type that could be bent, it can be used) by cutting them diagonally with wire-cutters or pinners about 1/4-in. from their heads. You now have 16 very short and pointed pins. Any other type of very short miniature nails may be used.

There are 16 small circles with white centres along the border of dial. Keeping dial flat on panel, start with the top circle and prick through centre of circle with some thin pointed instrument (I used a drawing-pin) for about 1-16 in. Insert a prepared pin into this hole and push home with any hard, flat-tipped-headed instrument (I used the handle of a screwdriver). Carry out the rest of the fastening-down of dial in following order: Circle between pin just inserted and condenser spindle; the two circles (on outer border) on each side of top circle; the two circles (on inner border) between last-inserted two pins and spindle. Carry on in this way, working towards the ends, keeping dial flat.

(S) CUT CENTERING TAB OFF WITH SAFETY-RAZOR BLADE by cutting along inner border where indicated (where tab is

SUPER CENTURION

THE POWER SUPPLY

Batteries: H.T. 120 v.—Drydex, G.E.C., Milnes H.T. Unit, Fuller, Marconiphone, Ediswan. G.B. 9 v.—Drydex. L.T. 2 v.—Exide, Fuller.

SUITABLE LOUDSPEAKERS

W.B., British Rola, Blue Spot, Wharfedale. (No significance attaches to the order of makes.) J. S.-T.

joined on). Tear away the tab from the condenser bush; there is really no need to remove the fixing nut to do this. Tighten up the fixing nut on bush of main tuning condenser.

STAND SET IN ITS NORMAL POSITION WITH DIAL FACING YOU.

(T) Turn projecting spindle of main tuning condenser fully anti-clockwise (fully left). Slip the large J.B. knob and long pointer on to end of spindle with the pointer pointing exactly horizontally to the left. Tighten grub-screw, which is the little screw which fits into edge of knob and is on opposite side to pointer. (Do not touch screw which secures the pointer.)

(U) Turn spindles of volume control, turret switch, anode reaction condenser, aerial reaction condenser, and aerial balancing condenser fully anti-clockwise (fully to left). Fit their knobs with their white spots or pointers exactly in a horizontal direction to the left. Tighten up their grub-screws.

(V) Fit knob on wavechange switch spindle (no special direction).

YOUR SET IS NOW COMPLETE. (See separate article next week on installation and operation.)

J. S.-T.

MY CORONATION SET

(Continued from page 595.)

by the application of reaction, and there is no need to reduce the aerial coupler. This in itself adds enormously to signal strength on weak stations, while preserving good selectivity. The whole matter has been discussed at great length in connection with the S.T.600. I am more than ever delighted with aerial reaction as being a means of greatly increasing both sensitivity and selectivity.

Selectivity on the anode circuit is obtained partly by reaction and partly by reducing the load of the anode circuit of the first valve. This is done by applying a negative potential to the grid. This is done by a two-way switch which is a Graham-Farish turret switch. In one position the set is switched off. In the next position, half-way, the set is in its most selective condition, with negative bias applied to the grid of the first valve. In the third position, the set is working at full sensitivity, but selectivity is rather less.

J. S.-T.

1936 BROADCASTING REVIEWED

The work of the West Region

THE West of England regional headquarters were greatly extended during 1936. Studio accommodation, which proved a problem during the early part of the year, was extended by the construction of a new studio.

Under the title "Western Salon" a new experiment was tried. Chamber Music was played to an audience gathered round the players so that a more intimate atmosphere might be created than in the concert hall. Broadcasts in this series included the Griller Quartet from Dartington Hall, the Grinke Trio from Marston Court, and the Bristol Chamber Music Players from the studio.

Broadcasts from public concerts included the opening concert of the Torquay Musical Festival and the concert to mark the re-opening of the Colston Hall.

Outstanding dramatic and feature programmes of the year included "Barnet's Polly," by Jan Stewer; "Treasure Island," by Robert Louis Stevenson, adapted by E. M. Delafield; "Towers and Sheep-bells," a programme about Ponthill, by Norah Richardson; and "Countrymen Afield," to celebrate the birthday of Richard Jefferies.

A new series entitled "Crowded Moments" was introduced and comprised visits to some important centres by a commentator, who described the scenes and his impressions. These "Moments" have ranged from Plymouth Hoe on a Saturday night to the Tramways Centre, Bristol. A broadcast was taken from the Royal Show at Ashton Park, Bristol.

Programmes made with the aid of the mobile recording unit included "May Games," a composite picture of the traditional customs for bringing in summer in the West; Barnstaple Great Fair; and Sherborne Pack Monday Fair.

Wales

Plans were completed during the year for the conversion into studios of the Public Assistance Offices, Alexandra Road, Swansea. The new accommodation includes a large music studio, a talks studio, a dramatic studio, and an effects studio, in addition to offices.

Twenty-five plays were broadcast up to November, 1936, and of these, the most outstanding were "Flood," by W. Evan Williams, a realistic drama of the pit; and "Y Llaw Gudd," a murder play adapted by John Ellis Williams from the novel by E. Morgan Humphreys.

The chief outside broadcast in the period under review was a programme entitled "Old King Cole." This took the form of a microphone tour of the Wyndham Colliery, Ogmere Vale.

Nineteen religious services in the English language were broadcast during 1936, and twenty-four religious services in the Welsh language. There were nineteen appeals.

The Welsh Interludes which brought leading figures in Welsh life to the microphone were continued. Other series in the programmes of Welsh talks included "Discovering Wales" and "For Welsh Farmers." Two discussions have been outstanding—"The Drift of Employment," a joint discussion with Midland Regional (the Welsh speakers were Lady Rhys Williams and Arthur Jenkins, M.P.), and "Conflict or Conciliation in the Confield."

The News Service in the Welsh language continued as a nightly service until the autumn of 1936, when a new bi-weekly service was inaugurated.

(To be continued.)

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SOUTHERN RADIO, 323, Euston Road, London, N.W.4 (Near Warren St. Tube). Phone: Euston 3775.

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(Continued)

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