DOUBLE NUMBER—USUAL PRICE 3D.

OUR NEW "FAVOURITE" THREE FULL DETAILS

Amateur Wireless

and Radiovision

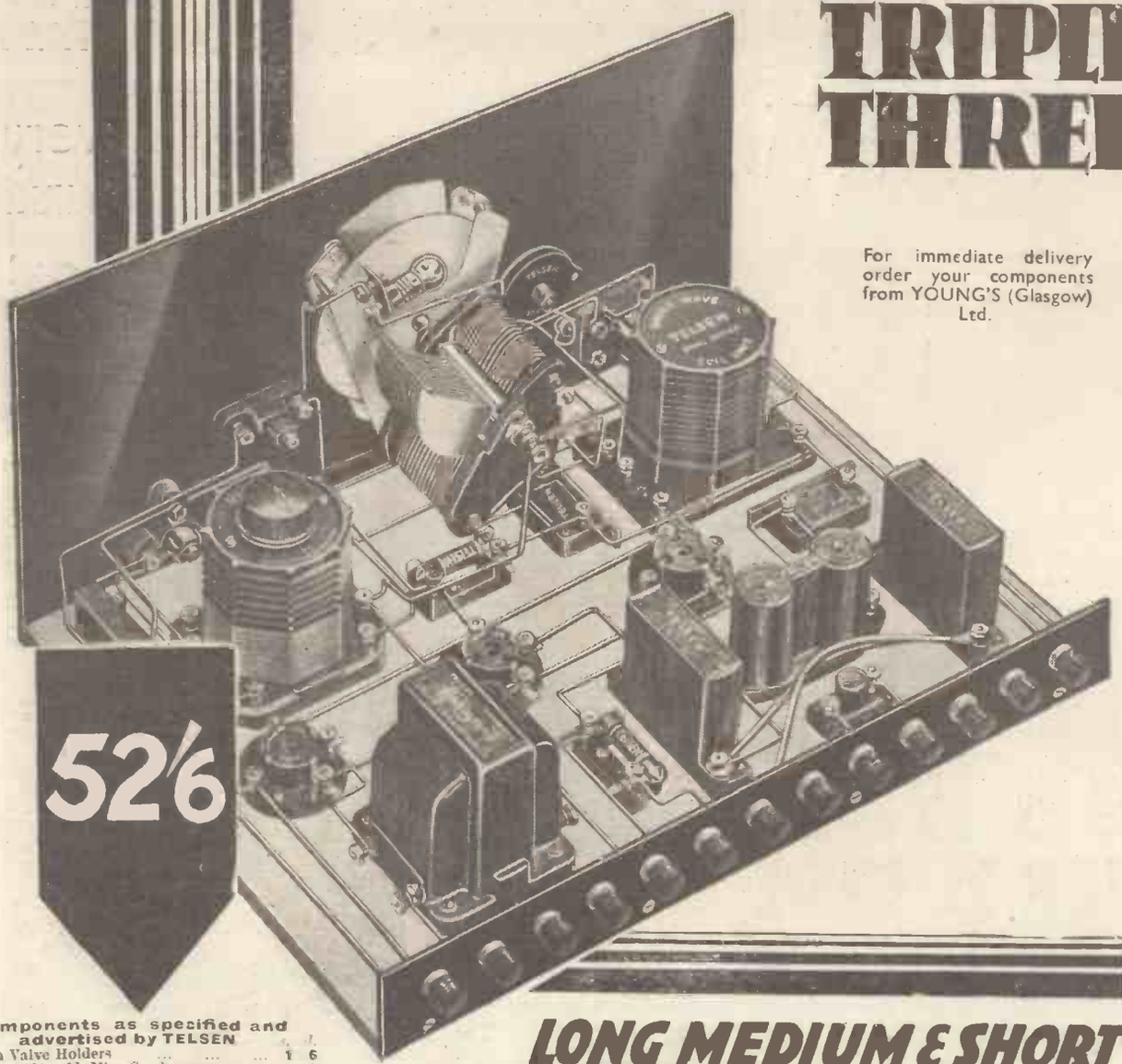
PERCY HARRIS JOINS OUR STAFF

Every Thursday 3d

Vol. XX. No. 506 Saturday, February 20, 1932

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

EVERY COMPONENT FOR THE TELSEN TRIPLE THREE



For immediate delivery order your components from YOUNG'S (Glasgow) Ltd.

52/6

Components as specified and advertised by TELSEN

		£	s.	d.
3	Telsen Valve Holders		1	6
1	Telsen .0001-mfd. Mica Condenser			6
1	Telsen .0003-mfd. Mica Condenser			6
1	Telsen .001-mfd. Mica Condenser			6
1	Telsen Grid Leak, 1-meg.			9
1	Telsen Grid Leak, 2-meg.			9
2	Telsen Grid-Leak Holders		1	0
1	Telsen Aerial Coil, with Selectivity Adjustment		7	6
1	Telsen Dual Range S.W. Coil Unit		4	6
1	Telsen .0005-mfd. Logarithmic Variable Condenser		4	6
1	Telsen .0003-mfd. Reaction Condenser		2	0
1	Telsen 2-point Switch		1	0
1	Telsen 3-point Switch		1	3
1	Telsen 4-point Switch		1	6
1	Telsen Radiogrand Transformer		8	6
1	Telsen 50,000-ohm Spaghetti Resistance		1	6
1	Telsen 25,000-ohm Spaghetti Resistance		1	0
1	Telsen .01-mfd. Mansbridge Condenser		1	6
1	Telsen 1-mfd. Mansbridge Condenser		2	3
1	Telsen Binocular H.F. Choke		5	0
1	Telsen Fuse Holder			6
1	Telsen Illuminated Disc Drive		4	6
		£2	12	6

LONG MEDIUM & SHORT WAVE RECEPTION ON ONE DIAL . . .

YOUNGS

(GLASGOW) LTD.

40, Stockwell St: GLASGOW

182

MORE EFFICIENT VALVES

MORE STATIONS FROM THIS LIVELY DETECTOR

If you want to liven up your tuning—if you want extra range, greater sensitivity—get this Lissen Detector Valve for your set. You will find its lively responsiveness bringing in the foreigners like magic. Match it up to a well-built set and work it in harness with other suitable Lissen Valves and you will be amazed at the results you get, the distance-searching you can do.

Ask for Lissen H.L.210.

PRICE

5/6

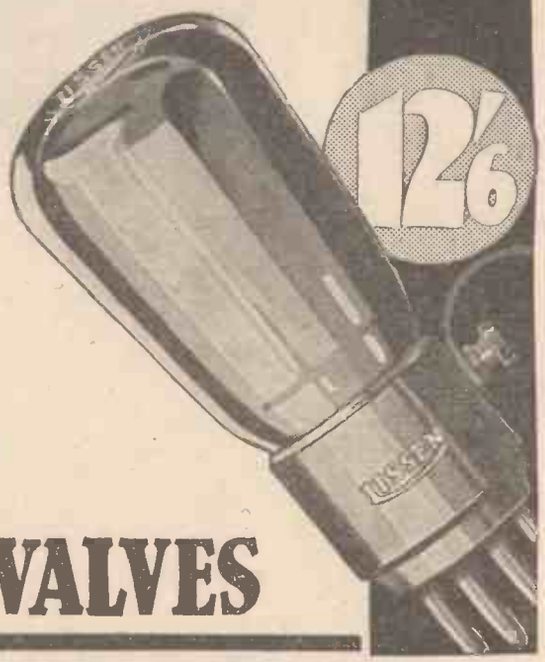
MORE VOLUME FROM THIS POWER PENTODE

Replace your power valve with a Lissen Power Pentode. Immediately you will notice a tremendous step-up in volume on all stations. Where before you got a whisper you will now get fine full loud-speaker strength, and your local station will give you a torrent of pure sound.

No need to alter the wiring of your receiver at all. Simply plug-in the Lissen Power Pentode Valve. It only takes 7 m/A of H.T. current, and can therefore be run off ordinary batteries. Ask for Lissen P.T.225.

PRICE

12/6



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The BEST BRITISH VALVES

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX

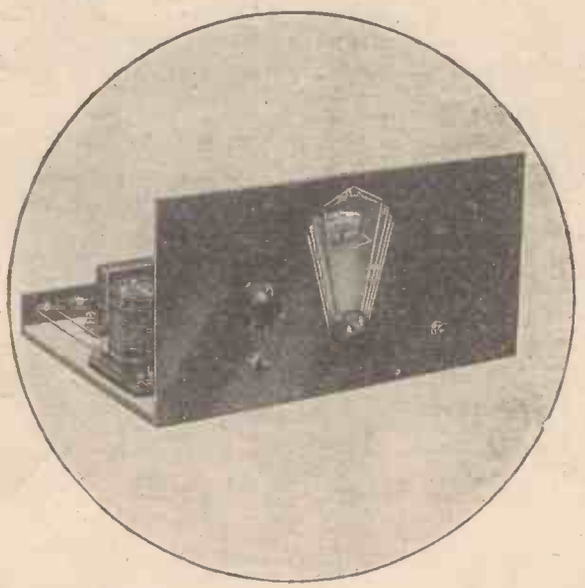
Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

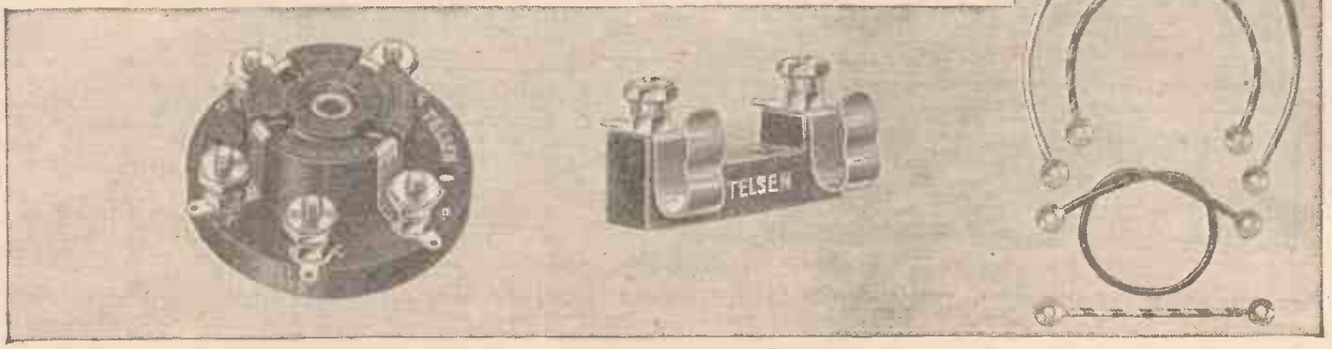
TELSEN

COMPONENTS FOR THE "A.W." WORLD-WIDE 3

		s.	d
3	Valve Holders	1	6
1	.0001 Mica Condenser		6
1	.001 Mica Condenser		6
1	Grid Leak, 2 meg.		9
1	Grid Leak, 1 meg.		9
2	Grid-leak Holders	1	0
1	Short-wave Coil Unit	4	6
1	.00025 Logarithmic Variable Condenser	4	6
1	.0003 Reaction Condenser ..	2	0
2	Two-point Switches	2	0
1	"Radiogrand" Transformer	8	6
1	Binocular H.F. Choke	5	0
1	.01 Mansbridge Type Condenser ..	1	6
1	Illuminated Disc Drive	4	6
1	1-mfd. Mansbridge Type Condenser	2	3
1	50,000-ohm Spaghetti Resistance ..	1	6
1	25,000-ohm Spaghetti Resistance ..	1	0
		42	3

Full wiring chart, building and operating instructions are included in the new issue of the Telsen "Radiomag," price 3d. at your dealer's, or, if you have any difficulty in obtaining a copy, write direct, enclosing 4d. in stamps to "Radiomag," Telsen Electric Company, Limited, Aston, Birmingham.





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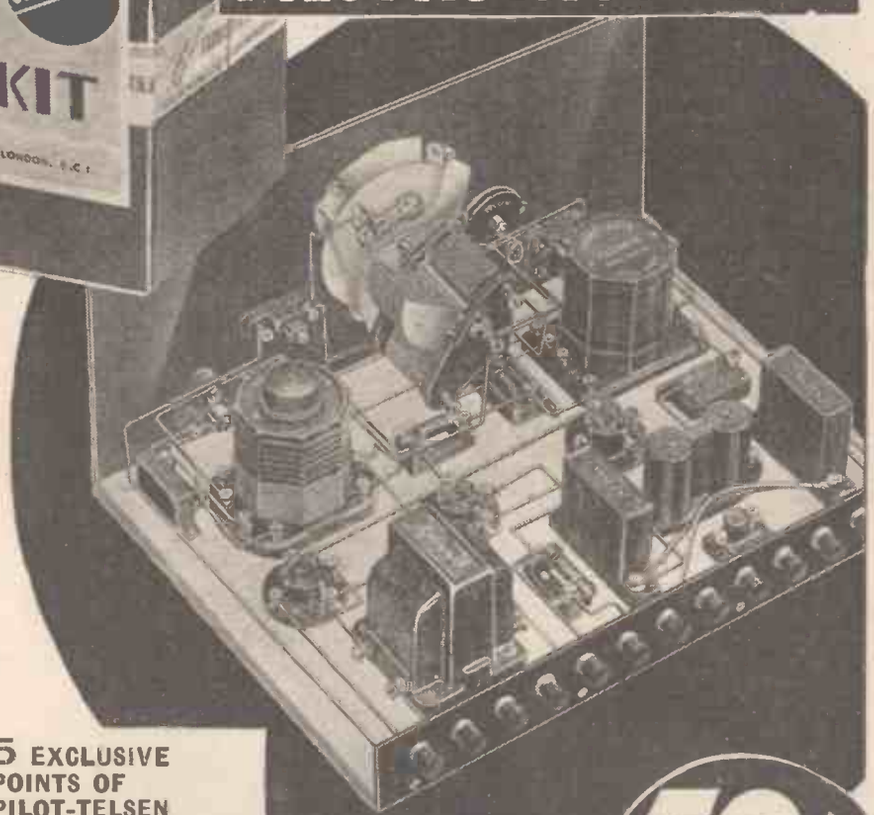
The Pilot has the last word.

TELSEN TRIPLE THREE now supplied as

PILOT AUTHOR KIT



CONTENTS OF KIT

Here is the list of Parts as specified and advertised by TELSEN and included in the **PILOT SEALED KIT** for the **TELSEN TRIPLE THREE.**

USE THIS LIST WHEN ORDERING SEPARATE ITEMS FOR CASH OR C.O.D.

	s.	d.
3 Telsen valve holders	1	6
1 Telsen .0001-mfd. mica condenser		6
1 Telsen .0003-mfd. mica condenser		6
1 Telsen .001-mfd. mica condenser		6
1 Telsen grid leak, 2-meg.		9
1 Telsen grid leak, 1-meg.		9
2 Telsen grid leak holders	1	0
1 Telsen aerial coil with selectivity adjustment	7	6
1 Telsen dual range S.W. coil unit	4	6
1 Telsen .0005-mfd. logarithmic variable condenser	4	6
1 Telsen .0003-mfd. reaction condenser	2	0
1 Telsen 2-point switch	1	0
1 Telsen 3-point switch	1	3
1 Telsen 4-point switch	1	6
1 Telsen Radiogrand transformer	8	6
1 Telsen 50,000-ohm Spaghetti resistance	1	6
1 Telsen 25,000-ohm Spaghetti resistance	1	0
1 Telsen .01-mfd. Mansbridge condenser	1	6
1 Telsen 1-mfd. Mansbridge condenser	2	3
1 Telsen binocular H.F. choke	5	0
1 Telsen fuse holder		6
1 Telsen illuminated disc drive	4	6

BASIC KIT 52/6

● EXTRA KITS. COMPONENTS FOR FULL KIT

1 14 in. by 7 in. oak panel, polished, drilled and cut for escutcheon	2	0
1 14 in. by 1¼ in. ebonite terminal strip ready drilled	1	0
1 14 in. by 9 in. Ply baseboard stencilled showing correct position for all components	1	0
3 Engraved insulated terminals	3	3
Flex wires and screws	1	6
	8/9	

● PILOT-TELSEN FULL KIT

Complete as illustrated, comprising Basic Kit as advertised by Telsen, with panel, baseboard, terminal strip, wire, screws and flex as above. Cash or C.O.D. **55/-**

Or 8 monthly payments of **7/6**

5 EXCLUSIVE POINTS OF PILOT-TELSEN AUTHOR KITS

- Exactly as specified by Telsen
- Drilled Oak Panel ready for assembly
- Drilled Ebonite Terminal Strip
- Stencilled Baseboard, showing correct positions of all components.
- Blueprint and full instructions. Also Telsen Radio-Mag.

BASIC KIT CASH OR C.O.D. **52/6**

Basic Kit, less panel, baseboard, terminal strip, wires and screws.

Full wiring chart, building and operating instructions are included in the new issue of the Telsen Radiomag, price 3d. at your dealer's, or if you have any difficulty in obtaining a copy write direct, enclosing 4d. in stamps to—**Peto-Scott Co. Ltd., 77 City Road, London, E.C.1**

EASY WAY

Basic Kit as advertised by Telsen :

7 monthly payments of 8/3

SOLE DISTRIBUTORS OF PILOT-TELSEN KITS and Stockists for full range of Telsen components. AVAILABLE TO THE TRADE AT STANDARD DISCOUNTS.

PETO-SCOTT

Co. Ltd.

77, CITY ROAD, LONDON, E.C.1. *Telephone: Clerkenwell 9406-7-8*
62, HIGH HOLBORN, LONDON, W.C.1. *Telephone: Chancery 8266*

Messrs. Peto-Scott Co. Ltd., 77, City Road, London, E.C.1

Dear Sirs, Please send me CASH/C.O.D./H.P.

TELSEN TRIPLE THREE IN PILOT SEALED CARTON £2 12 6

TELSEN TRIPLE THREE FULL KIT IN PILOT SEALED CARTON £2 17 6

Together with Copy Telsen "Radio-Mag" free.

for which I enclose £ s. d.

Name.....

Address.....

A.W. 20/2/32

THE TELSEN RADIOMAG

*HOW TO BUILD THE TELSEN TRIPLE 3

The current issue of the Telsen Radiomag contains complete instructions with blueprint so that you can easily and quickly construct the Telsen Triple 3.

This wonder receiver puts every wavelength—long, medium **and short**—on the one tuning dial, and incorporates all the latest short-wave Telsen matched components. The total cost of the components required is only 52s. 6d.

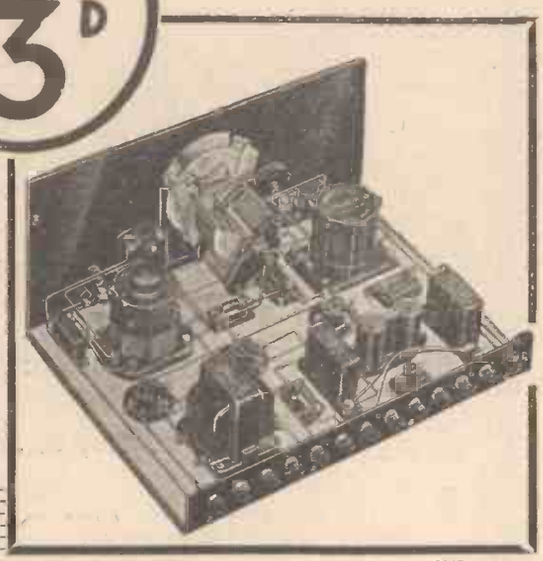
The way to a really all-round up-to-date receiver is made easy through the pages of the Telsen Radiomag. Get your copy to-day—from your usual dealer.

THE CONSTRUCTOR'S OWN MAGAZINE

The current issue of the Telsen Radiomag contains eight blueprints,* twelve pages in two colours, a special supplement on Short Wave Radio and many useful hints and tips. It is an entirely new edition, lavishly designed and beautifully executed—from cover to cover it is packed with information for constructor enthusiasts, both amateur and professional. Ask for your copy at your usual radio dealer's, and if there is any difficulty send 4d. in stamps (to cover postage) to

"Radiomag," The Telsen Electric Co., Ltd.,
Aston, Birmingham.

60 PAGES 3D



Advt. of The Telsen Electric Co Ltd., Aston, Birmingham CVS—167

THE TELSEN RADIOMAG

*HOW TO BUILD THE TELSEN SHORT WAVE 3

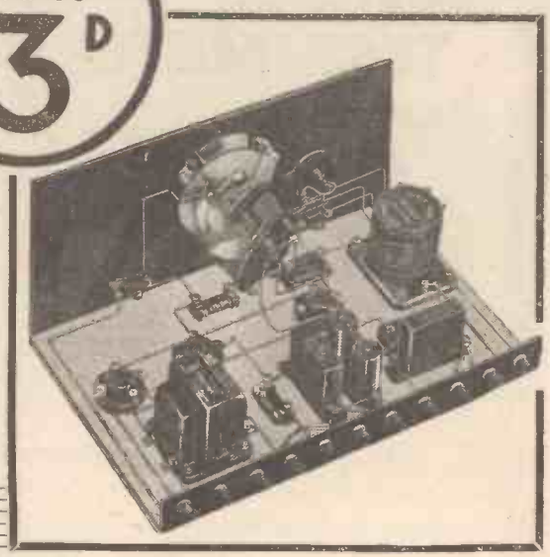
One of the most attractive circuits ever designed by the now famous Telsen radio engineers, the Short-wave Three does honour to the name and fame of Telsen. The total cost of the components required is a mere 42s. 3d., and the current issue of the Telsen Radiomag gives you complete instructions for constructing it yourself, including a blueprint. Capable of world-wide reception, the Telsen Short-wave Three is both simple to build and simple to operate—thanks to the incorporation of the Telsen Dual Range Short-wave Coil Unit. See further details in your copy of the Telsen Radiomag—**get your copy to-day.**

THE CONSTRUCTOR'S OWN MAGAZINE

Twelve two-colour pages, eight blueprints*, any number of useful hints and tips—that's just a taste of what this amazing magazine has to offer you. There's a special supplement dealing with Short Waves—written by an expert in a readable, interesting way. And this sixty-page magazine—full of information vital to any home-constructor, no matter how much or little he knows—is yours for 3d. Ask your usual radio dealer or send 4d. in stamps to cover postage to

"Radiomag," The Telsen Electric Co., Ltd.,
Aston, Birmingham.

60 PAGES 3D



THE TELSEN RADIOMAG

*HOW TO BUILD THE TELSEN SHORT WAVE ADAPTOR

The Short Waves are the talk of the hour. The current issue of The Telsen Radiomag puts you in possession of all the information you want and includes detailed instructions, and blueprint, so that you may yourself add the Short Waves to the range of your present set. You simply connect up as instructed — and immediately you are in touch with America, Australia, Canada, Russia, Africa and the Far East. The cost of the Telsen components required is only 24s. 9d. Get the Short Waves, too—order your copy of the Telsen Radiomag to-day.

THE CONSTRUCTOR'S OWN MAGAZINE

Never before has the radio enthusiast been offered such a magazine devoted entirely to his interests. Here are sixty pages, fully illustrated, dealing exhaustively with radio topics of the moment. The current issue of the Telsen Radiomag is an entirely new edition containing eight blueprints*, twelve pages in two colours, and a special supplement dealing with the Short Waves. It is sold through your usual radio dealer at the astonishingly low price of 3d. per copy. Should you find any difficulty in obtaining it, send 4d. in stamps (to cover postage) to

"Radiomag" The Telsen Electric Co., Ltd.
Aston, Birmingham.

60 PAGES 3D

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THE TELSEN RADIOMAG

SPECIAL SHORT WAVE SUPPLEMENT

You cannot be a radio enthusiast these days unless you are also a Short Wave enthusiast. That is why you need the current issue of the Telsen Radiomag.

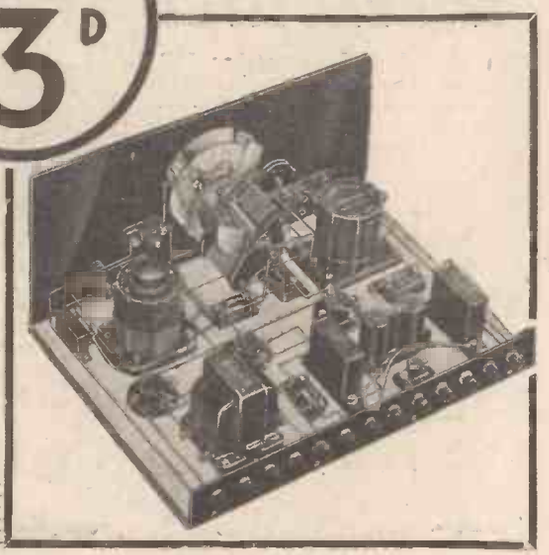
A special supplement written by an expert on Short Wave work answers all your questions and makes the construction and working of Short Wave receivers easy and fascinating. **Order your copy of the Telsen Radiomag to-day.**

THE CONSTRUCTOR'S OWN MAGAZINE

How often have you wanted a magazine devoted entirely to your hobby—written and designed for you. Here it is—the Telsen Radiomag. This striking production is crammed with facts that will interest and inform you. And this special sixty-page issue contains not only twelve two-colour pages, not only eight blueprints, but also a special supplement dealing with Short Waves. It's yours for 3d. from your usual radio dealer—or if you have difficulty send 4d. in stamps to cover postage to

"Radiomag," The Telsen Electric Co., Ltd., Aston, Birmingham.

60 PAGES 3D



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Don't Forget to Say That You Saw it in "A.W."

THE TELSEN RADIOMAG

PRACTICAL HINTS & TIPS

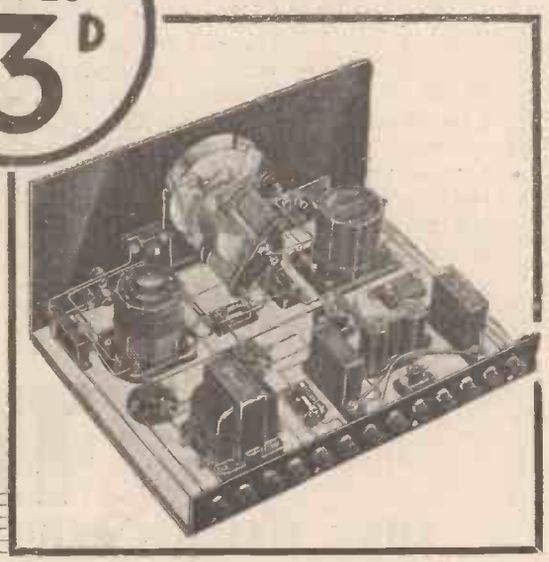
The new edition of the Telsen Radiomag is not confined to blueprints and constructional articles. It includes many practical hints and tips and much practical information of real service to every radio enthusiast. Special articles on batteries, valves, gramophone pick-ups, and a special chart of the Short Wave stations are included. **Get your copy of the Telsen Radiomag now.**

THE CONSTRUCTOR'S OWN MAGAZINE

Sixty pages. And that's not all. Eight blueprints. And that's not all. Twelve pages in two colours—and yet there's more to come. A special supplement dealing with Short Waves and a hundred and one useful facts about construction. This is the Telsen Radiomag—richly produced, strikingly designed—and it's yours for 3d. at your usual radio dealer's. But should you have difficulty send 4d. in stamps to cover postage to:

"Radiomag," The Telsen Electric Co., Ltd.,
Aston, Birmingham.

60 PAGES 3D



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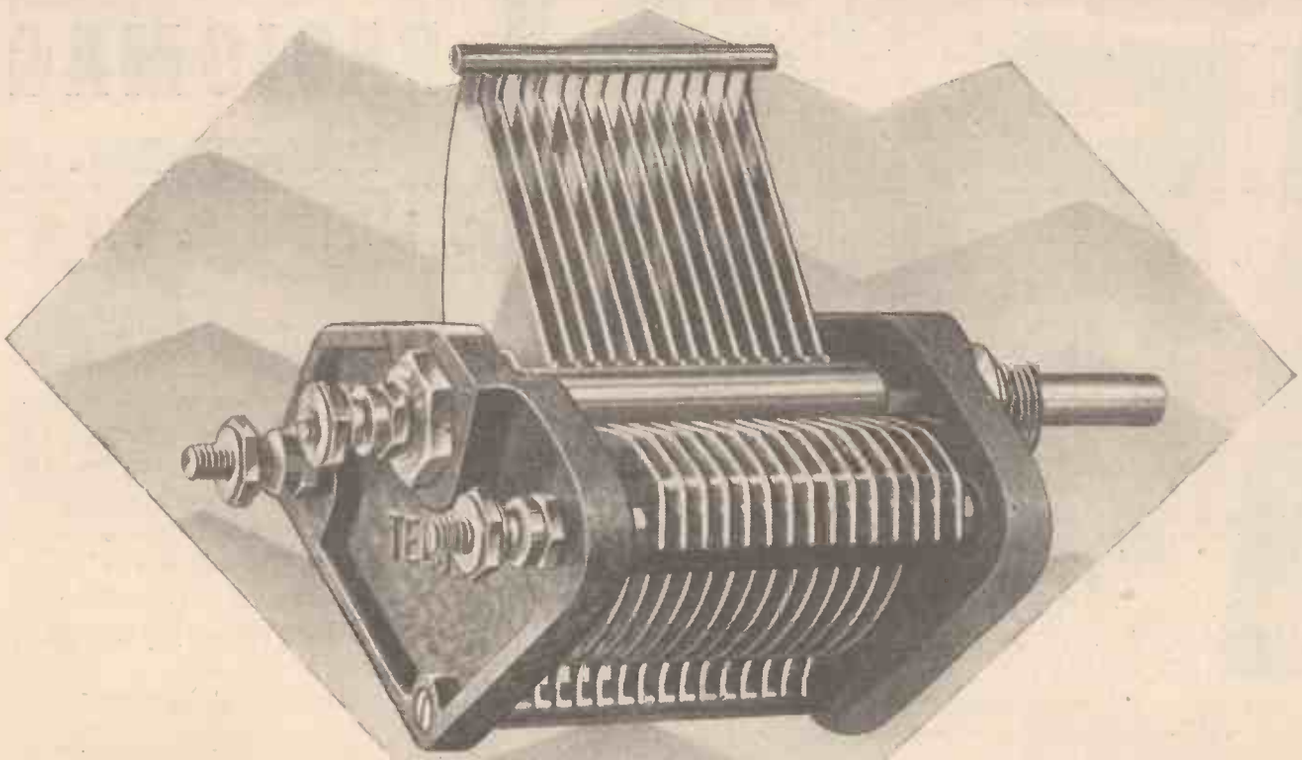
TELSEN VARIABLE CONDENSER



4/6

PRECISION . . .

Telsen Variable Condensers are built to give years of constant service. The frame is sturdy—braced by three solid pillars : the vanes are clamped at three points—distortion is impossible : the rotor is built into a rigid unit and the vanes are held at the ends—backlash and end play is avoided.

Telsen Logarithmic Variable Condensers in capacities .0005, .00035, .00025 .. .. .. Price 4/6

The Telsen Short-wave Coil adds the Short Waves without coil changing

TELSEN 100% ALL - BRITISH MATCHED COMPONENTS FOR THE TELSEN TRIPLE THREE

TELSEN

LONG, MEDIUM AND SHORT WAVE RECEPTION ON ONE DIAL

No. 506. Vol. XX. FEBRUARY 20, 1932

Amateur Wireless & Radiovision

BRITAIN'S LEADING RADIO WEEKLY
FOR CONSTRUCTOR, LISTENER & EXPERIMENTER

EDITOR: BERNARD E. JONES. TECHNICAL EDITOR: J. H. REYNER, B.Sc., A.M.I.E.E. RESEARCH CONSULTANT: W. JAMES. ASSISTANT EDITOR: H. CORBISHLEY.

NEWS & GOSSIP OF THE WEEK

A NEW "FAVOURITE"

HOW many "A.W." readers made up the "Britain's Favourite Three," which was first produced in 1928 as the result of a competition ballot to decide the most popular set? We know from correspondence that there are many of these sets still working, and the "New 'Favourite' Three" described in the middle pages this week is an interesting development of this popular "favourite."

PROGRAMMES AT 6 A.M.

PHYSICAL-JERK enthusiasts, who want the B.B.C. to start early morning programmes, quote the fact that the early morning Königswusterhausen programme, which runs from 6 a.m. to 7.15 a.m., is now S.B. by all German stations on the same chain, as it is so popular. But this is not a physical jerks feature. It is an orchestral programme which early morning risers will find it worth while tuning in!

AN INTERNATIONAL CONCERT

WE have heard some of the International Concerts relayed from Continental centres and Great Britain's contribution to the series is fixed for February 21. This is, of course, an all-British programme, and the B.B.C. has arranged for works by Sir Edward Elgar, John Ireland, Gustav Holst, and Delius to be performed.

THREE GOOD O.B.'s

THREE important outside broadcasts occur in two days during the early part of next month. The Grand National is on March 18, the Oxford and Cambridge Boat Race on the 19th and on the same day the Scotland versus England Rugger match. The Boat Race finishes at about lunch time, which leaves very little time for the O.B. engineers to pack up their gear and speed off for Twickenham where they are due for the match at 2 o'clock.

THE EMPIRE STATION

PLANS are being laid down for the new short-wave plant to be erected at Daventry for Empire broadcasting. An official of the Standard Telephones and Cables, Ltd., concern, who are building the new plant, emphasises the British enterprise and says that all the gear will be manufactured at Hendon and New Southgate. The latest schedule shows that the Empire station will be finished by the autumn and ready for testing just before Christmas.

THESE QUESTIONNAIRES

IN spite of the controversy about the "Changes in Family Life" pamphlet, which includes a form of Family Return of a most intimate nature, we hear that over 10,000 copies have been issued and 5,000 more are to come. Apparently some people don't mind bringing the family skeleton out of the cupboard and telling the B.B.C. about it!

SHORT-WAVE "FANS"

SHORT-WAVE enthusiasts who are getting world-wide reception with the sets and adaptors described recently in "A.W.", should note that a new Short-wave Club, the International Amateur Radio Society, has been formed at Michigan, U.S.A., with the object of facilitating the exchange of photographs and reception logs between short-wave "fans" in every country. The British representative of the I.A.R.S. is Mr. B. Costin, of the T. & R. Section of the Radio Society of Great Britain.

THE START OF RADIO CITY

Excavations are being made at the famous Fifth Avenue and 48th Street, New York, in connection with the new Radio City. Many of the buildings in the background will be demolished, for the new block of buildings for broadcasting will take up a very large area in the city

NEXT WEEK: A CONSOLE MAINS SET COMPLETE FOR £7:17:6. SEE PAGE 360

NEWS & GOSSIP OF THE WEEK—*Continued*

A £50 RING!

IN their recent broadcast of "New Songs for Old," Gordon McConnel and Christopher Stone included a number entitled "Only a Baby's Rattle," which was originally sung by Tots Davis, a well-known artiste of the 'nineties, who won "Ally Sloper's" Fifty Pound ring for this song. The broadcast rendering was by Olive Groves. A cheerful letter has been received by the B.B.C. from Miss Davis herself, who is still able to listen and who still has the Fifty Pound ring in her possession.

WELSH PROGRAMMES

WELSH listeners who are of the opinion that the B.B.C. does not cater sufficiently for them are having less and less cause for "grousing." On St. David's Day, March 1, speeches from the St. David's Day Dinner held at the Trocadero, London, will be relayed by Daventry National. Mr. J. B. Sackville Evans will propose the toast of "Our Guests," and Mr. Lloyd George will reply. Songs will be sung by Ben Davies, the veteran Welsh tenor. The speeches will also be heard by West Regional listeners.

A BIRMINGHAM O.B.

ARRANGEMENTS have been made for lines to be put in the Empire Theatre, Birmingham, for broadcasting variety turns. Two microphones have been erected in the footlights and one on each side of the proscenium arch, all connected to a four-way control located with the apparatus in the change room on the O.P. side of the stage. The B.B.C. officials at Broad Street are working in conjunction with the Empire management, and it is hoped that many novel items will be heard by Midland listeners.

THE LOTHBURY CHOIR

IT is understood that in fixing up new outside broadcasts the B.B.C. is considering the possibility of taking another "O.B." of the Lothbury Male Voice Choir. Microphone and balance tests made on this famous choir at the last broadcast were regarded as highly satisfactory by the musical side of the B.B.C. Balance and Control, and it is to be hoped that another date can be fixed before the end of the present season.

NOSMO KING AND PARTNER

WHAT did you think of the new black-faced comedian turn—Nosmo King and Partner? The first broadcast has been voted a great success, and the B.B.C. reminds us that here is another example of radio talent found latent in a music-hall turn. By the way, Nosmo King is *not* Harry Tate, as some listeners have assumed. The exact identity is still wrapt in mystery, but we understand that the gaff may be blown any minute!

800 APPLICANTS

SOME idea of the way the twelve or fourteen positions in the new B.B.C. dance band are coveted may be gained from the fact that at the time of writing Henry Hall has seen and heard over 800 applicants. Only one member of the famous Gleneagles Band has so far been taken on, namely Mr. Gillis, the saxophone leader. The first broadcast of Henry Hall's band will be from 8 to 8.30 p.m. on March 15. Studio 8a, at the top of Broadcasting House, has already been approved by Henry Hall as being suitable for the dance broadcasts, but for the inaugural broadcast it is probable that a Savoy Hill studio will have to be used.

THIS DOUBLE NUMBER

This is a 92-page "Amateur Wireless," a size unprecedented in any February issue of this publication. The number of editorial pages is very considerably increased. We give a real bumper number. Just a glance through our issue will show, too, that the advertisement pages are in great number, and every one of them is worthy of the reader's closest attention. In this connection we must quote from a signed letter received from Mr. A. W. Macnamara, the governing director of the Telsen Electric Co., Ltd. This letter confirms an order for 25 pages of Telsen advertising in this issue and then proceeds: "This, I think, you will find, is the record number of advertisement pages ever placed by any firm in a single issue of any radio journal in the world. Our records prove that our sales have advanced in proportion to the amount of advertising we have placed in 'Amateur Wireless' and it is with great confidence that we are devoting a £1,000 allocation to one issue."

Readers and advertisers will draw their own conclusions from this remarkable communication and the remarkable order to which it refers.

A WORLD'S RECORD!

A VATICAN CITY BROADCAST

A broadcast was made recently through the Vatican City transmitter of Pope Pius XI celebrating Mass in the Basilic of St. Peter, Vatican City. The microphone can be seen at the right

HENRY'S AUDITIONS

BY the sound of it, Henry Hall is having a fairly thick time just now—he is stated to be interviewing potential members of the new B.B.C. Dance Band at the rate of thirty a day. Auditions are, at the moment, being held at the H.M.V. studios in Abbey Road, North London, in preparation for the final combination of twelve or fourteen players.

IN UNIFORM

AS you may have read, Henry Hall's new band will wear a uniform, comprising white tunic, black trousers, black shoes, black tie, and white collar. At Broadcasting House the band will often accompany the vaudeville shows, in which the public will often "look in," so the costumes will be appreciated by a small proportion of listeners, even if television still prevents everyone from seeing how nice the "boys" look.

MUSIC-HALL RELAYS

IN view of the one-time "war" between the B.B.C. and the music-hall interests, it is significant to note that at the present time several halls are falling over one another to fix up relays from their bills. The Palladium relays are much appreciated by listeners, but we wonder the B.B.C. does not seek out some of the other circuits—thus giving us a real variety of variety turns.

IS IT FORESIGHT?

THERE is no harm in being optimistic, as evidently the gramophone companies are, about television. For we hear that all artistes wanting contracts with two of the leading gramophone concerns must sign away their television rights! The way commercial interests are forestalling technical progress in television is amazing, is it not?

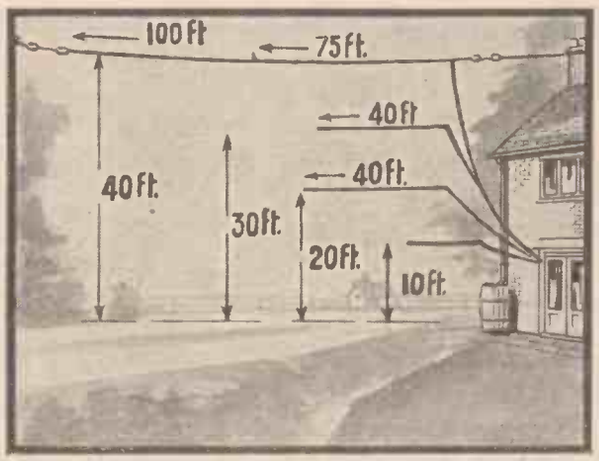
A light concert will be included in the Scottish Regional programme on March 5, the soloists being two popular Edinburgh artistes, Umberto Demarco and Maurice Scott.

SOME AERIAL EXPERIMENTS

Below is an account of some aerial experiments carried out by F. H. Robinson (5YM). The results are instructive in showing the relation of signal strength to selectivity with various types

SOME day, no doubt, outdoor aerials will disappear, and we shall all be using frames or short lengths of thin wire across the ceiling of the room or hidden in the picture rail. Meanwhile the majority of receivers in use require outdoor aerials and the dimensions of the wire are of some importance.

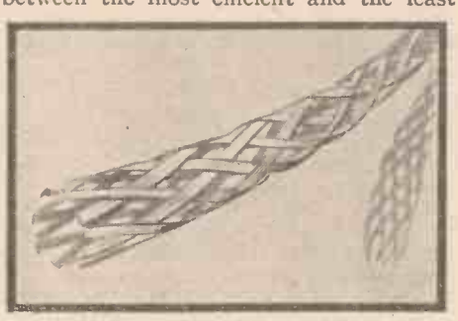
The kind of wire of which the aerial is made does not seem to matter very much, provided that it is copper or a metal with



Tests were made upon aerials of these proportionate sizes

electrical characteristics something like copper. The experiments to be described arose out of some quantative measurements on the efficiency of different kinds of wire; that is, the strength of the incoming signal was measured as accurately as possible.

The actual figures are not of much value, because they refer only to one particular neighbourhood and one particular height of aerial. The general result is, however, of interest to everybody, because it showed that the difference in signal strength between the most efficient and the least efficient wire tested was only 7½ per cent. On the loud-speaker, the difference in strength could not be detected. A very slight adjustment of reaction made the worst as good as the best.



Tubular aerial of woven wire

The kinds of wire used in the experiment were as follows, in order of goodness.

A tube of copper net, 1 in. in diameter, similar to the kind of stuff used to cover Sparklet bottles.

No. 14 enamel-covered copper wire.

7/22 enamel-covered copper, each strand coated.

7/22 copper wire.

No. 22 enamel-covered copper wire.

No. 18 aluminium wire.

Aerial Length

So much for the kinds of wire. The copper net tube would be ideal for picking up very distant stations; but it presents a big surface to wind and snow. I do not think that it is now sold.

Having proved that the actual kind of wire made very little difference and having carried the experiment a little further to show that a really good earth is far more important because it increases efficiency in regard to signal strength without affecting interference very much, that is, a good earth will bring up the strength of local stations without bringing in interfering stations, the next thing to do was to find out how aerial length and height affected selectivity.

Two sets were available for the test, both excellent all-mains receivers. One had two stages of screen-grid H.F. and the other one stage. The procedure was to shorten the aerial bit by bit and then try out first one set and then the other.

First of all the aerial wire—the 7/22 ordinary copper wire was chosen because it is most commonly used—was reduced to 75 ft. from the full 100 ft. used in the first measurements. The height was at first 40 ft.

Strength and Selectivity

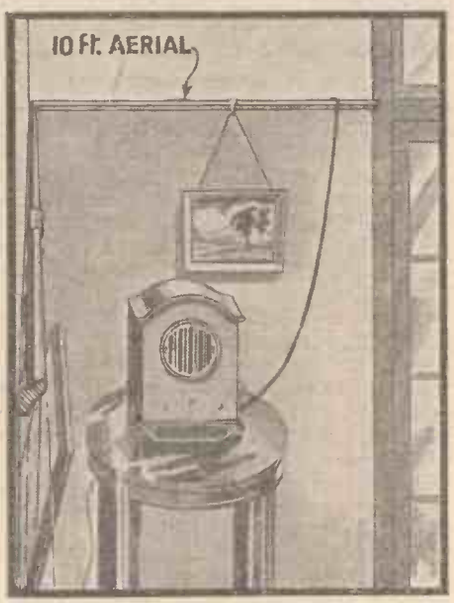
With the four-valve set, no difference could be detected; but there was a slight but distinct improvement in selectivity with the three-valver, and no apparent difference in signal strength.

Another 15 ft. were then chopped from the aerial and the result was a gain in selectivity with both receivers. A slight loss in signal strength in the three-valver was compensated for by use of the volume control. The ten stations normally received at full strength were still had at full strength. It should be observed that six of them required a fairly drastic use of volume control to prevent overloading the output valve. The four-valve receiver still brought in its usual number of stations.

A 40-ft. aerial, 40 ft. high, made a tremendous difference to the selectivity of the three-valve receiver; but four of the distant stations had become sensibly weaker even with the volume control all off. However, the whole performance was much better as regards quality, because the weaker stations were no longer interfered with by a "fringe" from others. The four-valve set lost one or two of its very weak stations; but as they were never worth listening to, that was not of any importance.

The 40-ft. aerial was next put up, first at 30 ft., and then at 20 ft. from the ground. This did not seem to make any difference at all to selectivity; but it made a very considerable difference to signal strength on distant stations. Brookmans Park, forty miles away, still came in at full strength when the volume control was adjusted, without any use of reaction, but

(*Continued in third column of next page*)



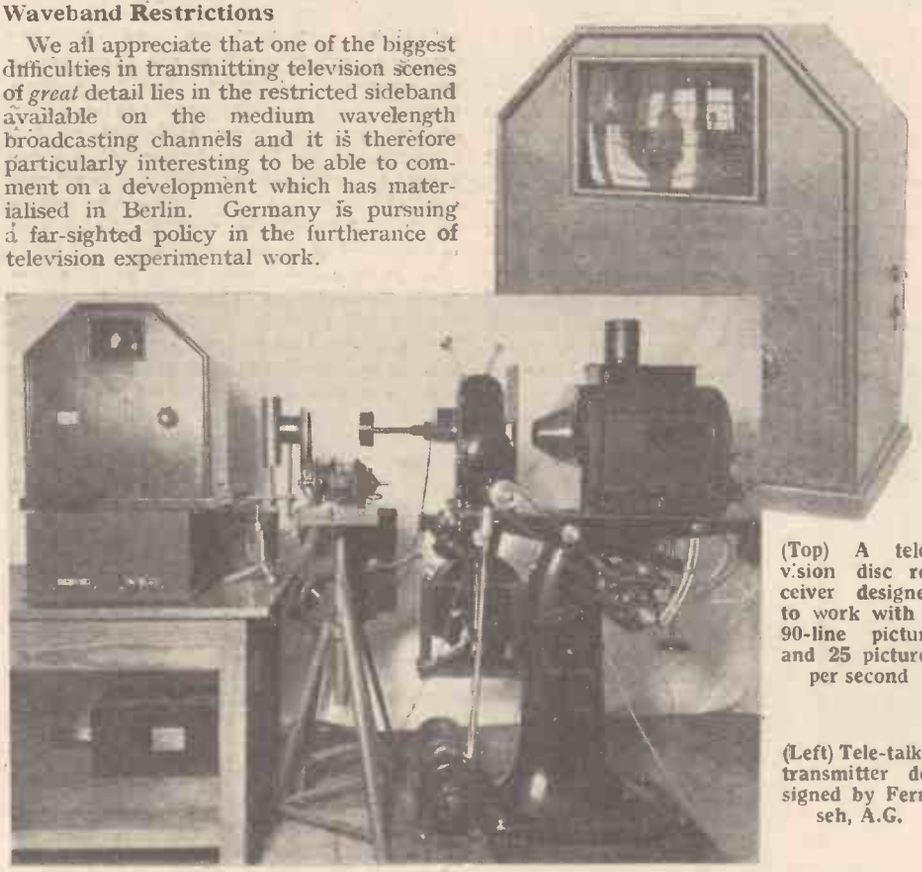
For large sets a wire concealed by the picture rail is effective

A NEW SHORT-WAVE TELEVISION TRANSMITTER FOR BERLIN

ACTIVITIES in several directions during the last few months emphasise very clearly that television has in no way been standing still. New avenues are being explored in an effort to portray images which are not so restricted in detail, have negligible flicker, are bigger and brighter, and can be viewed by quite a large number of people in a room at the same time.

Waveband Restrictions

We all appreciate that one of the biggest difficulties in transmitting television scenes of *great* detail lies in the restricted sideband available on the medium wavelength broadcasting channels and it is therefore particularly interesting to be able to comment on a development which has materialised in Berlin. Germany is pursuing a far-sighted policy in the furtherance of television experimental work.



(Top) A television disc receiver designed to work with a 90-line picture and 25 pictures per second

(Left) Tele-talkie transmitter designed by Fernseh, A.G.

A meeting of all the undertakings interested in the development of television was held in the Ministry of Posts a few days ago. The interests represented embraced the following: Telefunken Gesellschaft, the Thun, Loewe, and Ardenne patents, and the Fernseh, A.G., which is associated with the Baird Company on the basis of a full exchange of patents and television development generally.

From the Witzleben station there have been daily experimental broadcasts of television, using a thirty-line picture, horizontally scanned, with a 4 by 3 ratio and 12½ pictures per second. These transmissions have been on the air for over two years and were supplemented by further transmissions from the long-wave station, Königswusterhausen, and the shorter wave station, Döberitz (143 metres).

The subjects chosen generally were cinema films and the experimental data which has accumulated from the results of these prolonged tests has been most valuable. At the meeting referred to, however, it was decided to erect at the Witzleben station an experimental 7-metre transmitter, working on the Baird system, and the order for the apparatus was placed with the Fernseh, A.G.

There is no intention at present of instituting regular public television broadcasts, but it is the aim of the German Ministry, which, by the way, has the monopoly of all electrical transmission processes, to encourage the development of suitable receiving sets.

The apparatus is *wholly mechanical* and should serve to dispel the feeling that the present-day restricted performance is in any way attributable to the use of discs or mirror drums. Intensive research has been made into the question of increasing the number of scanning lines and augmenting the brightness of the controlled light source which, together with the associated disc, builds up the image. Special equipment has been built and with this the Fernseh, A.G., succeeded in producing perfect spiral holed discs with 90 holes.

This is remarkable and represents a high degree of workmanship, when it is remembered that with discs about 20 in. in diameter this corresponds to a hexagonal hole with a side of about 9/100ths of a millimetre.

Image Size

With the increase in the number of holes in the disc, which, by the way, retained the same diameter as the earlier models having only 30 holes, the size of the resultant image displayed to the individuals looking in was also increased. It was this factor that made it necessary to discard the neon lamp then employed and use an entirely new method for obtaining the source of light. Whereas the luminous intensity of the previous glow lamps was .5 to 2 Hefner candles, the newly developed ones give as much as 40 to 60 Hefner candles.

With this exceedingly good combination the resultant image is brighter and larger than obtained previously. One of the vision receiver models is shown in an accompanying illustration.

If, for the purposes of comparison, one talks in the disproved method of picture points, then this new transmitter gives 10,800 as against the present 1,200 picture points broadcast from Witzleben. This new departure is, therefore, of great interest, and since the number of complete images per second is rated at twenty-five, flicker will be negligible to all intents and purposes. H. J. BARTON-CHAPPLE, B.Sc.

"SOME AERIAL EXPERIMENTS"

(*Continued from preceding page*)

Midland Regional seventy miles away, was very sensibly weaker.

By the way, the signal strength from Daventry (National) suffered with each curtailing of the wire; but it was noticed that with both sets the selectivity was better with 75 ft. than it was with 100 ft., and that the loss of signal strength between 100 and 75 was very little.

Experiments with the big aerial having been finished, a very small outdoor aerial of No. 22 enamel-covered wire was put up, 20 ft. long and 10 ft. high. With this, the three-valve set gave a remarkably good performance from Brookmans Park, every trace of Muhlacker disappearing from the Regional reception, and the full strength being available without the use of reaction. London National required some reaction to bring it up to full strength and considerable, but not excessive, reaction was required to bring in Midland Regional at fair strength.

Lastly, 10 ft. of cotton-covered No. 22 wire was tucked into the picture rail. Even this did not seem to affect the four-valve receiver adversely. It still brought in about ten stations at fair to full strength and Brookmans Park still needed very considerable volume control to make the strength bearable in an ordinary sized room. But reception with the three-valve receiver was on the weak side.

You can get almost any degree of selectivity you like by experimenting with the aerial; but if the cutting is very drastic, there will naturally be considerable loss of signal strength. For best results on local station only a short aerial is recommended. The more powerful the set, the more you can do in aerial reduction. It is a good plan to have two aerials. One for the best interference-free reception of local station, and the other fairly high for distant work.

Percy W. Harris JOINS OUR STAFF

HE WILL CONTRIBUTE TO EVERY ISSUE OF "A.W."

WE have great pleasure in announcing that Mr. Percy Harris (by the way, he is Percy *W.* Harris, rejoicing in the middle name of Wooton) will contribute regularly to our pages week by week, as well as to every issue of *Wireless Magazine*, "A.W.'s" companion publication. We shall thus have the great advantage of the assistance of a technician who has won a remarkable reputation as a technical journalist, and who, in addition, has produced some of the most successful home-constructor sets yet published. From time to time, Percy W. Harris will design sets for "A.W." and we are sure, from our preliminary chats with him that readers will appreciate what he has in store for them.

A brief sketch of Mr. Harris's career will be read with pleasure and interest. Even as a boy he was an extremely keen wireless experimenter. He was only a boy when, in 1910, he joined the Marconi Company as a wireless operator, and at that time there were so few ship and land stations that the operator had to learn them all by heart before he could take up duty. The memorising could be done in an evening! Voyages to all parts of the world, including an exciting journey on an ice-breaking steamer to the North of Newfoundland, gave him a sound and peculiar experience of practical radio conditions and taught him many little tricks of manipulation and adjustment, which he has since applied for the benefit of the amateur. He served for a year as Chief Wireless Telegraphist to His Highness the Khedive of Egypt on board the Royal Yacht *Mahroussa*.

Early Experiences

Next came a land job, as inspector in charge of the Marconi Depot at Southampton, where he was responsible for the maintenance of radio installations on British liners; following which he became chief technical instructor in the Marconi Company's London School, where hundreds of operators passed through his hands.

When the War came he organised a scheme of intensive training to provide operators for Fleet Auxiliaries and merchant steamers, and about this time his first book, "The Maintenance of Wireless Telegraph Apparatus," was published and rapidly achieved success.

At the end of the War the Marconi Company transferred him to the Wireless Press, a publishing organisation which then owned the *Wireless World*, of which he became managing editor, and, later, he edited *Conquest*, a popular science magazine in which he was soon giving simple, non-technical instructions on set building, and in particular published his own design for a two-valve receiver, which was among the earliest of the popular home-constructor sets to be published in this country.

In 1922, AMATEUR WIRELESS and its competitor were founded, and in the following year the Radio Press started a number of radio publications. Percy Harris changed over to those publications and there he really found himself and clinched the remarkable reputation which he had been building. He possessed a real flair for what most writers find to be a very difficult branch of journalism, and he put so much brains into the design of his sets and so much skill into their presentation in the pages of the periodicals with which he was so prominently connected, that he rapidly became one of the most popular writers in the home-constructor radio field.

Designer and Builder

He has always been most particular to make with his own hands every set designed and published by him, and in this way has been brought up against, time and time again, the many difficulties that beset the home-constructor, with the result that he knows exactly what the amateur needs and knows better than most people how to meet that need.

Percy Harris's journalistic work has been full of interest. For example, he introduced into this country the Reinartz circuit giving that form of condenser-controlled reaction which has now entirely displaced the old swing-coil method; he was the first to show how to build the Armstrong super-regenerative circuit; and he was the pioneer of the "straight-line" type of condenser, prior to which variable condensers were all of the type that gave extreme congestion of tuning at the lower end of the scale and a wide spread at the top, owing to the fact that both fixed and moving vanes were of the semi-circular type, giving equal capacity variation with equal scale movement. In view of the attention now being given to ganged condensers, it is interesting to find that the first set with ganged condensers for home construction was his "Transatlantic Three," with two high-frequency stages and a detector, first published in 1923! This set was extremely popular for headphone reception of transatlantic broadcast stations.

Arising out of his journalistic work, Percy Harris made a tour of the United States in 1925 for the purpose of investigating wireless conditions, and in its course he visited New York, Washington, Pittsburg, Chicago, Schenectady, and numerous other centres. The Editor of AMATEUR WIRELESS was only too glad to receive his helpful suggestions before he, in the following year, followed in his footsteps.

Some two years or so ago he retired from journalism for the time being and joined Dr. James Robinson, whom he had already been assisting in connection with the design of the Stenode, Dr. Robinson's well-known invention. Percy Harris helped in the commercial development of the Stenode system and late in 1930 went to the United States, where he became President of the American company formed to develop the invention in that country. During his stay there he had frequent opportunities of visiting the chief laboratories and factories, as well as of meeting many men whose names are world famous in the scientific world. Just recently he came back to England and now, by joining the contributing staff of the Bernard Jones Publications, he returns to his real love.

Percy Harris will work whole-heartedly with the staff of AMATEUR WIRELESS and *Wireless Magazine*. In his fine laboratory he will mint ideas which we shall publish, and we look forward keenly to a co-operation from which our readers will get undoubted advantage. His wide circle of friends will wish him well in his new enterprise.

The HOME-LOVER'S ALL-ELECTRIC 3

First news of a wonderful all-electric set specially designed for amateur constructors who have an electric-light supply available.

IT'S here—an all-electric console for amateur constructors! Simple in design and outstandingly good in performance, this new set can be **built for a price within reach of all readers of** AMATEUR WIRELESS who have electric light available.

This new all-electric console, which is specially designed by S. Rutherford Wilkins, of the AMATEUR WIRELESS Technical Staff, is a fitting sequel to the series of articles on "The A.B.C. of All-electric Radio" concluded elsewhere in this issue.

What the Set is

From this series all regular readers will by now have appreciated the great merits of the all-electric set, and will be anxious to know how the new set has been designed.

First of all, it is a three-valver consisting of a variable-mu screen-grid stage, followed by a power-grid detector, followed by a power output valve.

Although there is nothing startling in the valve combination, there are outstanding advantages in each valve stage.

For example, the variable-mu screen-grid valve provides **the most effective control of volume yet developed.** Strong signals can be cut down without the slightest loss of quality. Moreover, the variable-mu valve is a powerful factor in the quest for selectivity, since it obviates the bugbear of cross-modulation.

The power-grid detector, as is well known, will take a large input without overloading **and will amplify strong signals without distortion.**

The power output valve of the all-electric console has a maximum undistorted output of 600 milliwatts, which is twice the maximum output of a battery super-power valve. **This valve provides for good quality with plenty of volume—more than enough to fill the average room.**

Undoubtedly, the outstanding advantage of the valve combination just mentioned is the overall good quality it delivers to the loud-speaker. But in addition to good quality this three-valve combination has been so skilfully engineered that **an exceptionally high degree of selectivity** has been obtained. This is all the more remarkable in view of the phenomenal range of the set under working conditions.

All three valves are of the indirectly heated type; that is to say, they have 4-volt heater filaments and indirectly heated cathodes. **Thus, hum from the mains is eliminated at each stage.**

The all-electric console is strikingly simple in its constructional details. There is a straightforward panel and baseboard layout, the baseboard being screened and a simple vertical screen being erected between the grid and anode circuits of the screen-grid variable-mu valve.

An outstanding feature is the perfect stability that has been obtained with simple screening. No ganging is employed as two separate variable condensers are used to tune the two screened dual-range coils. As the readings of the two tuning condensers keep very closely in step, the tuning operation is much simplified.

Unique Control

Which reminds us that **control generally with the new all-electric console is unique in more than one respect.** For example, there is a combined volume control and wavechange switch. Then there is a panel-mounted selectivity control, which is also useful for matching your aerial—of whatever length—to the aerial-tuning coil.

Other controls include a panel-mounted radio-gramophone switch, mains on-off switch, and a reaction condenser.

Just one other outstanding constructional feature—the power unit. This has been built as a separate unit rather than as part of the set, in order to produce a compact console cabinet. Only four wires are needed to join the power unit to the set, so there is no disadvantage in having the two parts of the complete console made up separately.

An All-in Set

The set and power unit, together with a suitable loud-speaker chassis, are mounted within a handsome cabinet, thus completing a **really notable all-electric console.**

Remember, it is an all-in set for A.C. mains operation, extremely simple to build, exceptionally lively in performance, and, above all, giving really wonderful quality of reproduction from most home and foreign stations.

Look out next week for full constructional details of this great AMATEUR WIRELESS achievement!

He. "When that man speaks the whole world listens."
She. "Really. A person of some importance!"
He. "Yes. A B,B.C. Announcer."

"LOCALISED" TELEVISION

TELEVISION experiments are now being carried out on a wavelength of 7 metres, so that it is possible to use wide side-bands and, therefore, to cover a large-sized picture without fear of overlapping or mutual interference. Although the range of transmission is limited to a few miles, it would cover an area wide enough to provide a satisfactory local service for the larger towns. There would be the further advantage that all the receivers could be synchronised simply and cheaply from the electric mains, since the whole of the service area would naturally be supplied from the same power-generating station.

M.

"BRITAIN'S FAVOURITE THREE"

brought up-to-date with BRITAIN'S FAVOURITE PARTS

THE favourite "straight three" re-designed! More Lissen in it! Because in a straight count Lissen parts always come out as first choice of designers and constructors. Thi time Lissen components are used to give you more power, more purity from a tried circuit. TO IMPROVE THE "FAVOURITE THREE" YOU MUST USE LISSEN!

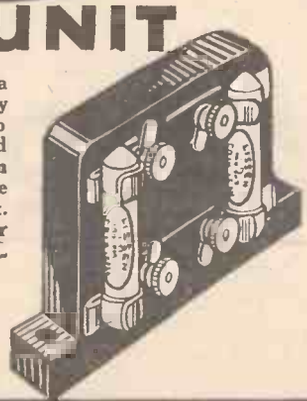
LISSEN HYPERNIK TRANSFORMER

In the improved 1932 "Britain's Favourite 3" the designers used the Lissen Hypernik Transformer in the actual set because they could not get such a good response curve—such fine quality of reproduction—from any other transformer at anything like this price.

With a primary induction of fully 100 henries, it yet operates perfectly when passing currents up to 5 m/A or more. Its step-up ratio is 4 to 1, and a stage amplification of more than 100 is obtained. PRICE **12/6**

LISSEN R.C.C. UNIT

This component provides a complete Resistance Capacity Coupling Unit. It includes two Lissen Fixed Resistances and one Lissen Fixed Condenser in brown moulded case. May be mounted upright or flat. Specially selected for "Britain's Favourite 3" because of the reliability and constancy of its values. PRICE.. .. **4/-**



LISSEN VALVE HOLDER

The new Lissen 5-pin Valve Holder is specified for the 1932 "Britain's Favourite 3" and used in the actual set. That is because the designers wanted a high-quality valve holder of robust construction and one that would be absolutely trouble-free. Finely finished, with brown moulded base and positive terminal connection to valve pins. PRICE **1/3**

LISSEN - THE PARTS THAT PULL TOGETHER

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX

Don't Forget to Say That You Saw it in "A.W."

On Your Wavelength!

JUNK

QUITE a few readers have written to me at one time or another to ask whether I can suggest any profitable method of disposing of the collections of old components, such as coils, condensers, transformers, chokes, resistances, and the like, that all constructors collect. Personally, I have never discovered any way of disposing of junk in exchange for filthy lucre. What I do myself is to have a clean-up about twice a year when all the bits and pieces that I can bring myself to part with are sorted out. I find that deserving local institutions, such as the Boy Scouts, Girl Guides, and school wireless societies, are very glad to have them.

SHEER CUSSEDNESS

I WONDER why it is that when you particularly want to do a little job, such as making a small alteration in some part of a set and haven't much time in which to carry it out, everything that can go wrong seems to do so unfailingly. The other night I was anxious to test out a new loud-speaker. It arrived with a built-in output transformer suitable for pentodes, and my desire was to try it out, both with this valve and with valves of the super-power variety. To make the necessary alterations was clearly quite a simple job.

All that had to be done was to mount in a suitable position (there happened to be one on the instrument) a little ebonite strip provided with four terminals, then disconnect the moving-coil leads from the output side of the transformer, and take them to one pair of the terminals. From the other pair of terminals a second pair of leads to the output secondary. Thus, by shorting two pairs of terminals, the transformer could be brought into action for pentodes, whilst with the shorting connections removed the pentode leads from a set using ordinary valves and a suitable matching transformer could be connected direct to the moving coil. Simple enough, isn't it? One little terminal strip to make, two connections to unsolder, and six altogether to solder to tags—well, that was where the cussedness came in.

AN EXASPERATING TIME

NOT more than an hour could be devoted to the test, but it seemed that the small conversion just described could be carried out in twenty minutes or so. But was it? First of all, I couldn't find a suitable ebonite strip; so I had to cut one, and broke a hacksaw blade in doing so. Then I took the centre-punch to mark the drilling centres. All went well until I came to the last one, when, under a gentle tap from the hammer, the ebonite cracked and broke up. I started again, and this time managed to get the holes drilled. I wanted two long screws to fix my little strip; though I have a large stock, I could find only one that would do. After a prolonged search, another turned up in an odd corner. This one, though, turned out to be slightly over-sized, so that no standard nut would go on to it until it had been put through the die. I rather fancy myself at quick, neat soldering, so I didn't think that the rest of the job would take long. Nor would it have done had not the bit of the soldering iron been manifestly in need of trimming up and retinning. What with one thing and another, my little twenty-minute job took me more than the hour that I had to spare; so the tests had to wait until another day.

FILAMENT "JUICE"

NOW that I have become very largely a 2-volter, though I always used to use 6 volts for the filaments of my battery sets, I am beginning to ponder over the problem of filament juice supply to such sets. It seems to me that they take a good deal more than they should. I have a four-valver, for instance, with two screen-grid stages, a detector, and a power output. The S.G.'s take .2 ampere apiece, the detector .1, and the output valve .3; this comes to .8 ampere in all, which seems rather a lot in these days. It seems to me that certainly 2-volt S.G.'s, and possibly pentodes and super-power valves, should be able to work efficiently with something less than this. In America they have developed a .06-ampere range of 2-volt valves, which includes screen-grids and G.P. valves of the H.L. type. Can't we do something of the same kind? Filament current becomes really quite a serious item when you try to work a seven-valve super-het. from 2-volt valves. Mine contains four screen-grids equal .6 ampere, two detectors equal .2 ampere, and a P240 output valve equals .4 ampere. The total is thus 1.2 amperes.

SOME CORRESPONDENCE

THE figures recently published by the B.B.C. of its correspondents during the last four years make very interesting reading. These show an increase from 25,000 odd in 1928 to the best part of 46,000 in 1931. The 1931 figure is actually a good deal less than that of 1930, but the latter was a peak year, owing to the inauguration of the regional scheme. What I find particularly interesting is the number of letters referring to interference. In 1928 more than two-thirds of the complaints about interference referred to howling by "Oscillating Oswalds" and "Ham-handed Henrys." Only one-fifth of the total complaints were concerned with interference due to electrical apparatus.

1931 FIGURES

CONTRAST these figures with those of 1931. In 1931 just *one*-third of the total complaints were in respect of oscillation and more than half of those received were with reference to electrical apparatus. The actual figures are: 1928, electrical, 2,435; oscillation, 8,662, out of a total of 12,604; in 1931, electrical, 8,673; oscillation, 6,910, out of a total of 16,539. These figures bear out clearly what I wrote not long ago. Listeners are becoming better and better behaved as regards howling, but electrical machinery is becoming a more and more fruitful source of interference.

DO IT NOW

IT is high time that legislation was introduced to minimise electrical interference with wireless reception. Sooner or later it will have to be done if broadcasting is to retain its popularity, and the wisest course would be to do it without delay. There will be an enormous growth in the number and diversity of electrical apparatus in use as current becomes cheaper with the development of the regional scheme. Now is the time for regulations forbidding the installation of any kind of device which is not interference-proof. If you are a sufferer, don't forget that the B.B.C. specially invites you to send information to its offices. The B.B.C. has already done an enormous amount of good work in reducing interference with the help of the Post Office engineers, but obviously it can take no action if listeners do not supply the necessary information.

SUPER-HETTING THE SHORT WAVES

NOT everybody seems to realise how very easy it is to turn any "broadcast" receiver with one or more stages of H.F. amplification into a most efficient short-wave set with the aid of a super-heterodyne adaptor. The super-het. adaptor is a one-valve detector-oscillator affair which hooks on in front of the set. The wave-change switch of the set is turned over to long and the circuits are tuned to 1,800 metres or so, care being taken not to select a wavelength on which a powerful station is working. This having been done, the broadcast receiver requires no further attention and all tuning is carried out with the controls of the adaptor. The H.F. valves of the ordinary receiver now become intermediate frequency stages and its detector is the second detector of the super-het. arrangement.

If your set has no H.F. you can obtain another sort of adaptor whose leads go to a plug which fits into the detector-valve socket. In this kind of apparatus no use is made of the tuned circuits of the ordinary receiver. The adaptor contains just a detector valve with suitable coils and tuning and reaction condensers of small maximum capacity. If you are looking out for an interesting and inexpensive constructional job, you might do much worse than make up an adaptor of one sort or the other.

On Your Wavelength! (continued)

SUBMARINE SIGNALLING

THE system of high-frequency "sound signalling" which has been developed for use under water, bears a close resemblance to certain aspects of wireless. Sound or pressure waves, too high in frequency to be heard directly, are used as "carriers" to transmit superposed L.F. signals through the water. Of course, the range is comparatively limited, but on the other hand messages sent, say, from ship to ship in battle formation, are far less likely to be intercepted by the enemy than the same signals sent by wireless. An interesting application is the location of enemy submarines, or sunken wrecks. The presence of any such foreign body under the water is indicated by a change in the note heard in the receiver as the transmitter sound wave is reflected back from the obstruction. It was in this way that the position of the ill-fated submarine M2 was finally ascertained.

PICK-UP EFFICIENCY

FOR some reason or other, the tendency still persists for perfect quality to be associated with almost perfect inefficiency! There used to be some excuse for this idea in connection with loud-speakers, for a soft mellow tone issuing from a comparatively inefficient speaker was infinitely preferable to the loud squawkings of a badly designed, but loud, horn-type speaker. And when electric gramophone pick-ups became first available, it usually transpired that the pick-ups with the least voltage output gave the best quality results. The effective voltage developed across the pick-up terminals was less than .1 of a volt, and four stages of L.F. amplification were necessary to bring the sound up to full loud-speaker strength. There are still a few pick-ups on the market with almost as low outputs as this, and, on the whole, the quality is as good as one could wish. But there are also available many pick-ups with outputs as high as 1 to 1.5 volts which give equally good quality.

WHY "LOUD-SPEAKER"?

A CORRESPONDENT writes to say that it is time someone thought of a better name for the loud-speaker. He thinks there is a derogatory flavour about the "loud" which does scant justice to the modern instrument, besides lending itself too readily to obvious forms of witticism. Finally, "speaker" is quite inappropriate when applied to the reproduction of music, which forms by far the larger part of the broadcast programmes. The argument is sound, but the word is so widely used now that I think it will "stay put." Even the French, who pride themselves upon a certain elegance in these matters, call it "haut parleur," which, like the German, "laut sprecher," is a strictly literal translation. My correspondent suggests "clear speaker"—though he admits this falls down as applied to music—with "magnaphone" as a second alternative. Well, there's nothing to prevent him from calling it what he likes, but he seems to have forgotten that we still use the word "wireless" to describe what is mainly concerned with wires.

FRIENDLY RIVALS

APROPOS of loud-speakers, it is rather surprising how well the moving-iron type of instrument is maintaining its popularity, in spite of increasing competition with the moving-coil. The use of the mains and the introduction of the permanent magnet have both helped to favour the latter, both as regards cost and upkeep, and, of course, sales have gone up accordingly. Yet I would say that moving-iron instruments—including the reed and inductor types—have more than kept pace. The trouble is that although the moving-iron speaker is a trifle high-pitched, the moving-coil is prone to be rather gruff, especially when reproducing speech.

BROADCAST RECORDS

THE output of the B.B.C. gramophone pick-ups is low; almost as low as that of a Reisz microphone, which requires two stages of amplification to bring it up to good headphone strength. I must confess I like the needle-armature idea, and the way this type of pick-up stands up to heavy low notes, such as pedal organ notes, is remarkable. Really strong low notes are usually absent from gramophone records, and when they are there, they invariably succeed in making buzzing noises on the pick-up and startling sounds on the loud-speaker. This is due to the pick-up moving bodily in response to the low-note recording, the heavy damping of the pick-up movement preventing internal motion.

SCREENING THE S.G. VALVE

With high-performance screen-grid valves, or with any type of screen-grid valve used in a set where there are stray coil fields and much stray capacity, the high-frequency stage may be unstable. If the set oscillates too

easily and flops when going into oscillation, then try screening the screen-grid valve itself. High-frequency interaction may cause a low-frequency howl and you can often stop this by putting a screening can around the S.G. valve.

SCREENING METALS

MANY years ago I can remember receiving a visit from a manufacturer who was desirous of showing me some magnetic brass! The point was that we were just busy with the design of screened coils at a time when these first became popular, and there was a certain controversy raging as to the best material to use for the screen. Copper, of course, was considered to be the best, with aluminium a fairly close second, but we rather looked askance at brass. Some of us were trying to suggest that brass was equally good, and this manufacturer had built up a number of suitable cans of this material. While he was experimenting with them he happened to notice a distinct magnetic effect, and on further investigation he found that the brass was definitely magnetic. He came into my office armed with a compass and a selection of cans and demonstrated the results to me. He attributed the magnetic properties to the presence of small quantities of iron as an impurity in the alloy.

REVISED IDEAS

AT the time we decided that this ruled out the use of brass as a screening material, but we now seem to know more about it, and have realised that brass is quite capable of being used satisfactorily. Indeed, some of the most successful sets on the market at the present time employ brass for their screening. Indeed, I am told that the National Physical Laboratory often use sheet iron for their screening, which was considered out-and-out heresy a year or so ago. The fact of the matter is, of course, that a great deal depends upon the conditions under which the screening is carried out. The screening action arises from the presence of eddy currents, which are set up in the material of the screen. Provided the current reaches a certain value, the screen has a certain efficiency. With a given value of current the loss is less with a low-resistance material, so that copper or aluminium appears most satisfactory, but the fact of the matter is that the variation in resistance of different metals is comparatively small, and the discrepancy is not so great as imagined.

PLENTY OF VARIETY

I WOULD draw your attention to the fine issue of *Wireless Magazine* which is published to-day. A special 20-page section is devoted to that fascinating subject, gramo-radio. In this section you will find articles telling you how to get the best from your pick-up, how to overhaul your gramophone motor—mine needs it badly—some interesting news about long-playing records, and a host of other information.

Among the constructional features there is some more information about the Quadradyne, the one-knob four-valver with two screen-grid high-frequency stages which was described last month. P. K. Turner, the man who believes in quality, is describing a 5-watt amplifier for A.C. mains which he has designed.

THERMION.

THE TELSEN--- TRIPLE THREE

A description of a new all-wave commercial three-valver which works on the long, medium and short waves. The price of the complete kit of parts is only 52s. 6d.

OF the many possible ways of listening to short waves below 100 metres, a convenient one is by means of an all-wave set, namely a set that tunes, by the flick of a switch, from, say, 20 to 2,000 metres. The medium and long-wave tuning, on a set of average efficiency, will cover most worthwhile European broadcasting stations; and the short-wave tuning will extend listeners' horizon even to the Antipodes!

Many listeners would, no doubt, like to enjoy such versatile reception, but are deterred from attempting it owing to the expense. It is true that, while short waves were the prerogative of the experienced amateur, the ordinary listener was not really well catered for, but all that is now changed. Indicative of the new order of things is the "Telsen Triple Three," the latest of the kit sets specially designed to embrace the short waves.

Three Wavebands

As its name implies, the "Telsen Triple Three" is designed to work on the three wave-bands, namely, the medium and long waves and the short waves between 20 and 50 metres.

A very important feature of this kit set is the elimination of coil changing. This has been made possible by the use of the new Telsen short-wave coil, as used in the "World-wide Short-wave 3," and the well-known Telsen dual-range coil, working in conjunction with a four-point and a three-point switch.

Both these coil switches are mounted on the control panel and the change-over from one range to another is readily memorised. For long waves both switches are pushed in, so that their contacts are open. For medium waves between 220 and 550 metres, the three-point switch is pulled out. For short waves between 20 and 50 metres the four-point switch is pulled out. Could anything be more simple than that?

Simple Switching

In order to keep the waveband switching as simple as possible, the dual-range feature of the Telsen short-wave coil is not utilised in this set, so that the .0005-microfarad tuning condenser covers the range from 20 to 50 metres.

There is very little of interest outside this wavelength range. The best heard American stations come within it and so do several powerful European short-wavers, as well as hosts of amateur transmitters all over the world.

You will find, on examining the theoretical circuit of the "Telsen Triple Three," that a perfectly straightforward three-valve sequence has been adopted. The first valve is a leaky-grid detector, utilising a .0001-microfarad grid condenser and a 2-megohm grid leak. Following the detector is a stage of resistance-capacity coupling and between the first low-frequency valve and the power output valve are straightforward transformer connections.

Ingenious Wavechanging

It will be seen that a high-frequency choke is connected between the anode of the detector valve and the anode resistance of the resistance-capacity coupling. Also that this anode circuit is properly de-coupled by connecting a 25,000-ohm resistance in series with the 50,000-ohm anode resistance, with a 1-microfarad fixed condenser connected between the junction of the two resistances and earth.

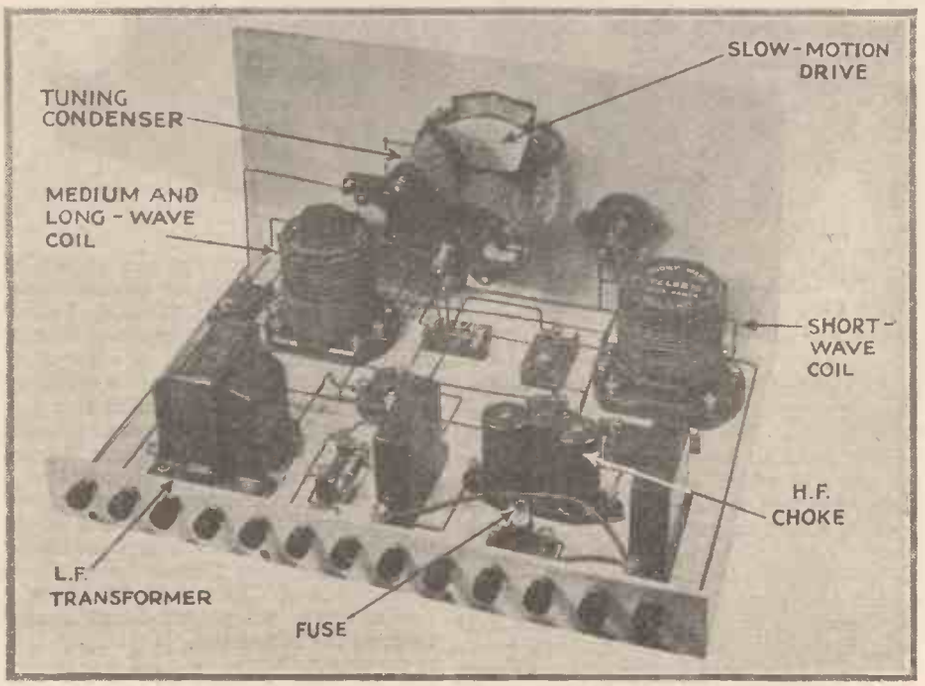
The high-frequency choke is, of course, part of the reaction system, which consists of a reaction condenser in series with the reaction winding of the well-known Telsen short-wave and dual-range coil units.

A careful study of the coil connections will show the ingenious way in which the all-wave feature has been achieved. Actually, the idea is much simpler in practice than it appears in the theoretical circuit, and there should be absolutely no difficulty in making the correct coil connections, since all are clearly numbered on the coil units and in the blueprint.

From this brief survey of the circuit it is clear that the "Telsen Triple Three" is particularly outstanding in design. The coil-changing idea is a marvel of simplicity—but then, all good ideas look simple once they have been thought out!

From a study of the components used, it is obvious that most of the leading Telsen products are incorporated in the "Triple 3." Outstanding among this list is, of course, the Telsen aerial coil with adjustable selectivity. No less important is the Telsen dual-range short-wave coil unit.

Other important components include the Telsen illuminated disc drive, the Telsen Radiogrand transformer, and the Telsen



From this descriptive photograph it will be seen that the "Telsen Triple Three" is designed with careful consideration of efficiency and simplicity

"THE TELSEN TRIPLE THREE" (Continued from preceding page)

binocular high-frequency choke. The list is completed by the Telsen .0005 logarithmic variable condenser, the Telsen reaction condenser, Telsen switches, grid leaks, fixed condensers, spaghetti resistances, and fuseholder.

The Layout

From the illustrations accompanying this article a very good idea can be gained of the pleasing layout of the "Telsen Triple Three." The Telsen short-wave dual-range coil unit adds to the symmetry of the baseboard layout, since, looking from the back of the panel, this unit on the right balances the dual-range coil for medium and long-wave tuning on the left. Coming between these two coil units is the tuning condenser on the panel, worked by the new Telsen disc drive.

Looking from the front of the panel we have a perfectly symmetrical arrangement of controls. To the left of the tuning condenser knob is the knob for reaction and balancing this to the right is the battery on-off switch. At the extreme left and right of the panel respectively are the four-point and three-point switches, closely related to their appropriate coil units.

Another rear view of the "Telsen Triple Three": note the ample spacing of components

The rest of the baseboard is a triumph of layout simplicity. The three valve holders are arranged in a line and the remaining components fit snugly into spaces on the baseboard, where convenient connecting wires can be taken.

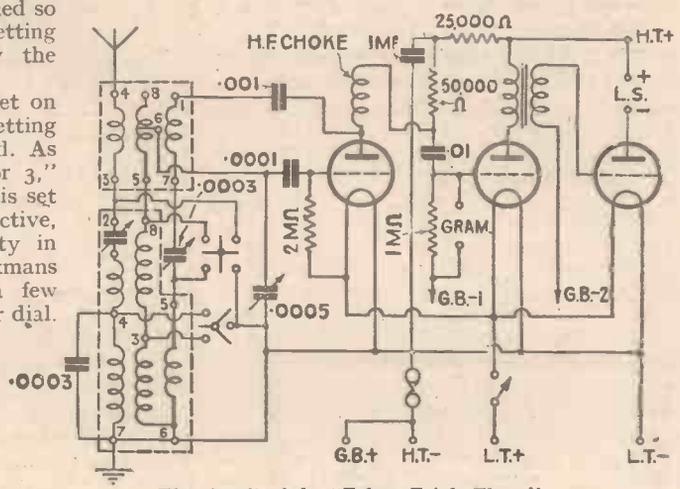
The model submitted for test was extremely well wired by means of insulated tinned-copper wire.

Running along the back of the baseboard is a terminal strip with thirteen terminals for battery and other connections.

Nothing has been omitted from this set that could usefully be included, as a study of the photographs and circuit diagram will show. For example, two of the terminals provide a pick-up connection should it be desired to play gramophone records through the low-frequency amplifier part of the circuit. In addition to high-tension, low-tension and grid-bias connections, there are terminals for the aerial and earth and loud-speaker. I had no difficulty at all in connecting up the set for test, as the blueprint very clearly shows what to do.

The makers recommend Mazda valves to work this set, a Mazda HL2 or H210 for the detector, a Mazda L2 for the first low-frequency valve, and a Mazda P220 or P220A for the power output valve. I used valves of the type specified so as to be quite sure of getting the results claimed by the makers.

I first tried out the set on the medium waves by setting the switches as instructed. As with the "Telsen Victor 3," tried some time ago, this set proved to be very selective, and I had no difficulty in cutting out both Brookmans Park stations within a few degrees of the condenser dial.



The circuit of the "Telsen Triple Three"

This good selectivity was maintained even when the selectivity control was set at a maximum volume position. I should mention that the aerial was a 60-footer, but it might well be longer in view of the exceptionally light aerial damping on the coil.

As a guide, I should mention that I got London National at 45 degrees and London Regional at 74 degrees, Midland Regional at 83 degrees and North Regional at 95 degrees. On the long waves, Daventry was a good signal at 82 degrees, and on this waveband I was particularly pleased to find that medium-wave "break-through" was entirely absent. This good feature is, of course, due to the patent circuit arrangement of the Telsen coil.

On the Short Waves

Switching over to the short waves was a delightful and simple process, and I was soon able to find my way about the 20-to-50 metre band.

Here are some of the wavelengths corresponding to dial degrees: 48 metres was tuned at about 80 degrees, 41 metres at 67 degrees, 39.2 metres at 60 degrees, 33.3 metres at 52 degrees, and 32.9 metres at 49 degrees.

On the short-wave position the "Telsen Triple Three" behaved exactly like a set specially designed for the short waves—what better compliment could be paid it than that? Oscillation was readily obtainable over the specified wavelength range, but it is, of course, essential to keep the reaction condenser well in hand, otherwise many stations may easily be missed.

In my opinion, this "Telsen Triple Three" is a notable achievement in more ways than one. Firstly, one must congratulate the makers on tackling the problem of all-wave tuning in such an ingenious manner. Secondly, one cannot help admiring the clean layout of the Telsen components, which pull so well together.

The price of the complete list of parts needed to build the set brings all-wave reception within the reach of all. There is no longer any excuse for amateur constructors missing the reception joys that are to be derived from a set capable of tuning in all wavelengths between 20 and 2,000 metres.

J. B.

Johanne Stockmarr and the Belfast Radio Singers are to take part in a concert, in co-operation with the Belfast City Y.M.C.A., which will be relayed from the Wellington Hall on March 5.

David John is to play Haydn's Concerto in C Major for Oboe and Pianoforte in the concert which will be broadcast from Belfast on the afternoon of February 29.

The Welsh Interlude, relayed on the Daventry National wavelength on March 5, will be given by Mr. R. T. Jenkins, whose subject will be "David Powel of Riwabon."

A West Country programme will be given on March 5. The Western Studio Orchestra and Hilda Blake are taking part, as well as the Exeter Male Voice Choir.

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1 .001 Mica Condenser		6
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1 Short-wave Coil Unit	4	6
1 .00025 Logarithmic Variable Condenser	4	6
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Panel 7 by 7 ins.
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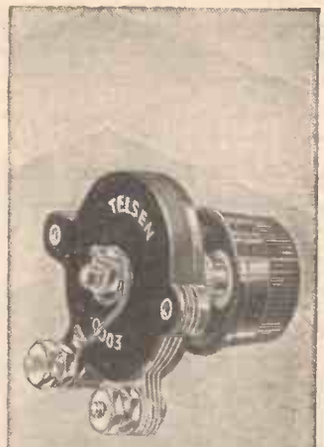

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AT THE B·B·C·

"STAGING" A RADIO PLAY

Some of the intricacies of radio play production are dealt with in this interesting article by our Special Commissioner

ONE of the well-known radio play producers at Savoy Hill has been telling me of troubles he is up against. The topic was started because, while sitting in his office, I came across the script of a forthcoming broadcast play and begged him to decipher some of the hieroglyphics at the top of it. "2E, 2G, 4, *Echo*, 4, 8," for example.

"You are looking at the play producer's manuscript," he said, "and not that used by the artiste.

"The artistes taking part do not have to be bothered with the code numbers, but they have strange markings of their own, which I will explain.

"When each radio play is put on the *tapis* for production, the manuscripts are typed out and a dozen or so copies made, one for the censor, one for the library, one for the effects man, and so on.

"The markings at the top show which studios will be used for creating effects, for the impression of artificial echo, for rehearsals and for final production. The leader of one of the orchestras, the Gershom Parkington combination or the B.B.C. Theatre Orchestra, has also to be provided with an MS. so that he will know when to expect a flick of the green indicator light in his studio. As you probably know full well, each part of a radio play is done in a separate studio.

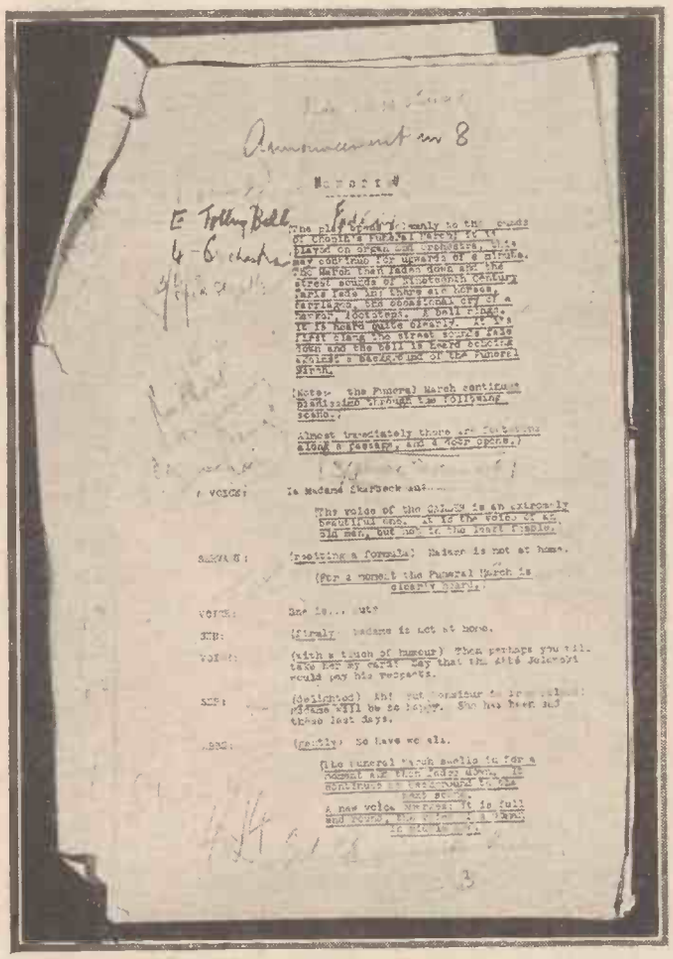
"Even the artistes may not all be in the one room. Here at Savoy Hill we generally have to squeeze the whole of the cast in one studio and have separate rooms only for the orchestra, the effects, echo, and dramatic control.

"As there is a certain amount of natural echo in the performers' studio, the man controlling the artificial echo has to allow for this. Where there are complicated sea and gale effects to be introduced it makes it very difficult to tell how much faked echo can be introduced. At Broadcasting House we shall get over this difficulty in a simple manner.

"The sixth and seventh floors are to be given over to productions and at least two of the studios on the sixth floor are fitted with a special wall lining, so that there is absolutely no echo at all, and the effect one gets is of speaking in the open air.

"This would be very disconcerting to newcomers, but we do not change our radio plays casts very often, and all these people are experts. Anyone reading the script of a radio play in one of these studios will have no natural echo in his voice, as heard by the microphone and so the man at the dramatic control panel is able to introduce any desired degree of echo on an entirely flat background.

"We have tried this experimentally and the effect must be heard to be believed."



This sheet of the manuscript of the recent play *Chopin* will give you an idea of the special markings for the producers, referred to in the accompanying article. You will see the "effects" markings for the tolling bell, street noises, footsteps and so on

Exaggerated Effects

Criticism is raised by some listeners about the advisability of continuing with these impressionist plays in which a high degree of skill is required in faking effects and introducing artificial echo, but as the productions department is spending so much time in fitting up special studios and control panels for this work, it may be taken for granted that plays of this type are not to be discontinued.

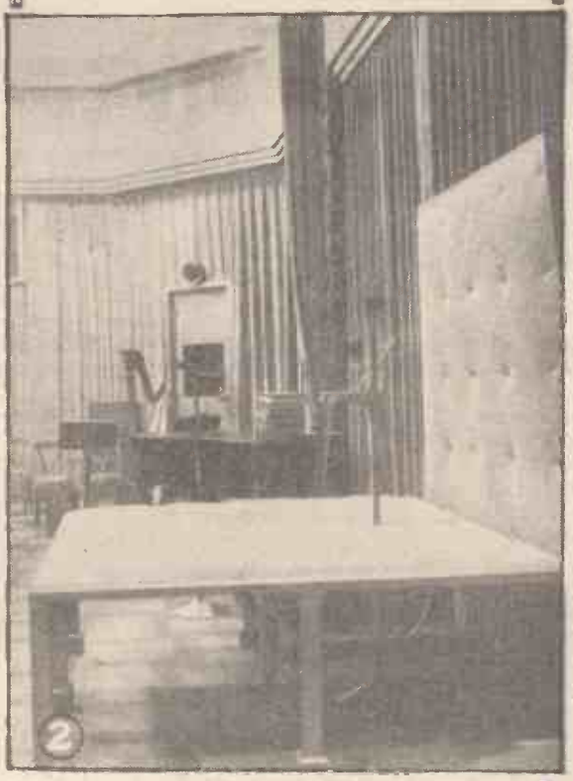
I was shown the Effects Department's script of the play *Chopin*, which was first produced in the latest series. This was marked with the studio from which the announcer would speak when giving out the title of the play, and with horizontal V-shaped marks, showing when the volume control and echo potentiometers should be turned up or down.

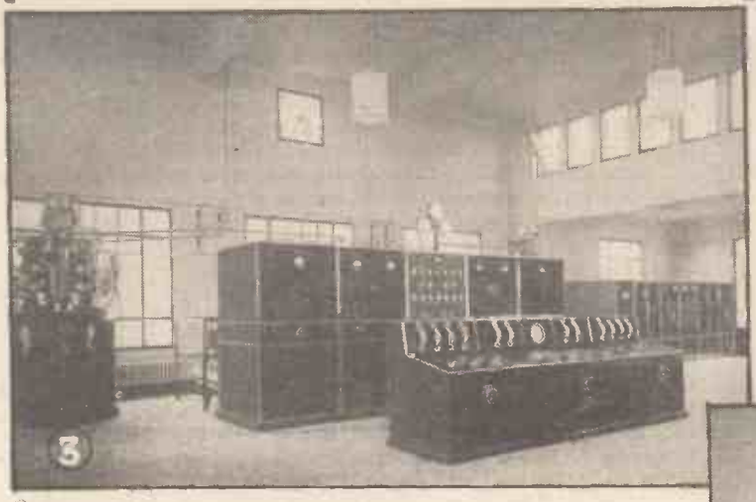
Signs were put in the margin to indicate when the tolling bell (a characteristic of the opening of this popular play) should be heard and when the orchestra should start playing Chopin's Funeral March, which was faded in the transmission against a background of footsteps, carriage noises, and the occasional cry of a hawker.

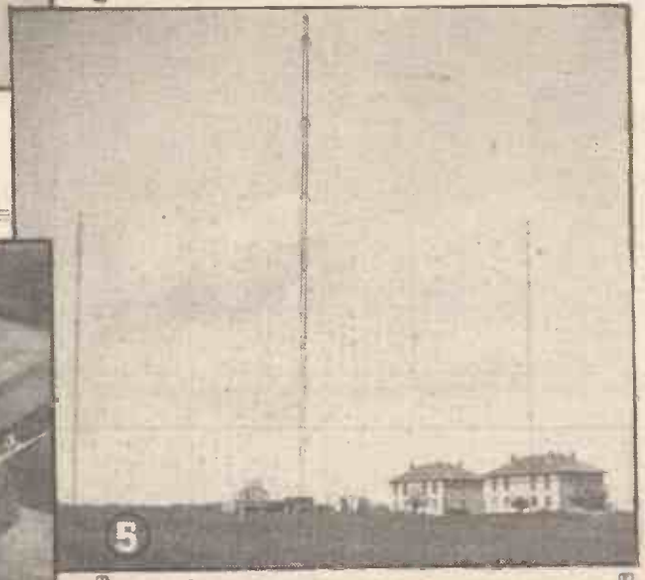
All these were produced by three gramophone records running simultaneously! A further set of marks indicated the settings

(*Continued at foot of page* 375)

THE NEW RADIO PARIS







THE NEW RADIO PARIS

Some interesting details of the new French high-power station

The Radio-Paris studios in the rue Francois, Paris

which can now be heard testing on greatly increased power.

FRANCE hitherto has been content with small and medium-sized stations, the largest of which—the old Radio Paris—had an output of only 17 kilowatts. Radio-Paris is now a thoroughly up-to-date high-power station built by the Société Française de Radiotechnique and with a number of interesting constructive features.

This new station has an aerial output of more than 100 kilowatts, and is one of the most powerful in Europe. It is situated in the open country, 38 kilometres to the south-west of Paris, on territory belonging to the community of Saint-Remy-l'Honoré. With the dwelling houses of the station staff, it is an inconspicuous group of buildings the purpose of which is only inferred from the three aerial masts.

Studios

The studios of the new Radio-Paris have not been accommodated in the station building but at the headquarters of the French Broadcasting Company (Compagnie Française de Radiophonie), Paris (11 rue François 1ier). There are three of them; first, a small studio (5.50 by 3.20 by 3.10 metres) for talks and news, second, a medium-sized one (7.80 by 5.50 by 4.50 metres) for the broadcasting of songs and chamber music, and third, a large studio 18 metres long, 8 metres wide and 6 metres high, which can be subdivided by means of a sliding partition enabling one-third, two-thirds or the whole of it to be used.

Two microphones are installed in each studio at carefully selected places, thus ensuring a correct acoustic reproduction. The microphone currents, after amplification, pass by landline to the transmitting station.

The landline is comprised of pupinised cable so as to transmit without any distortion all frequencies between 30 and 10,000 cycles. It is connected to an amplitude corrector and a terminal amplifier, and is carefully protected against all outside interference.

Transmitting Station

The transmitting station comprises, in addition to the transmitter house, some buildings inhabited by the staff. On the ground floor of the transmitter house there are converter and transformer sets, accumulators and pumps and there are also the repair shops and store-room. On the first floor there are, in addition to the transmitter and its control panels, the mercury vapour rectifiers, viz., the main rectifier, which supplies direct current at 12,000 volts, and the auxiliary rectifiers to supply current to the amplifiers.

The transmitting station has been designed for an output of 70 kilowatts, with a possible 100 per cent. modulation, and 85 kilowatts with an 80 per cent. modulation. This, according to the definitions of the International Radio Committee of The Hague, corresponds to an aerial output of 105 to 110 kilowatts.

The new modulation system used—the phase-shifting method—enables the last amplifier stage to be operated close to its maximum output which, in accordance with the above, entails a saving of energy of 30 to 35 per cent.

Instead of modulating in the grid circuit, the transmitter, according to this method (designed by M. Chireix), is allowed to work permanently with a strong high-frequency exciter current in the grid circuit and, therefore, with an excellent output. Deep modulation is effected in a novel way. The last amplifier stage is push-pull coupled.

The new transmitter, like the old one, works on a wavelength of 1,725 metres. It is controlled by a quartz crystal with an accuracy of 1/2,000. This quartz oscillator is followed up by two amplifier stages, the second one being modulated by the microphone currents.

In order, next, to arrive at the 80-100 kilowatts required in the aerial, the high-frequency current has to pass through another two amplifier stages; first of all, a stage constituted by two identical sets of two water-cooled valves. While the useful output of each of these valves is as much as 15 kilowatts, they are usually operated at a very low output. The last amplifier stage next following is likewise made up of two systems working in parallel, two sets of six water-cooled valves each handling 20 kilowatts.

The control desk comprises all arrangements for starting and stopping the transmitter, as well as all control devices.

The aerial of Radio-Paris is carried at a height of 208 metres above the ground by three masts installed at the apices of an equilateral triangle with sides 315 metres long.

The earth consists of 15,000 metres of buried copper wire and tape.

Power Supply

The transmitting station is fed from the three-phase current system of the "L'Ouest-Lumière" Electric Company, the high-tension line passing through a section cabin situated about 1,300 metres away, connected with the transmitting station by two cables and enabling the station to be fed at will from either of two sub-stations, thus eliminating any risk of a breakdown.

THE PICTURES ON THE OPPOSITE PAGE SHOW:

1. Transmitter house from the back, showing the aerial lead
2. The large studio
3. General view of transmitting room
4. Aerial view of Radio-Paris
5. Radio-Paris station buildings

"STAGING" A RADIO PLAY

(*Continued on page* 373)

for the volume controls at various points throughout the play, when the dialogue should rise or fall in volume according to the dramatic movement, and the most suitable reading on the programme meter at these points was also given.

In front of the producer, sitting at the dramatic control panel, is the programme meter showing the volume resulting from his turning of the various control knobs and from previous rehearsals the estimated figure at each passage was indicated, so that the producer would know whether the play was going over properly or whether the general level of speech and effects was below the normal volume.

Not only do these markings have to be followed in conjunction with the ordinary dialogue of the play, but there are special marks telling the producer when, in advance, he must tap the studio keys controlling the green indicator lights, known as "flicks." These act as a warning to the performer and to the orchestra, so that they are quite ready to come in at their proper cues. The green light "flick" is the equivalent of the theatrical call boy!

THE HOW AND WHY OF TUNING—XXIII

TUNED-GRID COUPLING SIMPLY EXPLAINED

The twenty-third article in a complete series covering all aspects of tuning : "Hotspot" here deal with tuned-grid coupling.

ONE of the disadvantages of the tuned-anode coupling referred to in the two preceding articles is that normally the tuning condenser is not at earth potential, and this makes ganging of two or three tuning condensers inconvenient.

A variation in tuned-anode coupling that has gained great popularity during the past year or so is tuned-grid coupling, and so I will devote this week's article to it.

The pictorial diagram shown as Fig. 1 will make clear the main details of tuned-grid, which is, remember only a variation of tuned-anode, but having advantages most evident when putting the circuit into practice.

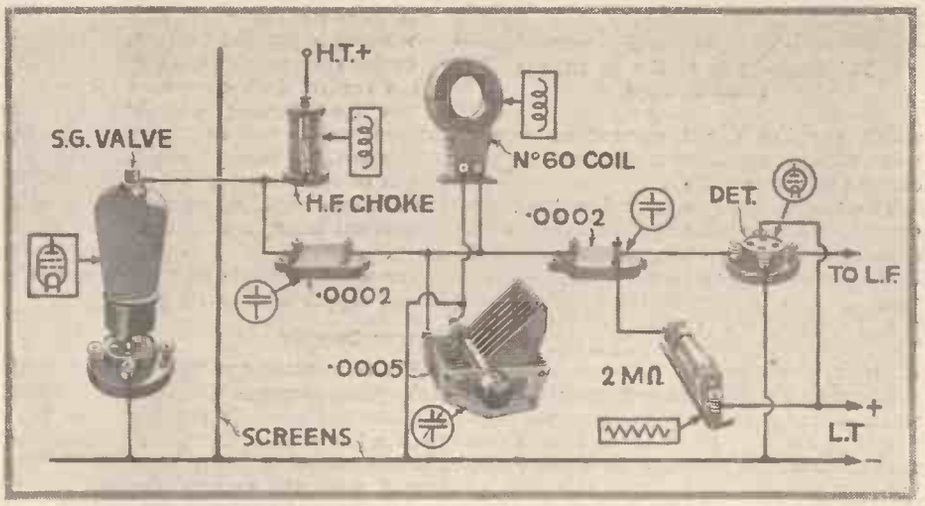


Fig. 1. A pictorial diagram showing the essentials of tuned-grid coupling

It will be seen that the tuned circuit is removed from the anode output of the high-frequency valve, and that in its place is inserted a high-frequency choke.

The coupling condenser remains as in tuned-anode coupling, but in place of the grid leak that would normally be connected after the coupling condenser we have the tuned circuit.

As it is usually necessary to bias the detector valve by a small positive voltage for detection, we have to interpose another fixed condenser between the grid end of the tuned circuit and the grid of the detector. If this second condenser were omitted it is obvious that the grid would be zero biased through the tuned circuit, since the lower end is connected to low-tension negative.

The usual grid leak is connected between the isolated grid of the detector and low-tension positive, thereby providing the most sensitive detection condition.

From this brief explanation of the circuit arrangement of tuned-grid coupling it is to be seen that more components are needed than for the simple tuned-anode coupling. The additional components are a high-frequency choke and a fixed condenser.

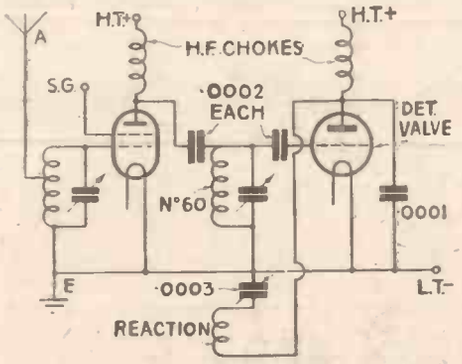


Fig. 2. How reaction is added to tuned-grid coupling

It is not necessary to go into deep technical waters to see that the high-frequency choke in the anode circuit is virtually in parallel with the tuned-grid circuit. When impedances are connected in parallel the total impedance is reduced, and for this reason it is necessary to choose a high-frequency choke with a really high impedance, otherwise the impedance of the tuned circuit will be appreciably reduced, and as a result the voltage developed across it will be decreased.

It may be found that a high-frequency choke suitable in a reaction circuit for medium and long waves would not be suitable for tuned-grid coupling, owing to the parallel effect on the tuned circuit.

Opposing Effects

Fortunately there are two opposing effects to be taken into account when considering this high-frequency choke. One effect is to reduce the inductance of the tuning coil, but the other effect, due to the stray capacities, is to add to the effective tuning capacity. It is often found that the tuning condenser setting with tuned-grid, that is with a parallel high-frequency choke, is practically the same as the setting for the tuned circuit used alone.

In practice you will find that the size of coil for tuned-grid coupling is about the same as for the aerial-tuning circuit, and a No. 50 or No. 60 coil of the plug-in honeycomb type will be quite suitable with a .0005-microfarad variable condenser.

From Fig. 1 the circuit symbols corresponding to the actual components pictured will readily be compared, and this will enable the beginner to understand the addition of reaction to tuned grid as shown by Fig. 2.

The reaction components comprise a reaction coil coupled to the tuned-grid winding, and in series with a reaction condenser of .0002- or .0003-microfarad capacity. A high-frequency choke will be needed in the detector anode circuit, and a .0001-microfarad fixed condenser is generally advised as an anode by-pass for the detector.

The Fig. 2 circuit is a well-tried arrangement known to give good amplification with adequate selectivity. It has the advantage that all the variable condensers are connected *via* their moving plates to earth, thus simplifying construction and wiring, and making for ease of control.

Coupling Condenser

So far I have not mentioned the value of the coupling condensers used in tuned-grid coupling. Theoretically, there is no need to use a coupling capacity larger than .0002-microfarad and for really selective tuning a .0001-microfarad condenser may be used between the anode and the tuned-grid coil, with the usual .0002-microfarad grid condenser for the detector.

Another way of improving the selectivity of tuned-grid is to make a tap on the grid coil, and to connect the coupling condenser to the tap, as shown at Fig. 3A. If detector damping is known to be considerable, as with power-grid detection, there is still another way of increasing the selectivity, as shown at Fig. 3B.

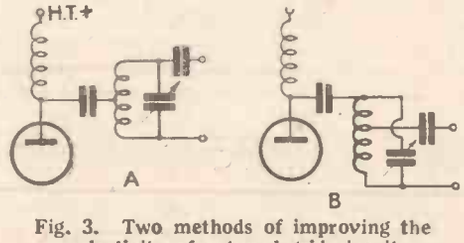


Fig. 3. Two methods of improving the selectivity of a tuned-grid circuit

Here the grid condenser is taken to a tapping about a third of the way down the tuned-grid coil, thus reducing the damping effect produced by the flow of grid current through the coil.

HOTSPOT.

NEXT WEEK : Tuned Transformer Coupling explained in theory and practice.

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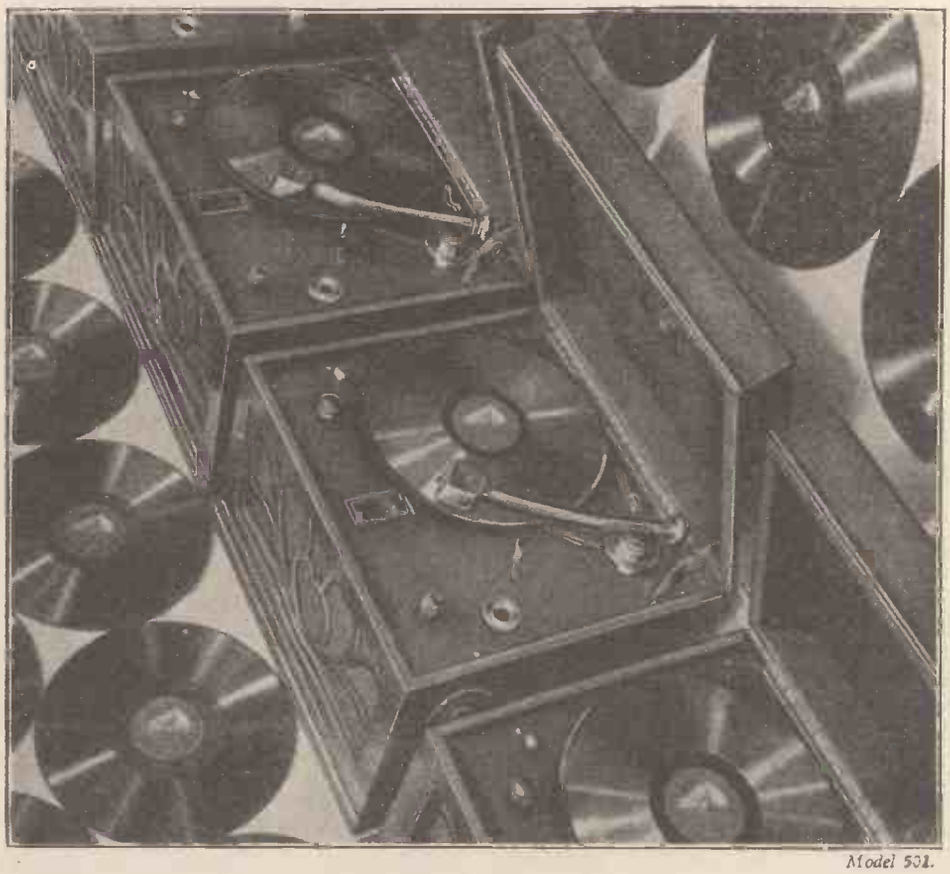

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1	.0003-mfd. Mica Condenser		6
1	.001-mfd. Mica Condenser		6
1	Grid Leak, 2 meg.		9
1	Grid Leak, 1 meg.		9
2	Grid Leak Holders	1	0
1	Aerial Coil with Selectivity Adjustment	7	6
1	Dual Range S.W. Coil Unit	4	6
1	.0005-mfd. Logarithmic Variable Condenser	4	6
1	.0003-mfd. Reaction Condenser	2	0
1	2-point Switch	1	0
1	3-point Switch	1	3
1	4-point Switch	1	6
1	Radiogrand Transformer	8	6
1	50,000-ohm Spaghetti Resistance	1	6
1	25,000-ohm Spaghetti Resistance	1	0
1	.01-mfd. Mansbridge Condenser	1	6
1	1-mfd. Mansbridge Condenser	2	3
1	Binocular H.F. Choke	5	0
1	Fuse Holder		6
1	Illuminated Disc Drive	4	6
		52	6

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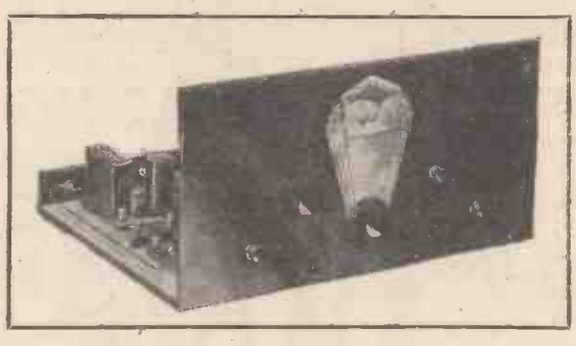

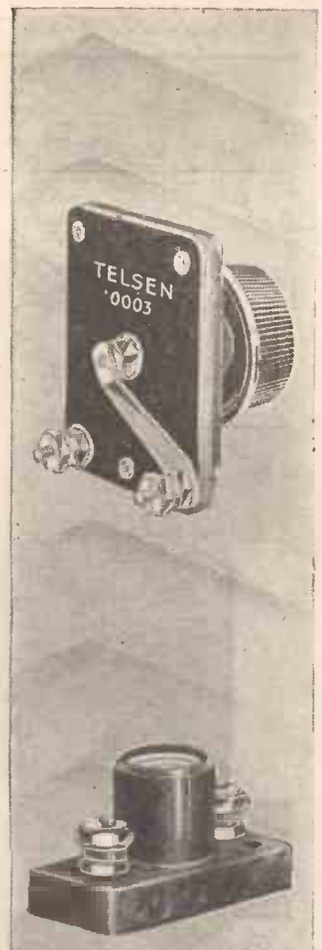

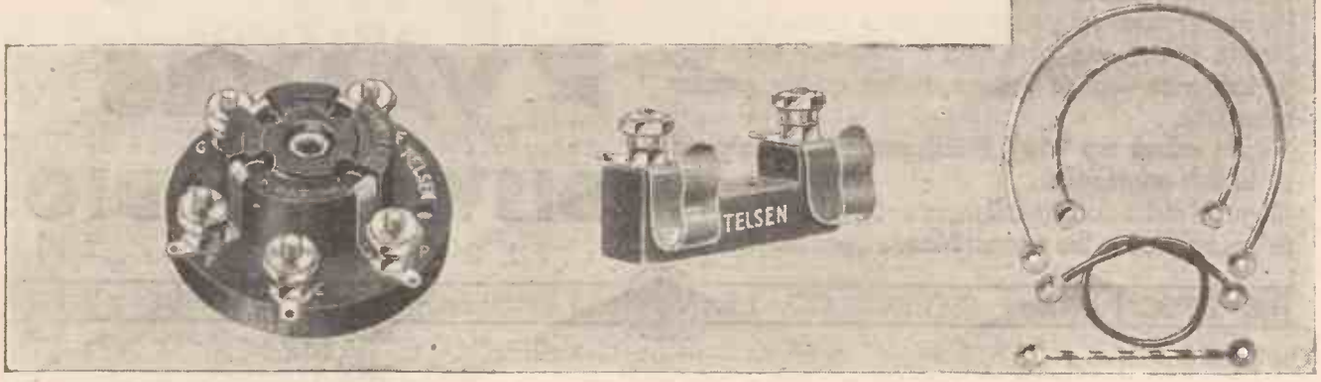

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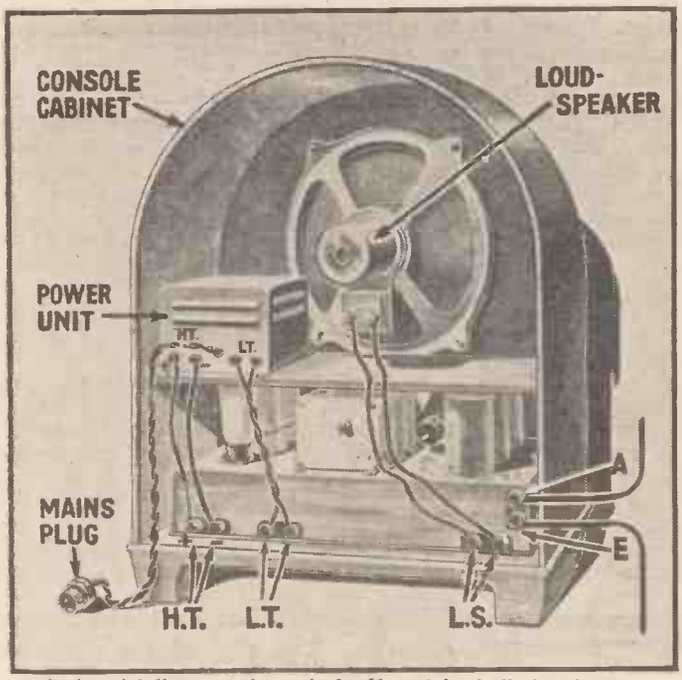
THE A·B·C· OF ALL-ELECTRIC RADIO

IV-CAN THE AMATEUR BUILD AN ALL ELECTRIC SET?

In this, the fourth and concluding article of a special series, ALAN HUNTER emphatically contends that the amateur can and should build an all-electric set if he is fortunate enough to have an electric-light supply

ALTHOUGH I have asked whether the amateur can build an all-electric set, I have not the slightest doubt about the answer. *Of course, he can.* And would, if the design were suitably simplified and the many advantages of all-electric working were brought home to him. Well, you are probably an amateur and possibly on an electric-light supply—why, if you are using a battery set, do you not consider the idea of building an all-electric set?

Is it that you think such a set would be difficult to construct? Or expensive? Or dangerous to use? I am asking you these questions because, quite frankly, I do not know why the all-electric set is not more popular with the amateur.



A pictorial diagram of a typical self-contained all-electric set: note the simplicity of the design

Nearly every set manufacturer has concentrated for the past two years on the all-electric set, often neglecting the battery set entirely. It is not far from the truth to say that while the set manufacturer has monopolised the all-electric set market, the amateur constructor has monopolised the battery-set market, with, of course, one or two notable exceptions on both sides.

Well, I believe AMATEUR WIRELESS is going to change all that. I believe that within the next year the amateur will get right into the all-electric set market, and will apply his art to the production of inexpensive fool-proof sets for mains operation. *As announced elsewhere, a special three-valve all-electric set is ready for* AMATEUR WIRELESS *constructors and first details are revealed.*

In this article I will deal quite generally with the question of home constructing the all-electric set, leaving the many details to the designers of future AMATEUR WIRELESS sets. The first question that naturally arises is how the construction of an all-electric set differs from that of a battery set.

Fundamentally, the difference lies in the fact that mains valves are much more efficient than battery valves. Because of this greater efficiency per valve stage, more complete de-coupling and screening are needed in the all-electric set. But it must not be thought that mains working necessarily involves an enormous amount of smoothing and de-coupling apparatus not found in the battery set. Much depends upon the discrimination of the designer, who can, undoubtedly, cut down the extra components to a number that makes all-electric set construction an economical proposition.

Another fallacy about all-electric set building centres around the danger of the mains. *There is no danger at all with normally efficient apparatus because the mains transformer isolates the mains circuit from the set.* As we are naturally dealing with higher voltages and greater power than in a small battery set, it is only common sense to switch off the power before meddling with the internal connections. A simple safeguard is a make-and-break switch gadget fitted to the back of the cabinet so that when the back is removed the mains are automatically switched off.

Easy to Build

An all-electric set need not be any more difficult to build than a battery set with a similar number of valves. The main difference in the layout will be in the connection of the filament terminals of the valve holders. I refer you to the pictorial diagram to emphasize this point.

You will see that the filaments of each valve are connected in parallel by a length of twisted flex, which finally goes to the two ends of the 4-volt secondary winding of the mains transformer. These filaments are, of course, heater elements and not the electron emitters. The indirectly heated cathodes correspond to the filament negative of battery valves and it is these cathodes that give us our "working" filament connections.

NEXT WEEK:
AN ALL-ELECTRIC A.C. CONSOLE OF SIMPLIFIED CONSTRUCTION

As has been explained in previous articles in this series, the grid bias is obtained by tapping off part of the high-tension voltage. This is most readily done by inserting bias resistances between the cathodes and the centre tap of the filament transformer, which is also connected to high-tension negative and earth.

The diagram on the next page shows the connections of the filament supply of a three-valve set comprising a high-frequency valve, a detector and a power valve, assuming three indirectly heated mains

(*Continued on next page*)

HOW IT IS DONE—I

When the Engineers Listen-in

PHOTOGRAPHS of engineers or control men engaged on B.B.C. work always show them wearing 'phones. This is usually the case when they are listening in the control-room or at an outside broadcast, but in the special listening rooms at Savoy Hill high-quality moving-coil speakers are used so that the listeners can judge the quality as well as carry out their technical tests.

There is an interesting point about this 'phone listening. You would think that the pairs of 'phones for the control would simply be plugged into the anode circuit of one of the resistance-coupled amplifiers on the Reisz microphone lines.

As you know, there are usually six valves on a typical microphone line before the first stage of modulation, and one would suppose that it would be easy to connect a pair of 'phones in a filter circuit across the anode output of one of the earlier stages.

A snag of this is that the number of pairs of 'phones in use is not always constant and occasionally an engineer may have to disconnect his 'phones entirely in order to go to some other part of the amplifier gear.

This switching would cause clicking noises to be heard on the transmission, and a trap circuit is used to prevent this little trouble.

A "trap" consists of a single stage of low-frequency amplification, transformer coupled, connected in parallel with one of the early stages of the microphone amplification chain. The 'phones are put in the anode circuit of this trap valve.

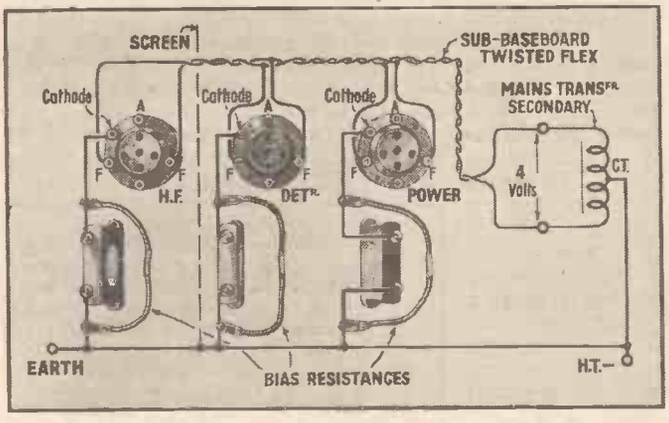
The valve is kept glowing all the time the transmitter is working and obviously the 'phones can be switched in and out of circuit with the trap, without any interference being set up in the main amplifier.

The trap makes the engineers' 'phones entirely separate from the microphone "boosters."

'CAN THE AMATEUR BUILD AN ALL-ELECTRIC SET?"

(*Continued from preceding page*)

valves with 4-volt filaments. The twin flex connection between the valve holders reduces the possibility of mains hum, especially if this inter-valve connection is carried out beneath a screened baseboard.



This diagram shows how the filament current is supplied to the valves of an all-electric set

The simplicity of this skeleton circuit will certainly appeal to all home constructors. Incidentally, it should help to dispel the illusion that the wiring in a mains set is complicated. Of course it is not.

With such a three-valve arrangement it is quite easy to visualise a very satisfactory three-valve all-electric console set. The second pictorial diagram shows a rough layout of such a console, indicating the main constituents. Inside the cabinet we have a platform, upon which rests the loudspeaker and the power unit, and beneath the platform is the set—very much like a battery set in its layout—and there you are!

From the power unit, which comprises the mains transformer with its associated rectifying valve and filament winding, will go a mains plug, preferably through the safety device already suggested. A twin-flex connection will join the filament secondary winding of the power transformer to the filament connections on the set.

Separate high-tension positive and negative leads will go from suitable terminals on the power unit to corresponding terminals on the back of the set. The loud-speaker will, of course, be connected to the loud-speaker terminals of the set and then the only external connections will be aerial and earth leads.

There is no Snag!

There is not the slightest reason why the amateur should be denied the pleasure of building such a set, and I can assure constructors that there is no snag. Moreover, the construction of an all-electric console such as I have roughly pictured need not be expensive. In fact, when you consider that such a set is absolutely self-contained save for the aerial and earth, you will be agreeably surprised at the moderate outlay involved.

In conclusion, I should like to say that the object of this "A.B.C." series has been to educate constructors up to the idea of the all-electric set, and we have now really arrived at the "X.Y.Z." stage, which is the contemplation of such a set in actual practice. I can now safely leave you to consider the very great attractions of the all-electric console to be introduced to you next week in AMATEUR WIRELESS.

WIRELESS IN PARLIAMENT

MR. CLARRY asked the Postmaster-General if he would state the number of prosecutions against the owners of non-licensed wireless receiving sets resulting from the activity of detector vans, the estimated number of licences taken out as a result of this activity, and manner of computation, and the total cost of the special campaign in the London area; and whether this detection service was to be augmented or reduced.

Sir Kingsley Wood said that the number of prosecutions for the use of wireless apparatus without a licence that had been, or were about to be, instituted as a result of the recent campaign in London was 117. Excluding renewals and deducting, also, as representing normal growth, the number of new licences issued during the corresponding period last year, the number of additional issues during the period of the campaign was about 204,000. He thought these licences might fairly be regarded as directly or indirectly attributable to the campaign. The cost of the campaign was estimated at £650. Arrangements were being made for similar campaigns to be conducted in other parts of the country.

Mr. Hannon asked the President of the Board of Trade why valves, permanent magnets and batteries had been excluded from the application of the import duty applicable to wireless sets and component parts thereof.

Mr. Runciman said that wireless valves and permanent magnets were already subject to duty under Part I of the Safeguarding of Industries Act, 1921, as amended by the Finance Act, 1926.

OUR BROADCAST CRITIC TALKS ABOUT—ENGLISH MUSIC

I WONDER if many of you heard the Cowen programme? Apart from the fact that it was a graceful gesture upon the part of the B.B.C. to honour Sir Frederic Cowen's eightieth birthday, the broadcast was an extremely enjoyable one.

There was some delightful writing in the *Fantasy of Life and Love*, the first item of the programme. The only thing that spoilt my pleasure was the out-of-tune playing of the horns in Section D of the B.B.C. Orchestra. As I do not know who plays in that section, I feel I can speak out a little.

To me it is little less than a positive misfortune that there is so much out-of-tune playing in the B.B.C. Orchestra. Is it not an appalling thought that one can listen to what is supposed to be the finest orchestra in the world and yet have to switch over to Jack Payne in order to hear perfect intonation? I intend to complain loudly and regularly *until something is done about it.*

If my opinion is doubted at Savoy Hill, I am perfectly willing to go there and prove my point. What Sir Frederic could have thought of some of the intonation in that performance I do not know; I expect he was too polite to say.

A word for May Huxley, who sang in the programme. The word is—*delightful.*

And if my humble congratulations are acceptable to Sir Frederic Cowen himself, I should like here to offer them.

◆ ◆ ◆

Abie and Sandy are two very good comedians; some of their patter was really funny. Is not Abie supposed to be Jewish in contradistinction to Sandy, who represents Scotland? Well, sir, you seemed almost as Scottish as your companion, until you forgot all about it and spoke more or less standard English.

My contention is that the *vot you t'ink* sort of speech is what is really wanted so that we can distinguish Hebrew from Scot the more easily. Try it next time, will you? All I add is that I hope next time is to be quite soon.

◆ ◆ ◆

Johnson Clark is an excellent ventriloquist. We can do with ventriloquists even on the wireless, where, unfortunately, we are deprived of the pleasure of watching the doll. Are Arthur Prince and Johnson Clark the *only* two to be had?

I ask because I think there is something about the style of ventriloquial broadcasts that has a distinctive atmosphere. And we can *always* do with distinctive broadcasts!

Florence McHugh amused me intensely with her hyper-modern version of *Drink to Me Only.* I thought it very true to life. I am inclined to dwell on the point and once again to urge that imitations are only worth while when they are *really* clever.

◆ ◆ ◆

Mabel Constanduros and Michael Hogan were at their best on Tuesday evening. Grandma is one of my favourites; I like old people when they are as sharp as she is. The old lady was well up to form.

◆ ◆ ◆

Some amazing playing came through on Wednesday evening from Queen's Hall. The first part of the concert may have been rather too much of a good thing for average listeners, but surely Szigeti's superb violin playing could hardly have missed the mark?

Prokofiev's concerto was not lovable music by any means; parts of it I did not care for at all. On the other hand, I was amazed at Szigeti's technique.

The fifth symphony of Tchaikovski, which constituted the whole of the second part of the concert, is Everyman's music. If Everyman did not listen—then more's the pity!

I could write that symphony out in places, having heard it more times than years I have lived. I followed closely with a score. Of all the performances I have heard since Arthur Nikisch did it at Manchester in 1905, that under Malko on Wednesday was the finest.

Gerald Osborne in cartoon

◆ ◆ ◆

Chick Farr and Partner are two broadcasters who can come to the microphone as often as they like, so far as I am concerned. I have been Farrther and fared worse many times!

◆ ◆ ◆

The Three Ginx are a great success. I think they ought to be employed by the B.B.C. to give diction lessons to intending broadcasters.

It seems strange to me that three people broadcasting light music can beat some of the opera singers to a frazzle in the matter of getting the words over. Strange, but 'tis true.

◆ ◆ ◆

I am not often at home for lunch in the middle of the week, and therefore get very little opportunity of hearing the midday broadcasts. I was at home, however, on Saturday, and heard the Commodore Grand Orchestra from Hammersmith. A very nicely selected programme.

◆ ◆ ◆

The Carlton Mason Sextet is one of those B.B.C. institutions which fill up the programmes (off the rush hours) and fill a want at the same time. They were, I thought, distinctly good. I also liked Nino Maudini, the tenor.

◆ ◆ ◆

A word to Nosmo King and Partner. One of you is more distinct than the other because one of you speaks too fast. I missed fully two-thirds of what you said. Please go slower.

◆ ◆ ◆

Cicely Courtneidge was as good as ever. *Ali Baba's Camel* is a classic. I love the bit where they sing "Oh, how the Camel loved Ali Baba"; I so enjoy hearing Cicely go off her notes! I should hate her to sing it properly!

◆ ◆ ◆

And now the Vaudeville Critic. Mr. Farjeon said the B.B.C. engaged him to criticise and to say what he thought of the week's vaudevilles. This he did not do. He said nothing about the artistes whatever. What he said about the studio audience was very true, and I am glad he said it. I think the idea of a vaudeville critic is good. I wonder whether one of them will *really* criticise! It takes a little courage!

WHITAKER-WILSON.

The NEW "FAVO

Here is a modern version of an old favourite—"Britain's Favourite Three"—a set which was an amazing success. The new model has several refinements such as band-pass tuning and im-

"CHOOSE your circuit" was the theme of a competition which AMATEUR WIRELESS held at the beginning of 1928. The circuit which was voted first in the competition was made up into a receiver deservedly titled "Britain's Favourite Three."

It was a straightforward detector, resistance-coupled and transformer-coupled outfit. It had plug-in coils and an extremely simple layout. It struck a new note in low-priced construction, ease of operation, and good output.

More Selectivity

It was basically a fine circuit and there are, we know from letters constantly received, very many readers who are still using modifications of this "Favourite Three."

The circuit, in its essentials, is still suitable for quality reception where exceptional range is not required.

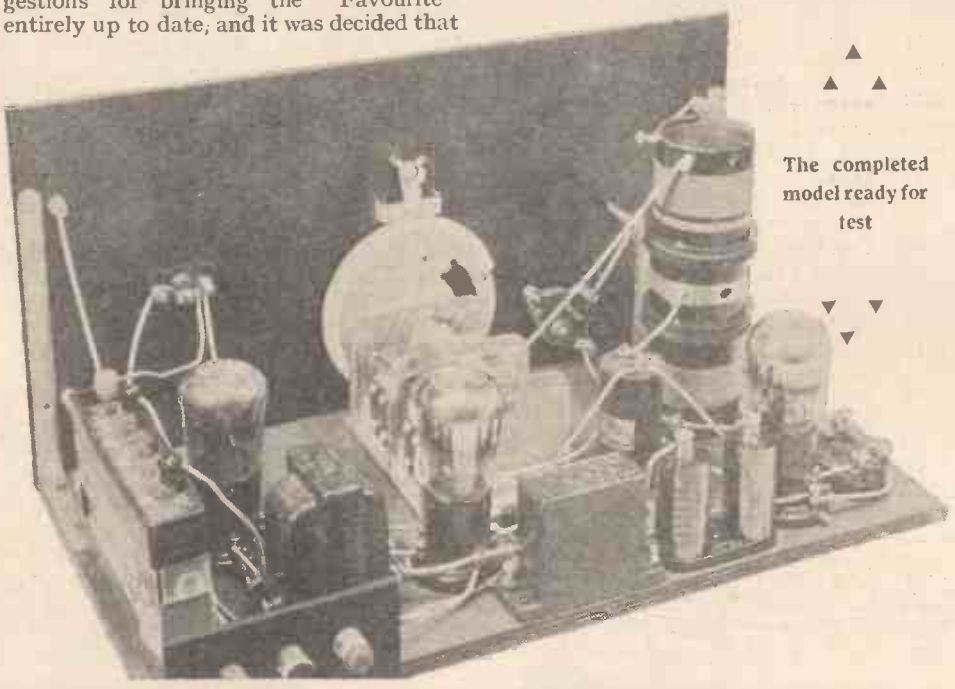
The original "Britain's Favourite Three" fails nowadays in not having sufficient inherent selectivity. The tapped coil arrangement does not prevent present high-power stations from overlapping, although at the date of inception of the original set, it was a tuning system fully able to deal with the then existing ether conditions.

The AMATEUR WIRELESS Technical Staff has constantly been asked for suggestions for bringing the "Favourite" entirely up to date, and it was decided that the best method of explaining these would be the production of a new set, conforming as closely as possible to the lines of the old one.

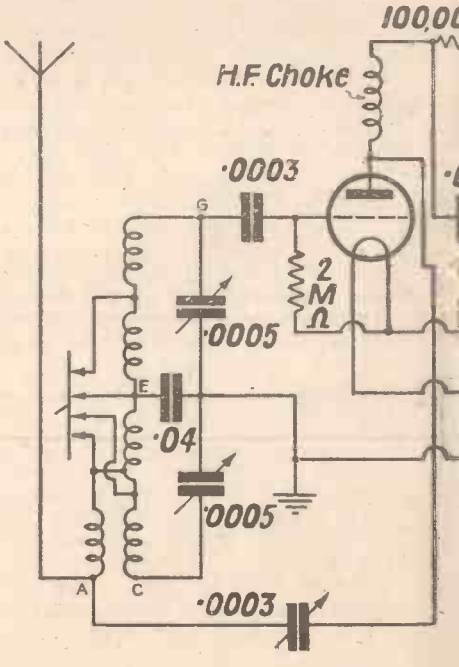
The accompanying photographs show that although the tuning system has been altered, the general lines of the new "Favourite" are very similar to those of the set which has achieved universal popularity.

Band-pass Tuning

The "New Favourite Three." is a detector, R.C. and transformer-coupled arrangement, with band-pass tuning. After the full technical explanation which has been given in connection with band-passing in such sets as the "Three Star Three," "Olympian Three," "1932 Ether



The completed model ready for test



COMPONENTS FOR THE "NEW FAVOURITE THREE"

Ebonite panel, 16 in. by 8 in. (Lissen, Becol, Peto-Scott, Trelleborg).
Baseboard, 16 in. by 9 in. (Camco, Clarion).
Two-gang .0005-mfd. variable condenser (Polar "Uniknob," J.B., Lotus, Utility).
Dual-range band-pass coil (Varley "Square Peak").
.0003-mfd. reaction condenser (Readi-Rad, Telsen, Lissen, Lotus, J.B., Polar, Formo).
Filament switch (Readi-Rad, Telsen, Lissen, Bulgin, Benjamin, W.B., Junit).
Three valve-holders (Lissen, Lotus, Telsen, W.B., Junif, Clix, Benjamin).
H.F. choke (Climax, Lissen, Varley, Telsen, Wearite, Readi-Rad, Sovereign, Watmel).
L.F. transformer (Lissen "Hypermik," Telsen, R.I.), Ferranti, Varley, Climax, British General).
Resistance-capacity coupling unit, with 100,000-ohm and 1-megohm resistances (Lissen, Dubilier, Varley, Graham-Farish).
50,000-ohm spaghetti resistance (Lewcos, Lissen, Varley, Bulgin, Telsen, Sovereign).
.04-mfd. fixed condenser—non-inductive type (Dubilier "9200").
.0003-mfd. fixed condenser with series clips (Dubilier, T.C.C., Telsen, Lissen, Graham-Farish, Sovereign).

"URITE" THREE

proved intervalve coupling and it is so designed that the old type can be brought up to date at little cost, or a new set built which will have a remarkable all-round excellence.

Searcher," and so on, and the success which band-passing has attained in these outfits, it is unnecessary to expand too much either on the sharp tuning given by band-passing or on the many other advantages.

The square-peak coupling given by the twin band-pass coil in the new "Favourite" makes the selectivity of this set comparable with that of an outfit incorporating a screen-grid stage. There is, however, only the one coil unit.

Modified Circuit

No screening is necessary, there is no expensive screen-grid valve and only a two-gang condenser is needed.

Certain parts have been added in the circuit, a decoupling unit, for instance, but in the main the circuit is that of the original "Favourite," apart from the special tuning system.

The description given for the construction of this new "Favourite" as a complete set will help those who want to modify their own sets to incorporate the 1932 features.

A blueprint has been prepared for the "New Favourite Three" and this can be obtained, price one shilling, from the Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4.

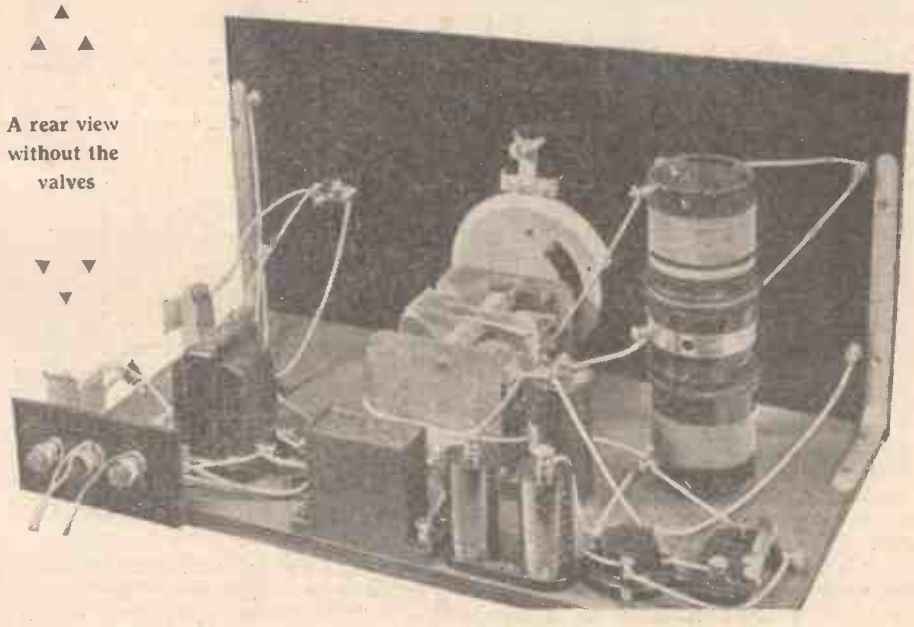
Simple Layout

This print will be of the greatest assistance to new constructors and will enable owners of original sets to see the small alterations entailed by fitting the new parts.

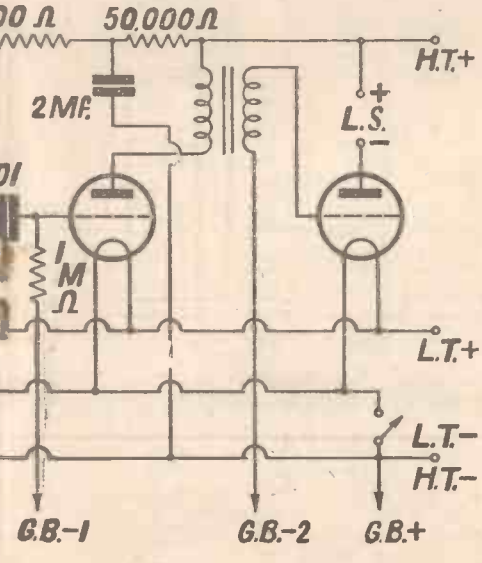
The panel layout is, of course, similar to that of the old set. Aerial, earth and speaker terminals are conveniently carried on the panel itself, which is of ebonite.

On the right, looking at the set from the front, is the on-off switch (replacing the original filament rheostat) in the centre a special two-gang condenser, and at the right a small solid-dielectric reaction condenser, replacing the previous air-dielectric component. The shaft of the wave-change switch of the dual band-pass coil projects through the panel immediately above the reaction condenser.

Easy wave-changing is, of course, a feature of this new set. There are no coils to plug in. You simply pull and push the switch for medium and long waves. A trifle more space on the baseboard is taken



A rear view without the valves



This is the circuit of the "New Favourite Three" showing the band-pass tuning arrangements

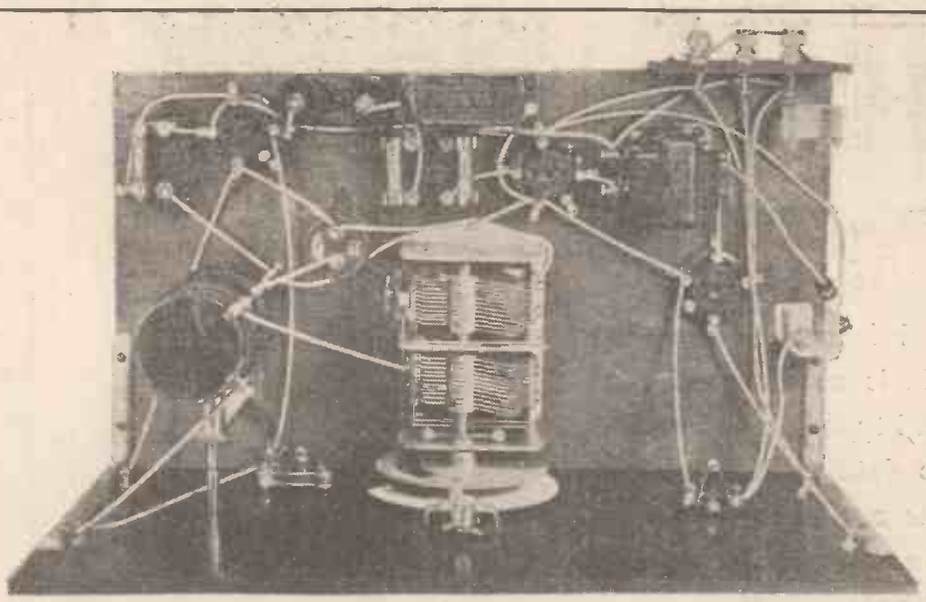
COMPONENTS (Continued)

2-mfd. fixed condenser (Telsen, Lissen, Dubilier, T.C.C., Ferranti, Formo).
2-megohm grid leak (Dubilier, Telsen, Lissen, Sovereign).
Seven terminals marked: Aerial, Earth, L.S.+, L.S.—, L.T.+, L.T.—, H.T.+ (Belling-Lee, Clix, Eelex).
Three wander plugs, marked: G.B.+, G.B.—1, G.B.—2 (Belling-Lee, Clix, Eelex).
One yard thin flex (Lewcoflex).
Connecting wire and sleeving (Lewcos).
Pair of grid battery clips (Bulgin).
Pair of panel brackets (Bulgin).
Ebonite strip, 4 in. by 2 in. (Lissen, Becol, Peto-Scott, Trelleborg).

ACCESSORIES

Speaker (Celestion, Lissen, Telsen, Sovereign, Blue Spot).
120-volt H.T. battery (Lissen, Fuller, Ever-Ready, Oldham, Pertrix, Drydex).
2-volt accumulator (Lissen, Fuller, Ever-Ready, Oldham, Pertrix, Drydex).
9-volt G.B. battery (Lissen, Fuller, Ever-Ready, Oldham, Pertrix, Drydex).
Cabinet (Camco, Readi-Rad, Peto-Scott).

"THE NEW 'FAVOURITE' THREE" (*Continued from preceding page*)



A plan view of the New 'Favourite' which will be helpful in studying the layout diagram below

up by the two-gang condenser for the bandpass circuit and by the single condenser in the old set.

New constructors should drill the panel, using the blueprint as a template, and this should be fixed at right angles to the baseboard, using the panel brackets to make a secure job.

The bandpass coil and the two-gang condenser are mounted on the baseboard, and not only must you take care to get the positions for these two parts exactly as shown on the print, but you must see that the shaft of the condenser and the wave-change rod pass easily through the panel.

The only parts actually mounted on the panel are the reaction condenser, on-off switch, and, of course, the four terminals.

There are three terminals on a small strip at the back for the two accumulator connections and the one high-tension positive connection. The negative accumulator terminal, it should be noted, is also used for the negative high-tension wander-plug.

Completing the Wiring

The grid-bias battery is on the baseboard. Two small aluminium clips hold it as in the original set. Short flex leads come direct from one of the grid leaks and from the secondary of the low-frequency transformer. This saves having long flex leads out to a battery away from the set.

The two sections of the bandpass coil are coupled by a .04-microfarad fixed condenser. This is connected across the sections of the coil as you can see in the blueprint.

The A. C. G and E terminals of the coil are lettered to correspond with the indications on the theoretical circuit diagram.

The resistance coupling between the detector and the first low-frequency valve has different component values from those in the original "Favourite."

That is because valve characteristics have altered since the set was produced and also because a filter circuit is put in series with the resistance coupling. This filter comprises a 50,000-ohm resistance and a 2-microfarad condenser.

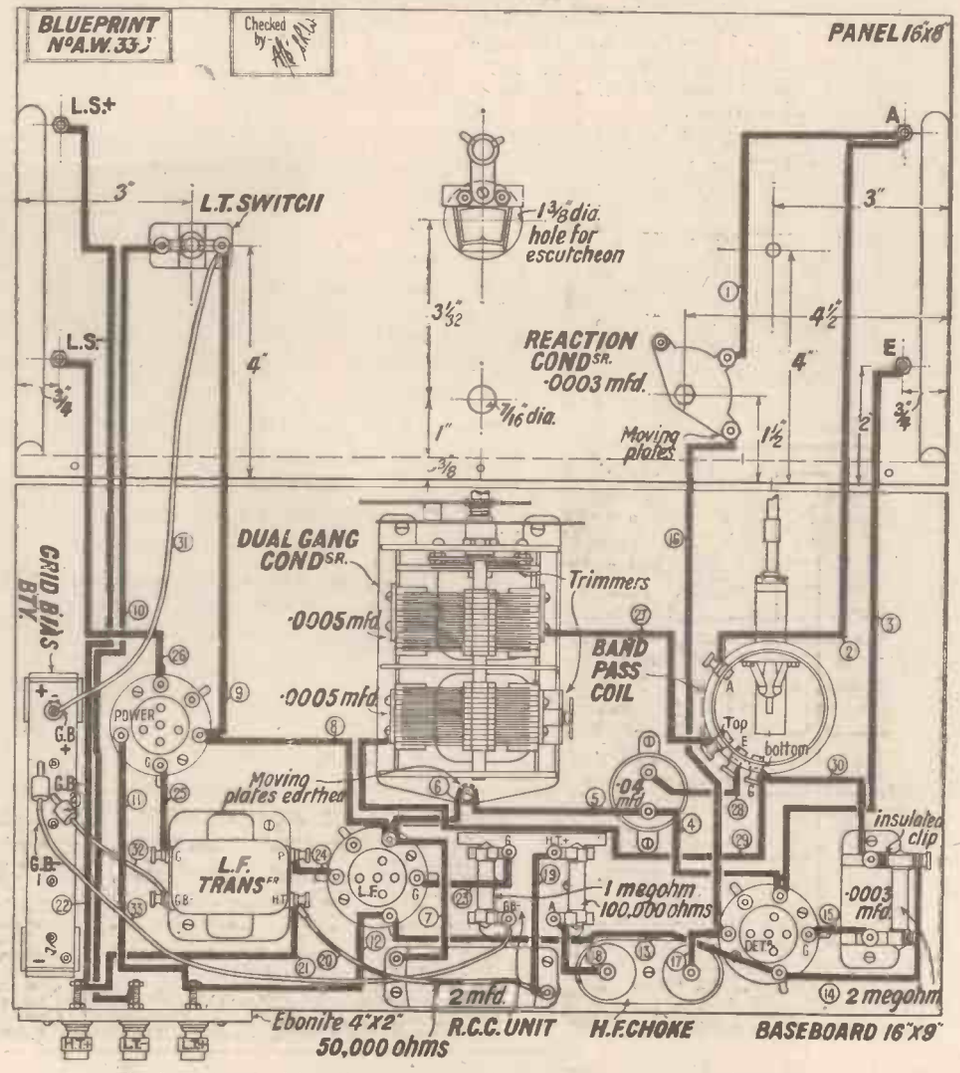
The set is shown wired on the point-to-point system, as with the now popular method of wiring up by bare wire covered in insulated sleeving you will probably find this easier than the soldering done in the original set. By the way, if you are converting an old receiver, make sure that there are no dry joints. It might be worth your while to re-wire the whole thing complete and it will make doubly sure of your getting the connections right.

Valves

Valves of the same type as originally specified for the "Favourite" will work in the present set, but in the case of an old receiver, if you have any doubt about the falling-off in emission of existing valves, then you should certainly not spoil the performance given by the new circuit.

A new set is worth new valves. In next week's issue a detailed valve list will be given, when also the operation of the new "Favourite" will be discussed. Once you have set up the circuit properly, the tuning of the new set is very simple.

Don't forget that this set is on view in the Radio Department windows of Messrs. Selfridge & Co., Ltd., of Oxford Street, London, W. A display is being arranged in connection with the "1932 Favourite Three."



The layout and wiring diagram. A full-size blueprint is available, price 1/-

"SQUARE PEAK"

REGD. TRADE MARK

BAND-PASS BEATS EVERYTHING

for SELECTIVITY—
with ease of tuning and
QUALITY *of* REPRODUCTION

"SQUARE PEAK," Britain's unbeatable band-pass coils, give band-pass tuning at its best, and are specified in the new model of "Britain's Favourite Three"—the New Favourite Three.

The original "Britain's Favourite Three" was one of the most popular circuits ever evolved—easy to build, easy to handle, amazingly efficient and economical. NOW Varley "Square Peak" Coils bring this fine circuit right up to date. You can build it—easily—and get all the advantages of super-selective Band-Pass Tuning with ample volume and faithful reproduction.

Varley "Square Peak" Coils, with or without wave-change switch, complete with universal mounting bracket 15/-.

Secure the wonderful improvements of "Square Peak" Band-Pass tuning! The new FREE "Square Peak" circuit brochure shows you how to build modern band-pass receivers—S.G. sets, simple Detector sets and super-Hets. ***Fill in the coupon below and post it to-day.***

To Messrs. VARLEY, Kingsway House, 103, Kingsway, London, W.C.2.

Please send me, free and post free, the "Square Peak" circuit brochure entitled MODERN "SQUARE PEAK" BAND-PASS CIRCUITS FOR EVERY REQUIREMENT.

DATE.....

NAME .....

ADDRESS.....

..... A.W.

Varley

Advertisement of Oliver Pell Control Ltd., Kingsway House, 103 Kingsway, London, W.C.2. *Telephone : Holborn 5303*

Don't Forget to Say That You Saw it in "A.W."

IN SEARCH OF A NEW INTERVAL SIGNAL

Foreign stations are easily recognisable by their call signs and interval signals. A suggestion for improving the B.B.C. programme-interval signal is here put forward.

VERY shortly we are to bid a partial good-bye to the tick-tock interval signal which since December, 1930, has filled the intervals between programmes with a ghostlike thud. I hear that the first experiment in abolishing the present interval signal will be started on March 7. Programme gaps in the afternoon will then be filled by gramophone music in place of the interval signal.

Well, this is certainly a step in the right direction. Although the present interval signal, which has earned its nickname of "the ghost in goloshes," was the result of much deep pondering on the part of the control-room engineers, it never seemed to strike a popular note.

Quite apart from its lack of entertainment value, there was, according to listeners' letters, a diversity of opinion as to whether the ticking was too loud, so being irritating, or too soft, so being utterly useless.

Programme Continuity

It is much easier to effect continuity in programmes by a regular sound, such as the ticking of a clock, rather than by specially arranged interval items of gramophone records; but that is a poor excuse for further mechanisation of B.B.C. productions.

Listeners aver that when they turn on the wireless they want to be entertained, and that the average of five minutes between programmes is entirely wasted from the entertainment end when the electric clock is ticking.

A trouble with the B.B.C. time signal is that it lacks character. After the news bulletin, practically every National and Regional station can be heard giving out the same monotonous thud. To foreign stations it must be very disturbing. The foreign stations cater much better for us.

Munich has its musical box, Ljubljana has its cuckoo call, Leipzig its metronome, and at Radio Lyons the energetic announcer counts from 300 to 320, as a characteristic opening and interval signal.

German and Austrian stations, as a rule, are most precise in the way they distinguish themselves. In the intervals between programmes at Graz, a metronome ticking 200 to the minute is switched on and at intervals the Morse letter K (— . —) is transmitted automatically. Hanover is even more understandable. Every minute of the interval a gong strikes to denote the passage of time and the Morse sign, HR (. . . . — .), for Hanover, is sent out. Hamburg has a similar arrangement, but the distinguishing letters HA (. . . . .—) for Hamburg are given.

Surely with this galaxy of curious calls on the ether, the B.B.C. could find something more enterprising than a dull thud!

Copenhagen, which previously had an opening and interval signal of gong strokes, has gone in for a most elaborate bell chiming arrangement. This gives two lines of an old Danish folk song, dating back to about the year 1300, and taken from an old parchment sheet known as the *Codex Runicus*. It is actually the oldest record of Danish music with text attached.

The machine which plays this has six bars like a xylophone, and the hammers which tap the bar bells are worked from an electric motor. The relay mechanism is adapted from the rotating contact type of drive which works most of our flashing electric signs. The whole thing is put into operation by just touching the main switch, which starts up the motor. A microphone is put on a stand about a foot away from the bars.

The electric clock and microphone used for the interval signal at Savoy Hill

Many Suggestions

The B.B.C. argument against a call of this kind is that it is too characteristic and its reiteration in the programmes would be disturbing. But if you listen to the Copenhagen signal you will find it too musical to be intrusive. The bell part of the gadget was made by a Copenhagen firm of clock and bell makers, and the tone of the little tune is not unlike that of the bells in the Copenhagen City Hall, which are broadcast at the end of the programme.

Most of the Continental gong and Morse code signals are done automatically by a rotating drum, so the B.B.C. cannot hold up the entirely mechanical action of our own signal as being one of its assets.

"Many other suggestions, such as the metronome, the tick of a grandfather clock, a musical chord, or jingling bells, were tried, but for various reasons none of them was considered satisfactory," says the B.B.C. with reference to the circuit of the present interval signal.

If you have not already learned the secret of the "ghost in goloshes," the accompanying photograph may surprise you. The noise is made simply by an electric clock with a second hand. It is put in a felt-lined box above the control room and a microphone stands on top of it.

A relay switch in the control room polarises the microphone, switches on the filament of the three-valve microphone

(*Continued at foot of page* 390)

TELEVISION IN A TRAIN

Successful Television reception was carried out on an L.N.E.R. express recently by a Baird Television official in conjunction with L. McMichael Ltd. Two Standard Super Range portables, one for speech and one for sound, were used for reception. Results were good, even when the train touched 70 m.p.h.

TELSEN SHORT-WAVE COIL

COMBINED DUAL RANGE SHORT WAVE COIL UNIT

This Unit for the first time brings the construction of short-wave receivers into line with the simplicity of modern practice. When tuned by a .00025 condenser, a wave range of 20 to 80 metres can be covered by the operation of a switch as in ordinary broadcast practice. No coil changing is necessary and no other coils are required, as the unit incorporates windings for aerial, tuning and reaction circuits. The coil is also suitable for use with sets covering all wave bands with a .0005 tuning condenser. In this case the Dual Range feature is not employed.

WAVE RANGE OF 20-80 METRES

4/6

The Telsen Short-wave Coil adds the Short Waves without coil changing.

TELSEN 100% ALL-BRITISH MATCHED COMPONENTS FOR THE TELSEN TRIPLE THREE

TELSEN

LONG, MEDIUM AND SHORT WAVE RECEPTION ON ONE DIAL

Advt. of The Telsen Electric Co., Ltd., Aston, Birmingham. CVS 149

Don't Forget to Say That You Saw it in "A.W."

IN MY WIRELESS DEN

Weekly Hints—Constructional & Theoretical

By W. JAMES

Using the Mains as an Aerial

THE usual "mains" aerial consists of a circuit made by joining the aerial terminal of the tuning coil through a condenser to one side of the mains.

The condenser used may have a capacity of about .0001 microfarad and it must be well made and able to withstand the mains voltage. A condenser having a *working* voltage of 500 A.C. could be used with perfect safety.

If you use a condenser having a *test* voltage of 500 A.C. it may burn out and earth the mains through the tuning coil and destroy that too. I have seen two or three sets which were returned to a manufacturer with the aerial coils burnt out as the result of their owners trying mains aerials with ordinary condensers.

Do not use a pre-set condenser unless it is made to withstand a high voltage, and the ordinary little condensers that we use in sets are not suitable. Special condensers having a reasonable factor of safety should be used.

A capacity of .0001 microfarad may be too much and a .00005 be more suitable for the work. You cannot be sure until a few tests have been made.

High-frequency Choke Points

I notice that it is now possible to obtain high-frequency choking coils having a screen. Plain chokes may cause considerable trouble and in sets where the parts are fairly close together some sort of shielding is desirable.

A metal cover must not be too close a fit. As with coils, the effectiveness of the choke may be spoiled if the metal shield is too close to the windings.

Some sets have two high-frequency chokes, one being connected to the anode of the screen-grid valve and the other in the detector circuit. If these chokes are not screened and are close together, the results are bound to be affected.

We have much stronger high-frequency currents in one circuit than the other and the coupling may well be such that the set is made unstable. With shielded tuning coils, condensers, and chokes, the stray couplings are the minimum. Unscreened chokes may well provide enough feedback to spoil the results entirely.

Those Small Transformers

Some of the cheaper low-frequency transformers have so small a core that the results vary greatly with different anode currents that pass through the primary.

The inductance of the primary winding might be 50 henries with no direct current passing through it. This is a satisfactory value when the amplifying valve has a moderate impedance and so the transformer must be resistance fed.

When direct current passes through the primary the inductance falls, perhaps to 30 henries for 1 milliampere and 20 henries for 2 milliamperes. This falling off in the inductance is serious, as the amplification obtained, particularly of the lower notes, decreases when the inductance falls. To connect a transformer having a small value of inductance when carrying 2 or 3 milliamperes of direct current in the anode circuit is foolish, as the results are bound to be poor.

Using Variable Mu's

The variable-mu battery valve has arrived at last. This valve is intended to be used in a circuit in such a way that the bias of the valve can be adjusted for the purpose of varying the amount of the amplification.

In one method a high-resistance potentiometer is connected across the grid-bias battery. If this battery is of 9 volts and the potentiometer has a resistance of 9,000 ohms, the current passing through it is 1 milliampere.

It is, therefore, advisable to break the potentiometer circuit when switching off the set, and for this purpose an extra contact should be used on the "on off" switch.

H.F. DECOUPLING

In an efficient screen-grid stage it is just as essential to decouple the screen-grid circuit as it is to put a filter arrangement in a good L.F. or detector

stage. A non-inductive condenser should preferably be used as a by-pass, and a condenser of this type is used in the typical decoupled screen-grid stage illustrated.

A Speaker Hint

Moving-coil speakers having an electro-magnet and used in A.C. mains sets are usually connected in a part of the circuit where the current required for the magnet is that which also passes through the circuits of the set, or perhaps one of them.

The speaker field can, for example, be used as the output choke, provided there is enough power available. In other sets no choke is used in the smoothing circuit, but instead the field winding is connected in this circuit and acts to some extent as the choke. Now the winding of the speaker, when it is joined in place of a choke, carries a varying current.

This varying current may cause the diaphragm of the speaker to vibrate at the frequency of the variations, say 100 cycles per second, when a full-wave rectifier is used with a full-wave rectifier. Sometimes there is a loud hum heard.

The makers get over this in a rather neat way. They supply, at a slight extra cost, a neutralising winding.

This is fitted over the central hole of the magnet and is in series with the speech coil. A current is induced in the neutralising winding and it balances that induced in the speech coil. Under good conditions the hum can be eliminated in this way.

"IN SEARCH OF A NEW INTERVAL SIGNAL"

(*Continued from preceding page*)

amplifier and, by a separate potentiometer, connects the output of the interval signal amplifier to the other amplifiers in the transmission chain.

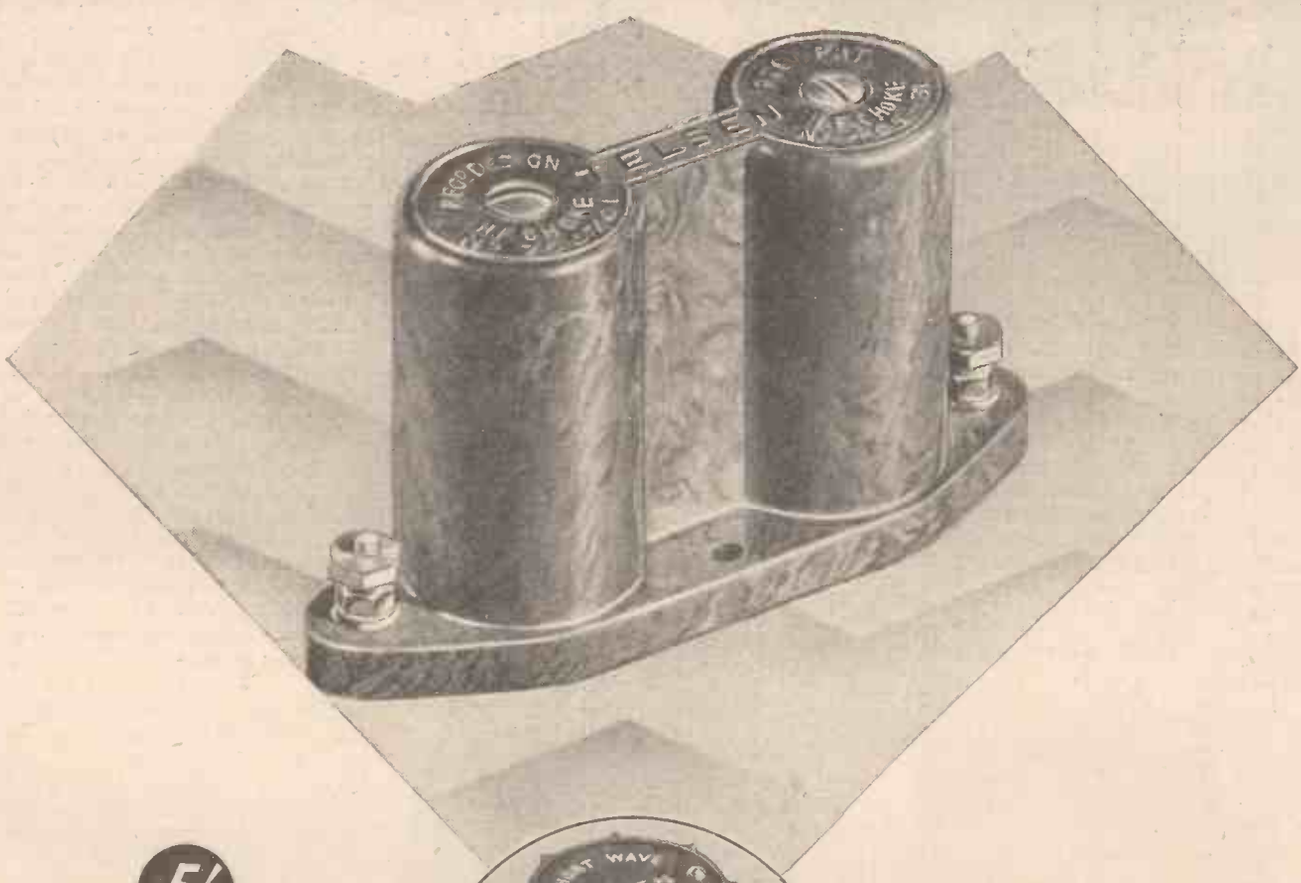
Each tick of the clock indicates the passing of one second, and if you have nothing better to do during programme intervals, you can use the "ghost" for timing purposes!

The box is padded to prevent unnecessary echo effect and also to keep out extraneous sounds. In that respect it is like a little studio, although it is only a packing case of ordinary dimensions.

"Unofficially," says a B.B.C. engineer, wittily, "this box is known as studio 10a, and is, perhaps, the only studio that has never been visited by a member of the public!" However that may be, the large majority of the listening public will be glad that from March 7 onwards the "ghost" is to thump less frequently in our programmes.

KENNETH ULLYETT.

TELSEN BINOCULAR CHOKE

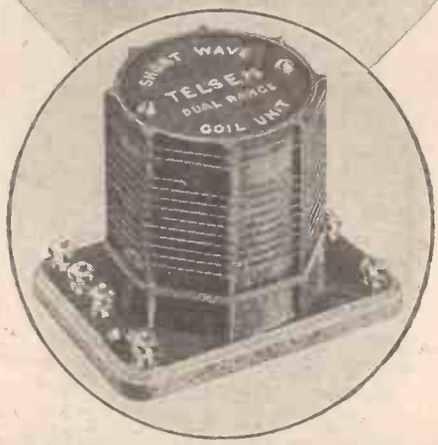


5/-

TELSEN BINOCULAR H.F. CHOKE

The Telsen Binocular H.F. Choke is efficient on all wavelengths down to 20 metres, thus enabling the short-wave band as well as the medium and long-wave broadcast bands to be worked with the same H.F. Choke. Whatever the circuit or wave-band the Telsen Binocular H.F. Choke is the safe choice for highest efficiency.

Telsen Binocular H.F. Choke Price 5/-



The Telsen Short-wave Coil adds the Short Waves without coil changing

TELSEN 100% ALL - BRITISH MATCHED COMPONENTS FOR THE TELSEN TRIPLE THREE

TELSEN

LONG, MEDIUM AND SHORT WAVE RECEPTION ON ONE DIAL

SETS OF DISTINCTION

H.M.V. ELECTRICAL REPRODUCER—

Makers: The Gramophone Co., Ltd.

Price: 42 guineas

ONCE again I am delighted to report upon an H.M.V. product. This time it is something out of the ordinary run of radio apparatus, namely a super-power electrical reproducer of gramophone records. I have had one of these machines delivered to me for test and I must say before going into any technical details what a wonderful reproducer it is. My colleagues have been startled with the tremendous volume of undistorted sound obtained during tests of various records.

It is really amazing what can be done with push-pull amplification. This system is the secret of the good performance of this new H.M.V. instrument.

First of all, I should explain that Model 553 is specially designed to give *very loud* reproduction of gramophone records, and although suitable for the home, it has the added application of being specially useful for restaurants, cafes, small dance halls, and so on.

Automatic Record Changing

One of the big attractions of the machine is the automatic record-changing mechanism. By means of this mechanism it is possible to play eight records at one loading. These can be either 10-inch or 12-inch records, but it is not possible to mix the sizes.

If desired, a single record can be loaded up and reproduced any number of times up to eight. If you want to finish playing any selection at any given time during its reproduction you simply press a button and the unwanted record will be rejected and the next record introduced.

After playing the last record, the mechanism automatically switches the motor off.

In action this mechanism is almost uncanny, especially if you allow it to work with the lid closed. Assuming the mechanism has been loaded up you can sit back and enjoy your selection without the slightest effort. For dancing purposes the mechanism has obvious attractions, since it is possible to arrange a continuous dance programme.

As with all H.M.V. products, this electrical reproducer is housed in an extremely attractive walnut cabinet. Some idea of the appearance can be gained from the illustrations, but you should make a point of seeing the instrument for yourself if you are interested in this form of reproducer.

As already indicated, its main function is to give loud reproduction of gramophone records, for which all the necessary apparatus is provided, including the automatic record-changing mechanism, gramophone pick-up, electric motor, moving-coil loud-speaker, three-valve power amplifier and all A.C.-mains equipment.

External Volume Control

When the lid is closed the only external control is the knob for volume, mounted just above the ornamental loud-speaker opening in the front of the cabinet. A special jack is provided on the back of the chassis, so that the output of an ordinary radio set can be plugged into the input valve of the electrical reproducer, thus enabling super-power results to be obtained in the reproduction of broadcast programmes.

The H.M.V. Electrical Reproducer is the most modern type of gramophone and is suitable for either home or public use

Two leads are taken from the loud-speaker terminals of the set to the radio plug, but you must first determine whether the output of the set is suitable for direct connection to the reproducer. If necessary, a special coupling transformer can be supplied by the makers. A useful point is that the volume control on the reproducer also comes into action when the radio set is connected up.

Now for a word or two on the circuit, which has many outstanding technical points of interest. In brief, it comprises an MHL input valve, transformer coupled by the push-pull method to two PX4 super-power valves. The outputs of these two valves are combined in the push-pull output transformer, the secondary of which goes to the speech coil of the moving-coil loud-speaker.

Plenty of Power

This loud-speaker is of the mains energised type, being specially designed to take very considerable power without distress. Moreover, it has a frequency response in keeping with modern ideals. *A straight-line response from 70 to 5,000 cycles is claimed.* I should say, from actual audition, that this claim is perfectly justified.

The anode current for the three amplifying valves is obtained through a U8 valve rectifier. The filament for the first valve is indirectly heated and is fed from a 4-volt secondary winding supplying one of the PX4 valves with filament current. The other PX4 has a separate secondary winding for the filament supply, and this enables the automatic grid bias of each output valve to be adjusted so that the valve characteristics are matched.

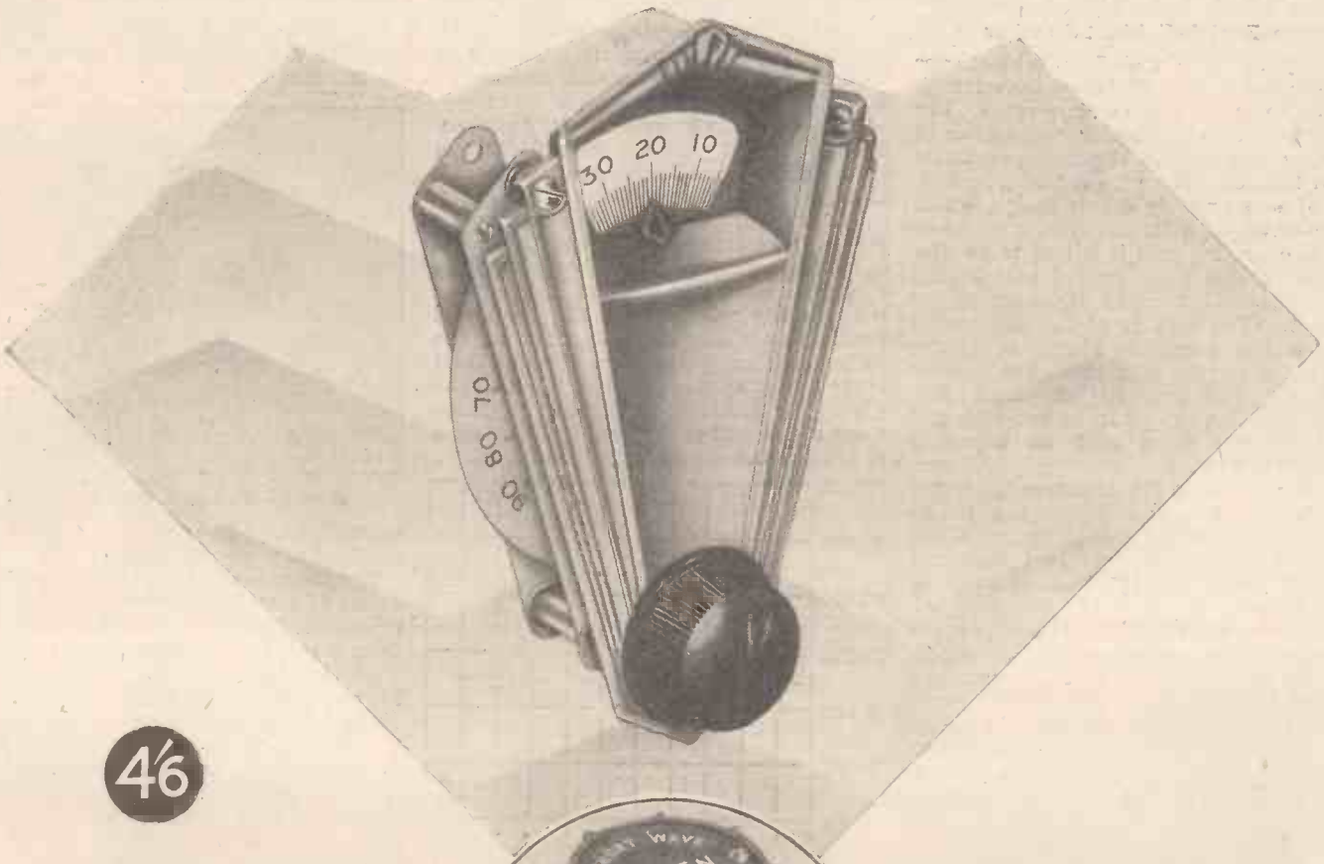
The mains input transformer is designed to work with all normal A.C. supplies. It can be readily adjusted to voltages varying from 100 to 260 volts by means of numbered pairs of sockets mounted in an accessible position to the left of the chassis.

So powerful is the amplifying equipment that as many as six external loud-speakers can be connected up if desired. Moreover, a remote volume control can be plugged in either by itself or with external loud-speakers.

My tests were naturally confined to a critical audition of the machine whilst playing a number of records. The volume control works admirably and there is no appreciable loss of quality when the volume is reduced to a moderate output.

SET TESTER.

TELSEN ILLUMINATED DRIVE



4/6

TELSEN ILLUMINATED DISC DRIVE

A good smooth "slow motion" drive is essential for short wave work. The Telsen Illuminated Disc Drive incorporates an improved movement which gives an exceptionally smooth action and a gear ratio of approximately 5-1, and the bold and well-proportioned figures make for delightfully easy tuning, and, as the dial rotates over the full circle, all types of condensers are catered for. It is fitted with a handsome oxydised silver escutcheon of modern design and the dial may be illuminated by means of an ordinary flashlamp bulb.

Price 4/6

TELSEN 100% ALL-BRITISH MATCHED COMPONENTS FOR THE TELSEN TRIPLE THREE

TELSEN

LONG, MEDIUM AND SHORT WAVE RECEPTION ON ONE DIAL

A weekly review of new components and tests of apparatus conducted by J. H. Reyner, B.Sc., A.M.I.E.E.

Graham-Farish Cabinet Speaker

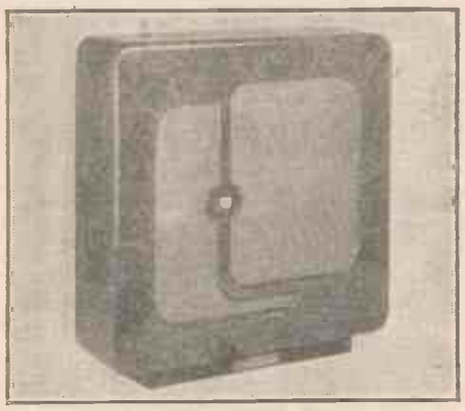
THE Graham-Farish Snap cabinet cone speaker is a small, inexpensive instrument of quite attractive appearance. The cabinet is a bakelite moulding which can be obtained in a number of pleasing imitation wood finishes. The grille is fabric, backed, and of an extremely simple design, which is, nevertheless, quite effective.

The operating unit is bolted to an aluminium bridge piece located just behind the grille and running right across the cabinet. The unit is of the differential type and is extremely simple in design, consisting merely of a short bar magnet with the coil and its associated pole piece passing through it, at one end, and the armature pivot with an adjusting screw at the other.

The free end of the armature is located just above the pole piece, the actual position being adjustable by means of the screw which can be operated from the front of the speaker by means of a coin or screwdriver.

The diaphragm is of the free edge paper type having a peripheral ring of felt to prevent any rattling of the diaphragm against the cabinet.

On test the speaker gave fair results considering the cheapness and the simplicity of the design. The frequency response extended from about 3,000 cycles down to about 200 cycles, with a dead spot around 2,000 cycles.



Graham-Farish cabinet cone speaker

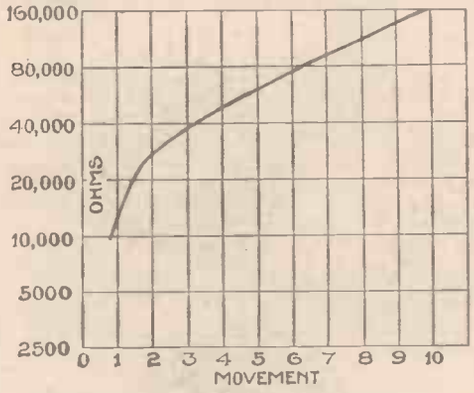
The sensitivity was somewhat below standard, but it should give satisfactory service with the usual type of super-power valve. It is nicely constructed and retails at 21s.

Clarke's Atlastat

THE Atlastat recently marketed by Messrs. Clarke & Co., makers of the well-known Atlas components, is an interesting form of volume control of the built-up variety. There are a number of washers of insulating material interleaved with brass discs.

A moving arm travels over the surface, making contact with the metal discs and the circuit is, of course, completed through the chain of resistance elements in series.

The advantage of this construction is that a large area of resistance element is obtained, giving a good current-handling capacity, while the contact takes place between the rotating arm and the metal interleaving discs, so that wear on the resistance element is avoided. Finally, there is the advantage that the resistance can be graded by inserting discs of lower resistance at one end of the bank and any form of grading can very easily be obtained.



This curve shows the variation of the resistance with the pointer movement of the Atlastat

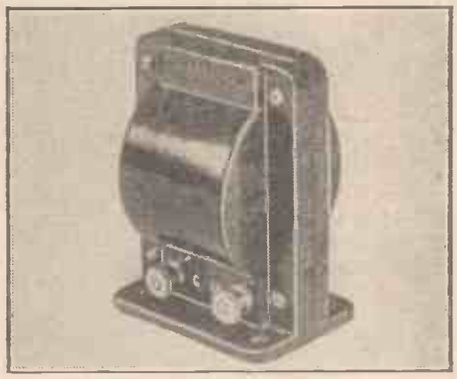
The Atlastat has a further ingenious feature, which is that the unit is built up in two banks side by side, and the moving arm in its rotation passes first over one and then over the other. This enables a very compact arrangement to be obtained, the whole instrument measuring just under 1½ in. square and 1 in. from back to the front.

The particular sample tested was rated at 100,000 ohms and was actually found to have a maximum value of 133,000 ohms. The minimum value was 4,000 ohms, and from the curve herewith it can be seen that the variation of resistance with pointer movement is approximately logarithmic.

The component sells at 8s. 6d. and can be recommended where a resistance of high capacity and noiseless action is required.

Athco L.F. Transformer

AN inexpensive intervalve transformer which we have tested this week is that known as the Athco. This transformer is completely housed in a moulded bakelite case which is finished a mottled brown colour. This case is shaped to accommodate the windings and the core, and also carries the terminals for the external connections. Lugs for mounting are moulded as a part of the case.



A neat L.F. transformer, the Athco

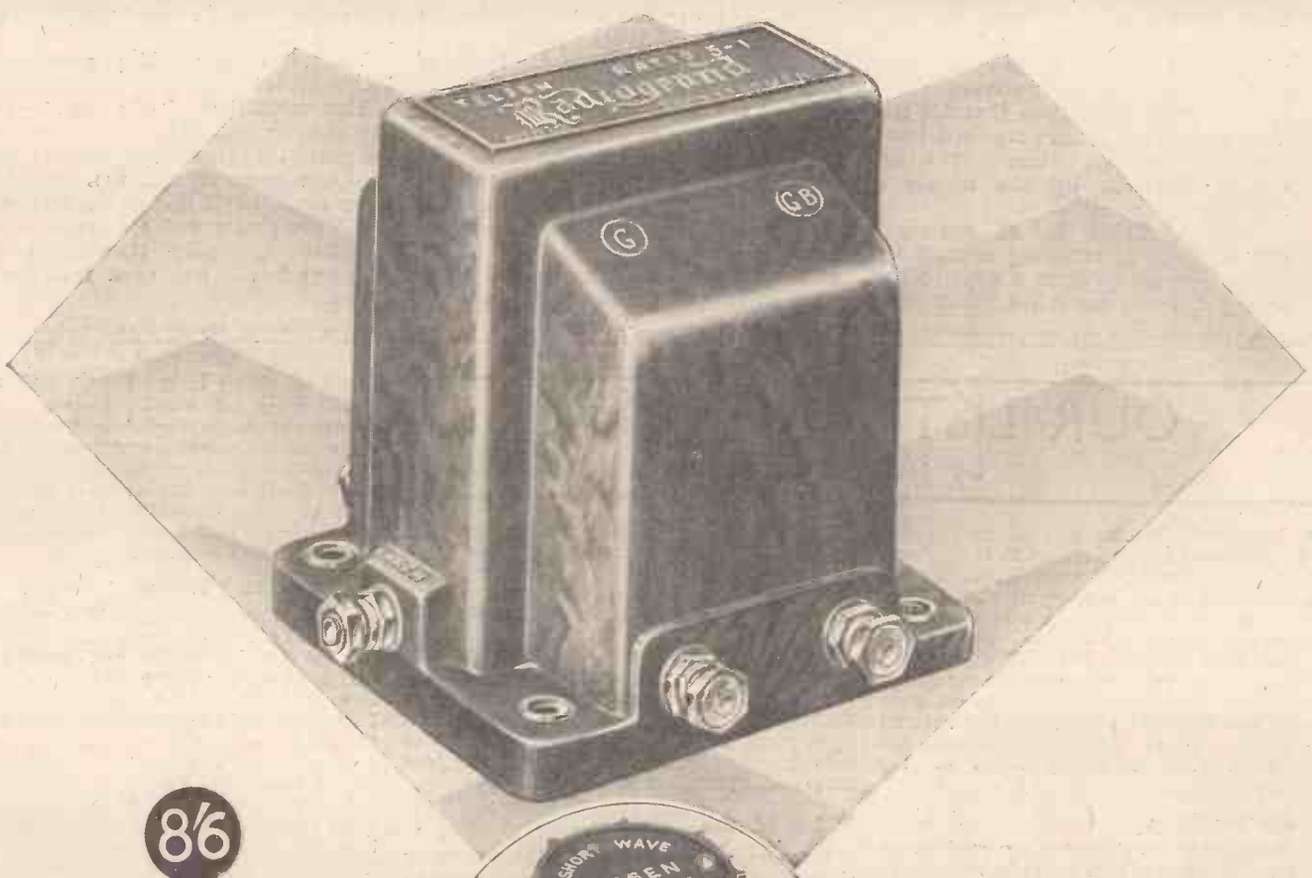
The transformer was tested with the object of ascertaining the amplification to be expected over the audio-frequency range from a stage using the transformer. The valve employed was of the L210 type, having an amplification factor of 15.6 under the conditions of the test, which consisted in measuring the ratio of input to output voltages at various points in the frequency range. An amplification of some 50 times is to be expected over the 600 to 4,000 cycles. The inductance of the primary was approximately 5 henries with 3 milliamperes D.C. and .25 milliampere A.C. in the windings.

A.C. RESISTANCE

A DIRECT current, once it is established, flows uniformly throughout the whole cross-section of a conductor. An alternating current, on the other hand, starts first on the outside layer, and takes an appreciable time to "soak" into the centre core. If it changes direction fast enough—in other words, if the frequency is sufficiently high—the current has no time to penetrate much below the surface, so that the inner core is left inert, i.e., it plays practically no part in the process of conduction. For this reason a multiple-stranded wire, such as Litzendraht, has a smaller A.C. resistance than a single wire of the same weight. Similarly a "tape" wire is a more effective lightning conductor than one of circular cross-section. B. M.

NEXT WEEK:
"THE HOME-LOVER'S ALL-ELECTRIC 3"

TELSEN RADIOGRAND TRANSFORMER



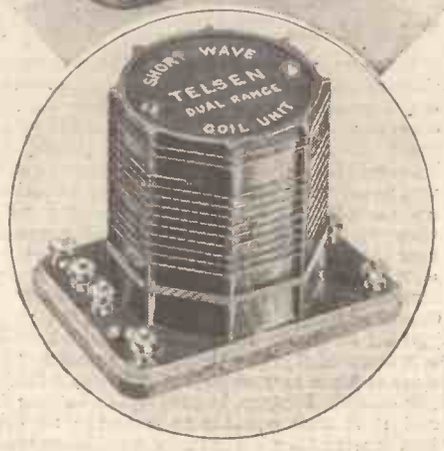
8/6

TELSEN L.F. TRANSFORMERS

Telsen Transformers have achieved fame in the radio world on account of the high standard of their quality and performance. Designed and built on the soundest engineering principles, these robust, full-size Transformers will give not only efficient but enduring service.

L.F. TRANSFORMERS

"Ace" Transformer, ratios 3-1, 5-1	5/6
"Radiogrand" Transformer, ratios 3-1, 5-1	8/6
"Radiogrand" 7-1 Transformer	12/6
"Radiogrand" 1.75-1 Transformer	12/6



The Telsen Short-wave Coil adds the Short Waves without coil changing

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LONG, MEDIUM AND SHORT WAVE RECEPTION ON ONE DIAL

For the Newcomer to Wireless: THOSE FOREIGN STATIONS

I AM always hearing discussions about foreign listening, whether it is worth while or whether it is not. What do you think about it? It all depends upon what you mean by foreign listening. There are some people who take a surprising delight in logging distant stations just because they are distant, and not because pleasant noises can be heard from them.

I know. I am always meeting people who tell me with pride that they heard Zagreb or Zurich on a two-valve set and I know from experience that all that they can possibly have received was a mixture of mush, atmospherics and signals distorted by the misuse of reaction.

Exactly. There is, of course, a certain thrill in receiving any kind of signal that comes from a weak station a long distance away, but that's about all that can be said for it. Many a happy home has been broken up by a husband who glories in picking up fifty stations a night, hearing a couple of bars of music from some and half a sentence in an unintelligible foreign tongue from others.

I can quite believe that. What are your suggestions?

Most people go through a period when their pleasure is proportionate to the number of stations bagged. But the sane listener soon grows out of this.

What are the signs of sanity?

In the course of his explorations he finds that there is a certain limited number of stations—the number depends upon the size of his set—which can be well received on any night that is not hopelessly unfavourable. He makes a list of these and if he wants alternative programmes he turns to this list for his choice of stations.

You mean, he doesn't tune in a station simply because it's far away. He listens only to those foreign stations whose programmes provide genuine musical or other entertainment?

That's just what I am driving at and the number of such stations is surprisingly large with a good set of even modest size such, for example, as a modern three-valver.

What stations would you expect to hear with it?

That would depend, of course, to some extent upon the locality. Stations that are good, for example, in Scotland may be quite poor in Cornwall or Kent. There are, though, certain transmissions which are pretty well received in most localities. Generally the higher the wavelength the less of a nuisance is fading.

OUR LISTENING POST

By JAY COOTE

ANOTHER Russian station on the air! During the past week or so it has been possible to pick up the Moscow Trades' Unions transmissions on 378 metres; they are broadcast by a new regional station in the Soviet capital working on 20 kilowatts. Fortunately it closes down towards 6 p.m. G.M.T. Moscow-Stalin, by the way, which prevents our reception of the Madrid entertainments on most nights, now signs off at latest at 11 p.m. and reappears at 1 a.m., when the broadcasts are carried on until the early hours of the morning.

Listen for Riga

A new arrival on the ether reported to me by some listeners is Riga on 198.5 metres. It would appear that for the moment it is still in its experimental stage and only relays the main programmes from 2 to 2.30 p.m. and again from 8.30 to 9.30 p.m., during which time the 525-metre transmitter is resting.

Conditions remain very favourable for the reception of low-powered stations, and long-distance searches have been relatively easy during the past month. CT1AA (Lisbon), now on 282.5 metres, is well heard on most nights; it seems to possess a competitor at Oporto (possibly CT1AY), which has been found testing towards 1.30 a.m. between 224 and 230 metres. The call-sign is that of an amateur experimenter; but then, there *are* no regular broadcasting stations in Portugal.

Wilno Moves

Wilno must be causing the Geneva authorities some little anxiety, as it has again moved to a higher position in the waveband; my last observation shows it in the immediate proximity of Hanover, well above Budapest. Palermo also, of which the allotted wavelength was never used by Italy, may now be picked up on condenser readings coinciding with those of Riga. It is possible, for this reason, that the latter is seeking another channel. I notice in my log the reappearance of Radio Lyons on 286 metres, and on several days its broadcasts have been received at good loud-speaker strength. Radio Lyons has undergone a process of rejuvenation and transmits from time to time at much greater power. Radio Normandie, Fécamp, has also gained strength, and it is now possible to hear the midday broadcasts; they are usually carried on until 1.35 p.m. On two occasions this month I discovered that this station was televising; I am told that it is a new system and that regular broadcasts of this kind are to be made in the near future.

Down Below 200

A search now and again on the lower end of the broadcast band often secures interesting items. On wavelengths in the neighbourhood of 160, 180, and just under 200 metres you may find Cuxhaven Radio (Germany) in communication with fishing trawlers; in some instances the English language is used. Also lightship shore telephony in the British Isles is to be found in the region of 230 metres. Norddeich (Germany) on the longer wavelength is always to be heard towards midnight, when messages and news bulletins are transmitted to shipping in the North Sea. As the wavelength is almost that of Königswusterhausen and broadcasts are made after that station has closed down, the transmitter is easily identified.

On the Long Waves

Whilst listening on the long waves a few nights ago, I picked up a French call which puzzled me. The station was calling Toulouse and HVJ, giving out F8BO as its own call-sign. When a further message came through I solved the problem. F8BO is the call-sign of the Bélin Laboratory at Malmaison (Paris); it is from that studio you hear a picture transmission on about 1,190 metres. HVJ is the call of the Vatican (Rome) station, where special plant for the transmission of photographs has been installed by the French inventor. Tests were being carried out between the three cities. As experiments are still made from time to time, should you come across them you will know what is taking place.

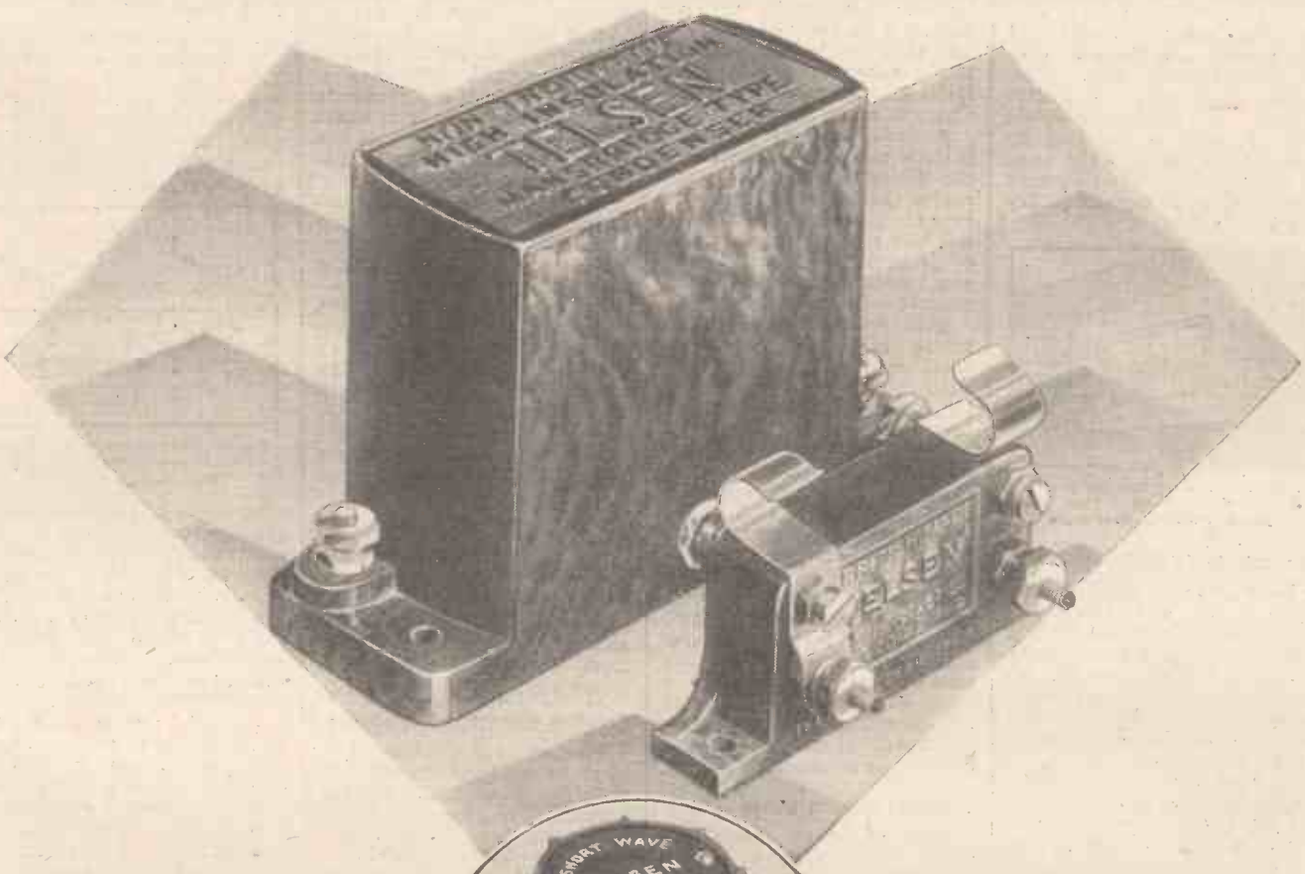
MAINS UNIT CONNECTIONS

Although it is general to have flexible resistances to cut down the voltage for each tapping in a home-built mains unit, at least one variable tapping is used. A wire-wound potentiometer should be used and it is best to mount this on the terminal strip, so that one knows to what position the potentiometer is set before the H.T. lead is connected to the variable tapping.

STRAY COIL FIELDS

It is a mistake to mount tuning coils too close to a metal screen in a set, although it is a popular misconception that a vertical screen is always "safe," electrically speaking. In many cases this is quite wrong and the presence of the screen in the coil field will tend to increase interaction.

TELSEN CONDENSERS



MANSBRIDGE TYPE CONDENSERS

The preliminary research, the most modern plant in the world, the finest raw materials, the latest methods of manufacture, and the final test, all combine to give Telsen Mansbridge Type Condensers a high insulation through years of service with freedom from breakdown. The type of construction employed makes them genuinely non-inductive. From 1/6.

FIXED MICA CONDENSERS
(Pro. Pat. No. 20287/30)

Telsen Fixed Mica Condensers are made in capacities from .0001 mfd. to .002 mfd. They can be mounted upright or flat, and up to .0003-mfd. Telsen Fixed Condensers are supplied complete with patent grid-leak clips to facilitate series or parallel connections. Price 6d.

The Telsen Short-wave Coil adds the Short Waves without coil changing.

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Advt. The Telsen Electric Co., Ltd., Aston, Birmingham. CVS—161

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

PRACTICAL HINTS AND TIPS FOR CONSTRUCTORS

Builders and users of receivers and radio-gramophones will be interested in these practical hints, dealing with construction and operation

Making for Neat Layout

IN a modern circuit there is really no need to have all the controls at the front of the set. The main condenser knob and the reaction knob should be at the front, but the volume control, wave-change switch and radio-gram. switch can conveniently be at the side.

Very often this facilitates wiring, too, and where possible, one should avoid bringing up unnecessary wires to the front of the panel as they may have to run close to high-frequency parts.

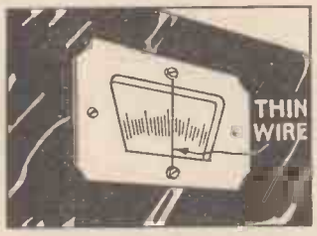

Fig. 1. Showing how an accurate reading-indicator can be fitted to a condenser scale

Accurate Scale Reading

In most modern tuning dials the engraved scale moves and the reading is obtained against a fine line, running parallel with the engravings. A fault of some dials is that this index mark is too thick and in a sharply tuned set it is absolutely impossible to get an accurate reading.

In a super-het, or bandpass outfit where stations are separated by a fraction of a degree, the finest possible index mark must be used, so that one can

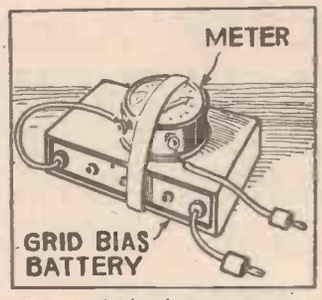

Fig. 2. A simple arrangement for a circuit tester

see exactly where the stations come on the dial.

If your present index mark is too thick and is perhaps a web of the pressing from which the dial is made, then cut it out and stretch across the scale opening an inch or so of 40 or 50-gauge bare copper wire, as used in speaker windings.

This can be stretched between two tiny screwheads and will form a hair-line indication. (Fig. 1).

A Useful Tester

Most of us use a voltmeter for checking batteries and in some cases one of the handy triple-purpose jobs is utilised, so that high-tension and low-tension volts and high-tension milliamperes can be read. A meter of this kind can be made into a handy tester for checking set faults and for tracing over the wiring of a new set.

A flash lamp or grid bias battery should be clamped to the meter (a couple of stout rubber bands can be slipped over the two components) and a flex lead taken from one socket of the battery so that the meter can be put in series with this miniature D.C. supply. (Fig. 2).

This type of tester comes in handy in several ways. In checking over a suspected short-circuit in the high-tension wiring, for instance, it is much better to disconnect the H.T. supply and test through with the meter in series with the battery rather than use the meter alone and try to spot the leakage of the high-voltage supply.

In some tests you may need limiting resistances in series with the battery and meter but for ordinary tests it suffices to put the voltmeter winding (not milliammeter winding) of a dual or triple-purpose meter in series with the battery and to test for continuity in that way.

If the meter needle flicks then it indicates a "short."

Working a Short-waver

It is, of course, possible to convert many types of set for short-wave working by an adaptor which cuts out the normal detector stage, the low-frequency side of the broadcast band set being used for power amplification. Several of these adaptors have been described recently in "Amateur Wireless," and these replace all the H.F. components of the broadcast band set, so that the detector stage has parts of proper value for short-wave working.

If you are converting a detector stage then do not overlook the fact that entirely different values will be needed at certain points for effective working on the short waves.

Some high-frequency chokes, for instance, which work well on the broadcast band between 200 and 1,800 metres or thereabouts, are no good for short-wave working because they "cut off" below 150-metres or so, and below that level there is no high-frequency choking effect.

Some H.F. chokes are suitable for all wavelengths from 20 metres upwards and a component of this type should be fitted in a dual-purpose set, intended for short-wave and broadcast band working.

Preset Position

It is well worth while having the knob of the preset condenser placed so that the value of the capacity in series with the aerial can be varied while one is tuning. This tip is particularly valuable in bandpass sets where the ganging of the circuits can be varied within limits by adjusting the preset.

In an ordinary set it is common knowledge that slacking off a preset condenser sharpens up the tuning and slightly reduces signal strength.

In a bandpass set this may not happen when the set is being worked at the extreme ends of the main condenser scale. In all probability, the ganging will not be absolutely accurate at the ends of the scale and adjustment of the preset condenser will make a marked difference in the signal strength.

It will affect, actually, only the matching between the aerial circuit and the other ganged circuits, and it is the aerial circuit which is more difficult to keep correctly ganged. This is just what is wanted and so it is most essential to have the preset knob within easy reach.

Ganging Wavechange Switches

Where ganged coils are mounted immediately in line with the wavechange switches on the same shaft, it is most important to see that both switches open and close together.

A feature of some circuits is that the set will work, but, of course, give poor results, if one switch is open and the other is shut, the coil with the open switch (being on the long waves) acting as a plain H.F. aperiodic circuit.

Conversely, if your set does not work properly on the long waveband and shows a marked break-through of short-wave local stations, then probably both switches are not opening simultaneously.

Shake or pull the wavechange rod and make sure that there is no crackling. An intermittent contact may imply that a direct short is not made across the long-wave winding and that there may be only a virtual high-resistance in parallel.

Push-pull wavechange switches may go out of true in opening and closing together if the ebonite insulation, usually put between the two sections of the switch, is rotated.

This is usually tapped at both ends, so that the metal parts of the switch gear screw into it, thus ganging the two switches. If the ebonite piece is rotated it will vary the distance between the contacts and prevent them making and breaking simultaneously. (Fig. 3).

Radiogram Wiring

A good idea is to shield the twin leads going to a pick-up. This has several advantages. For one thing it keeps the pick-up wiring neat and out of the way. For another the metal casing of the pick-up shield can be earthed and this is often very

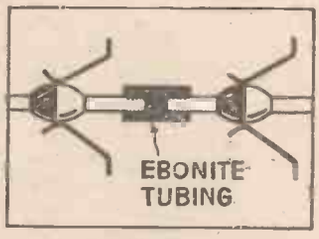

Fig. 3. This illustrates the point raised in connection with ganged wavechange switches

effective in cutting down mains interference and crackles or commutator hum pick-up from the turntable motor. (Fig. 4).

Twin metal braided wire, as used for the wiring of a motor-car sidelamp is quite suitable, but, of course, this heavy wire must not be carried right through to the pick-up.

It must be used only for the under-baseboard and set wiring and two fine flexible wires should be carried through to the pick-up so that its horizontal movement is not restricted.

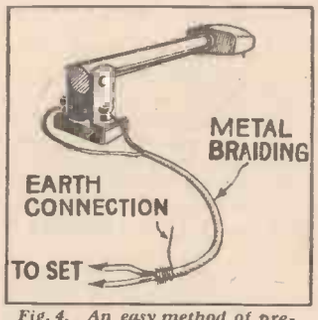

Fig. 4. An easy method of preventing interference in pick-up wiring

Motor Mounting

Small electric gramophone motors and some types of clockwork motors are fitted with double spring washers, one on each side of the mounting plate, to prevent the motor vibrations being transferred to the turntable board and pick-up.

This suspension should, of course, be resilient and the bolts running through the spring washers must not be tightened down so that no loose movement is possible.

Why a Detector By-pass is Important

W. JAMES deals with an important feature of circuit design which concerns every amateur set-builder

THE little condenser that you often see connected between the anode of the detector valve and its filament plays a very important part.

This condenser is marked C in Fig. 1. It could be joined between the anode and the high tension as shown by the broken connections in the figure, but it is always as well to connect a condenser used as this one is, between the anode and the filament.

You get stronger signals when this condenser is used and often the selectivity is noticeably better than when no condenser is connected in the anode circuit. The actual amount of the improvement depends upon the valve used and the "goodness" of the circuit connected to the grid. It may amount to a 30 or 40 per cent. increase in the strength of the signal.

Some Experiments

A few experiments will soon prove the truth of these remarks. You can use an ordinary receiver. First tune in a signal and then make the signal fairly weak, in order that differences in the effectiveness of the detector and in the efficiency of the circuit will be the more likely to produce noticeable changes in the strength of the output from the loud-speaker. If reaction is included in the set it had better be disconnected.

Then add a fixed condenser of, say, .0005 microfarad to the anode circuit and observe how the strength has increased. If you connect and disconnect this condenser, or the one already in the set, you

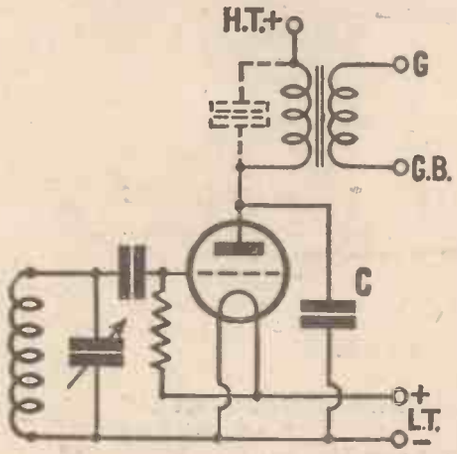

Fig. 1. The important anode by-pass condenser is shown at C

will be able to note the effect produced. Also note the difference in the sharpness of tuning, this being most marked when the tuning circuit joined to the grid is a good one.

It may seem strange that a change like this in the anode circuit will affect the tuning of the grid circuit and also the signal strength. The reason is to be found in the fact that the anode circuit is coupled to the grid circuit by a condenser. This condenser is formed by the grid and anode elements of the valve and is of sufficient capacity under working conditions to have a great effect upon the working of the valve.

The signal applied to the grid of the valve is a modulated high-frequency voltage. The high-frequency oscillations are modulated by the low-frequency output from the

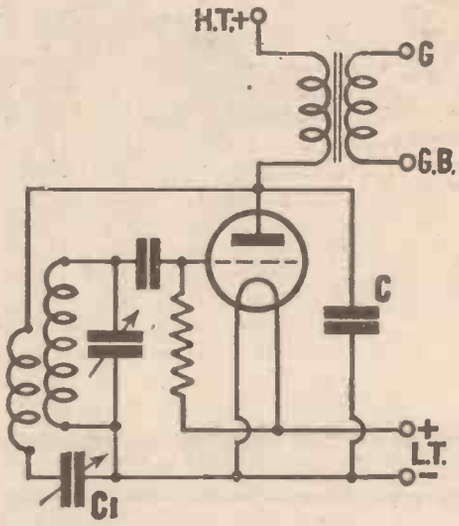

Fig. 2. The by-pass condenser is at C, and the reaction condenser at C1

microphone at the transmitter and it is the purpose of the detector to extract, as it were, the low-frequency part of the signal from the modulated oscillations.

Now we get in the anode circuit of the detector, with the low-frequency output, high-frequency currents. These are usefully employed when there is a reaction circuit as in many receivers. But at the same time, when high-frequency voltages are allowed to appear in the anode circuit, they force a current to flow back to the grid circuit through the anode-grid condenser.

Detector Input

The result is that the value of the input to the detector is affected. When a condenser is joined between the anode and filament circuit the high-frequency currents produced in the anode circuit flow from the anode to the filament through the condenser. This condenser has a very low impedance to high-frequency currents and, therefore, the high-frequency voltage developed at the anode is small. In consequence, the feed back through the valve is reduced by the by-pass condenser.

If the condenser has a capacity of .0001 microfarad appreciable feed-back may still occur, but by connecting a .0003 or .0005-microfarad condenser the feed-back is made negligible. The total capacity in the anode circuit is made up of the capacity of the by-pass condenser, that of the wiring and the low-frequency component connected to the anode, and also the anode to filament capacity of the valve.

When reaction is included, as in Fig. 2, we have also the reaction coil and condenser C1 to consider, a certain amount of high-frequency current passes through the reaction circuit. As the capacity of the reaction condenser C1 is increased, so the strength of the current flowing through this circuit increases.

Now the total value of the capacity used in the anode circuit may be so great that the high audio-frequencies are weakened. It depends partly upon the characteristics of the transformer used and the impedance of the valve.

Reaction Capacity

The usual practice is to include no more capacity in the anode circuit than is necessary for good rectification and signal strength and to design the rest of the circuit in order that the quality shall be right. But owing to the fact that the reaction condenser is adjustable, the quality will vary because of the change in the capacity as the reaction is adjusted.

This is avoided by using a differential condenser, connected as in Figs. 3 and 4. There are two equal sets of fixed vanes in condensers of this type and a rotor. In the circuit arrangement of Fig. 3 the rotor or moving vanes are connected to the filament circuit, one set of fixed plates is joined to the anode, and to the reaction coil, while the second set of fixed plates goes to the other end of the reaction coil.

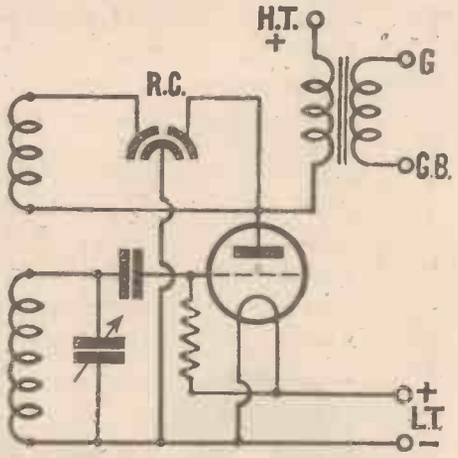

Fig. 3. A differential condenser with the rotor connected to L.T. negative

The capacity to earth is the sum of the capacities of the fixed plates to the moving plates. When the moving plates are fully between the plates in one set of fixed vanes, the capacity is the same as when the moving plates are moved to the opposite position. In one case the high-frequency currents pass from the anode to the filament and in the second position they pass through

(*Continued on next page*)

"WHY A DETECTOR BY-PASS IS IMPORTANT"

(*Continued from page 400*)

the reaction coil on the way to the filament circuit.

In intermediate positions the current divides, some passing direct to the filament and the rest through the reaction coil to the filament.

No fixed condenser is needed in the anode circuit when a differential condenser is

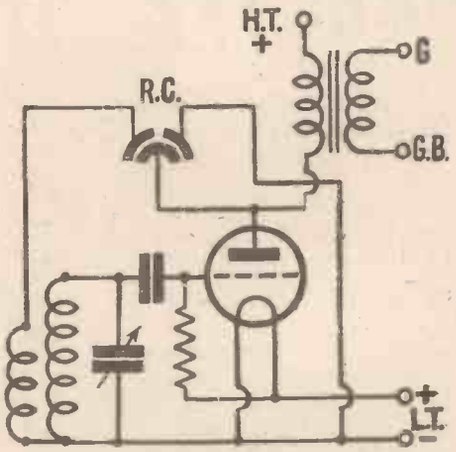

Fig. 4. Normal method of connecting a differential reaction condenser

used, unless it is for the purpose of helping the reaction, as for example, when the differential condenser has a small capacity.

In the circuit of Fig. 4 the moving vanes are joined to the anode of the valve. One side of the reaction coil is joined to the filament. Many tuning coils have a reaction winding connected in this way, but when possible the arrangement of Fig. 3 should be used, in which the moving vanes of the condenser are taken to the low tension.

BROADCASTING "BIG BRUM"

New arrangements for a popular Birmingham Outside Broadcast

A NEW microphone has been installed in the tower of the Birmingham Art Gallery for the broadcasting of "Big Brum," the giant bell which rings out Birmingham's standard time. It takes the place of an old microphone which has been in the tower for some years. This has been used occasionally, but very few people seem to know that the Birmingham chimes can be heard on the wireless.

There is no fixed time for the broadcasting of "Big Brum," but the microphone in the Art Gallery tower is used at least once daily, usually at 5.15 p.m. in the Midland Regional programme.

The performance of the old microphone has not given satisfaction lately, the tone of the bell sounding very hard. It was decided to instal a modern "mike" of the Reisz type, and I spent a very interesting (and breathless) time with the B.B.C. engineers who were searching for a suitable position for the microphone. Mr. Cooper, the B.B.C.'s Engineer-in-Charge at Birmingham, explained that one can never foretell with any certainty what sounds a microphone will pick up. Consequently, extensive tests are necessary when a new microphone is installed anywhere.

Traffic noises were to be avoided, and so it was decided by the engineers to instal the Reisz "mike" at a considerable height above the street. Several positions on the roof of the Art Gallery were tried first, without much success.

The engineers fixed a microphone at the top of the canopy over the entrance to the Art Gallery, which is below the clock, but here the "mike" failed to pick up the chimes at all, so the search party moved to the clock tower itself.

The 160-ft. ascent of the tower reminds one of climbing a lighthouse. At first the stairs are stone. We laboured upwards, round and round and round, until we felt quite giddy. Then came iron stairs, and a final climb up wooden ladders brought us to a landing where we were on a level with the clock face. Each dial is 10 ft. 6 in. in diameter and is illuminated by gas. The hour bell known as "Big Brum" weighs 3 tons 6 cwt.

Next Week

At a wonderful price! A new all-electric set with mains unit, cabinet and speaker for only £7 17 6.

The position eventually selected for the microphone is above the clock. In fact, the engineers took the "mike" to the top of the clock tower, as far as they could climb, before they were satisfied with results. This is the highest point in Birmingham.

And so in the eerie darkness of the tower hangs "mike" enclosed in a waterproof sponge bag to protect him from damp and birds. I was in the tower when "Big Brum" struck. The noise at close quarters is deafening.

The microphone is connected by landline to the B.B.C. control room in Broad Street, Birmingham. The wires and mechanism of the clock have made noises which, in the past, have been broadcast along with the chimes, but the City Surveyor has now arranged for the clock and bells to be overhauled. It is hoped that this will reduce the extraneous noise, and with the improved broadcasting arrangements we may anticipate that "Big Brum" will be heard more often in future. L.B.

TESTING A NEW POLICE RADIO OUTFIT

(Left) The receiver used in new police cars in New York is remote controlled, from the small box clamped to the steering column. (Right) Each car is fitted with a speaker in the roof and this puts the "speed cops" in direct touch with police Headquarters, where the movements of criminals are reported by telegraph

WAVELENGTH ANOMALIES

THE fact that the National programme on 261.3 metres generally comes in at less strength than the Regional programme on 356.3 metres to listeners within a twenty-mile radius of Brookmans Park is a pretty clear indication that the shorter wavelengths are not suitable for "local" broadcasting. The falling-off in field strength at such close range is due to the large proportion of "space-wave" energy as compared with the longer waves from the Regional transmitter, which are more earthbound and, therefore, do not tend to "skip" over the local receiving aerials. The proportion of earthbound energy on the long-wave programmes between 1,000 and 2,000 metres is still greater, and reception is consequently easier at all times. On the other hand signals sent say, on 40 metres, will skip over distances sometimes amounting to several thousand miles. M.L.

The WORLD AT YOUR ELBOW

WITH THE "WORLD WIDE SHORT-WAVE 3"

Jay Coote continues his helpful hints on tuning in the short-wave stations of the world

THE conditions of the ether during the past fortnight have been exceptionally favourable for the reception of short-wave transmissions, and over this period many entries have been made in my log. One broadcast in particular which has cropped up with a pleasing regularity is that from Radio Saigon (Indo-China) on 49.05 metres. It may be heard on almost any afternoon between 1 and 3 p.m. G.M.T. If you have already registered W3XAL (Boundbrook) on 49.18 metres, you should find Saigon almost immediately below. The call is given out in both French and English (*Ici Radio Saigon*; pronounced *Say-ee-gon*), and the transmissions consist of news in both languages, gramophone records, a concert, and a native orchestra of the usual Oriental stringed variety and wailing chorus. Between items a particularly strident gong is struck and also after each announcement. When closing down with the "Marseillaise," between 3.15 and 3.45 p.m., the announcer bids you good night, for it is then nearly 10 p.m. in that quarter of the globe. The station opens at midday G.M.T.

American Stations

Just below Saigon we find W2XE, the short-wave relay on 49.02 metres of WABC, Wayne Township (N.J.), the key station of the Columbia Broadcasting system. It is on the ether daily from 1 p.m. until 5 a.m., and is often well heard between 8 and 11 p.m., although I have frequently logged it at an earlier hour. Then, a short twirl of the condenser, but only on Wednesdays and Fridays, should bring you W8XK, on 48.86 metres, taking the KDKA (East Pittsburgh) programme. Best time: between 11 p.m. and the early morning hours. As an alternative to this channel on other days, try on 25.25 metres, as this latter transmission is carried out daily. On Wednesdays and Saturdays W8XK also works on 19.72 metres, but apparently only between midday and 4 p.m. The call occasionally heard is "This is KDKA, the Pittsburgh broadcasting station of the Westinghouse Electric Company," but more frequently on these wavelengths you will pick up the National Broadcasting Company's programmes, which KDKA takes through WJZ (Boundbrook, N.J.), and consequently the call will be in accordance.

On the same wavelength as VQ7LO (Nairobi), 49.5 metres, but between 2 and 9 p.m. daily, we may log W3XAU, a short-wave relay of WCAU (Philadelphia, Pa.), another member of the Columbia group, and from which you get the WABC call. Also W9XAA, on 49.34 metres, in the immediate vicinity, acts as relay to WCFL (Chicago, Ill.), between 2 p.m. and 5 a.m., and again supplies an alternative channel for the N.B.C. entertainments.

German Short-wavers

Between this station and W3XAL (Boundbrook) we may search for a Canadian, namely, VE9GW (Bowmanville), working on 49.22 metres on weekdays, between 11.45 a.m. and 3 p.m., and again from 8 p.m. until 3 a.m.; on Sundays from 5.30 p.m. to 4.15 a.m. VE9CL (Winnipeg) is another powerful short-waver on 48.84 metres, just clear of W8XK (East Pittsburgh). Try for it on any weekday after midnight; it works until 2.30 a.m., but does not broadcast on Sundays.

As you will see from the above, these stations are all very close together and the actual search to be made is only over a few degrees of the dial.

Now another useful landmark to log is Zeesen on 31.38 metres, as this station is surrounded by a number of interesting transmitters. It broadcasts daily from 1 until 11 or 11.30 p.m., and therefore gives you many opportunities of picking it up. It relays programmes from Berlin, Breslau, Leipzig, Frankfurt-on-Main, Hamburg, Cologne, and Munich. The call on most occasions is a combined one or that of the original station and the words *Weltrundfunksender* or *Deutscher Kurzwellensender*, denoting that the transmission is also being given by the German short-wave station. Interval signals vary in consequence, e.g., metronome from Berlin, three notes from Stuttgart, etc. These transmissions are particularly well heard *in the afternoon*.

Having logged Zeesen, a very slight increase in condenser setting should give you W2XAF, which takes the WGY (Schenectady) programmes of the N.B.C. On weekdays it starts work at 10.30 p.m.; on Sundays you may pick it up about an hour earlier; it closes down at 4 a.m. (W2XAD, its more powerful brother on 19.56 metres, can only be found on weekdays between 6 and 8 p.m.; on Saturdays and Sundays the transmissions are extended about one hour.) This station is linked up with WEAF (New York). As they open you will hear the announcer's initial call: "This is station W2XAF (Schenectady) of the General Electric Company, transmitting on a frequency of 9,530 kilocycles. Good afternoon, ladies and gentlemen." The WGY interval signal, when own programme, is a short melody of eight notes played on an instrument akin to a xylophone.

Full details of the "World Wide Short-wave 3" were given in Nos. 504 and 505. The set is very easy to build and operate

Immediately above W2XAF, on most nights, you are sure to hear Skamlebaek, on 31.51 metres, relaying the Copenhagen entertainments, from roughly 6 p.m. G.M.T. until the Dane closes down. The call is the well-known "*Kalundborg-Kjobenhaven og Danmarks Kortbölgesänner*,"

(*Continued on page* 406)

TYPICAL OF TELSEN VALUE

TELSEN VALVE HOLDERS
(Prov. Pat. No. 20286/30)

The Telsen four- and five-pin valve holders embody patent metal spring contacts, which are designed to provide the most efficient contact with split and non-split valve legs, and are extended in one piece to form soldering tags. Low capacity and self-locating.

4-Pin Valve Holder .. .. .. Price 6d.
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GRID LEAK HOLDER
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FIXED MICA CONDENSERS
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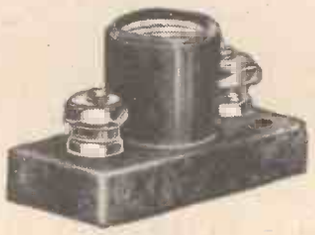
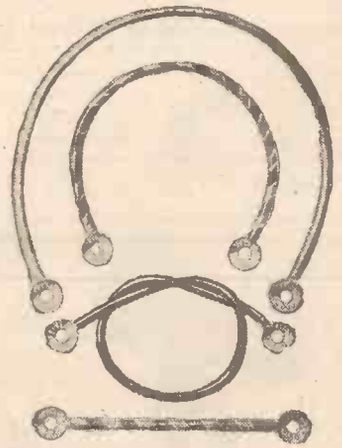
SPAGHETTI FLEXIBLE RESISTANCES
From 6d.





TELSEN
TRIPLE THREE

LONG, MEDIUM AND SHORT WAVE RECEPTION ON ONE DIAL

Advt. of The Telsen Electric Co., Ltd., Aston, Birmingham. CVS 172

"THE WORLD AT YOUR ELBOW"

(*Continued from page 404*)

and the interval signal that of the mother station, namely, an old Danish traditional of the musical-box variety. Make a careful note of these condenser readings, as they will assist you as a jumping-off point for a trip to the Dutch East Indies. PLE (Bandoeng, Java), on 31.86 metres, must be set down for a search on a Tuesday between 1.40 and 3.40 p.m.; it is the only period in the week—barring, perhaps, occasional short tests—on which broadcasts of entertainments are given; at other times the station ultilises its plant for public telephony services. As a rule the concert consists of gramophone records with, at intervals, short talks by the Bandoeng Radio Club, and even comprises messages and greetings sent by its members to relatives and friends in Holland. All announcements are made in several languages, including English, and the station invariably closes down with the Dutch National Anthem. The local time being at that moment not far short of 11 p.m., the announcer cheerfully calls, "Good-night to everybody in the world."

30-40 Metres

Again, moving slightly up the scale, we shall find Rabat (Morocco), on 32.26 metres, which can be logged when broadcasting on Sundays between 7 and 9 p.m. G.M.T. The interval signal is a metronome possessing a peculiar metallic clang. French announcements are made throughout the programme and numerous references to "*L'Orchestre de Radio Maroc*," of which the studio is inordinately proud. The call is "*Ici Radio Maroc.*"

Let us pick up again the readings of Zeesen and try for Poznan (Poland), on 31.35 metres, either on a Tuesday, between 6.45 and 9.45 p.m. G.M.T., or on a Thursday, between 6.30 p.m. and 1 a.m. Personally, I have logged this transmission on only two occasions towards 11.30 p.m. There are no distinctive peculiarities to register about the Tuesday broadcasts, which mainly consist of gramophone records for test purposes, but on Thursday it relays whatever the main Poznan studio may be transmitting or taking from another Polish station. The call will vary accordingly.

On the same wavelength on many evenings you will hear the WBZ (Springfield) and WBZA (Boston) broadcasts through WIXAZ, and immediately below, on 31.30 metres, W3XAU relaying WCAU (Philadelphia) daily from 9 p.m. onwards (Thursdays and Fridays excepted).

Down Under

Finally, a serious effort should be made on a Sunday, between 2.30 and 4.30 p.m., with a view to capturing a transmission from VK2ME (Sydney), as at that time special concerts are broadcast for the benefit of British listeners. The opening call: "This is VK2ME, the Australian National Empire short-wave station on 31.28 metres." The interval signal cannot be mistaken; it is the call of the kookaburra or lyre bird (laughing jackass). The announcer usually gives us the Sydney local time, i.e., ten hours ahead of G.M.T. VK3ME (Melbourne), on this wavelength, is to be sought between 10 and 11.30 a.m. G.M.T. on Wednesdays or Saturdays. The broadcast opens with a time signal from the Malvern Observatory and chimes from the Melbourne Town Hall. The call varies little from that given for Sydney.

MAGNETISM

IRON, nickel, and cobalt, and their alloys form a class by themselves in possessing strongly magnetic properties. They are not only attracted by a magnetic pole, but are capable of acquiring and retaining magnetism and so becoming magnets themselves. Actually they form part of a larger group of substances all of which are called paramagnetic, because they are more or less feebly attracted by a magnetic pole. Diamagnetic substances, on the other hand, are feebly repelled by a magnetic pole, the most noticeable example in this class being the metal bismuth.

B. A. R.

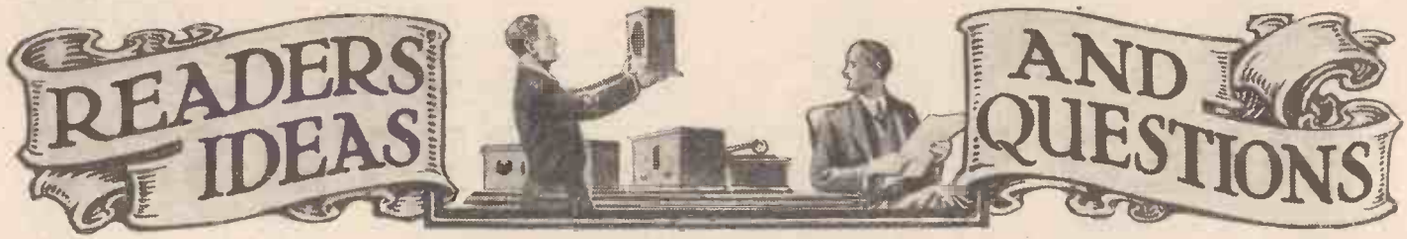
POST OFFICE RELAYS

THE suggestion recently made to relay programmes over the existing telephone wires recalls the fact that a similar proposal was made in the early days of broadcasting, when the original Electrophone licence expired. The Electrophone, it will be remembered, was connected to certain West End theatres, and broadcast the words of the play, as picked up by a microphone on the stage, to telephone subscribers, who paid ten or fifteen guineas a year for the privilege of listening-in through a pair of headphones closely resembling a doctor's stethoscope.

M. B.

The creator of the "Joan and Betty" Bible stories which are now S.B.'d to many stations, Mr. E. R. Appleton, the Western Regional Director of the B.B.C. He is supervising the construction of the new station at Washford Cross, Somerset, which will give the Western Regional programmes

PERSONALITIES IN THE WEEK'S PROGRAMMES



Quality and the Super-het.

SIR,—In "A.W." No. 503, page 218, you give a reply to a reader concerning quality and the super-het. in which you rather decry the use of a super-heterodyne receiver for quality reception and absence of background noises. This reply seems rather contradictory in the light of several statements that have appeared from time to time. W. C. (Edinburgh.)

If you will refer to the querist's letter in the above issue, you will see that this reader wants quality as the first essential, together with absence of background noises, and secondly, a few alternative programmes when the local station or stations have not a programme to his liking. Now the super-het. receiver is capable of picking up many more stations than is often required. The large number of stations that are capable of being picked up will, in many cases, interfere with each other and spoil the quality of reception of a particular station that is required. To accomplish reception of many stations there are two screen-grid intermediate frequency valves employed. These, when working at maximum efficiency, give rise to valve hiss and other parasitic noises. These combine to give rise to what are termed background noises. A decrease in the number of valves used in any set means a decrease in the amount of valve noise experienced. Alternatively, it would be possible to use many valves and reduce the magnification of each valve stage to such an extent that background noises would not be noticeable. This arrangement, however, so far as the amateur is concerned, is somewhat wasteful and would not be tolerated by many. Our reply, therefore, still holds good in that a receiver possessing fewer valves is more likely to meet with the requirements of the reader to whom the reply was addressed. The other side of the case is, readers who wish to possess a receiver which is capable of long-distance reception and, at the same time, quite good quality reproduction, quality not to be of the first importance, may still consider the super-het. to fill the bill. Background noises will be in evidence when receiving distant stations, but these noises may be cut down or entirely eliminated by reducing the volume control voltage regulator to effect minimum H.F. amplification.—ED.

Switching on a Set

SIR,—My set is the "1931 Ether Searcher," to which I have added a safety fuse. I use this with a mains H.T. supply unit and find that whenever I switch on the mains unit first and the receiver switch last, my safety fuse burns out. As the fuse burns out, it would seem I am throwing a heavy strain on the valves in my set. Whenever I switch on the receiver first and the mains unit switch afterwards, the fuse remains intact. I assume the latter sequence of switching is the most satisfactory, but as I use my set for gramophone work and switch off the filament current to the S.G. valve separately, does not this put a strain on the S.G. valve? I should be glad of your observations on this subject.

C. A. B. (Hammersmith).

It is quite true that a heavy strain is put on the valves when the H.T. circuit is completed before the L.T. circuit. The L.T. supply should always be connected to the receiver and valves, before the H.T. voltage is applied. In the case of a set employing H.F. valves which are switched off when the set is adapted for gramophone work, it is simpler to disregard the strain thrown on the S.G. valve when switching from gramophone to radio. When switching from radio to gramophone there is no strain put on the valve. If you want to take particular care of your valves, it would be better to switch off the receiver entirely before changing from gramophone to radio.—ED.

"Century" Results

SIR,—I wish to thank your technical staff for giving us the "Century Super." After having used this set for two months with entire satisfaction on the long and medium wavebands, I decided to try my luck on the short waves, not without misgivings, I must admit, as I have tried some so-called "three-waveband" sets before.

In four days I had added the following stations to my log, all at good loud-speaker strength: Vatican, Moscow, Cincinnati W8XAL, Bound Brook W3XAL and W3XL, Pittsburgh W3XK on 48.86 and 25.25 metres, Lisbon, Skamlebaek, Zeesen, Schenectady W2XAF, Chelmsford G5SW, Rome, and—the greatest thrill of all—Sydney VK2ME. Tuning was not critical and hand-capacity effects negligible, which facts made listening a real pleasure.

J. H. (N.W.8).

Sunday Programmes!

SIR,—I have read with interest a recent article on Sunday Programmes. I disagree with one paragraph. We just *don't* want the B.B.C. to commence broadcasting light orchestral music before 3 p.m. You know what the B.B.C.'s idea of "light music" is—Bach's cantatas and so on!

So why drown Radio Paris, which has a clearer conception of light music? Enough said! S. H. (St. Annes-on-Sea).

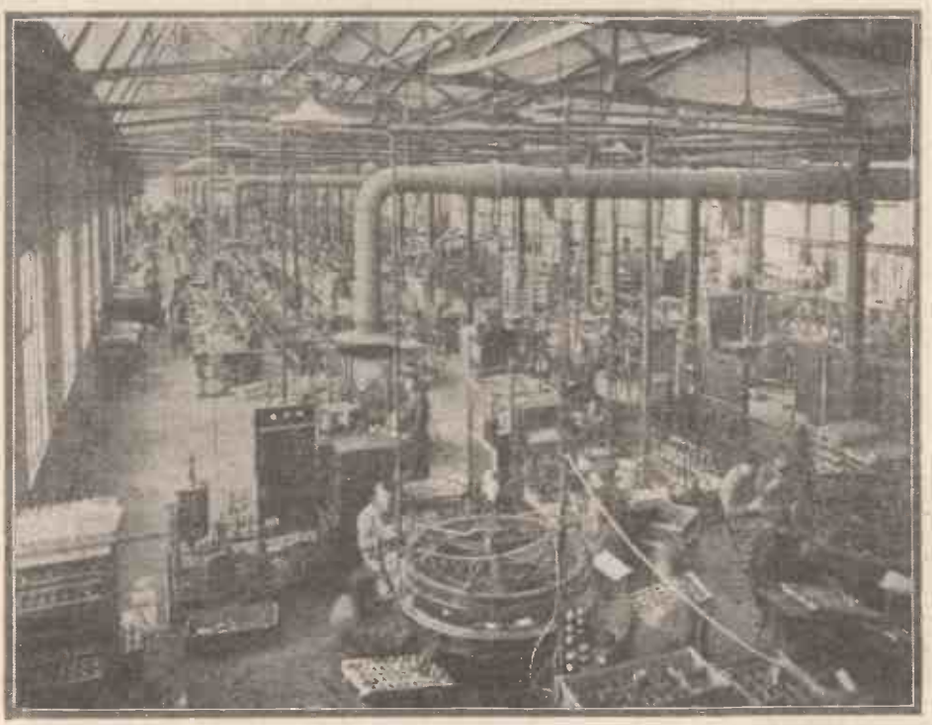
Short-wave Results

SIR,—"Jay Coote" said recently that when it is midday in London (to-day) it is 10 a.m. (to-morrow morning) in Sydney. This I think is wrong. It should be 10 p.m. to-day. Sydney, Australia, is ten hours in front of G.M.T.

Here is a bit of news for "A.W." Last Sunday, between 16.40 and 17.13 G.M.T., I heard an Italian station working on the amateur 40-metre waveband and giving the usual Italian type of call, namely: "Pronto, pronto, pronto," and then "Radio

(*Continued on page 410*)

MAKING A VALVE



When you buy a new valve, perhaps you don't think of the vast organisation needed in its manufacture. This glimpse of the main assembly shops of the Mazda valve works give some idea of the large amount of machinery needed for valve making

"READERS' IDEAS & QUESTIONS"

(*Continued from page* 408)

Coltana Bisa." This station was giving gramophone records and closed down at 17.13 with the following announcement in English: "Hallo, Hallo. This is Italy calling from Radio Coltana and closing down. Good-bye."

I find reception below 100 metres is brightening up now and I have been getting the U.S. stations better lately than for some months. H. L. (Prestwich).

An Eliminator Circuit

SIR,—With reference to the description of our new model A.C.5 Power Unit in a recent issue, it is necessary to correct the statement referring to the rectifier in the low tension circuit. The rectifier in question is of a type little known in this country at present.

We suggest that the statement, "while that in the low-tension circuit is of a special patent construction and is manufactured by the makers of the eliminators themselves," should read, "while that in the low-tension circuit is of a special construction not manufactured in this country."

MAINS POWER RADIO CO. (Romford).

An Accumulator Hint

SIR,—I have sometimes noticed on taking the accumulator off my set that the top of the positive plate is darker in colour than the bottom. This means that the plate is being used more at the bottom than at the top. On testing, the density of the acid at the bottom was greater than that at the top. The accumulator, I suppose, loses acid at the charging station, and the assistant fills it up with distilled water, which, being lighter than the acid, remains at the top. Now, after each charge, my accumulator receives a slight shake to render the density of the liquid the same throughout. F. J. W. (London, S.W.).

The "Century Super" in South Africa

SIR,—I am writing to congratulate you and your staff, especially Mr. James, on designing and publishing such a magnificent set as the "Century Super."

If I am not mistaken, I was the first man in South Africa to build it, and I might tell you I have had quite a number of fellows round to see it, and all have praised it.

Just lately reception conditions have not been too good, but, in spite of atmospherics and other things, the "Century Super" still brought stations in.

On the short waves the last two or three weeks America has been coming over just as if it was next door, and as for Moscow, he nearly blows the roof off.

I am using the battery model, but running off the mains with the Orgola Jnr. power unit.

I read with interest "Thermion's" remarks in AMATEUR WIRELESS, No. 485, anent American receivers. In this country we are overrun with them; in fact, it is very difficult to get a British set at all. I have compared the "Century Super" with some of them, and they are not in the same street.

So far, I have logged about thirty stations on the speaker, which I consider is very good for this country.

A. D. McI., (Port Elizabeth, South Africa).

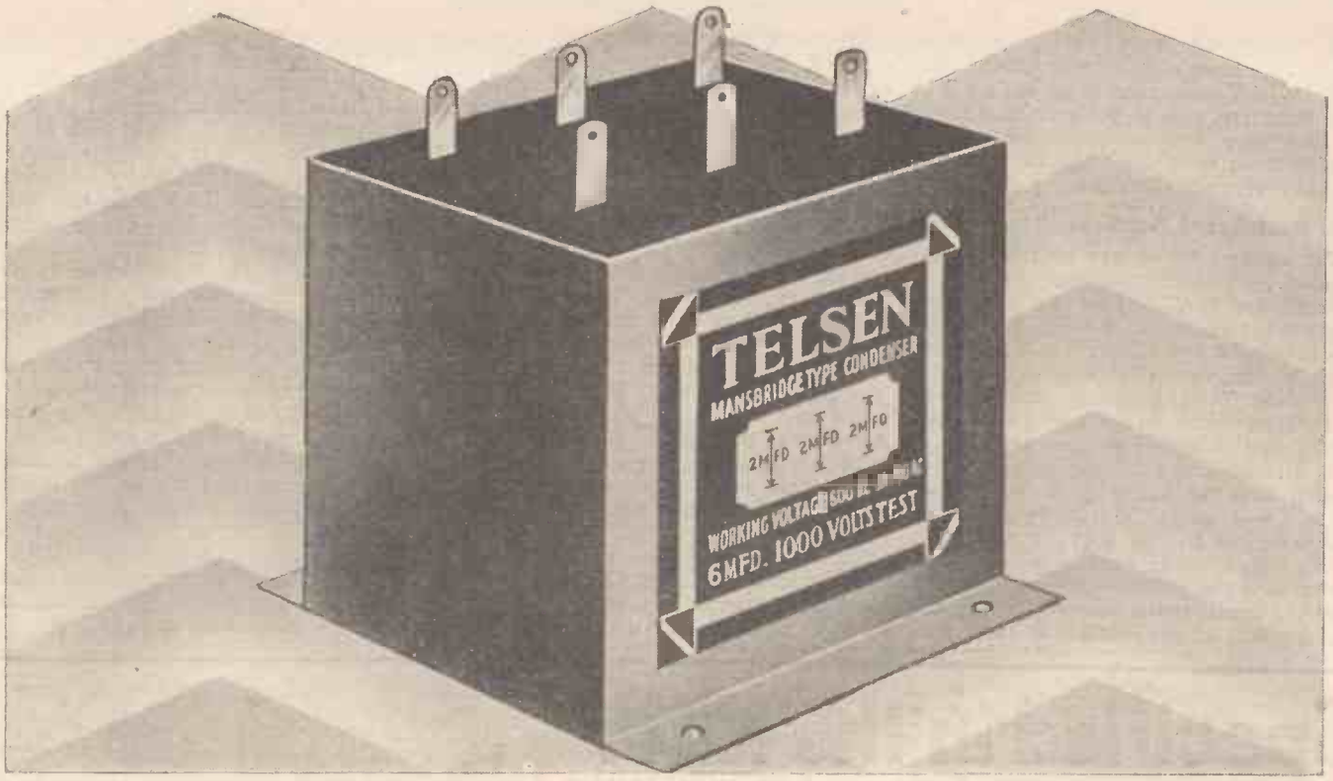
Short-waves and Super-hets

SIR,—I have constructed a short-wave super-het adaptor as described in the special supplement in AMATEUR WIRELESS for January 23, and find that I cannot get results when using this in connection with my "Century Super." Can you explain to me where I have gone wrong as I am sure the adaptor is constructed and wired correctly and the super-het works quite satisfactorily for broadcast reception.

T. W. (Hatfield).

The super-het adaptor to which you refer is for use with a straight-circuit receiver to convert the latter into a short-wave superheterodyne receiver. This particular adaptor must not be used with an existing superheterodyne receiver. To adapt the "Century Super" for short-wave work you should follow the instructions given in reply to a querist on page 166 of the same issue of AMATEUR WIRELESS. An existing superheterodyne can be converted to short-wave work only by the use of special aerial-tuning and oscillator circuits or, alternatively, a separate short-wave plug-in detector unit may be plugged up in place of the second detector valve to change the set into a straight-circuit short-wave detector and L.F. set. The latter arrangement, however, would be rather uneconomical and a wasting of available range in the cutting out of the super-heterodyne circuits.—ED.

TELSEN NON-INDUCTIVE BLOCK CONDENSERS
(MANSBRIDGE TYPE)



TELSEN NON-INDUCTIVE BLOCK CONDENSERS
(MANSBRIDGE TYPE)

These are made by the most advanced processes from the finest materials it is possible to obtain, and subjected during manufacture to a series of stringent tests under laboratory conditions. They are of the true Mansbridge type, self-sealing, non-inductive and hermetically sealed.

Cap.	500 volt test	1,000 volt test
4-mfd.	5/6	9/6
6-mfd.	8/-	14/6
8-mfd.	10/6	

FROM 5/6

The Telsen Short-wave Coil adds the Short Waves without coil changing

TELSEN
TRIPLE THREE

LONG, MEDIUM AND SHORT WAVE RECEPTION ON ONE DIAL

LISTENING TO AMERICA

Helpful advice for those out to log the leading U.S. stations on the broadcast band

AT the present time, the conditions on the broadcast band for transatlantic reception are excellent. At a recent early morning "sitting" the writer counted 51 definite carrier waves on the broadcast band at an hour when it was known that no European stations were on the air. It was, therefore, safe to presume that these stations were American—perhaps one or two of them were Canadian or Mexican, but they were not identified.

The Best-heard Stations

The stations which can best be recommended for transatlantic reception at the moment are WABC, New York, on 860 kilocycles (5 kilowatts), WGY, Schenectady 790 kilocycles (50 kilowatts), WJZ, New York, 760 kilocycles (30 kilowatts), WBZ, Springfield (15 kilowatts), and WOR, Newark, on 710 kilocycles, with 5 kilowatts. WABC and WBZ are perhaps the best of these stations and can sometimes be heard coming over at really good volume at 2 a.m.

It is curious to note that the 5-kilowatt stations come over equally well, if not better, than the 50-kilowatt giants. Apart from the actual power factor, a very great deal depends on the location of the transmitter and the design of the transmitting aerial.

Identification

To receive these medium-wave American stations is a moderately easy business if conditions are good, but the problem of definitely identifying any one station is not so very easy when the signal is weak. First of all, it should be remembered that there is a law in the United States to the effect that every station must announce its call letters and location at least once every fifteen minutes. The rule is only waived when public speeches, operatic items, etc., are being transmitted. An amendment has been proposed whereby the call may be made less frequently, but at present the old order is still in force. The programmes, then, have been ground down to a systematic fifteen-minute rule. Advertisers arrange for their programmes to cover fifteen-minutes or multiples of that figure.

When a chain of stations is taking one programme, every single station on the chain has to announce its own identity every fifteen minutes. Thus, when the station is actually coming in loud enough to be heard, you will know that you will not have to wait longer than fifteen minutes before you hear which station you are listening to, excepting in the rare cases mentioned above, when this rule is dropped.

On certain nights the ether will appear to be dead as far as distant stations are concerned and if European stations have not been coming in very well it will not be very much use trying for the Americans. Again, if atmospherics are louder and more prevalent than usual, they will almost certainly drown the American signals.

Look to the Set

Before a definite search can be made for the Americans, it is essential to see that the receiver is in as sensitive a condition as possible. If it is a small receiver, the reaction control must really be absolutely smooth, because the signals will have to be held just on the edge of the oscillating point, perhaps all the time.

In cases where the reaction is ploppy or goes out very suddenly, this can often be put right by using a higher value of grid leak, a 10-megohm leak being appropriate. Well, assuming that the receiver is really very sensitive and that we have a night when conditions are really good, we may set about trying to reach across. It is a good plan to use the dial readings for the European stations as landmarks by which to search for the Americans. For instance, WOR at Newark, comes in between Dublin and Rome. WJZ will come in just slightly below Midland Regional. The powerful WGY station will

(*Continued on page 414*)

"LISTENING TO AMERICA"

(*Continued from page* 412)

come in between Lwow, Poland and Glasgow.

It is worth while definitely to note the dial readings on your set for these European stations and then, some time after twelve midnight, they will come through if conditions are at all good.

600 Stations!

Here are a few more of the more powerful stations: WBZ at Boston, will come in very slightly above North National; WABC New York, will come in dead on the spot where you receive the Barcelona (EAJ1) station; WTIC, another easily heard station at Hartford, will come in between Copenhagen and the German relays on 283 metres. The world-famous KDKA station at Pittsburg will come in between Cardiff and North National. WIOD, a small, but very loud station at Miami Beach, Florida, will come in just above the Cork station.

There are in all just over 600 stations in the United States at the present time. They are not all on the air at the same time, some of them appearing on the air only in the daytime and making way for other stations on the same wavelengths at night time. All the call letters begin with either a "W" or a "K." There are about 70 stations in Canada, all using fairly low power, excepting CKAC at Quebec, which is sometimes heard over here on 960 kilocycles, (just above North National), with a power of 5 kilowatts. There are also a number of powerful stations in South America, which stand a chance of being heard over here when conditions are favourable. XED at Reynosa, Mexico, is one of these and he works on 961 kilocycles or 312 metres with a power of 10 kilowatts.

Trying for the long-distance stations on the broadcast band is a fascinating game, although it generally involves sitting up until the early hours. However, the results are truly worth while and the long-distance fiend will realise this when he finds he has another 50 or so stations to add to his log.

WHEN SUBMITTING QUERIES

Please write concisely, giving essential particulars. **A Fee of One Shilling** (postal order), a stamped addressed envelope, and the coupon on the last page must accompany all letters. The following points should be noted.

Not more than two questions should be sent with any one letter.

The designing of apparatus or receivers cannot be undertaken.

Modifications of a straightforward nature can be made to blueprints, but we reserve to ourselves the right to determine the extent of an alteration to come within the scope of a query. Modifications to proprietary receivers and designs published by contemporary journals cannot be undertaken.

Readers' sets and components cannot be tested at this office. Readers desiring specific information upon any problem should not ask for it to be published in a forthcoming issue, as only queries of general interest are published and these only at our discretion. Queries cannot be answered by telephone or personally.

Readers ordering blueprints and requiring technical information in addition, should address a separate letter to the Query Department and conform with the rules.

"MULTIPLEX" WIRELESS

RECENT developments in ultra-short wave radiation on 10 metres and under encourage the hope that television will soon become a practical proposition. By using a very short carrier-wave, a sufficiently wide range of modulation frequencies can be transmitted to reproduce a picture of definite interest value. Another interesting possibility in ultra-short wave working is that of multiplexing, or sending several messages simultaneously, without overlap. Some years ago J. H. Hammond demonstrated a system in which no less than eight different messages were superposed on a single 10-metre carrier-wave. With recent improvements this number could, no doubt, be doubled, so as to reduce existing congestion on the commercial wavelengths, whilst at the same time giving increased secrecy.

B.

A repeat performance of that original and tuneful revue, "Merry-Go-Round," which was given by the Radioptimists about the end of last year, will be broadcast on March 2.

In a recent speech made by the French State Minister for Posts, Telegraphs, and Telephones, it was stated that work on the erection of the new 60-kilowatt transmitter for the Ecole des Postes et Telegraphes (Paris PTT) would be started towards the end of next March. The site chosen for this station is in the neighbourhood of the French capital, but well outside city limits.

A POST OFFICE direction-finding van started a four weeks' campaign on Monday, February 8, in the Preston, Blackburn, Burnley, and Bolton areas, with the object of tracing unlicensed sets.

On February 29 a special vaudeville programme will be given to celebrate Leap Year. It will include a Buggins sketch and a musical extravaganza by Reginald Beck and Temple Abbady.

Two first broadcast performances will be given by the Alex Cohen Quartet in the Midland Regional programme on February 28. The first is a Quartet in G minor by Pick Mangiagalli, who has recently been appointed conductor at "La Scala," Milan.

During every Midland Regional Children's Hour in the week beginning February 29, the children will be entertained by Georgie Wood, the comedian.

A Charles Brewer production—"A Minuet—and How"—is to be repeated in the Midland Regional programme on February 29 with Kathleen Henry and Charles Herbert in the leading parts.

Gramophone recitals are becoming a feature of the Midland Regional programmes. Another will be given by Robert Tredinnick on March 2, when some famous musical comedy numbers will be heard, as well as a performance by Jack Hylton's Band and Layton and Johnstone numbers.

A symphony concert by the City of Birmingham Orchestra on March 3 to be relayed from the Town Hall, Birmingham, will be conducted by Sir Henry Wood. His programme will include Beethoven's Symphony in C, No. 1, and the "Nursery Suite" by Elgar. Midland Regional listeners will hear this programme.

The Joan and Betty Bible Story by Mr. E. R. Appleton, West Regional Director, to be given on February 28, is entitled "The Birth and Offering of Isaac."

Two afternoon concerts will be given by the Western Studio Orchestra, one on February 29, when the vocalist will be David Thomas, and the other on March 2.

On St. David's Day the West Regional Children's Hour will be relayed from Swansea and is entitled "The Children's Tribute to the Memory of St. David."

At 7.20 p.m. a St. David's Day Programme, entitled "For the Honour of Wales," will be given in the West Regional programme and relayed to Daventry National.

On March 2, Mr. H. M. Vaughan will give a West Regional talk entitled "Old Welsh Country House Life."

Mr. H. L. McCready, M.A., chairman of the Linen Industry Research Association, is to give the fifth talk in the Belfast series entitled "The Manufacture of Linen," on February 27.

A. J. O'Farrell and Terry O'Connor are to take part in an orchestral concert from the Belfast station on February 27.

Bertie Woodburne is to sing during the Military Band concert from Belfast on February 23. Frank Martin will also take part in this concert, and the Belfast Wireless Military Band will be conducted by Harry Dyson.

Sir Ivor Atkins, well known as organist and Master of Choristers at Worcester Cathedral, is to pay another visit to Ulster on February 26, when he will conduct an orchestral concert in the Belfast studio.

On March 5, Alderman Fred Evans, chairman of the Cardiff Education Committee, will sum up the results of Education Week in Cardiff, in a talk to West Regional listeners. Practically all the educational institutions in the city are taking part in this.

WHY NOT HAVE TWO SETS?

SOME SUGGESTIONS WELL WORTH CONSIDERING

IT is surprising that more listeners do not effect an economy by having two sets.

Nearly everybody's ambition is to have a big set for quality reception, a three-valve band-pass set with a big power stage, or a super-het, but this powerful reception is not always needed. There are times when a crystal set, or a one-valver with a pair of phones would be much more suitable, especially when one member of the family wants to listen.

A two-valver, with a pentode in the output stage—the whole outfit being cheap to run—would be a good companion to a big set.

The man who likes B.B.C. reception interspaced with a certain amount of experimenting should consider the advantages of having a small set of his own which he can alter at will without affecting the continuity of B.B.C. reception for the family. In practically every household a one-valve set will pay for itself time and time again.

There comes a time when one member of the family wants to listen to, say, a talk, while the others want the big set for dancing. To save all argument, it is much better to switch on the one-valver.

The battery for the one-valver will last the best part of a year and the small accumulator can be charged with the battery of the main set. There is no grid bias battery.

Reception is limited to phones, of course, but in these special circumstances it is often an advantage. A separate aerial should be used and an indoor wire, even arranged around the picture rail, is satisfactory. Keep it well away from the aerial of the big set, for otherwise alteration in tuning on the one-valver will affect the tuning of the main set.

One-valver Uses

A one-valver is a good companion to a big set, even when it is never required to work both together.

The detector valve of the big set can be taken out and put into the one-valve socket when, for any reason, the speaker is not needed and just one person wants to listen in comfort with his phones. In this case only one valve holder is needed.

The aerial tuning arrangement of the big set can be used for the one-valver and if you keep the leads very short and mount the one-valve arrangement close up to the aerial side of the big set, then there is no need to disconnect anything and it suffices merely to shift the detector valve from holder to holder.

A crystal set can be used in either case as an alternative to a one-valver where the reception point is reasonably close to B.B.C. stations. With a semi-permanent crystal detector the old bugbear of cat-whisker tickling is overcome, and provided one makes up a fairly efficient circuit, there is no difficulty in the way of interference between National and Regional.

A good many people who would otherwise make more use of radio reception in their bedrooms, but who are afraid that they might drop off to sleep before switching off the batteries of the main set, should try a crystal set, which can always be left switched on.

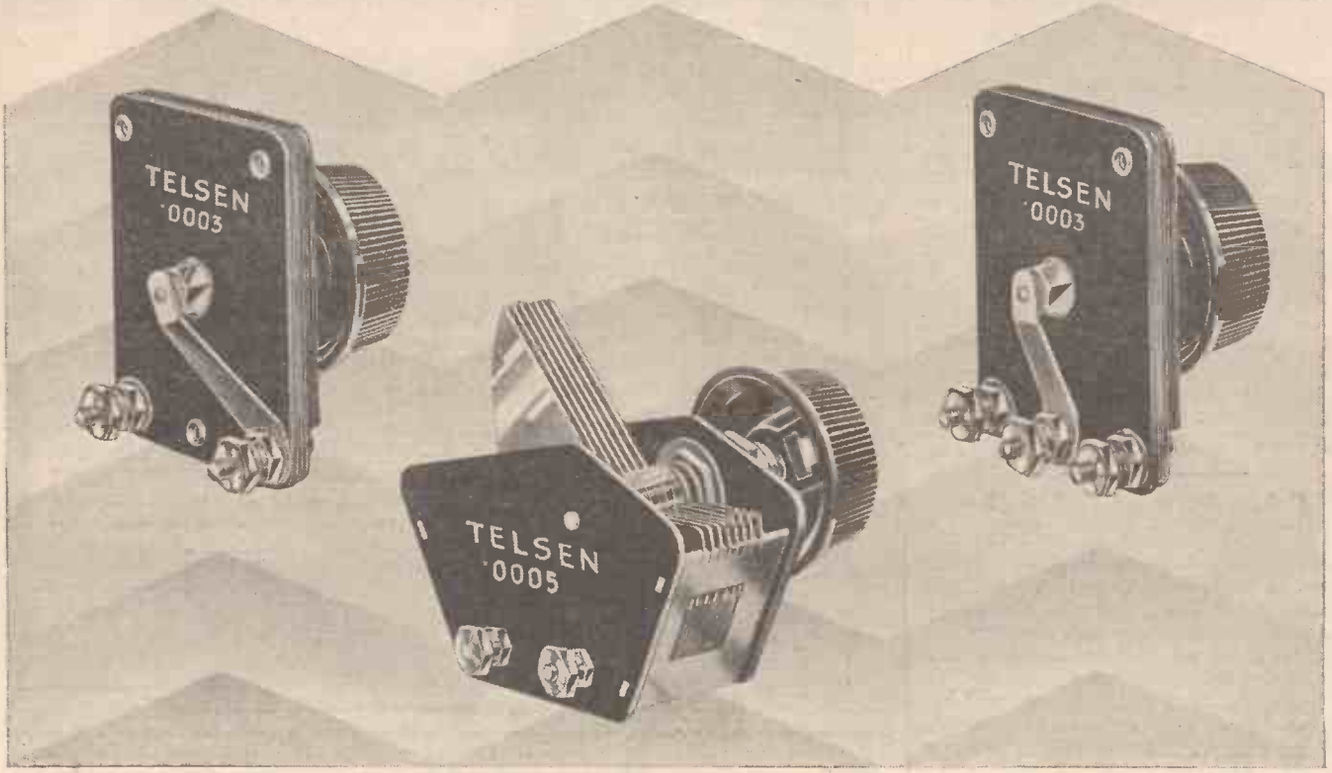
An increasing number of people are using portables and transportables indoors, the idea being that on fine days they can be taken out in the car. This plan sometimes falls flat, because there are people left behind while the main party is out on a picnic and who would be very glad of a wireless set to pass away the time.

If there is an auxiliary one-valver or crystal set in the house there need be no scruples about taking the portable out for a trip.

How cheap can a good mains set be?

"A.W." answers this problem in next week's issue by introducing an all-electric "three" which, complete with cabinet, speaker, mains unit and efficient circuit costs £7 17 6. Remarkable value!

TELSEN BAKELITE DIELECTRIC CONDENSERS



TELSEN BAKELITE DIELECTRIC CONDENSERS

These Condensers are of an improved type, of great rigidity and precise construction. The rotor vanes are keyed to the spindle, and fitted with definite stops. The vanes are interleaved with finest quality solid dielectric. A strong nickel-silver contact makes connection to the rotor, and a positive connection is made to the stator vanes. Supplied complete with knob.

Differential Condensers, Cap. : .0003, .00015, and .0001 ..	Price **2/6**
Tuning Condensers, Cap. : .0005 and .0003	Price **2/6**
Reaction Condensers, Cap. : .0003, .00015, and .0001 ..	Price **2/-**
Capacities .00075 and .0005 ..	Price **2/6**

FROM 2/-

The Telsen Short-wave Coil adds the Short Waves without coil changing

TELSEN TRIPLE THREE

LONG, MEDIUM AND SHORT WAVE RECEPTION ON ONE DIAL

CHEAPER WIRELESS LICENCES?

MR. LYONS asked the Postmaster-General whether he would consider a reduction in the cost of wireless licences to listeners or, alternatively, a reduction of fees paid therefrom to the British Broadcasting Corporation.

Sir K. Wood upheld that the amount of the wireless licence fee was considered by the Broadcasting Committees of 1923 and 1925 and both committees recommended that the fee be maintained at 10s. a year, and it would not appear that a reduction was justified. The payments made by the Post Office to the British Broadcasting Corporation were covered by agreements which are due to remain in force until December 31, 1936.

Mr. Lyons then asked whether the P.M.G. would make any representations to the B.B.C. to bring to an end the spending of public money to make private inquiries into the lives of listeners.

Sir K. Wood: "That is another matter altogether!"

C.A.V. DRY BATTERIES

A USEFUL range of high-tension and grid-bias batteries is produced by Messrs. C. A. Vandervell & Co., Ltd., who have earned a good name in connection with non-spill accumulators for wireless purposes, after establishing a world-wide reputation for car batteries.

The high-tension batteries are available in three types, standard capacity, triple capacity, and portable sizes. The smallest standard capacity H.T. battery, the H.T. D1, is a 60-volt job, costing only 5s. 6d., and the standard capacity batteries are also made in 66, 99, and 120-volt sizes. A 60-volt triple capacity battery costs only 12s., and 105- and 120-volt batteries are in the same range.

Three types of portable high-tension batteries and 9 and 16½-volt grid-bias batteries are available.

Samples of these batteries are now undergoing a performance test in the "A.W." laboratory and a detailed report will appear shortly in the "We Test For You" feature. Full details of all the batteries are given in an illustrated folder which can be obtained free on mention of "A.W." from Messrs. C. A. Vandervell & Co., Ltd., Well Street, Birmingham.

"The A.B.C. of All-electric Radio."—Our attention has been called by the makers of Westinghouse metal rectifiers to the Fig. 1 diagram on page 197 of AMATEUR WIRELESS dated January 30, 1932, which illustrated the first article on the above subject. It has been pointed out that the Fig. 1b circuit showing the fundamental connections for double-wave rectification might possibly be confused with the voltage-doubler arrangement adopted in certain Westinghouse metal rectifiers. We should like to make it clear that this Fig. 1b circuit is merely indicative of the general scheme of double-wave rectification, and does not apply to any particular Westinghouse unit.

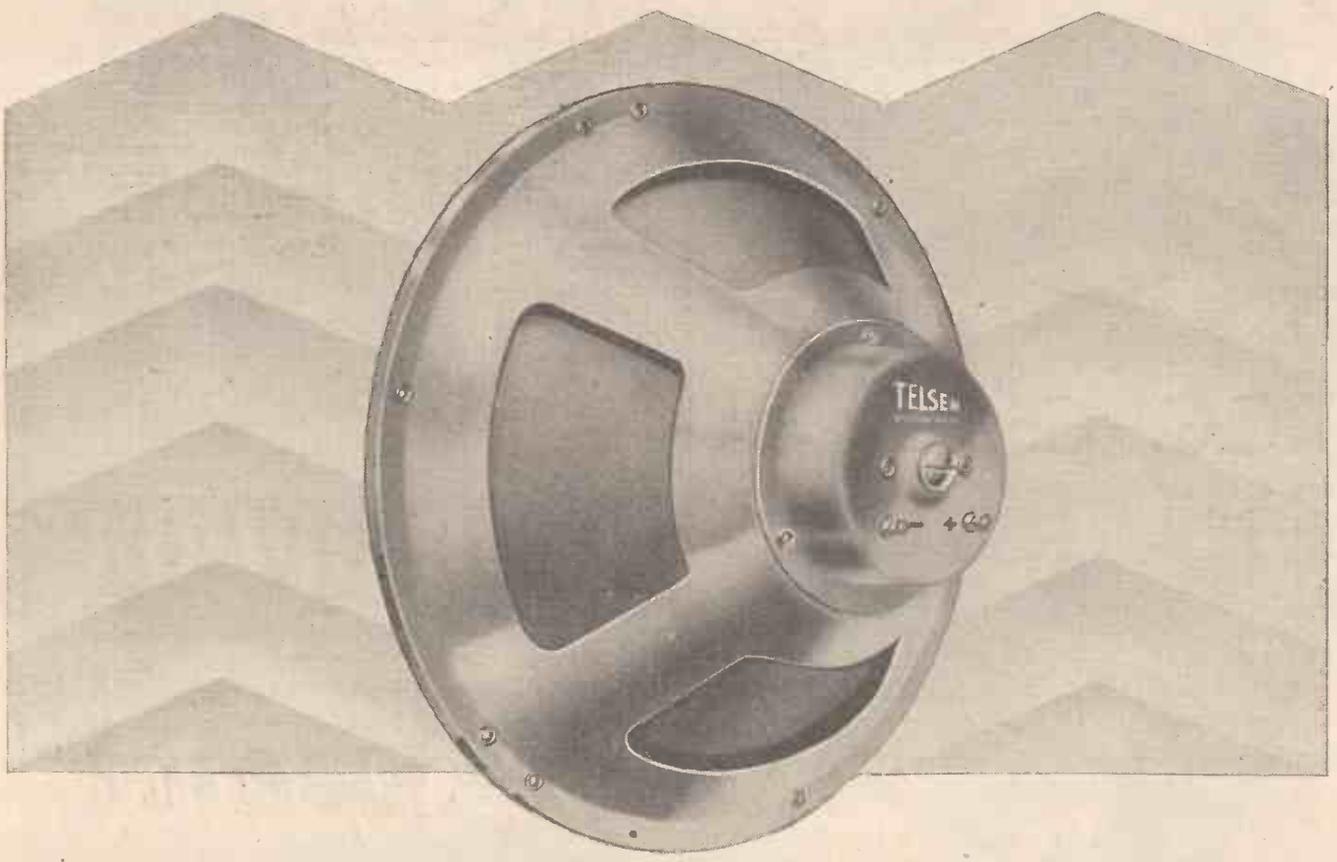
Secrets of Super-Het Success

OTHER INTERESTING FEATURES IN WIRELESS MAGAZINE—MARCH

The Double Band-pass Four: Screen-grid Set with Two Band-pass Tuning Circuits 174
The Economy Radio Gramophone: Completely Self-contained and battery-operated 192
The A-P-A: An A-quality Power Amplifier and High-tension Supply Unit for A.C. Mains, by P. K. Turner, M.I.E.E. .. 211
About the Quadradyne, by "W.M." Technical Staff 224
Getting the Best from Your Pick-up, by S. Rutherford Wilkins 182
Electric Drives for Turntables 184
Pick-up Damping, by Noel Bonaviv-Hunt, M.A. 186
Overhauling Your Electric Gramophone Motor, by E. J. G. Lewis .. 190
Long-playing Records, by P. K. Turner, M.I.E.E. 200
Are We Using the Right Type of Condenser? by P. K. Turner, M.I.E.E. 153
Microphones: Some Recent Developments, by Capt. H. J. Round, M.I.E.E. 161
Secrets of Super-het Success. By W. James .. 234
Radio Medley 157
How a Play is Broadcast, by Frank Rogers .. 166
The Voice of Italy, by J. Godchaux Abrahams 206
What Quality Means, by Whitaker-Wilson .. 209
Good-bye to Savoy Hill, by Our Own Commissioner 228
On the Crest of the Waves, by Jay Coote .. 240

In this article W. JAMES goes over some of the more-important points to be noted about super-heterodyne circuits as used for the original Super 60, the 1932 Super 60, and the 1932 A.C. Super 60. His remarks will be of interest to all who have built, or are thinking of building, one of these successful "Wireless Magazine" receivers. He hints also that a one-knob super-het will soon make its appearance in "Wireless Magazine."

TELSEN LOUD-SPEAKER



TELSEN LOUD-SPEAKER

An inexpensive combined Loud-speaker Cone Chassis and Unit, which gives a pleasing and natural balance of tone, and will handle all the output necessary for ordinary reception. Fitted with a fully floating cone of damp-resisting material, and mounted in a rigid pressed frame of 11 in. diameter. Price **10/6**

10/6

The Telsen Short-wave Coil adds the Short Waves without coil changing.

TELSEN
TRIPLE THREE

LONG, MEDIUM AND SHORT WAVE RECEPTION ON ONE DIAL

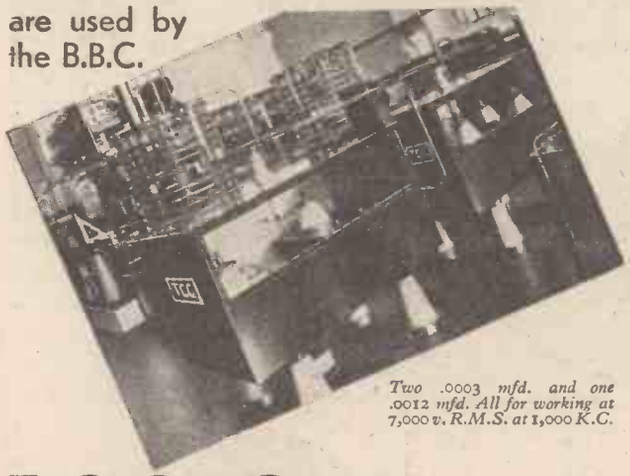
T.C.C. Condensers

are used by PRAGUE

A .00075 mfd. and a .0005 mfd. for peak working 18,400 v. And a .0005 and .0004 mfd. working at 4,500 v. R.M.S. at 550 - 1,000 K.C.

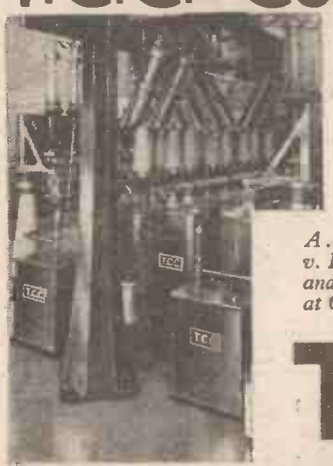
T.C.C. Condensers

are used by the B.B.C.



Two .0003 mfd. and one .0012 mfd. All for working at 7,000 v. R.M.S. at 1,000 K.C.

T.C.C. Condensers



are used by the POST OFFICE THE ADMIRALTY and all the world's LEADING CABLE COMPANIES

A .1 mfd. for working up to 20,000 v. D.C. tested to 50,000 v. D.C. and two .004 mfd. to pass 18 amps. at 600-1,000 K.C. Peak working 20,000 v.

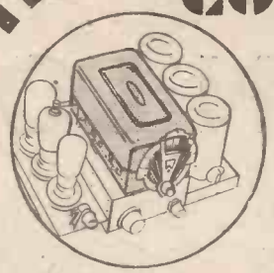
T.C.C.

ALL-BRITISH CONDENSERS

The Telegraph Condenser Co. Ltd., N. Acton, W.3

♡9810

THE MODERN CONDENSER for modern circuits



The British Radiophone Ganged Condensers are specially designed to meet the exacting requirements of modern circuits requiring very high selectivity; smooth, steady action; and perfect ganging. **Accuracy is guaranteed to within one-half per cent.**

2-Gang - 18/-
Dustproof Cover 3/-

3-Gang - 28/-
Dustproof Cover 3/6

4-Gang - 38/-
Dustproof Cover 4/-

Oxidised Silver Escutcheon and Drive Assembly with pilot lamp attachment .. 5/-

Super-Het type condensers with special tracking vane now available.

Write for descriptive illustrated brochure.

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PIFCO

ALL IN ONE RADIOMETER

There is no instrument like it.
You must have one to secure best reception.
Tests everything in your set!

Your Radio or Electrical Dealer can supply.
If any difficulty, write Pifco Ltd., High Street, Manchester.

Postcard Radio Literature

GET THESE CATALOGUES FREE

Here "Observer" reviews the latest booklets and folders issued by well-known manufacturers. If you want copies of any or all of them FREE OF CHARGE, just send a postcard giving the index numbers of the catalogues required (shown at the end of each paragraph) to "Postcard Radio Literature," "AMATEUR WIRELESS," 58/61, Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire. Please write your name and address in block letters.

New Eta List

A NEW list of Eta battery and mains valves has just been issued. There are full-wave rectifier valves for H.T. units in the range and also nine valves with American bases for use in the leading American sets obtainable in this country. **707**

A "Motor" Speaker

The Motor permanent magnet moving-coil speaker is available in two types, for triode power valve sets and pentodes. A tapped transformer is provided with each. Full details are given in a folder to be had free from Tekade Radio & Electric, Ltd. **708**

For Your Mullard Catalogue

Readers who have a Mullard loose-leaf catalogue should get the new sheet VR. 69/5A, which has just been issued in connection with the popular PM2DX. **709**

A Handy Switch Socket

If you are installing a mains set, then get the literature describing the new Lincoln switch socket made by J. A. Crabtree and Co., Ltd. **710**

New Microfuses

I have just received two new folders giving the new details and prices of the flat type Microfu. These fuses have a thin, metallic film and are obtainable in ten stock ratings, suitable for every set. **711**

OBSERVER

Listeners who are thinking of buying a new speaker should note that the Radio Department of Messrs. Selfridge & Co., of Oxford Street, London, W.1., have a number of Ericsson Fan moving-coil speakers. The usual price of these instruments is £6 6s., but Selfridge's are offering them at the special price of 66s., or on deferred payments for seven instalments of 10s.

The Hallé Society was to have included Stravinsky's "Le Sacre du Printemps" in the programme on February 25, but this has been changed. The programme, relayed to the Northern Region, will now include "Life's Dance," by Delius.

BROADCAST TELEPHONY

Broadcasting Stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is that of the carrier wave.

Kilo-Metres	cycles	Station and Call Sign	Power (Kw.)
GREAT BRITAIN			
25.53	11,751	Chelmsford (GSSW)	10.0
242.3	1,238	Belfast	1.0
261.5	1,147	London Nat.	50.0
288.5	1,040	Newcastle	1.2
288.5	1,040	Swansea	0.12
288.5	1,040	Plymouth	0.12
288.5	1,040	Edinburgh	0.3
288.5	1,040	Dundee	0.12
288.5	1,040	Bournemouth	1.0
288.5	1,040	Aberdeen	1.0
301.5	995	North National	50.0
309.9	968	Cardiff	1.0
355.9	843	London Regional	50.0
376.4	797	Glasgow	1.0
398.9	752	Midland Regional	25.0
480	625	North Regional	50.0
1,554.4	193	Daventry (Nat.)	30.0
AUSTRIA			
218.7	1,375	Salzburg	0.5
245.9	1,220	Linz	0.5
285.2	1,052	Innsbruck	0.5
352.1	852	Graz	7.0
453.2	666	Klagenfurt	0.5
517.8	579.5	Vienna	15.0
also testing on 1,219 m. from 7.0 p.m. (Mon., Wed., Sat.)			
BELGIUM			
206	1,456	Antwerp	0.25
208.3	1,440	Liege	0.15
215.3	1,393	Chatelineau	0.2
216	1,389	Liege	0.1
216	1,389	Bruxelles Conference	0.2
22.1	1,357	Binche	0.1
240.8	1,245.8	Liege (Exp.)	0.1
273	1,095	Liege (Cointe)	0.4
283.6	1,058	Brussels (SBR)	0.5
338.2	887	Brussels (No. 2)	15.0
509.3	589	Brussels (No. 1)	15.0
BULGARIA			
318.8	941	Sofia (RodnoRadio)	0.5
CZECHO-SLOVAKIA			
249.6	1,201.8	Prague (2)	5.0
263.8	1,137	Moravska-Ostrava	10.0
278.3	1,078	Bratislava	13.0
293	1,022	Kosice	2.5
341.7	878	Brunn (Brno)	35.0
488.6	614	Prague	120.0
DENMARK			
281.2	1,067	Copenhagen	0.75
1,153	260	Kalundborg	7.5
also on 31.51 m. (9,520 Kcs.)			
ESTONIA			
296.1	1,013	Tallinn	11.0
465.3	644	Tartu	0.5
FINLAND			
291	1,031	Viipuri	13.0
368.1	815	Helsinki	12.0
559.7	536	Tampere	1.0
1,796	167	Lahti	54.0
FRANCE			
219.9	1,364	Béziers	0.5
221.6	1,353.5	Fécamp	5.0
237.6	1,261.2	Bordeaux-Sud-Ouest	2.0
249.4	1,203	Juan-les-Pins	0.5
255.1	1,176	Toulouse (PTT)	1.0
265.9	1,128	Lille (PTT)	1.3
271.3	1,105.7	Rennes	1.2
285.4	1,051	Montpellier	0.8
286	1,049	Radio Lyons	10.0
293	1,022	Limoges (PTT)	1.0
304.9	984	Bordeaux (PTT)	13.0
314.7	962	Natan-Vitus (Paris)	0.5
also on 43.75m. (6,865 Kcs.)			
317.3	945.4	Marseilles	1.6
327.5	916	Grenoble (PTT)	2.0
329.3	911	Poste Parisien	1.2
345.2	869	Strasbourg (PTT)	11.5
370.4	810	Radio LI. (Paris)	0.5
also on 61 m. (4,198 Kcs.)			
384.4	779	Radio Toulouse	8.0
447.1	671	Paris (PTT)	0.7
466	644	Lyons (PTT)	1.5
1,445.7	207.5	Eiffel Tower	13.0
1,744	172	Radio Paris	75.0
GERMANY			
19.73	15.226	Zeesen	15.0
31.38	9,560	Zeesen	15.0
217	1,382	Königsberg	0.75
217.5	1,370.9	Flensburg	0.5
227.4	1,319	Cologne	1.5
227.4	1,319	Münster	0.5
227.4	1,319	Aachen	0.25
232.2	1,292	Kiel	0.25
239.4	1,253	Nürnberg	2.0
245.9	1,220	Cassel	0.25
253.1	1,185	Gleiwitz	5.0
259.3	1,157	Leipzig	2.0
269.8	1,112	Bremen	0.2
276.5	1,085	Heilsberg	60.0
283	1,060	Magdeburg	0.5
283	1,060	Berlin (E)	0.5
283	1,060	Stettin	0.5
318.8	941	Dresden	0.25
325	923	Breslau	1.5
360.6	832	Mühlacker	60.0
372	806	Hamburg	1.5
389.6	770	Frankfurt	1.5
419	716	Berlin	1.5
453.2	663	Danzig	0.5
472.4	635	Langenberg	60.0
532.9	563	Munich	1.5
559.7	536	Kaiserslautern	1.5
559.7	536	Augsburg	0.3
556	530	Hanover	0.3
569.3	527	Freiburg	0.25
1,634.9	183.5	Norddeich	10.0
1,634.9	183.5	Zeesen	60.0
2,525	119.3	Königswuster-hausen (press)	15.0
4,000	75	ditto	
HOLLAND			
298.2	1,006	Huizen	8.5
299.5	1,001.3	Radio Idzerda (The Hague)	3.0
1,071.4	280	Scheveningen-Haven	10.0
also on 49.6 m.			
1,875	160	Hilversum	8.5
HUNGARY			
550	545	Budapest	20.0
ICELAND			
1,175	255.4	Reykjavik	16.0
IRISH FREE STATE			
224.4	1,337	Cork (6CK)	1.2
413	725	Dublin (2RN)	1.2
ITALY			
25.4	11,810	Rome (2RO)	15.0
247.7	1,211	Trieste	10.0
273.2	1,098	Turin (Torino)	7.0
312.2	961	Genoa (Genova)	10.0
318.8	941	Naples (Napoli)	1.5
331.5	905	Milan	7.0
368.1	815	Bolzano	1.0
441	680	Rome (Roma)	50.0
500.8	599	Florence (Firenze)	20.0
525.4	571	Palermo	3.0
LATVIA			
198.5	1,510	Riga	16.0
525	572	Riga	17.0
LITHUANIA			
1,935	155	Kaunas	7.0
NORTH AFRICA			
363.4	825.3	Algiers (PTT)	16.0
416	721	Radio Maroc (Rabat) and 32.26 m. (9,300 Kcs.)	8.0
NORWAY			
235.5	1,274	Kristianssand	0.5
240.2	1,249.2	Stavanger	0.5
365.4	821	Bergen	1.0
367.6	816	Frederiksstad	0.7
497.2	603.4	Trondheim	1.2
1,093.7	274.3	Oslo	60.0
POLAND			
214.2	1,400	Warsaw (2)	1.9
234.9	1,283	Lodz	2.2
312.8	959	Cracow	1.5
344.4	897	Poznan	1.9
380.7	788	Lvov	16.0
409.8	732	Katowice	12.0
566	530	Wilno	16.0
1,411.8	212.5	Warsaw	120.0
PORTUGAL			
282.2	1,060	Lisbon (CT1AA) also on 42.9 m. (Fri.)	2.0
ROMANIA			
394	761	Bucharest	12.0
RUSSIA			
378	792.5	Moscow Regional	20.0
424.3	707	Moscow-Stalin	100.0
720	416.6	Moscow (PTT)	20.0
937.5	320	Kharkov (Rv20)	25.0
967.7	310	Alma-Ata	10.0
1,000	300	Leningrad	100.0
1,075	279	Tiflis	10.0
1,116	268.5	Moscow Popoff	75.0
1,170	256.4	Taschkerit	25.0
1,268	236.6	Moscow (Trades Unions) also on 50 m. (6,000 Kcs.)	165.0
1,481	202.5	Moscow	100.0
1,600	187.5	Irkutsk	15.0
1,910.8	157	Sverdlovsk	20.0
SPAIN			
251	1,193	Barcelona (EAJ15)	1.0
260.4	1,126	Valencia	5.0
348.2	861.5	Barcelona (EAJ1)	8.0
368.1	815	Seville (EAJ5)	1.5
409.8	732	Madrid España	2.0
424	707	Madrid (EAJ7)	2.0
456.6	557	San Sebastian (EAJ8)	0.6
SWEDEN			
230.6	1,301	Malmö	1.25
257	1,167	Hörby	10.0
306.8	977	Falun	0.5
321.9	932	Göteborg	10.0
435.4	689	Stockholm	55.0
541.5	554	Sundsvall	10.0
777.5	386	Ostersund	0.6
1,241.6	241.6	Boden	0.6
1,348.3	222.5	Motala	30.0
SWITZERLAND			
244.7	1,226	Basle	0.65
246	1,220	Berne	0.5
403	743	Söttens	25.0
459	653	Beromuenster	60.0
TURKEY			
1,204.8	249	Istanbul	5.0
1,538	195	Ankara	7.0
YUGOSLAVIA			
307	977	Zagreb (Agram)	0.75
430.4	697	Belgrade	2.5
574.7	522	Ljubljana	2.5
2,450	1,224	Skolpje	20.0

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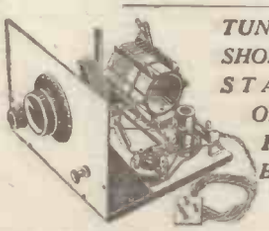

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