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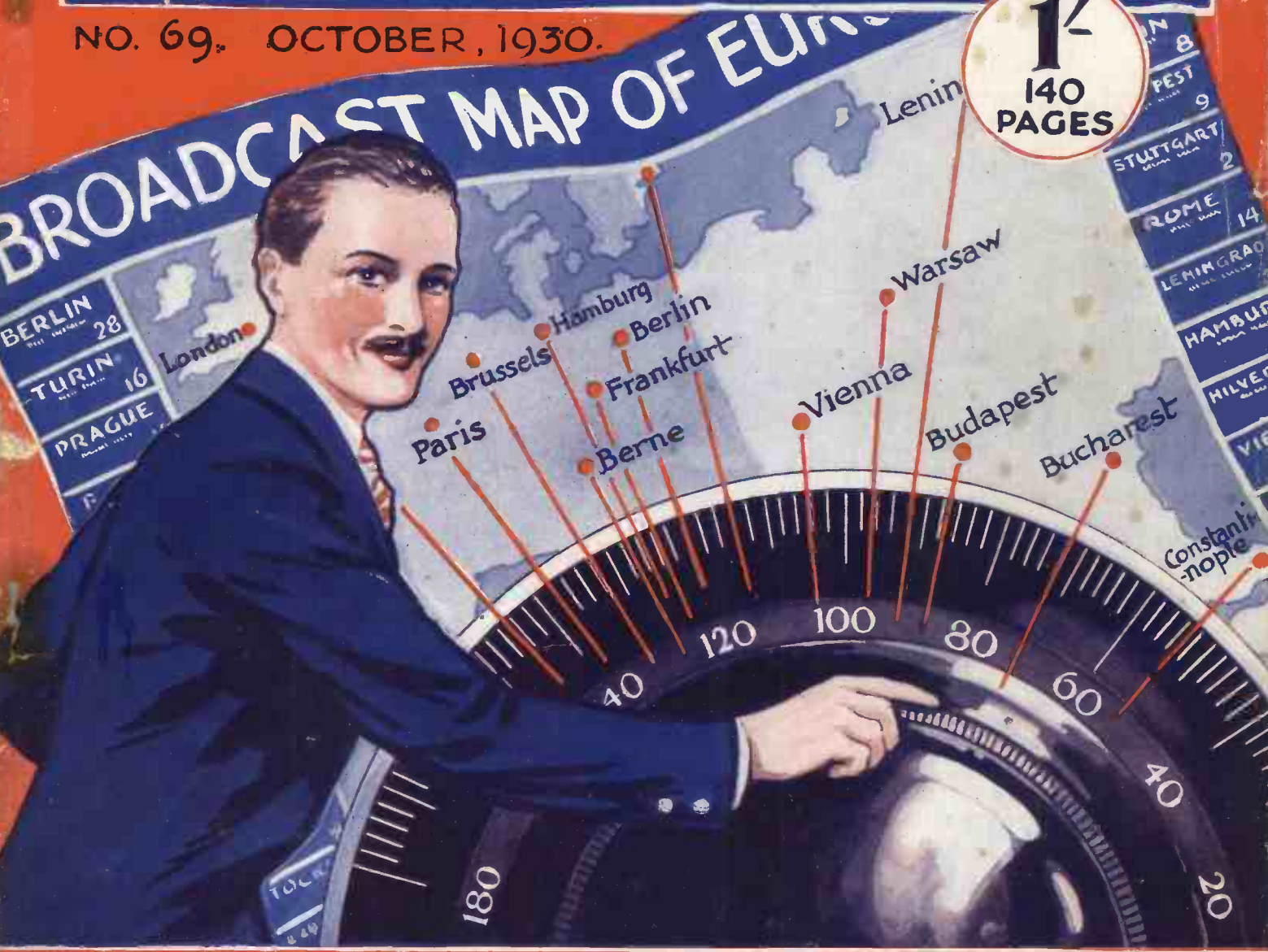
Wireless Magazine

SPECIAL

EXHIBITION NUMBER

NO. 69. OCTOBER, 1930.

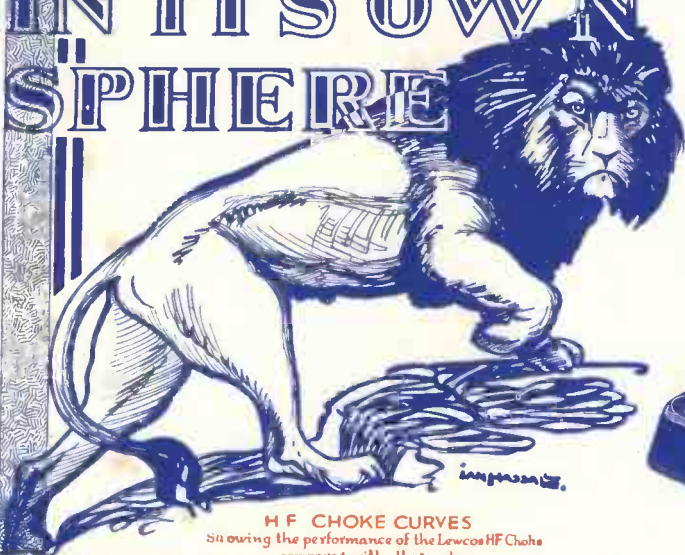
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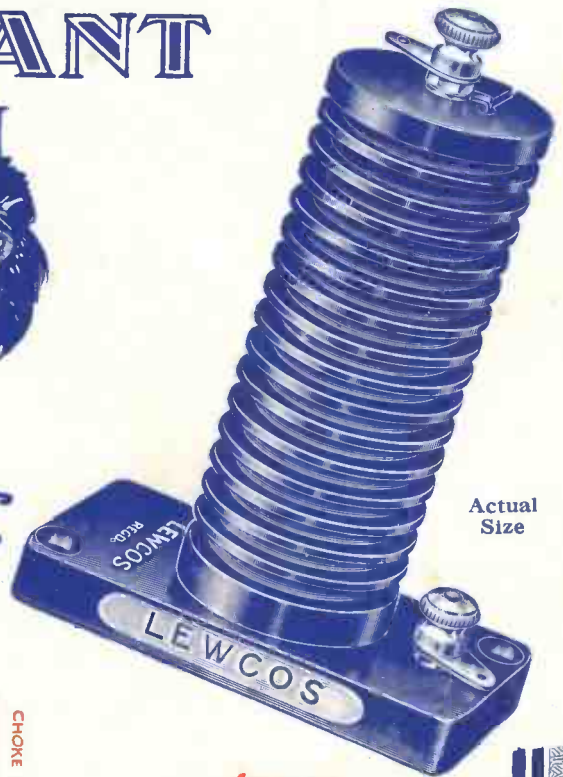
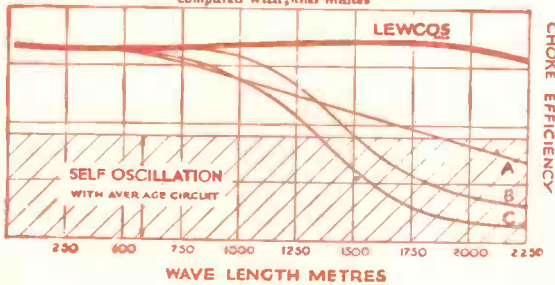
Sir John **REITH** on A Challenge to the B.B.C

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Wireless Magazine

The Best Shillingsworth in Radio

Vol. XII :: OCTOBER, 1930 :: No. 69

Research Consultant:

W. JAMES

Assistant Editor:

D. SISSON RELPH

I HAD the pleasure of meeting Sir John Reith within a week or two of his appointment as chief executive of the original British Broadcasting Company, and the impression he made on me as we sat at lunch has been both heightened and deepened during the period of nearly eight years that has elapsed since that occasion.

Sir John is, in himself and in his work, one of the great personalities in the life of today; he pays homage to fine ideals and high principles; he knows what he believes in; he is never in doubt as to what he wants; he does not falter by the way; but for all his unswerving purpose he is quick and adroit in debate, and either as friend or foe is a man always to be reckoned with.

I called to see him some few weeks ago. Incidentally, I mentioned the "Sunday" symposium of views which you will find in this issue, and told him that a surprisingly large proportion of the views expressed was in favour of the B.B.C.'s Sunday programme.

"Will you print those opinions?" he shot at me. "Certainly," I said, and here in this issue you find them just as we received them.

My purpose in seeing Sir John was to invite him to write a special article for WIRELESS MAGAZINE. It was my wish to give that article pride of place in this special issue, but Sir John left for the Continent with the MS. unfinished and wrote the greater part of it in Berlin, sending it too late, unfortunately, for me to put it in the forefront this month.

You will see his article is entitled "A Challenge to the B.B.C." He has always had his ear to the ground for whispers of criticism, and though I feel that no man is less deflected from his course by other people's comments, no man better enjoys a challenge or more willingly crosses his sword with that of his adversary, always with a great

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air of courtesy, but always determined to win!

But I hope that my readers will not conclude that Sir John is wedded to just one idea and that nothing can dissolve the union, for this, in spite of anything suggested to the contrary, is distinctly not the case. While he has no time for criticism of ill-informed order, he will always listen to criticism that is constructive and likely to assist the B.B.C. in the better carrying out of its great function.

This issue is published on the day the National Radio Exhibition at Olympia opens. Undoubtedly that show will be the finest of its series—more exhibitors, more stands, and more space occupied than ever before.

WIRELESS MAGAZINE will be there in what its readers will agree is the right place—Stand No. 1, and there you will find a welcome from members of the staff in charge.

There also will be found the sets described in this issue—notably W. James' Regional Band-pass Four, his "star" set for the new season, a beauty! The Five-point Three, which offers five marked advantages; the Merlin Two, a little set for operation from A.C. mains; and the "W.M." Standard A.C. Unit will all be there.

By the way, this is the biggest issue of the WIRELESS MAGAZINE I have ever produced. I think it is the best as well, but I must give way to the reader's opinion in that matter, whatever it may be. It is varied, interesting, and useful—three things which every editor strives to impart into his printed work. And I think you'll like it.

To every reader this month I am presenting a Station Identifier and Log-Map which has points of ingenuity and usefulness which I think will commend themselves to you.

Shall we meet at the Exhibition?

THE EDITOR.

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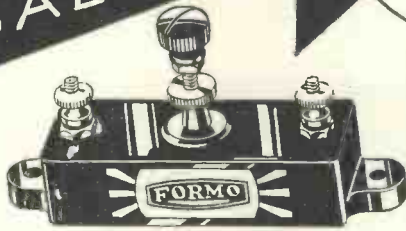
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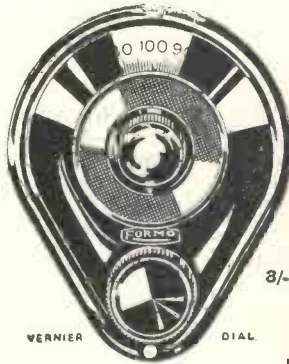


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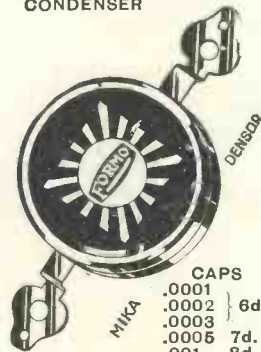
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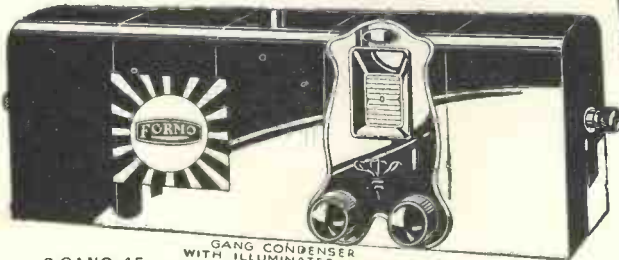
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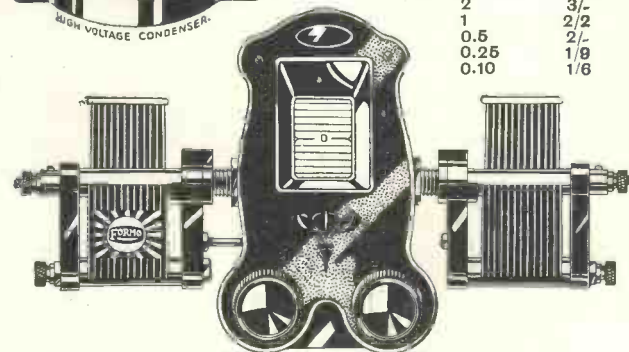
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VALVES TO USE IN YOUR SET

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Maximum Anode Voltage	Grid Bias at 100 volts	Grid Bias at 150 volts
Two-volt Three-electrode Valves								
Dario ..	R-resist.	60,000	30	.1	.5	160	1.5	3.0
Mazda ..	H210	59,000	47	.1	.8	150	.5	1.0
Lissen ..	H210	58,000	35	.1	.6	150	1.5	1.5
Six-Sixty	210RC	55,500	39	.1	.7	150	1.0	1.5
Mullard	PM1A	51,000	36	.1	.7	150	1.5	1.5
Cossor ..	210RC	50,000	36	.1	.72	150	1.5	1.5
Osram ..	H210	50,000	35	.1	.7	150	1.5	1.5
Marconi	H210	50,000	35	.1	.7	150	1.5	3.0
Osram ..	210HF	25,000	19	.1	.75	150	—	—
Six-Sixty	HL210	23,000	20	.1	.87	150	2.0	4.0
Osram ..	HL210	23,000	20	.1	.87	150	1.5	4.0
Mullard	PM1HF	22,500	18	.1	.8	150	3.0	4.5
Dario ..	Super HF	21,000	25	.15	1.5	200	1.5	3.0
Lissen ..	HL210	21,000	18	.1	.85	150	1.5	4.5
Mazda ..	HL210	21,000	26	.1	1.25	150	1.5	3.0
Cossor ..	210HF	20,000	20	.1	1.0	150	1.5	3.0
Six-Sixty	210LF	12,500	10.6	.1	.85	150	4.5	7.5
Cossor ..	210LF	12,000	10	.1	.83	150	3.0	4.5
Marconi	L210	12,000	11	.1	.9	150	3.0	7.5
Mullard	PM1LF	12,000	11	.1	.9	150	4.5	7.5
Osram ..	L210	12,000	11	.1	.92	150	3.0	7.5
Six-Sixty	217D	10,700	13.5	.17	1.25	150	—	4.0
Mullard	PM2DX	10,700	13.5	.2	1.25	150	3.0	6.0
Dario ..	Univ.	10,000	9	.1	.9	200	—	1.5
Lissen ..	L210	10,000	10	.1	1.0	150	3.0	7.5
Mazda ..	L210	10,000	15.5	.1	1.55	150	2.5	4.5
Dario ..	Super Det.	7,500	15	.15	2.0	200	1.5	3.0
Marconi	P215	5,000	7	.15	1.4	150	7.5	12.0
Osram ..	P215	5,000	7	.15	1.4	150	7.5	12.0
Six-Sixty	220P	4,800	7.2	.2	1.5	150	10.0	16.0
Lissen ..	P220	4,700	7	.2	1.5	150	9.0	15.0
Dario ..	SP	4,500	9	.15	2.0	200	7.5	12.5
Mullard	PM2	4,400	7.5	.2	1.7	150	7.5	12.0
Cossor ..	220P	4,000	8	.2	2.0	150	4.5	9.0
Mazda ..	P220	3,700	12.5	.2	3.4	150	3.0	6.0
Six-Sixty	230SP	2,750	5.5	.3	2.0	150	10.0	23.0
Dario ..	Hyper	2,700	5	.3	1.8	200	12.5	15.0
Mullard	PM252	2,600	5.4	.3	2.1	150	9.0	15.0
Marconi	P240	2,500	4	.4	1.6	150	15.0	24.0
Osram ..	P240	2,500	4	.4	1.6	150	16.0	24.0
Marconi	P2	2,300	6.5	.2	2.8	150	7.5	12.0
Osram ..	P2	2,300	6.5	.2	2.8	150	7.5	10.5
Cossor ..	230XP	2,000	4	.3	2.0	150	12.5	22.5
Lissen ..	PX240	2,000	4	.4	2.0	150	12.5	22.5
Mazda ..	P240	1,900	7	.4	3.7	150	6.0	13.5
Two-volt Screened-grid Valves								
Mazda ..	215SG	400,000	450	.15	1.1	150	1.5	1.5
Cossor ..	215SG	300,000	330	.15	—	150	—	—
Dario ..	SG	250,000	250	.15	1.0	200	—	1.5
Mullard	PM12	230,000	200	.15	.87	150	—	—
Six-Sixty	215SG	220,000	190	.15	.87	150	—	—
Cossor ..	220SG	200,000	200	.2	1.0	150	—	1.5
Lissen ..	SG215	200,000	180	.15	.9	160	—	1.5
Marconi	S215	200,000	170	.15	.85	150	1.5	1.5
Osram ..	S215	200,000	170	.15	.85	150	—	—
Two-volt Pentode Valves								
Lissen ..	PT225	64,000	90	.25	1.4	150	3.0	6.0
Six-Sixty	230PP	64,000	80	.3	1.25	150	6.0	10.5
Mullard	PM22	62,500	82	.3	1.3	150	6.0	12.0
Dario ..	P n.t.	55,000	100	.3	1.8	160	6.0	15.0
Osram ..	PT240	55,000	90	.4	1.65	150	6.0	9.0
Marconi	PT240	55,000	90	.4	1.65	150	6.0	9.0
Lissen ..	PT240	22,500	45	.4	2.0	150	7.5	10.5
Cossor ..	230PT	20,000	40	.3	2.0	180	6.0	7.5
Mazda ..	230Pn.	—	—	.3	1.8	150	9.0	9.0
Four-volt Three-electrode Valves								
Cossor ..	410RC	60,000	40	.1	.66	150	—	1.5
Dario ..	Resist.	60,000	30	.075	.5	160	—	1.5
Marconi	H410	60,000	40	.1	.67	150	1.5	1.5
Osram ..	H410	60,000	40	.1	.67	150	—	1.5
Lissen ..	H410	60,000	40	.1	.66	150	—	1.5
Six-Sixty	4075RC	58,000	37	.075	.64	150	1.0	1.5
Mullard	PM3A	55,000	38	.075	.66	150	1.5	1.5
Marconi	HL410	30,000	25	.15	.83	150	2.0	3.0
Lissen ..	HL410	21,000	25	.1	1.2	150	1.5	3.0
Dario ..	Super HF	21,000	25	.1	1.2	200	1.5	3.0
Cossor ..	410HF	20,000	20	.1	1.0	150	1.5	4.5
Mullard	PM3	13,000	14	.075	1.05	150	3.0	6.0
Six-Sixty	4075HF	12,500	13.5	.075	1.1	150	3.0	5.0
Dario ..	Univ.	10,000	10	.075	1.0	200	—	1.5
Cossor ..	410LF	8,500	15	.1	1.76	150	3.0	6.0
Lissen ..	L410	8,500	15	.1	1.8	150	1.5	4.5
Marconi	L410	8,500	15	.1	1.77	150	2.0	4.5
Osram ..	L410	8,500	15	.1	1.77	150	3.0	4.5
Mullard	PM4DX	7,500	15	.1	2.0	150	3.0	6.0
Dario ..	Super Det.	7,500	15	.075	—	200	3.0	4.5
Six-Sixty	410D	7,250	14.5	.1	2.0	150	—	3.5
Marconi	P410	5,000	7.5	.1	1.5	150	6.0	10.5
Osram ..	P410	5,000	7.5	.1	1.5	150	6.0	10.5
Dario ..	SP	4,500	9	.1	2.0	200	6.0	15.0
Lissen ..	P410	4,500	9	.1	2.0	150	6.0	12.5
Mullard	PM4	4,450	8	.1	1.8	150	7.5	12.0
Six-Sixty	410P	4,200	7.7	.1	1.85	150	6.0	9.0

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Maximum Anode Voltage	Grid Bias at 100 volts	Grid Bias at 150 volts
Four-volt Three-electrode Valves—continued.								
Cossor ..	410P	4,000	8	.1	2.0	150	4.5	9.0
Dario ..	Hyper P	2,700	5	.15	1.8	200	12.0	17.5
Osram ..	P425	2,300	4.5	.25	1.95	150	9.0	16.5
Marconi	P425	2,300	4.5	.25	1.95	150	9.0	16.5
Lissen ..	P425	2,250	4.5	.25	2.8	150	12.5	19.5
Osram ..	415XP	2,000	4	.15	2.0	150	12.0	22.5
Mullard	PM25A	2,000	4.2	.18	2.1	150	13.5	22.5
Six-Sixty	420SP	2,000	4	.2	2.0	150	12.0	22.0
Mazda ..	P425	1,950	3.5	.25	1.8	140	1.40	26.0
Four-volt Screened-grid Valves								
Dario ..	SG	250,000	250	.075	1.0	200	—	1.5
Mullard	PM14	230,000	200	.075	.87	150	—	—
Six-Sixty	4075SG	220,000	190	.075	.87	150	—	—
Cossor ..	410SG	200,000	200	.1	1.0	100	—	1.5
Marconi	S410	200,000	180	.1	.9	150	1.5	1.5
Osram ..	S410	200,000	180	.1	.9	150	—	—
Lissen ..	SG410	200,000	180	.1	.9	150	—	1.5
Four-volt Pentode Valves								
Dario ..	Pent.	55,000	100	.15	1.8	160	6.0	15.0
Six-Sixty	SS4 Pent.	53,000	83	.275	1.55	300	10.0	14.0
Marconi	PT425	50,000	100	.25	2.0	150	4.7	7.5
Osram ..	PT425	50,000	100	.25	2.0	150	4.0	7.5
Mullard	PM24	28,000	62	.15	2.3	150	6.0	12.0
Six-Sixty	415PP	27,000	60	.15	2.2	150	6.0	10.5
Lissen ..	PM24A	25,000	50	.275	2.0	300	6.0	21.0
Mullard	PT425	22,500	180	.25	2.0	150	7.5	10.5
Cossor ..	415PT	20,000	40	.15	2.0	150	6.0	9.0
Mazda ..	425P n.	—	—	.25	2.0	150	14.0	14.0
Six-volt Three-electrode Valves								
Mazda ..	H607	90,000	40	.07	.45	150	.8	1.5
Cossor ..	610RC	60,000	50	.1	.8	150	—	1.5
Lissen ..	H610	60,000	40	.1	.66	150	—	1.5
Marconi	H610	60,000	40	.1	.67	150	1.5	1.5
Osram ..	H610	60,000	40	.1	.67	150	—	3.0
Six-Sixty	6075RC	58,000	42	.075	.7	150	1.0	1.5
Mullard	PM5B	53,000	40	.075	.75	150	1.5	1.5
Marconi	HL610	30,000	30	.1	1.0	150	1.5	1.5
Osram ..	HL610	30,000	30	.1	1.0	150	1.5	3.0
Lissen ..	HL610	21,000	25	.1	1.2	150	1.5	3.0
Cossor ..	610HF	20,000	20	.1	1.0	150	1.5	3.0
Mazda ..	HL607	20,000	20	.07	1.0	150	1.5	3.0
Six-Sixty	6075HF	15,200	17	.075	1.1	150	2.0	4.0
Mullard	PM5X	14,700	17.5	.075	1.2	150	3.0	4.5
Six-Sixty	D610	9,250	18.5	.1	2.0	150	—	4.0
Lissen ..	L610	9,000	18	.1	2.0	150	3.0	4.5
Mullard	PM6D	9,000	18	.1	2.0	150	3.0	4.5
Cossor ..	610LF	7,500						



FROM the moment you start using TUNGSRAM Barium Valves in your set you will save money. Yet you will get vastly improved performance. For TUNGSRAM Valves cost considerably less than any other valves of similar quality you can buy. And they are so economical in use that battery costs are less. TUNGSRAM Valves have a longer life. They will give to your set greater selectivity, longer range, perfect tone, and increased volume. TUNGSRAM Valves give you better performance at less cost.

L.F. 5/6; H.F. 5/6; R.C. 5/6; Power 7/3; Super-Power 8/-; A.C. Indirectly Heated H.F. and L.F. 9/6; A.C. Directly Heated Power 8/6 each; A.C. Directly Heated H.F. and L.F. 8/-; Rectifying Valves 10/- each. Tungfram Photo-Electric Cells. Nava E. £2:17:6. Nava R. £3:3:0.

TUNGSRAM VALVES

TUNGSRAM ELECTRIC LAMP



WORKS (GT. BRITAIN) LTD.

Rad o Dept., Commerce House, 72 Oxford Street, London, W.1

Factories in Austria, Czechoslovakia, Hungary, Italy, and Poland

Branches: Belfast, Birmingham, Bristol Cardiff, Glasgow, Leeds, Manchester, Newcastle, Nottingham, and Southampton

CLIX—FOR RELIABLE CONTACT . . .



No. 9. **PARALLEL PLUG**
Pat. Pro.
Pat.

No. 9. PARALLEL PLUG
A Resilient Plug of great utility that gives quick and sure contact for all kinds of plug and socket connections. Used with Clix Rigid Sockets for the A.C.2. Red or Black, plain or engraved **2d.**

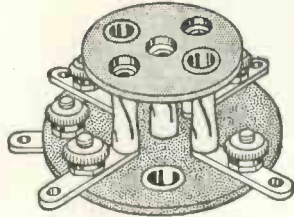
No. 19. RIGID SOCKET
with locknut and engraved insulated shoulder. Makes excellent contact with Clix Coil Pin or Parallel Plugs **1 1/2d.**

No. 15. CLIX ALL-IN TERMINAL. The only terminal completely insulated from the panel, whether connected or disconnected. Black; engraved with full range of markings. **Price Complete, 8d.**
Flex portion 4d., Panel portion 4d. Can be converted into a twin-plug attachment by using special adaptor plate **Price 2d.**

LECTRO LINX, LTD., 254 VAUXHALL BRIDGE RD., S. W. 1



No. 19



No. 27. **CLIX VALVE HOLDER**
(4/5 Pin)

Incorporating the new Resilient Sockets. Perfect contact with solid or any other type of valve pin. Sockets air-dielectrically insulated and self-aligning. Impossible to blow valves.

Type B for Baseboard Mounting:
Complete as Illustrated 10d.
Without Screw Terminals 8d.

"A.C.2"

There are Clix for every type of connection. Write for illustrated leaflet, "W.M."



No. 15. **Pat. Pro.**
Pat. Reg. Des.

STAND
G. 131
OLYMPIA

H&B

World's Greatest Kit Service A.C. TWO

The complete kit of components exactly as used in the original set, together with panel and strips drilled, baseboard, wire, and screws. Full-size blueprint Free with each kit.

CASH PRICE £4 4 6

2 Marconi valves, 32/6 extra.

Regional Band-Pass Four.

The Four You Must Build!

Complete kit exactly as used by designer, together with panel and strips drilled, baseboard, wire, screws, and full-size blueprint.

CASH PRICE £9 10 6

4 Mazda valves, as specified, £2 7 6 extra. Oak cabinet, 17/6 extra.

Five-Point Three

Marvellous Three, an Ideal Family Set.

Complete kit to construct this receiver only costs £5 3 0, and is complete in every detail. Full-size blueprint with each order for kit.

3 Mullard valves, as specified, £1 19 0 extra. Oak cabinet, 17/6 extra.

Write for detailed Lists of these Kits.

Any Parts Sold Separately

We construct any Set FREE of Charge with components purchased from us.

HERE IT IS!!!

The G.E.C. 2 Screen-grid 4-valve Kit. A real distance getter and a perfect music reproducer.

Complete kit, with 4 valves and full-size working drawing. **Cash Price £11 15 0**, or 23/6 down and 12 monthly payments of 18/6. Write for full details.

Carriage paid on all cash orders C.O.D. over £1.

H. & B. RADIO, Co.
34, 36, 38, Beak Street
Regent Street, W.1

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LIMIT'S NEWEST SOUNDBOX

Try the new Limit EXCELSIS, the blue riband of soundboxes, against any other make. You will be astounded at the marvellous improvement in reproduction. In fact it is better than many soundboxes sold at double the price. Fit one to your own gramophone—you can get one to fit it. Any good dealer can supply. **15/6**

The original Limit soundbox, priced at 10/6, still maintains its high reputation in the gramophone world. If any difficulty in obtaining write for name of nearest stockist.

LIMIT Engineering Co., Ltd.

Albion Street, King's Cross, N.1.



CONSULT the LEADING RADIO DOCTORS of Gt. BRITAIN



G. Scott Sessions & Co., officially approved as Wireless Doctors by the Radio Society of Gt. Britain and the Wireless League, will diagnose your most intricate radio trouble and offer you the simplest and most inexpensive solution.

Receivers can be modernised, repaired or overhauled without delay. "Wireless Magazine" and other sets constructed to specification.

Write for list giving price for building the following sets described in this issue:—
"Regional Band-pass 4," "Five-point Three," "Merlin Two," "W.M. Standard A.C. Unit."

G. SCOTT SESSIONS & CO.,
MUSWELL HILL, LONDON, N.10
(Phone: Tudor 5326)

All the advertisers in the Wireless Magazine will be pleased to welcome our readers at their stands, and to those who cannot get to Olympia they will send full details of their New Season's products on request.

Advertisers like to know whence the business comes—please mention "W.M."

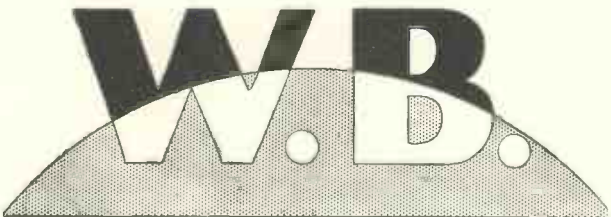
THE NEW W.B. PERMANENT MAGNET MOVING COIL SPEAKER



Assembled in hand-
somerly finished
cabinet, size 17" x 15" x
19". Oak Cabinet
Model - £8 8 0
Mahogany Cabinet
Model - £8 18 6

Assembled in Chassis
form and fitted with
14" baffle board.
Price - £6 6 0

You have not heard your set at its best until you have listened to the new W.B. Permanent Coil Speaker. It is a moving Coil Speaker with a Sheffield made Cobalt Steel Magnet weighing 10½ lbs. and guaranteed for five years. The Permanent Magnet makes energising from the mains unnecessary. It is the most sensitive speaker you can buy. It can be supplied completely assembled in chassis form or in an attractively designed and well-made Oak or Mahogany Cabinet.



Made by the Makers of the famous Whiteley Boneham Valve Holders.
WHITELEY BONEHAM & CO., LTD., Nottingham Road, Mansfield, Notts.
London Office 21 Bartlett's Buildings, Holborn Circus, London, E.C.4.
Telephone: Central 8745 (3 lines)

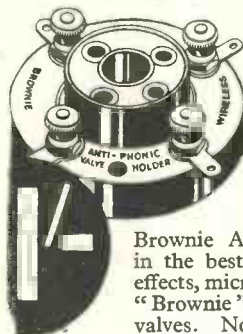
... When you get volume and richness of tone



The purity of amplification of the wonderful "Popular" Transformer gives a more vivid clarity of reproduction throughout the musical scale—not just now and then, but always. Build it into *your* new set.

96

When you marvel at that absence of "crackle"



Brownie ANTI-PHONIC valve-holders, moulded in the best bakelite, entirely eliminate all capacity effects, microphonic noise and shock. By specifying "Brownie" you will lengthen the life of your valves. Not only best—but cheapest!

When you tune-in one station after the other



The special non-backlash design (for fine tuning) combined with its low price make the Brownie "Dominion" Vernier Dial a real radio bargain. In smooth-black or beautifully grained mahogany bakelite, it cannot fail to improve the appearance of your panel.

26

Then you'll thank BROWNIE

BROWNIE WIRELESS CO. (G.B.) LTD., NELSON STREET WORKS, MORNINGTON CRESCENT, LONDON, N.W.1
NATIONAL RADIO EXHIBITION, OLYMPIA. STAND 102

Broadcast Identification Sheets

For the benefit of readers we are publishing each month a series of panels specially compiled for the WIRELESS MAGAZINE by Jay Cooté.

In these, readers will find a ready means of identifying foreign stations. To prevent any confusion in a.m. and p.m., the times are given on the Continental twenty-four-hour system. Example: 8 a.m.=8.00; 8 p.m.=20.00.

In the event of alterations in wavelength, power or call, a special panel bearing the alteration will be published at the earliest opportunity.

These identification sheets should be cut out and filed either alphabetically or in order of wavelength as they appear.



516.4m.
(581 kc.)

Power: 18.5 kw.

VIENNA
(Austria)

760 miles from London

Standard Time: Central European (G.M.T. plus 1 hour).

Announcer: Man.

Call: *Hallo! Radio Wien* (phonetic, *Veen*).

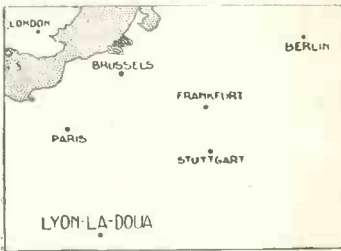
Opening Signal: Morse V (. . . —).

Interval Signal: Fast beating metronome (265 per minute).

Good-night: *Gute Nacht, meine Damen, Gute nacht, meine Herren, gute nacht*. Usually closes down with the morse signal SK (. . . — —) and, on special occasions, with the old Austrian Anthem (Haydn's Hymn). *Vide* German stations, *Deutschland Ueber Alles*.

Main Daily Programme: B.S.T. 09.20, weather; 12.00, 16.00, concerts; 19.55, time signal, main evening entertainment; 22.20, late concert (Sunday, Tuesday, Wednesday, Friday); 22.30, dance music (Monday, Thursday, Saturday).

Relays: Linz, 246 m. (1,220 kc.); Innsbruck, 283 m. (1,058 kc.); Graz, 352 m. (851 kc.); Klagenfurt, 453 m. (662 kc.); Salzburg (under construction).



466m.
(644 kc.)

Power: 5 kw.

LYON-LA-DOUA
(France)

460 miles from London

Standard Time: Greenwich Mean Time (France adopts B.S.T.).

Announcer: Man.

Call: *Allo! Allo! Allo! Ici le poste de radio diffusion des PTT de Lyon*.

Opening Signal: Military march (gramophone record) Occasional interval signal: one or two strokes on a bell, followed by abbreviated call: *Ici PTT Lyon*.

Closes down with formula usually used by French stations (*vide* PTT Paris).

Main Daily Programme: B.S.T. 20.30, own concert (Tuesdays, Wednesdays, Fridays); other days, relay of Ecole Supérieure (Paris PTT), Marseilles, or other French provincial station.



1,000m.
(300 kc.)

Power: 20 kw.

LENIN-GRAD
(U.S.S.R.)

1,308 miles from London

Standard Time: Eastern European (G.M.T. plus 2 hours).

Announcers: Man and woman.

Opening Call: (Phonetic) *Slouschaitye Leningrads-kaya Radio Veschtschotel-naya Stan-see-ya na Vol-nee-yay Tee-sat-chaah Maytrov* (Attention! Leningrad radio station speaking on 1,000 metres).

Occasional Interval Signal: Cuckoo call, followed by *Allo! Leningradski radio Central*.

Good-night: (Phonetic) *Dos-vee-dan-ee-ya spakonee nolchee*.

Main Daily Programme: B.S.T. 05.30, 06.00, and 06.30, physical exercises; 19.00, main evening concert or relay from theatre studio or from other Russian stations (e.g., Moscow, Kharkov).



493m.
(608 kc.)

Power: 60 kw.

OSLO
(Norway)

712 miles from London

Standard Time: Central European (G.M.T. plus 1 hour).

Announcer: Man.

Call: *Hallo! Osloher*.

No interval signal.

Good-night: *God nat* (twice).

Main Daily Programme: B.S.T. 10.15 (Sunday), sacred service (relayed); 19.15, weather, news, concert; 22.40, dance music (except Tuesday and Friday).

Relays: Frederiksstad, 368.1 m. (815 kc.); Rjukan and Notodden, 445 m. (674 kc.); Porsgrund, Tromsø, and Nidaros, 453 m. (662 kc.); Hamar, 587.1 m. (511 kc.).



1,411m.
(212.5 kc.)

Power: 12 kw.

WAR-SAW
(Poland)

900 miles from London

Standard Time: Central European (G.M.T. plus 1 hour).

Announcers: Man and woman.

Call: (Phonetic) *Hallo! Hallo! Polskie raadjo Var-schaw-va*.

Opening Signal: Morse signal W (. — —).

Interval Signal: Metronome.

Announcements are frequently made in both Polish and French. Closes down with the Polish National Anthem (*Dombrowski Mazurka*).

Main Daily Programme: B.S.T. 10.15 (Sunday), sacred service; 20.00, time signal and main evening concert; 22.15, weather, news (Polish and French); 23.00, dance music (except Tuesday and Friday).

Relay: Lodz, 234 m. (1,283 kc.).

End battery worries!

buy an **OLDHAM H. T. Accumulator unit-by-unit**

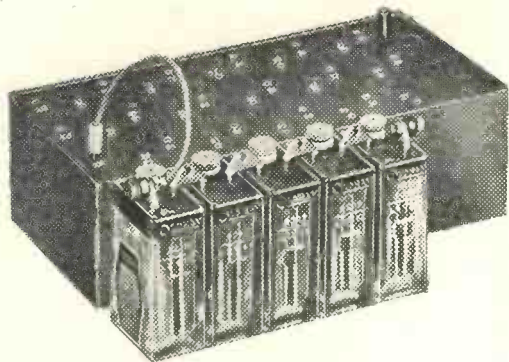
End the continual expense of renewing H.T. Dry Batteries. Assemble an Oldham "Air-Spaced" H.T. Accumulator unit-by-unit. Buy your first Oldham Unit to-day—next week buy another—continue until you have the voltage you want. For a modest weekly outlay you can soon build up the finest source of H.T. current yet devised. Because of its "air-spaced" cells (which prevent current waste) an Oldham H.T. Accumulator seldom needs recharging. No other H.T. Accumulator will give such long service with so little recharging. And because it gives pure smooth current in abundance it will coax the very best from your Receiver. Start to build up your Oldham to-day. Every Wireless Shop sells Oldham 10-volt Units.



The Pioneers of "Air-spaced"
H.T. ACCUMULATORS

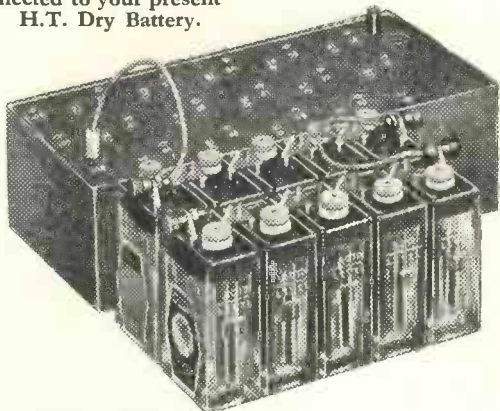
Standard 10-volt Unit
Capacity 2,750 millamps **5/6**

Extra Large Capacity
(5,500 millamps) Per 10-volt Unit **6/9**



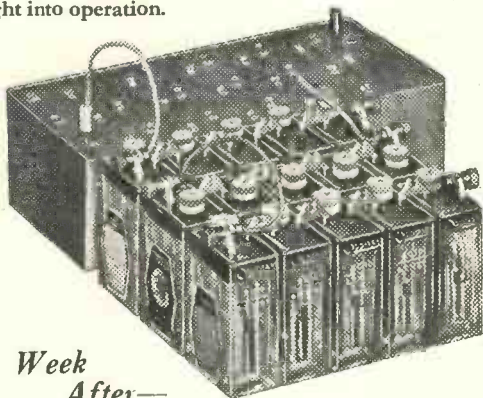
To-day

Here's your first **OLDHAM Unit** connected to your present H.T. Dry Battery.



Next Week

Now the second **OLDHAM "Air-spaced" unit** is brought into operation.



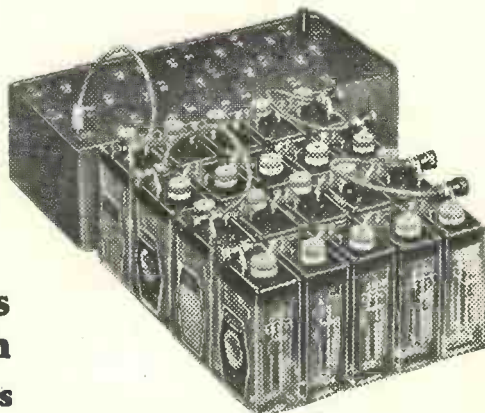
The Week

After—
The third **OLDHAM Unit** begins noticeably to improve your reception.

Continue—

—and soon you will be able to discard your H.T. Dry Battery altogether.

5/6 a week buys 40 volts in a month
Once bought—lasts for years



Oldham & Son, Ltd., Denton, Manchester. Telephone: Denton 301 (4 lines).

London: Bush House, Aldwych, W.C.2. Telephone: Temple Bar 3039.

London Sales Service: 40 Wicklow Street, King's Cross, W.C.1. Telephone: Terminus 4446 (3 lines).

Glasgow: 200 St. Vincent Street. Telephone: Central 4015.

SOLVES EVERY RESISTANCE PROBLEM

CLAROSTAT



"VOLUME CONTROL"

For many years this splendid Volume Control has been extremely popular with the public. It is regularly specified by all the radio journals, giving proof of its efficiency. Single-hole fixing, noiseless, small and neat; fits panels up to $\frac{1}{2}$ in. Baseboard bracket with each. Reasonably priced at

6'6

The "MIDGET CLAROSTAT"

Electrically and mechanically identical to the Volume Control, but with soldering tags and without baseboard bracket. Same size, same resistance range, same usefulness. Only

5'-



"POWER" — 35 Watts

Will comfortably dissipate 35 watts continuously. Ideal for super-eliminators, amplifiers, radiograms, chargers, etc. For use up to 550 volts.

"Store" Types (N.P.) **12'6**

"M" Types (Brass). **10'6**



NOW QUITE READY!

— FREE —

All should write for a copy of our New 48-page Book on Mains Units, etc. Over 100 illustrations, including many most valuable circuits of interest to every "radio" enthusiast. Ask your dealer for a copy of this wonder book, or send a p.c. direct to us.



NEW WONDERFUL VOLUME CONTROLS

The New "Clarostat" genuine Wire High-resistance Potentiometer Volume Controls are now ready, made in 20 different ranges. Our book contains 24 new circuits regarding them. They mark a decided step forward in the design of correct Volume Controls. Prices from 5/- to **8/6**



"STANDARD"

Universal range; 100 ohms to 5 megohms; dissipates 15 watts at 230 volts or 20 watts at 120 volts. The accepted control for Eliminators. Also made in a wide variety of other ranges, replacing bothersome fixed resistances. After six years, selling better than ever.

"Store" Types (N.P.) ... **8/6**
"M" Types (Brass Finish) ... **7/6**

THIS IS NOT THE WHOLE STORY. THERE ARE MANY OTHER TYPES.

CLAUDE LYONS, LTD.

Phone: CENTRAL 4641

76 OLD HALL ST., & 40 BUCKINGHAM GATE, LIVERPOOL LONDON, S.W.1

Phone: VICTORIA 7595

SPECIFIED FOR THE TWO LATEST "W.M." SUCCESSES

Once again the merits of Neophone have been recognised by radio experts. The Technical Dept. of the WIRELESS MAGAZINE has once more specified Neophone cabinets for their two new sets detailed in this issue.

"THE FIVE-POINT THREE"

When building this efficient three-valver make certain that you house it in the Neophone cabinet as specified. Beautifully finished in oak this cabinet is priced £1.

"THE STANDARD A.C. UNIT"

The Neophone special metal box as recommended for the Standard A.C. Unit is stoutly built to the exact dimensions required. Price 12/6

Send for particulars or if in the neighbourhood come and see for yourself.

THE NEOPHONE ENGINEERING CO.

8 GARRICK STREET, W.C.2

(Adjoining Leicester Square Tube Station)
Trade Enquiries Invited. Telephone: Temple Bar 1039

Trelleborg's GUARANTEED GENUINE EBONITE

- ☞ Highest dielectric insulation 120,000 v. per m.m.
- ☞ Lowest power factor.
- ☞ No current absorption.
- ☞ Unconditionally guaranteed perfect.
- ☞ No surface leakage.
- ☞ Easy machining.
- ☞ Best polished surface.
- ☞ Super fine consistent quality.

PANEL PRICES

PER SQUARE INCH		$\frac{1}{8}$ " thickness $\frac{1}{4}$ "	
Black Highly Polished	...	$\frac{1}{16}$ d.	$\frac{3}{16}$ d.
Mahogany Ditto	...	$\frac{3}{16}$ d.	1d.



TRELLEBORG EBONITE WORKS, LTD.
UNION PLACE, WELLS ST., W.1

There is news in the "Wireless Magazine" advertisements



THE MAN WHO TRANSFERRED

When he improved the set with an Ever Ready battery it was as good as a transfer from the pit to the stalls. The Ever Ready gives what listeners want. Gives long life. But not at the cost of efficiency. It works steadily—not in spurts. Silently—not with a crackle. Powerfully—not below the capacity of the set. It lasts but it does not slack. The battery goes on but the loud speaker doesn't go off. You must try the Ever Ready. It is made by an exclusive process—a specially thorough process. It is guaranteed to give satisfactory service by a company which has been making reliable batteries for 28 years.

Ever Ready batteries are made for all wireless sets. If you own a portable you can obtain an Ever Ready of the exact size to fit it.

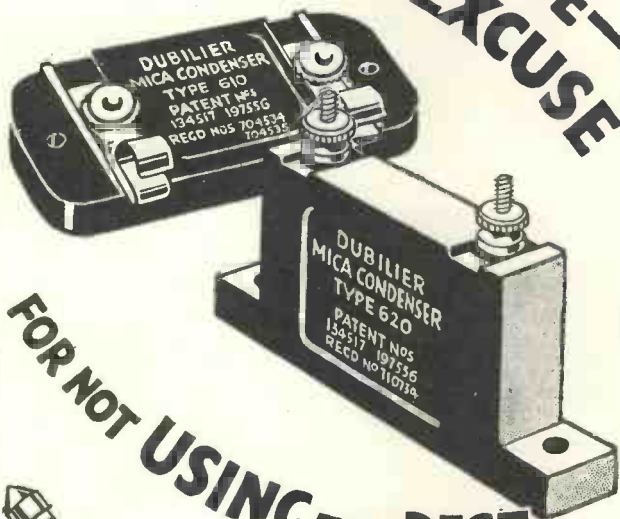
**BRITISH MADE
HIGH TENSION
BATTERIES**

**EVER
READY**

The batteries that give unwavering power

The Ever Ready Co. (Gt. Britain) Ltd., Hercules Place, Holloway, London, N7

**NOW
THAT DUBILIER
CONDENSERS HAVE BEEN
REDUCED IN PRICE—
THERE'S NO EXCUSE**



FOR NOT USING THE BEST



**USE ALSO
DUMETOHMS
—THEY'VE
BEEN RE-
DUCED TOO!
FROM
2/6 to 1/9**

Increased demand has made it possible to reduce the cost of producing the world famed Dubilier Condensers and Grid Leaks, an advantage which we are handing on to you!

The extreme accuracy and constancy of Dubilier Condensers is well-known and users are assured that the standard will be maintained.

There is now no excuse for using inferior Condensers in your set.

PRICES :

Types 610 and 620.

.0005 to .0009	- 1/8	.001 and .002	- 2/-
.003, .004, .005	- 2/3	.006	- - - - 2/6
	.01	- - -	3/-

DUBILIER MICA CONDENSERS

We are exhibiting at **STAND 50
THE NATIONAL RADIO EXHIBITION**

OLYMPIA (New Hall), SEPTEMBER 19th—27th, 1930

**DUBILIER CONDENSER CO. (1925) LTD.
DUCON WORKS, VICTORIA RD., NORTH ACTON, LONDON, W.3**

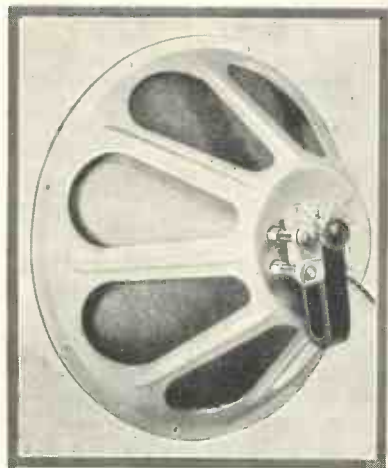
Please mention "Wireless Magazine" when corresponding with advertisers

Our Tests of New Apparatus

BLUE SPOT UNIT

THE Blue Spot loud-speaker unit is one of the best known of its type in this country and the fact that for so many years the construction has been unchanged does credit to the original design.

The makers have recently made certain



FOR THE CONSTRUCTOR

This new Blue Spot loud-speaker combination gives excellent results. For the best reproduction it should be used with a baffle board; suitable boards are made by Borst's and Pickett's.

modifications to the original unit and the new design will probably meet with considerable popularity. We have recently tested one of these, model 66P, mounted in a Blue Spot chassis.

The unit is attached to a 13-in. diaphragm of considerable rigidity, owing to the acuteness of the cone angle. A soft flexible material supports the diaphragm at the periphery and is attached to a frame, which has a rough copper finish. Eight holes are drilled in this frame for the purpose of mounting to a suitable baffle board or cabinet.

Noteworthy Performance

The performance on test was noteworthy, particularly in conjunction with a large baffle board or cabinet, both speech and music were well produced with a pleasing fullness of tone. When fitted to a small baffle board the reproduction was a little high pitched, although this is preferable to a "boomy" tone, particularly when receiving speech.

Readers will certainly not be disappointed with the performance of this chassis if they use an adequate baffle, when the freedom from resonance makes the reproduction commendably natural.

PARMEKO INTERVALVE TRANSFORMER

THOSE who have studied distortion in low-frequency amplifiers are aware that the intervalve coupling, be it transformer, choke, or resistance, is invariably a weak link in an amplifier.

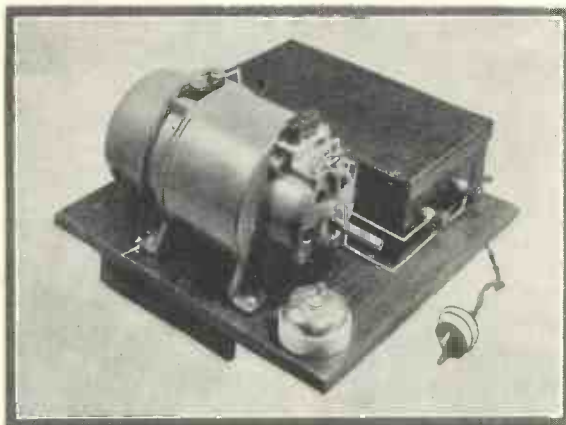
It is generally known that the ability to amplify the lower audible frequencies depends upon the magnitude of the primary inductance preceding a given valve. Unfortunately, the higher this inductance is made, the more likely is the self-capacity to become serious and the iron to saturate: consequently, one advantage may be off-set by other disadvantages.

Partridge and Mee, Ltd., of Leicester, manufacturers of the well-known Parmeko mains transformers, have produced an intervalve transformer in which the various problems of design have been tackled convincingly.

The iron core is gapped in order to prevent saturation and to keep the inductance constant. Without polarising current we found that the primary had an inductance of 86 henries; whilst with 10 milliamperes D.C. through the winding, this figure had only fallen to 81 henries. These values of inductance are unusually high for a gapped transformer, yet, by suitably sectionalising the primary and secondary windings, the self-capacity has been kept at a reasonable figure.

Tests conducted on the amplification of the transformer from frequencies below 100 cycles up to 5,000 cycles give an approximately level characteristic.

The step-up ratio is 1 to 2 and the secondary winding may be obtained with a centre tap for use in push-pull circuits. The price of this instrument is of necessity high, owing to the cost of manufacture; but the figure of 35s. does not appear to us unreasonable in consideration of its manifold advantages.



FOR CONVERTING D.C. TO A.C.

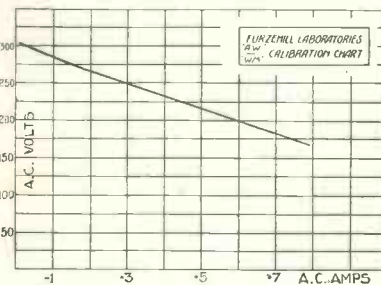
Such an instrument as the M-L converter is particularly useful for running A.C. sets from D.C. mains without any alteration. This particular machine is rated at 85 watts and can be supplied for any standard D.C. input

M-L CONVERTER

THERE are two chief advantages in using alternating current for operating an all-mains receiver: firstly, the maximum high-tension voltage can be raised at will by the use of a step-up transformer, and secondly, the heating of the valve filaments is more economical.

It is for these reasons that the anode converter is becoming popular for use with D.C. mains sets, since it will convert direct current to alternating current, after which the usual A.C. systems may be operated.

The M-L Magneto Syndicate, Ltd., are one of the pioneers of the converter in this country, and their experience, dating over many years, has enabled them to turn out very compact machines,



INTERESTING CURVE

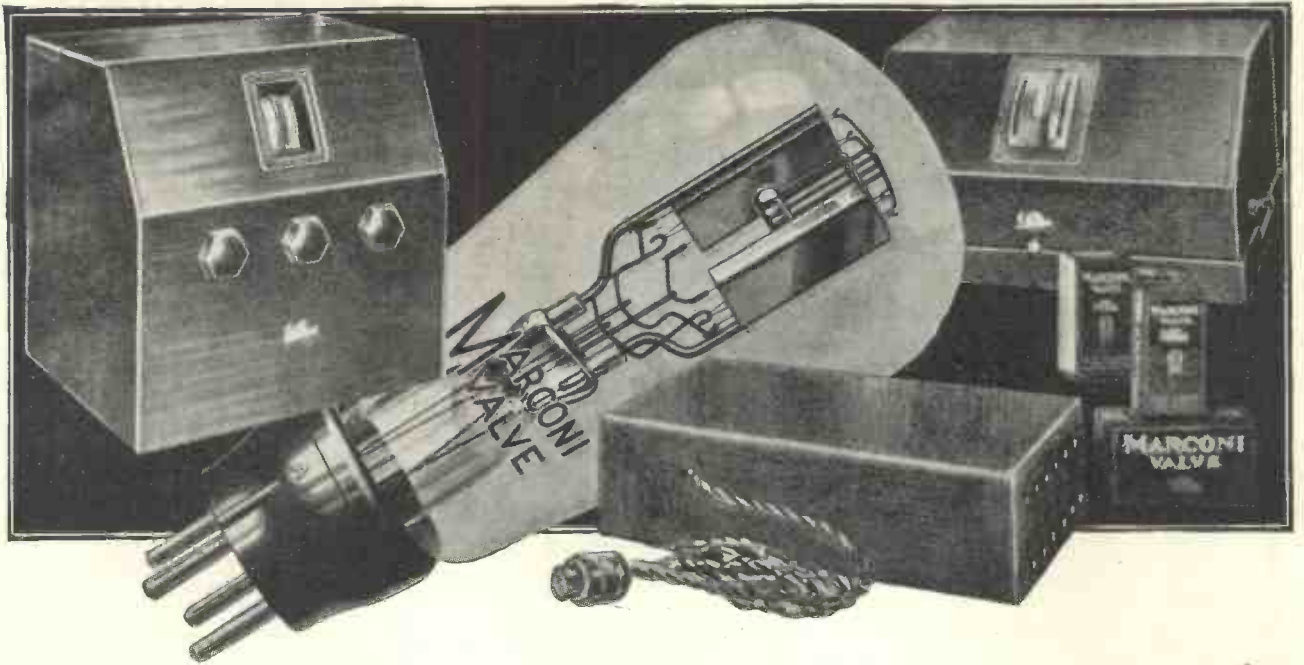
Showing relationship between A.C. voltage and current from an M-L Converter

suitable for use with high-grade amplifiers. We recently had the opportunity of testing one of their latest machines, comprising a converter and smoothing box, which serves to eliminate audible ripple and high-frequency disturbance set up by the machine.

There are two input terminals and three output terminals, one of which should be connected to earth and the remaining two to the A.C. amplifier.

This actual machine is rated to handle 85 watts, and was, therefore, tested on a powerful amplifier operating a moving-coil loud-speaker. The results of these tests both on radio and gramophone reproduction showed that the machine is quite practical for use on any type of amplifier, and gives surprisingly little interference.

On gramophone, by placing one's ear in the cone of the loud-speaker, it was possible to hear a hum, but this becomes inaudible at a small distance away. On radio, when the circuit tuner is correctly set, there is a slight rustling noise in the loud-speaker.



A New Rectifier FOR ALL-ELECTRIC RADIO !

Harnessing the power of the electric mains for the finest radio reproduction, giving a full supply of high tension current at the maximum voltage for A.C. Mains valves and Power valves, Marconi U.10 is the new Rectifier for modern All Electric Receivers and A.C. High Tension Eliminators. ★ It will deliver 60 milliamperes at 200 volts, with full-wave rectification. Filament consumption is 1 ampere at 4 volts—a standard rating rendering Marconi U.10 suitable for most A.C. sets and H.T. Units. Impedance is only 220 ohms—giving excellent voltage regulation. ★ The price is 17/6 AND IT IS ALL BRITISH.

THE

MARCONI U.10



Remember! Marconi Valves are used by The B.B.C., Imperial Airways, Croydon Control Tower, Metropolitan Police, Trinity House Beacon Stations and Lightships, Empire Wireless Communications, Large Passenger Liners, etc., etc.

17/6

You will get prompt replies by mentioning "Wireless Magazine".

for Ether or Records—

TANNOY

PRODUCTS

ALL ELECTRIC
RADIO GRAMOPHONE

for A.C. or D.C.

INCORPORATING
MOVING COIL LOUD-SPEAKER

TANNOY radiograms re-create everything that is produced either by broadcast or by Gramo Discs.

At your will you may hear the most distinguished and most brilliant performers in every field of entertainment — your house is the stage of the world.

Innumerable improvements in the art of combining Radio with Gramophone have been made by skilled hands in the production of the new Tannoy radiograms.

These instruments are developed with a shade more thoroughness in production, in choice of material, and in technical assembling; all of which contributes to general superiority.

Hear a TANNOY before purchasing any new Radio or Gramophone Instrument.

Just 'phone or write for particulars—there's a Tannoy Radiogram to suit YOUR pocket.

BUY FROM A SPECIALIST



from 45 gns.

ADVT. TANNOY PRODUCTS
1-7 Dalton Street, S.E. 27

'Phone - Streatham 6731-2

Excellent Selectivity



for 17/6

DESIGNED to meet the new Regional Scheme requirements, the Watmel Tuner serves as the Aerial tuner for practically all circuits embodying reaction; also it acts as a wave trap, since the loose aperiodic aerial coupling gives great selectivity and a considerable degree of stability. Radio Paris and 5XX are easily separated, as also are both Brookman's Park transmissions.

All moulded parts are of attractive Walnut-mottled Bakelite. The switch is a robust positive specially designed push-pull type, concealed in the base.

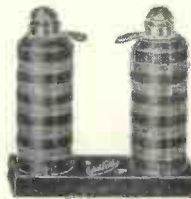
Price complete 17/6

If you cannot get this Watmel product at your dealers, write direct to us and enclose remittance, the tuner will be sent to you by return.

THE WATMEL BINOCULAR H.F. CHOKE gives maximum efficiency, very low self-capacity and an extremely restricted field.

Type DX3
Inductance - 200,000 mh.
Self Capacity - 1.6 m.mfd.
D.C. Resistance, 1,400 ohms.
Price 6/-

Type DX2
Inductance - 40,000 mh.
Self Capacity - 1.2 m.mfd.
D.C. Resistance, 450 ohms.
Price 4/-



OLYMPIA STAND No. 12.

WatMel

WATMEL WIRELESS CO., LTD.,
Imperial Works, High St., Edgware.

Telephone: EDGWARE 0323

RAYMOND'S

27 & 28a LISLE ST., LONDON, W.C.2

Come to Leicester Square Tube Station
This address is at the back of Daly's Theatre.

NOTE—NEW 'PHONE NUMBER—GERRARD 2821

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NEW OSRAM MUSIC MAGNET FOUR

SEND NOW	The last word in kits. 2 screened-grid H.F. stages. All parts screened. Great range and extreme selectivity Cash, £11-15-0.	Balance in 12 Monthly Payments of
23/6		18/6

And we deliver the set ready wired if necessary. Carriage Paid, for 23/6 now.

Do you see them at the Show? RED STAR SETS

The World's Wonder Receivers

2-VALVE SET, in handsome oak cabinet, wired ready for use at once ...	63/-	3-VALVE SET dual range coil, drum dial, gang condensers. All Telsen components used in manufacture. Marvellous performer. ...	84/-
---	------	---	------

Deliveries from stock immediately Carriage Paid Money Returned if not satisfied within 7 days.

Try one. We will return your cash if you are not satisfied in 7 days.

FIVE-POINT THREE

This wonderful set, fully described in this issue, can be had in the following kit: Levcos H.F. choke, Lissen L.F. choke, .0002 Edison Bell, Franklin 1 mfd. and 2 mfd. Ormond .0005 small log, Formo midget and knob, Sovereign .0003 Preset, Ormond drum dial S.M., 16 by 8 panel, 2 Junit blocks, 3 Lissen plugs, 2 Telsen valve holders, Junit Universal holder, Lissen holder and 2-meg. grid leak, 2 Bulgin 600 ohm, 2 Gripso switches, Igranic (type J), 4 marked terminals, 8 marked plugs, wire, screws, B.B. screens, wiring diagram, for ...

84/-
Delivered Carriage Paid in United Kingdom

COSSOR EMPIRE MELODY MAKER £6:17:6

Complete with 3 Cossor New Process valves. Ready wired if desired and sent Carriage Free. Immediate Delivery from Stock.

THE "MERLIN TWO"

Complete kit of parts. All parts as 1st specification of "Wireless Magazine." Delivered Carriage Paid for 75/-

The "A.C. UNIT"

Complete kit of parts, all as specified by designers of "Wireless Magazine." Delivered Carriage Paid for £5:7:6 With Wiring Diagram.

REGIONAL BAND-PASS FOUR

A really wonderful set, with enormous power, volume, and strength, and very selective. Complete kit, comprising R.I. Hypercore L.F. choke, 2 Wearite Binowave coils (1930 type), T.C.C. .0002, .002, .015; 5 Ferranti 2 mfd., 1 J.B. 2-gang condenser, 1 J.B. .0005 and drum, Lotus .0003 diff. Formo Preset, 18 by 7 panel, 3 Junit blocks, 3 W.B. valve holders, 1 600 ohms, 30,000 and 80,000 magnum, Lissen 1 meg. and holder, and 2-meg. Roto-ohm, Wearite rheostat, screen, A.F.3 Ferranti, plugs, spade terminals, wire, G.B. clips, and wiring diagram. Carriage Paid for ...

£8:19:0

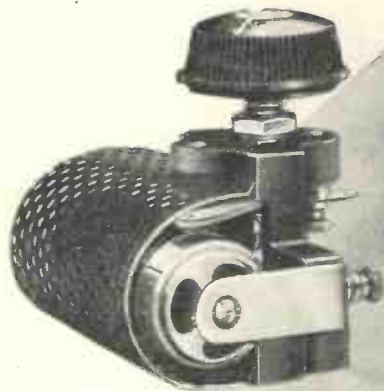
IMPORTANT. All letters and communications must be addressed to:

K. RAYMOND LTD.
27 & 28a LISLE STREET, LONDON, W.C.2

The name of the street is not sufficient.

When replying to advertisements, please mention "Wireless Magazine"

GET THE BEST OUT OF RADIO



Power
Potentiometers
complete range
Prices from
9/6 to 11/6

To get the best out of radio you must put the best into your set. Varley Components have twenty-five years' experience behind them. Experience spells progress, and progress means ultimate achievement.

The Varley Power Potentiometer is the latest development in Power Control. Ideal for high voltage eliminators, the resistance element cannot "pack," and a spring loaded contact arm ensures an efficient and dependable connection

Remember that when you buy Varley Components you buy quality—the results of twenty-five years' research—perfect efficiency

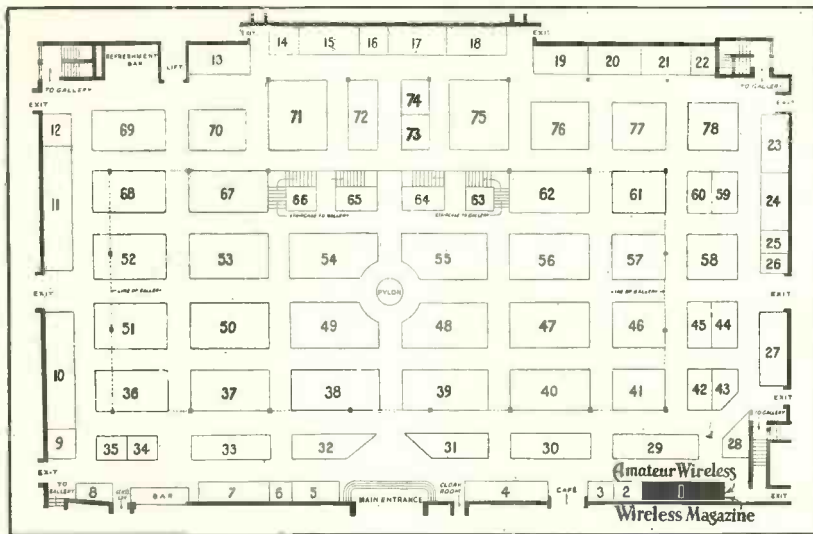


STAND
No. 105
OLYMPIA
Sept. 19-27

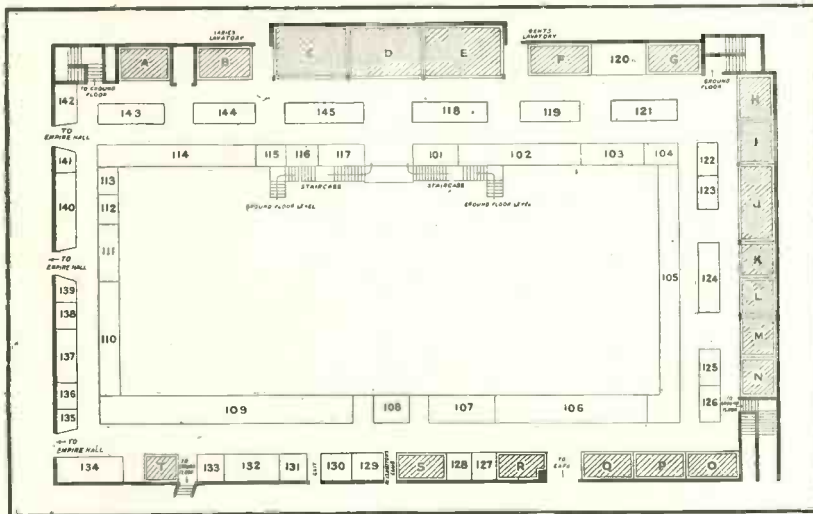
Advertisement of Oliver Pell Control Ltd., Kingsway House, 103, Kingsway, London, W.C.2. Telephone 1 Holborn 5303.

There is news in the "Wireless Magazine" advertisements

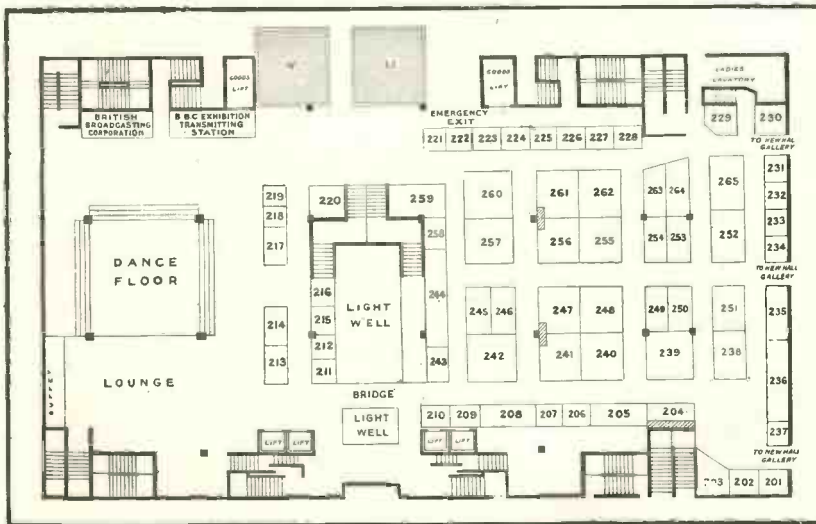
NATIONAL RADIO EXHIBITION



Ground floor plan of National Hall



Gallery plan of National Hall



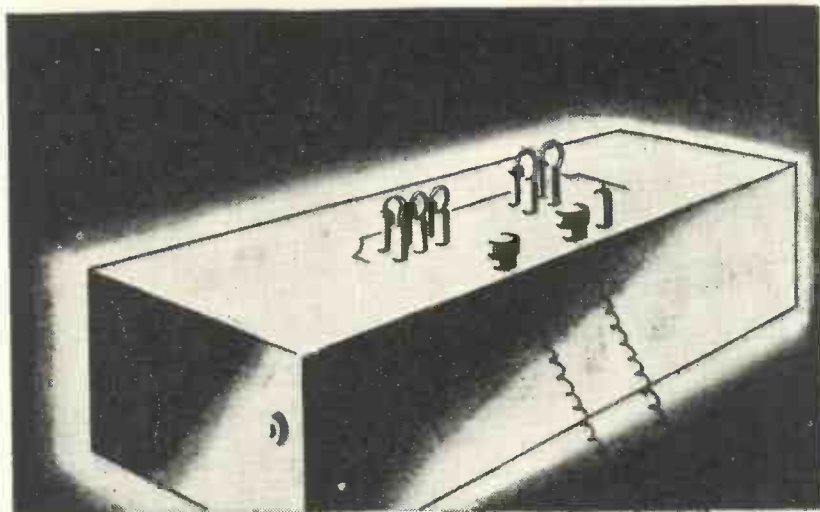
Plan of the Empire Hall

The sixth National Radio Exhibition will be held at Olympia (London) from Friday, September 19 to Saturday, September 27. Hours of opening are from 11 a.m. to 10 p.m. daily; the price of admission is 1s. 6d. There are nearly two hundred exhibitors and 22 demonstration rooms.

LIST OF EXHIBITORS

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Atalanta	232
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Baird Television Co., Ltd.	216
Bakelite, Ltd.	255
Baker's Selhurst Radio	137
Beaver Electrical Supply Co.	206
Bel-Canto Radio, Ltd.	264
Belling & Lee, Ltd.	134
Benjamin Electric, Ltd.	115
Bird, Sydney S., & Sons, Ltd.	73
Birkbys, Ltd.	245
British Ebonite Co., Ltd.	253
British General Manufacturing Co., Ltd.	59
British Radiophone, Ltd.	223
Brown Bros., Ltd.	17
Brown, S. G., Ltd.	78
Brownie Wireless Co. of Great Britain, Ltd.	102
Bulgin, A. F., & Co.	103
Bullphone, Ltd.	33
Burndep Wireless (1928), Ltd.	56
Burne-Jones & Co., Ltd.	121
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Danipad Rubber Co., Ltd.	208
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Falk Stadelmann & Co., Ltd.	119

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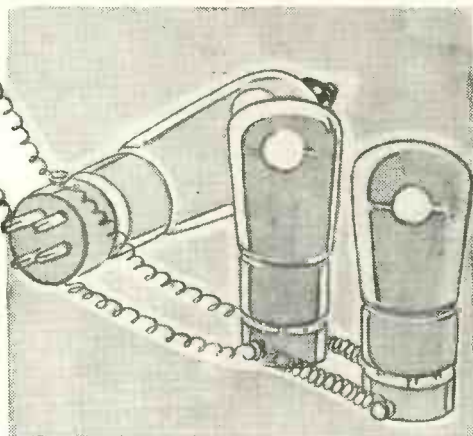


Make your Battery set All-Electric

The Six-Sixty A.C. mains conversion equipment is suitable for any Battery receiver

*No internal wiring alterations.
Specially selected Six-Sixty A.C.
Valves and Six-Sixty 4/5 pin
valve holder adaptor.*

The new Six-Sixty A.C. mains equipment enables you to turn your present battery receiver into an all-mains A.C. operated set. No need to scrap a satisfactory set—just adapt it. *The dimensions of the complete Six-Sixty conversion equipment do not exceed those of the previous batteries*, while the unit is specially designed to co-operate with specially selected Six-Sixty A.C. valves. Nowhere else can you obtain this advantage—valves and mains-conversion unit built by the same manufacturer to suit each other and work together.



The Unit can be obtained correctly built for any A.C. house supply. It is fitted with L.T. terminals giving 4 volts and up to 5 amps. H.T. tapplings of 60, 75, 100, 120, 150 and 200 volts and Grid Bias tapping of —1.5 to —20 volts are provided—any three H.T. or two G.B. values being available for use simultaneously. Automatic Grid Bias is provided—the most modern and expensive arrangement. A further advantage is that the H.T. leads from the set are not removed when once inserted.

Dimensions, 13" x 5½" x 4". Price complete, from £8 5s.
Mains Unit alone £6 6s.

Made by the makers of the famous Six-Sixty Valves.

Write for leaflet giving particulars of complete range, including new Six-Sixty Valves, Six-Sixty Cone Speaker Assembly and Cone Speaker Paper, Six-Sixty Turntable, Six-Sixty Valve and Set Tester, Six-Sixty Valve Adaptors, Six-Sixty Gramophone Pick-up Attachments, Six-Sixty Grid Leaks and Holders.



SAY SIX-SIXTY

Six-Sixty Radio Co., Ltd., Six-Sixty House, 17/18, Rathbone Place, Oxford Street, W.1. Telephone Museum 6116/7.

Advertisers take more interest when you mention "Wireless Magazine"

National Radio Exhibition—Continued

Name	Stand No.	Name	Stand No.	Name	Stand No.
Ferranti, Ltd.	47	Lock, W. & T., Ltd.	132	Rees Mace Manufacturing Co., Ltd.	117
Flinders (Wholesale), Ltd.	22	Loewe Radio Co., Ltd.	207	Regent Radio Supply Co.	51
Formo Co.	72	London Electric Wire Co. and Smiths, Ltd.	41	Ridged Cone Co., Ltd.	112
Fuller Accumulator Co. (1926), Ltd.	221, 265	Loud Speaker Co., Ltd.	214	Rolls Radio, Ltd.	35
Gamage, A. W., Ltd.	244	Mainten Manufacturing Co., Ltd.	219	Selectors, Ltd.	114
Gambrell Radio, Ltd.	106	M.P.A. Wireless (1930), Ltd.	213	Sel-Ezi Wireless Supply Co., Ltd.	14
Garnett Whiteley & Co., Ltd.	30	M-L Magnet Syndicate, Ltd.	222	Selfridge & Co., Ltd.	242
Garrard Engineering and Manufacturing Co.	256	McMichael, L., Ltd.	57	Sheffield Magnet Co.	125
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Grosvenor Battery Co., Ltd.	263	Mullard Wireless Service Co., Ltd.	36	Standard Battery Co.	42
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Halcyon Wireless Co., Ltd.	144	National Accumulator Co., Ltd.	39	Sun Electrical Co., Ltd.	19
Harlie Bros. (Edmonton), Ltd.	141	New London Electron Works, Ltd.	34	Swift Levick & Sons, Ltd.	129
Henderson Wireless and Electrical Service	231	Oldham & Son, Ltd.	64	Sylvex, Ltd.	127
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Itonia Gramophones, Ltd.	21	Partridge & Mee, Ltd.	248	Turner & Co.	9
J.R. Wireless Co.	136	Partridge, Wilson & Co.	251	Ultra Electric, Ltd.	77
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Lamplugh, S. A., Ltd.	124	Radio Instruments, Ltd.	61	Whittingham Smith & Co.	74
Lectro-Linx, Ltd.	131	Radio for the Million (Mullard)	101	Wilkins & Wright, Ltd.	60
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				Young Accumulator Co. (1929)	225
				Zeitlin, V., & Sons, Ltd.	26

EASY - TO - BUILD KITS NOW READY

EASY-TO-BUILD Kits for all current "W.M." Sets are ready for immediate delivery. Even a novice can assemble these receivers without difficulty. No cheap foreign components. Get the best results by using specified parts.

REGIONAL BAND-PASS FOUR

SPECIFIED KIT - £9-12-6
OAK CABINET - 14/6

THE FIVE-POINT THREE

SPECIFIED KIT - £5-5-6
OAK CABINET - 13/6

THE MERLIN TWO

SPECIFIED KIT - £4-0-6
OAK CABINET - 12/-

"W.M." STANDARD A.C. UNIT

SPECIFIED KIT - £6-11-6

Send for FREE LIST. Carriage paid on all orders. Easy terms by arrangement. Write NOW for full details.

P.B. RADIO CO.

35 OXFORD STREET, LONDON, W.1

Phone: Gerrard 3546. Telegrams: Equipregim, London.



Model U 99
£4 : 10 : 0

SEE AND HEAR THE NEW AND IMPROVED DOUBLE LINEN DIAPHRAGM SPEAKER, STAND No. 77, Demonstration Room F.

1. Fitted with the new scientific Baffling System giving remarkable sharpness of tone definition on the lower and higher registers.
2. Greatly increased sensitivity to weak signals.
3. Handles enormous power input without overloading.
4. Improved cabinet designs in Walnut, Oak and Mahogany.

ULTRA ELECTRIC LIMITED,
661/3, Harrow Rd., London, N.W.10.

ULTRA

(PAREX)

SCREENS. CABINETS.

Products PAR-EXcellence, as used and specified in W. James'

REGIONAL BAND-PASS FOUR

Special screen, drilled and bent, 4/6 "Parex" SG. valve holders 2/- ea.

"PAREX" SCREENS are also used and specified in the FIVE-POINT THREE

drilled and bent to specification, 4/- "Parex" SG. valve holder - 2/-

MUSIC MONITOR Dual coil as specified - 10/6



IMITATION WOOD ALUMINIUM PANELS

(Oak, mahogany or walnut finish) 18 x 7. 7/6

Screens and metal Cabinets for all circuits.

STAND No. 227, OLYMPIA

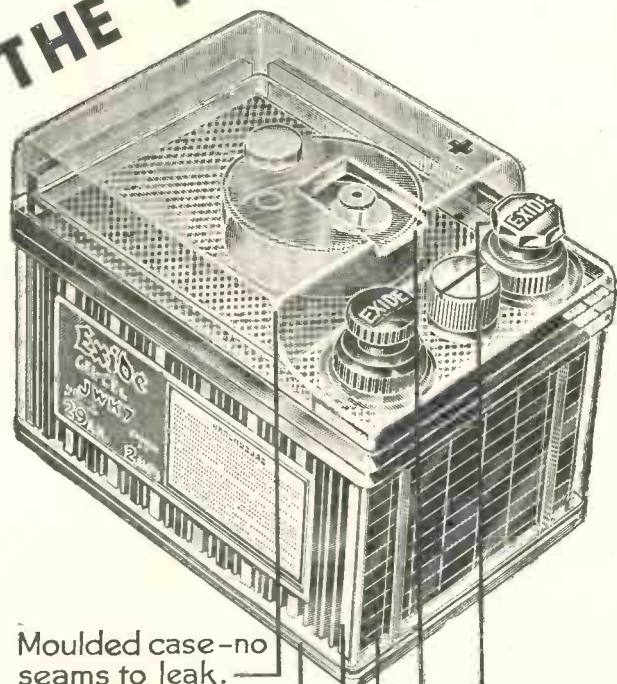
E. PAROUSSI

10 Featherstone Buildings, London, W.C.1

Phone: CHANCERY 7010

★ ANNOUNCING

THE PERFECT JELLY ACID BATTERY



- Moulded case—no seams to leak.
- Double bottom for extra strength.
- Exide Long-Life Plates.
- Exide Jelly Acid.
- Improved Acid Trap.
- Non-interchangeable terminals, differently shaped and coloured.

THE makers of the Exide Battery have never before offered a jelly acid battery. A remedy had first to be found for certain well-known defects of this type of battery. This has now been done. And here is the result—the Exide Gel-cel.

The Exide Gel-cel is the first jelly acid battery to compare in efficiency with the best free acid batteries. And yet it has all the freedom from spilling which jelly acid provides. As an additional safeguard, should there be any residual acid, Exide have even provided an improved acid trap and a case with a double bottom, moulded and seamless, that cannot leak. It is the strongest, most efficient jelly acid battery for portables ever produced. Before you replace your present battery—see the Exide Gel-cel.

Exide GEL-CEL

REGISTERED

A size for every set. Prices from 13/-. See it on Stand 54 at the National Radio Exhibition

From Exide Service Stations or any reputable dealer. Exide Service Stations give service on every make of battery

Exide Batteries, Clifton Junction, near Manchester. Branches at London, Manchester, Birmingham, Bristol and Glasgow

L24

When replying to advertisements, please mention "Wireless Magazine"

IN TUNE WITH THE TRADE

A SPECIAL FREE SERVICE TO KEEP YOU IN TOUCH WITH THE LATEST DEVELOPMENTS

Permanent-magnet Moving-coils

ALL the rage these days among moving-coil enthusiasts is for permanent-magnet jobs. Once upon a time permanent-magnet moving-coil loud-speakers were inferior in results to those taking magnetising juice from the mains or from the low-tension battery.

But now the high-quality steel manufacturers have been at work and you can buy moving-coils sans the need for energising current which are just as good as those taking a healthy fraction of an ampere from the place where it is most needed, namely the accumulator.

Take Epoch's, for instance. I have at hand a little folder describing the new Epoch moving-coil loud-speakers, and I read with interest that the cobalt-steel permanent magnets with which these are fitted are actually guaranteed against perceptible loss of magnetism for two years.

That is rather a surprising claim, but knowing Epoch's I can realise that it is fully justified. **137**

Home-made Mains Units

THERE are two ways of obtaining a mains unit, and therefore of enjoying the advantages of mains operation, without paying very much for this undoubted bliss. One way is to take advantage of the many hire-purchase systems available, under which you can get a complete eliminator for about 10s. down. But, of course, you have to pay the full price in the end! Obvious, but true!

Now, another good way deserving of consideration is the purchase of a kit of parts so that you can make up your own power unit. This is so simple that I wonder it is not more popular. I know it is simple because I have just been reading through literature sent me by the Wholesale Wireless Co., about the new Sensitite constructional kits for eliminators. You should get the illustrated sheets which are available showing complete layouts. **138**

Go Ahead, Philips!

PHILIPS was never a firm to stand still. Nor is this surprising considering the vast organisation which the name represents. And here we have several new pieces of Philips apparatus, all of which are described in folders which you can have on application.

I should just like to make mention of two new and very fine loud-speakers, the types 315 and 2024. These are rather different from the usual run of cabinet loud-speakers. Two other newcomers

are two radio gramophones, quite a new idea so far as Philips are concerned. **139**

Cheap Running

THE great benefit you get from working from the mains is the extreme lowness of running costs. It is such a boon never to have to bother about accumulator charging or to count up the number of days longer which the high-tension battery may last, with luck. All the advantages of mains operation may be enjoyed by owners of such a set as the model 307 table-type Columbia set.

I believe I have referred on a previous occasion to the Columbia type 308 radio gramophone. The table-model set embodies the same type of radio receiver. A new folder has been issued describing both. **140**

Choke Troubles

I DON'T profess to be much of a technician, but I have heard it said and proved for myself that many receivers give "dud" reception because of flat spots in the range of the high-frequency choke. At these flat spots reaction is difficult to obtain and the sensibility drops off; and at the corresponding high spot the set may be tricky in operation.

Chokes are innocent-looking things, and it is in design rather than in working that they can go wrong, but if you have a really good choke, such as the Watmel

Binocular DX3 or DX2, then you know that you are safe, and that is a great satisfaction.

A leaflet giving particulars and characteristic curves of both these chokes can be had. **141**

A Panel-mounting Test Meter

YOU know the handy Wates three-in-one test meter, of course. Perhaps you do not know so well that it can be obtained as a panel-mounting job complete with a little plug and socket arrangement so that it can easily be changed for reading volts 0-6 for low tension, volts 0-150 for high tension, and milliamperes 0-30 for high-tension consumption. This is a good idea because the meter is so reasonably priced at 13s. 9d. that one does not mind having it permanently in the set.

If you want to know all about the various uses to which this handy tester can be put then get the new illustrated sheet describing it. **142**

Knife-edge Portables

EVEN the worst and cheapest portable is bound to be satisfactory so far as sharp tuning is concerned, provided—and it is a rather important "provided"—that the interfering station is not in line with the station it is desired to receive. If it is, then the portable is on a worse footing for selectivity than an ordinary aerial-earth set.

A new idea to make portable sets more selective is the McMichael wave-trap for portables. This is a handy gadget selling at 18s. 6d. (and fully described in a new McMichael leaflet) which clamps on to the top of the frame aerial in the set and at the touch of the dial cuts out the interfering station with the rapidity of the magician's "hey presto." **143**

It Simplifies Soldering

SOLDERING? Well, of course, there is no doubt that connections in a set are always more satisfactory if soldered, but there is a little prejudice existing which doubtless has arisen because a good many amateurs do not know how to solder nor have the proper equipment. Fluxite solves this problem because complete soldering sets can be obtained, containing a small iron, with a non-heating metal handle, a pocket soldering lamp, solder, and a useful supply of Fluxite.

If you want to read about one of these kits before buying it then get the folder available from Fluxite, Ltd. **144**

SEND TO US FOR THESE CATALOGUES!

As a keen wireless enthusiast you naturally want to keep abreast of all the latest developments, and this special feature will enable you to do so with the minimum of trouble and the cost of only ½d. for postage.

Here we review the newest booklets and folders issued by eight well-known firms. If you want copies of any or all of them just cut out this coupon and send it to us. We will see that you get all the literature you desire.

Just indicate the numbers (seen at the end of each paragraph) of the catalogues you want below.

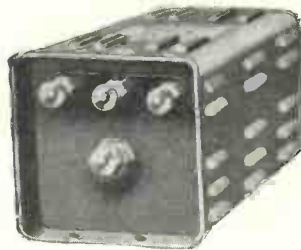
My name and address are:—

Send this coupon in an unsealed envelope, bearing ½d. stamp, to "Catalogue Service," WIRELESS MAGAZINE, 55/61 Fetter Lane, E.C.4. Valid till Oct. 31

Important Developments IN WESTINGHOUSE RECTIFIERS

ON

STAND No. 239
(EMPIRE HALL)



NEW

WESTINGHOUSE
METAL RECTIFIERS
FOR HIGH TENSION

From 15/- each

THE WESTINGHOUSE BRAKE & SAXBY SIGNAL CO., LTD.
82 York Road, King's Cross, London, N.1

Call for the
1931 Edition of
"The All-Metal Way"
enlarged to
40 pages of
valuable
technical and
practical data
for mains users

Advertisers take more interest when you mention "Wireless Magazine"

NOW ONLY 17'6

THE WORLD'S MOST ECONOMICAL BATTERY..



The world's most economical battery—Columbia 4780—Triple Capacity—now costs only 17/6. It is economical—it gives you smooth flowing power for hour after hour, day after day, month after month. And such radio—pure, evenly-balanced, and entirely trouble free. Remember Columbia 4780—the battery you have waited for.

For large Sets employing power valves, Columbia "Layerbilt"—truly a battery and a half. No. 4486, 45 volts, 24/-

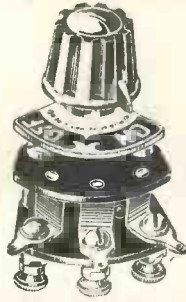
For 2- or 3-Valve Sets, Columbia No. 4721. 10/6

For Portables, Columbia No. 4755, 99 volts. 18/-
Columbia Grid Bias Battery 9 volts. No. 4756. 2/-

Columbia RADIO BATTERIES

J. R. MORRIS, Imperial House, 15 Kingsway, London, W.C.2.
Scotland: J. T. Cartwright, 3 Cadogan St., Glasgow

With
Terminals
1/9



Without
Terminals
1/6

SOMETHING DIFFERENT

HERE IS THE SWITCH FOR WHICH EVERY CONSTRUCTOR HAS BEEN WAITING.

The Bakelite pointer knob is affixed to the spindle by a set screw in a brass bush. The spindle itself carries an insulated arm at the end of which is a spring loaded ball contact.

Movement of the knob causes the ball to click firmly into the gaps between the contact strips thereby forming a low resistance, self-cleaning connection. One hole fixing (1/4" clearance) suitable for insulated or metal panels, heavy gauge soldering tags and novel quick grip terminals. Highly finished in every respect.

BENJAMIN

THE BENJAMIN ELECTRIC LTD.
Tariff Road, Tottenham, N.17. Tottenham 1500

SAVE YOUR VALVES!

Make it easy to connect up batteries by fitting

You can write in your own voltages.

NEW



CORTABS DE LUXE

A Complete Set of UP-TO-DATE wordings 1/- of all good dealers or (postage 1d. extra) from

MONEY HICKS, LIMITED,

The Leading London Ivorine Printers,
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GET THE BEST OUT OF YOUR SET

1/9

CHOOSE YOUR OWN RADIO PROGRAMME

POST FREE with the aid of the B.G.L. RADIO STATION FINDER 40-50 stations ought easily to be picked up by any modern set. The B.G.L. RADIO STATION FINDER enables you to identify any station calling, or TUNE IN TO ANY

WIRELESS STATIONS you like. No technical knowledge necessary. Can be used with any valve set. Eliminates oscillation. The readings of all stations within range of your set are

GUARANTEED

by the manufacturers or your money refunded. Complete with full instructions. Sent on receipt of 1/9. THOUSANDS ALREADY SOLD. **BRITISH GAMES LTD. (Dept. W.M.),** 19 Clerkenwell Close, London, E.C.1.

In YOUR Home



For ANY Set or Radio Gram

DE-LUXE RADIO FURNITURE

Houses your SET or RADIO-GRAM and all accessories, dust and damage proof. Beautifully grained Mahogany or Oak. Built by hand. Piano finish hand polished. Bronze Door fittings, Piano hinges. More than a Cabinet—a really fine piece of Furniture.

Improved Baffle and Tone Chamber. Gives remarkable purity and tonal qualities. Handles full volume without distortion or drumming. Equally suitable for all units.

De-Luxe Models £5-5-0 to £15-15-0 "Popular" 75/- Cash or Deferred
7 Days approval at our expense—without obligation.

Write TO-DAY for FREE Photographs and full particulars.

PICKETT'S Wireless Furniture Makers,
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Established at beginning of Broadcasting

FRANKLIN

FULLY GUARANTEED CONDENSERS

Use them for a full six months and we will replace any which prove defective. Remember the name. See test reports in current wireless journals

PRICES	
1 mfd. 500 v. D.C. test	2/-
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FRANKLIN ELECTRIC CO., 187-189, Ilford Lane, ILFORD, Essex. Phone: Ilford 0281



CLARION AT OLYMPIA

The Clarion Cabinet Specified and used by "Wireless Magazine" for the "MERLIN TWO" Set, will be displayed on their STAND No. 1.

Buy this Clarion Cabinet from your Dealer. Price complete (solid oak) 19/6

**HIGH-CLASS CABINETS
AT REASONABLE PRICES**

Write for details of our complete range.
CLARION RADIO FURNITURE
28-38, Mansford Street - LONDON, E.2

ANNOUNCING THE NEW ELECTROCET P.2



All electric. No batteries. No accumulators. Needs no attention whatever. Extremely simple to operate.
(For A.C. mains only.)
Finished in polished oak

£15
or 30/- down, and 12 monthly payments of 27/-.

And our combined Radio-Gramophone Table 18 gns. model in mahogany

Send to-day for our illustrated brochure describing both these fine instruments.

THE ELECTROCET RADIO CO.
Solihull, Birmingham.

THE SQUIRE! 101!



This Squire speaker is one of the most successful double-diaphragm models yet marketed. Full value is obtained in the lower registers with an entire absence of drumminess, while the high-frequency response is remarkably clear and crisp. The Squire chassis is a master-piece of design and workmanship, the cones are accurately made and perfectly balanced, and the assembly is exact in every detail.

Will take Blue Spot (including new models), Ormond, Watmel, Hegra, etc., Units.

FREDERICK SQUIRE, Ltd.
KING'S WORKS, 10 LESWIN PLACE,
STOKE NEWINGTON, N.16
Telephone - CLISSOLD 0334

M.C.5

"Utility"

MITE CONDENSERS

again preferred for
"The Merlin Two"

No greater tribute can be paid to the superior quality of "Utility" instruments than their regular choice by the master set constructors. "Utility" Dials and Switches are just as popular as "Utility" Condensers, and whether you build a set yourself or buy one complete, it is a wise plan to see that the components are of Guaranteed "Utility" manufacture. All high-class dealers stock "Utility." Write to-day, to the makers, for a fully illustrated up-to-date list.

WILKINS & WRIGHT LTD
HOLYHEAD^o *Utility* BIRMINGHAM

"MITE" CONDENSER
(with Drum Dial)
as illustrated.

PRICES		
Cat. No.	Capacity	Price
W.201	.0005	11/6
W.202	.0003	11/-
W.203	.0002	10/6

The wonderful new Receiver specified in this issue of "Wireless Magazine"



STAND 60 RADIO EXHIBITION

**ARE YOU INTERESTED IN
REALISTIC REPRODUCTION ?**

If so, write for new free 32-page booklet on Moving Coil Speakers.

BAKER'S SELHURST RADIO
42 Cherry Orchard Rd., E. Croydon
Phone: Croydon 1618


High-Grade
SET AND SPEAKER CABINET
Constructed of finely figured Oak on carved ball and claw legs, hand french polished.

The ACME OF CRAFTSMANSHIP
£8.8.0, carriage paid.

RADIO-GRAMOPHONE CABINET
£10.0.0, carriage paid

Models from £2.2.0 to £20. Thirty-page illustrated catalogue, post free.

GILBERT, Cabinet Maker.
Established 1866. Swindon



ELEX

SPADES, PINS, HOOKS & EYES
6 Colours, 2d. each

Write for List P 77
J. J. EASTICK & SONS,
118, Bunhill Row, London
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Buy "AMATEUR WIRELESS" 3d. Weekly
You will get prompt replies by mentioning "Wireless Magazine"

SOME NOTES *for the* NEW READER

MANY who buy this issue of WIRELESS MAGAZINE will be making acquaintance with it for the first time.

They will appreciate some notes on how to make the best possible use of the various services associated with WIRELESS MAGAZINE. There are also some special features that will be better appreciated when their object is pointed out.

In the first place, should you be in need of any kind of technical help the Information Bureau is at your service.

A fee of 1s is charged (to prevent the asking of frivolous questions which, unfortunately, results from an entirely free service) and two questions can be asked at a time; all inquiries must be accompanied by the

special "Information" coupon to be found at the foot of the inside back cover.

The simple rules governing the service will be found on page 220.

If you want advice regarding the type of set to buy that will meet your own particular needs best, then you should consult the Set Selection Bureau. This service will cost you only the price of a stamped-addressed envelope for a reply. There is no need to send any coupon and the rules will be found on page 245.

One of the most popular of WIRELESS MAGAZINE services is that by which full-size blueprints for building a set can be obtained for half price during the month of currency. If you

are going to build one of the fine sets constructionally described in this issue, you can get a blueprint for half price (representing a saving of 6d. or 9d.) by using the coupon on the inside back cover.

Each reader can obtain only one blueprint at half price for each coupon, and the set must be one of those described this month. The coupon is valid until October 31, but an appropriate extension of time will be made in the case of overseas readers.

Most readers will be wanting catalogues of some sort or another. The feature, "In Tune with the Trade," which appears on page 206, is intended to give the reader what he wants in this respect with the minimum of trouble and expense. Send the coupon to us in an envelope bearing ½d. stamp and we will do the rest!

Set constructors will be interested to learn that we offer half a guinea for each photograph of a home-built WIRELESS MAGAZINE set published in these pages.

A selection of photographs from readers will be found on pages 238 to 241; their comments will be found of considerable interest and value to the prospective constructor.

Special attention is drawn to the fact that the lists of components for all WIRELESS MAGAZINE receivers include the prices of all the parts. This is an exclusive WIRELESS MAGAZINE feature and enables the prospective constructor to estimate quickly the cost of putting any particular set together.

Because this issue is published earlier than usual in the month many pages went to press before full details of new products were available from the manufacturers.

It will, therefore, be found that in some cases the cost of parts has been reduced from the prices actually given in the various lists of components printed in these pages.

If you look on page 229 you will see a prize of half a guinea offered for a suggestion. The prize-winner in the August competition was Mr. W. E. Lowe, of Dene Top, Goldieslie Road, Wylde Green. Look out next month for an interesting article!



Rigidity is obviously a feature of the Epoch loud-speakers shown here



An attractive cabinet made by the Epoch Radio Manufacturing Co., Ltd., for their permanent-magnet loud-speaker, which is guaranteed against loss perceptible loss of magnetism for two years



An interesting Epoch permanent magnet moving-coil loud-speaker. No tools, except a screwdriver, are required for its assembly

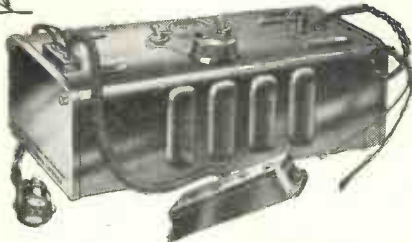


This model 99 entirely dispenses with suspension and a weak spot in moving-coil design is thus removed



ALL-ELECTRIC RADIO

A GROWING POWER IN MAINS RADIO

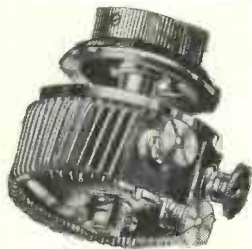


COMBINED MAINS UNIT.

	(H.T. with L.T. charger)	
A.C. Model	£5 17 6
D.C. " "	£3 19 6

MAINS UNITS

Regentone Mains Units have been instrumental in showing tens of thousands of the radio public the simple way to make their sets, even their Portable sets, All-Electric. The first Combined Mains Units to fit inside a Portable were made by Regentone. Now leading British Set Manufacturers recommend Regentone Combined Mains Units for use in their sets—they have proved the reliability and satisfaction which every day make Regentone a still greater power in Mains Radio.



THE NEW REGENTSTAT

The only TOTALLY WIRE-WOUND VARIABLE POWER RESISTANCE on the market. Complete range of Values. Prices 9/6 and 11/6

Mains Components

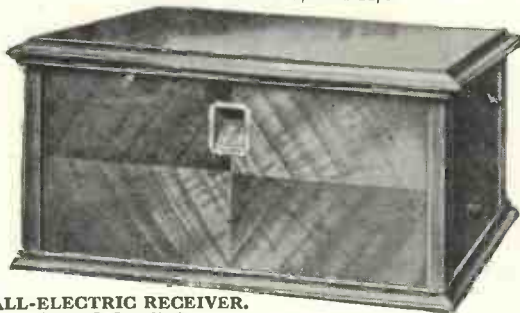
The home constructor knows the value of mains components made by a firm specialising in all-electric radio. These components are themselves the "bits" that go to make up Regentone Mains Units—there can be no greater recommendation than this.

Mains Receivers

The new Regentone 4-Valve All-Electric Receiver (for A.C. supplies) has the same outstanding performance and reliability as the famous Regentone Mains Units. It is made by a firm which has specialised for years in the study of all-electric radio. It is a good receiver, a superlatively good receiver possessing to a marked degree simplicity of control (one knob tuning), selectivity, tonal quality, volume, range, and beauty of cabinet design. It is *the* Receiver for the discerning few who insist on the best.

Price complete 30 guineas.

Write for our new Art Booklet—"The Simple Way to All-Electric Radio"—free on application.



4-valve ALL-ELECTRIC RECEIVER.
(for A.C. Supplies)

4-valves (2 stages Screened Grid H.F.) Single-knob Control. Long and Short Waves. Rectification by Westinghouse Metal Rectifiers. Walnut Cabinet.

REGENT RADIO SUPPLY Co., 21 Bartlett's Buildings, Holborn Circus, LONDON, E.C.4

Telephone: Central 8745 (3 lines).

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IF YOU USE A**

FULL-SIZE BLUEPRINT

CRYSTAL SETS	
6d. each, post free.	
Regional Crystal Set	WM176
ONE-VALVE SETS	
All these 1s. each, post free.	
Special One	WM116
Hartley Single One-Valver	WM198
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All these 1s. each, post free.	
Clipper Two (D, Trans)	WM135
Continental Two (D, Trans)	WM143
Ether Ranger (D, Trans)	WM156
Brookman's Two (D, Trans)	WM168
A.C. Two (D, Trans)	WM175
Programme Two (D, Trans)	WM177
New Crusader (D, Trans)	WM182
Radio-Record Two (SG, D)	WM187
Gleaner Two (D, Trans)	WM201
Music Monitor (D, Trans)	WM208
★Merlin Two (AC set) (D, Trans)	WM213
THREE-VALVE SETS	
All these 1s. each, post free.	
All-wave Screened-grid Three (HF, D, Pentode)	WM110
Standard Coil Three (HF, D, Trans)	WM117
Festival Three (D, 2LF-Dual Imp)	WM118
The Q3 (D, RC, Trans)	WM124
Lodestone Three (HF, D, Trans)	WM129
Simple Screen Three (HF, D, Trans)	WM131
At Home Three (D, 2RC)	WM141
Short Wave Link (D, RC, Trans)	WM142

A blueprint of any one set described in the current issue of the "Wireless Magazine" can be obtained for half-price up to the date indicated on the coupon (which is always to be found on page 111 of the cover) if this is sent when application is made. These blueprints are marked with an asterisk (*) in the above list and are printed in bold type. An extension of time will be made in the case of overseas readers.

Send, preferably, a postal order (stamps over sixpence in value unacceptable) to

Fanfare (D, 2Trans)	WM157
Brookman's Three (SG, D, Trans)	WM161
Community Three (D, RC, Trans)	WM164
New Q3 (SG, D, Pentode)	WM167
Brookman's Push-pull Three (HF, D, Trans), 1s. 6d.	WM170
Celerity Three (SG, D, Trans)	WM173
All-nations Three (D, 2, Trans)	WM178
Inceptordyne (SG, D, Pen.)	WM179
Brookman's A.C.3 (SG, D, Trans)	WM184
Music Marshal (D, 2 Trans)	WM190
Gramo-Radio D.C. Three (SG, D, Trans)	WM196
Concert Three (D, 2 Trans)	WM199
New Lodestone Three (HF, D, Trans)	WM205
De-luxe Three (D, RC, Trans)	WM209
★Five-Point Three (SG, D, Trans)	WM212

FOUR-VALVE SETS	
All these 1s. 6d. each, post free.	
Standard-coil Four (HF, D, 2RC)	WM122
Dominions Four (2SG, D, Trans)	WM134
The Drum Major (HF, D, RC, Trans)	WM137
Music Player (HF, D, RC, Trans)	WM144
Arrow Four (SG, HF, D, Trans)	WM154
1930 Monodial (2SG, D, Trans)	WM158
All-electric Four (SG, D, RC, Trans)	WM162
Outpost Four (SG, D, 2 Trans)	WM165
Brookman's Four (2SG, D, Trans)	WM174
Transportable Four (SG, D, 2RC)	WM180
Lodestone Four (HF, D, RC, Trans)	WM193
Searcher's Four (SG, D, RC, Trans)	WM194
Invitation Four (SG, D, RC, Trans)	WM200
★Regional Band-pass Four (SG, D, RC, Trans)	WM211

FIVE-VALVE SETS	
All these 1s. 6d. each, post free.	
Fidelity Five (HF, D, 2RC-parallel)	WM130
All-wave Lodestone Five (HF, D, Push-pull)	WM146
1930 Five (2HF, D, RC, Trans)	WM171
Dual-screen Five (2SG, D, RC, Trans)	WM185
Radio-Record Five (SG, D, Trans-Parallel)	WM188

Overseas Five (3SG, D, Trans)	WM191
PORTABLE SETS	
Wayfarer Portable (Super-het)	WM139 1/6
1929 Chummy (SG, D, Trans, RC)	WM145 1/6
Picnic Portable (D, RC, Trans)	WM148 1/-
Pedlar Portable (D, Trans)	WM195 1/-
Pedlar Portable (D, 2 Trans)	WM197 1/6
James Portable SG3 (SG, D, Trans)	WM203 1/-
Foursome Portable (SG, D, 2 Trans)	WM206 1/6
AMPLIFIERS	
All these 1s. each, post free.	
Audiot Amplifier	WM132
Concentrator (HF Unit)	WM169
Radio-Record Amplifier (DC Mains)	WM183
Universal Push-pull Amplifier	WM204
Selecto Amplifier (H.F. Unit)	WM210

MISCELLANEOUS	
James H.T. Unit for D.C. Mains	WM133 1/-
Two-ampere Low-tension Unit	WM147 1/-
A.C. Mains Amplifier	WM149 1/-
A.C. Mains Unit for All-wave	
Lodestone Five	WM151 1/-
H.T. Unit for A.C. Mains	WM159 1/-
"W.M." Linen-diaphragm	WM172 1/-
Trimmer (Selectivity Unit)	WM181 1/6
Brookman's "Wipe Outs" (Wave-traps)	WM186 1/-
Short-wave Adaptor for Overseas Five	WM192 1/-
Staminator Unit for A.C. Mains	WM202 1/-
Outspan Short-wave Adaptor	WM207 1/6
★"WM" Standard AC Unit	WM214 1/-

Each blueprint shows the position of each component and every wire and makes construction a simple matter. Copies of "Wireless Magazine" containing descriptions of all these sets can be obtained at 1s. 3d., post free. Index letters "W.M." refer to "Wireless Magazine" sets.

Wireless Magazine

BLUEPRINT DEPT.
58/61 FETTER LANE,
LONDON, E.C.4

MICROPHONES

You will get the best and cheapest selection of Microphones for all purposes at 218, Upper Thames Street, E.C. Electradix Mikes are used everywhere. Broadcast Mikes, £12, £8 and £2, for public address. Announcers' Hand or Stand Mikes, 15/-. Wrist Speech Microphones, 10/6. Solo Hand Mikes 107B in brass case, 3/6. Microphone Units for making multiple mikes, 4/6. Skinderviken Buttons, 3/6. W.E. Service Speech Buttons, 10d. Booklet "Wonders of the Microphone," 6d. Add postage on above.

New Aug.-Sept. Sale List just issued. Free for stamped addressed envelope.

Microphone Specialists,

ELECTRADIX RADIOS,
218 Upper Thames Street, E.C.4

Telegrams: Electradix, Cent. London.
Phone: City 0191.

SPECIFIED USED . . .

The Sovereign Compression-type Condenser is used and specified in the FIVE POINT THREE.

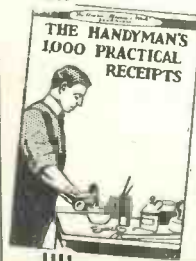
Type F1, .0001 mfd.
Type G2, .001 mfd.
Type J3, .0003 mfd. **1/6**



SOVEREIGN PRODUCTS, LTD.,
52/54 Rosebery Ave., London, E.C.1

CAN YOU

PAINT A HOUSE,
MEND CHINA,
ENAMEL A BATH,
REPAIR HOT
WATER PIPES?



A copy of "The Handyman, 1,000 Practical Receipts," will explain to you clearly the simplest methods of dealing with these and hundreds of other household problems, 1/6 post free from the Publishers or 1/6 from any news-agent or bookseller.

CASSELL & Co., Ltd.,
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NATIONAL RADIO EXHIBITION

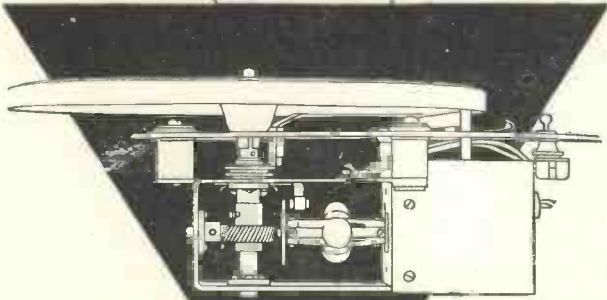
2 Greatly Enlarged Show Numbers of

AMATEUR WIRELESS, 3d.

The first, on sale September 18th } Full of information about the new
The second, on sale September 25th } Season's products. Don't miss these big issues.

Better service results from mentioning "Wireless Magazine" when writing to advertisers

no more
tiresome
winding!



ELECTRIC MOTOR for £3.3.0

The new B.T.H. Electric Gramophone Motor costs only £3.3.0 complete and plays 200 12-inch records for a cost of only one unit of electricity. Why wait? Here is the most moderately priced electric gramophone motor on the market, yet as efficient, as trouble-free as motors costing nearly twice as much.

Price £3.3.0 complete



There is also a B.T.H. Super Motor at £6.6.0 complete

**ELECTRIC
GRAMOPHONE
MOTORS**



THE EDISON SWAN ELECTRIC CO., LTD.
Radio Division,
1a Newman Street, Oxford Street, W.1
Branches in all the Principal Towns

EDISWAN W.92

Electrify
your Mullard
ORGOLA



for the **ORGOLA SENIOR**
A.C. Mains. Model A.C. 38. Price
£9 12s. 6d. Cash, or 10/- deposit
and nine monthly instalments of
22/- each. D.C. Mains. Model
D.C. 50. Price £7 15s. 0d. Cash,
or 10/- deposit and nine monthly
instalments of 18/- each.



for the **ORGOLA III**
A.C. Mains. Model A.C. 16. Price
£4 10s. 0d. Cash, or 10/- deposit
and nine monthly instalments of
10/- each. D.C. Mains. Model
D.C. 16. Price £3 15s. 0d. Cash,
or 10/- deposit and eight monthly
instalments of 9/- each.

**OLYMPIA
STAND NO.
211**

RECOMMENDED BY
"RADIO FOR THE MILLION"

CLARKE'S
"ATLAS"
MAINS UNITS

H. CLARKE & CO., (Mcr.), Ltd., Old Trafford, MANCHESTER

**CLEAN
CELLS
BIG
CELLS
yielding
constant
power**

**THROUGH LONG PROGRAMMES—
THROUGH MONTHS OF HEAVY USE
THE SECRET PROCESS OF THE**

LISSEN

**H.T. BATTERY GENERATES
PURE CURRENT**

Every Lissen Battery is fresh when you buy it. The big cells are fresh, clean, and packed full of energy put there by the Lissen Secret Process. Through months and months of life the Lissen Battery will give you a steady flow of pure silent current. There is never a sign of ripple in it, never a trace of hum. Lissen Battery power is famous for its purity—it brings out every note of music, every word of song and speech in sharp and stereoscopic relief.

PRICES				
60 volt (reads 66) ...	7/11	60 volt (Super Power)	13/6	
100 volt (reads 108) ...	12/11	100 volt	22/-	
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An Editorial Word

TO ADVERTISE — OR NOT TO ADVERTISE

THE public looks to broadcasting for entertainment first and foremost. It is interested in news; it submits to talks, but it must be entertained. Stop entertaining, stop listening!

In British radio we have been brought up on a system of broadcasting financed by the public's licence money and by profits made by the B.B.C. in competition with publishers. But Great Britain is the Great Exception. There was broadcasting in the United States long before the B.B.C. came into existence and yet to this day the American listener doesn't pay a cent directly for it; who then pays for the very costly service which he enjoys from a hundred or more stations? And amazingly costly that service is.

When spending an evening in Mr. Hugo Gernsback's former station on the roof of the Roosevelt Hotel in New York, he told me that the maintenance cost him no less than £17,000 a year, although his station was "only a little one." It is safe to say that every farthing of expense incurred by the American broadcasting stations is paid for by business interests, which either maintain a station as a part of their publicity enterprise or buy "time" as they require it at somebody else's station—in each case, merely to create and maintain a public demand for the goods they sell.

Traders rapidly learnt one lesson: the public looks to broadcasting for entertainment first and foremost, and to occupy an hour "on the air" with straight advertising of toothpaste or whisky would be sheer waste.

A custard-powder company in a big way of business gave up—if ever it entertained the idea—of telling the world of the merits of its custard powder; it just contented itself with inventing a Custard-powder Quartet which gave splendid broadcast entertainment, and by the power of mental association kept the particular brand of custard-powder well in the public's mind.

The owners of stations that "sold time" rapidly saw that they could not afford to hire out their broadcast, at whatever price, to anybody who did not realise that he must first and foremost entertain, because the great public would refuse to tune them in, fearing that they would be bored with a "puff" of some commodity or other.

Seller and buyer of broadcast time had forced upon them the one outstanding fact—the public seeks entertainment and will not submit to very much of anything else.

The British listener has had a few opportunities to listen to advertisers' or sponsored programmes and will soon have more. Radio Paris, Turin, Toulouse, Brussels, and other foreign stations, have sent forth such programmes

and in the near future Dublin and Cork will put out every evening an hour's programme sponsored by an advertiser.

It is thought that the B.B.C.'s charter gives the right to "sell time," and even if there be doubt on that point we can be sure of the B.B.C.'s right, which it has already exercised, to allow an outside party to provide and sponsor a special programme.

As I see it, the idea of the advertiser's sponsored programme is good, which is not to say that the B.B.C. programmes are not good. The B.B.C. does its work day in and day out, year in and year out, and although we criticise it we know full well—if we understand entertainment at all—that we should be hard put to it to do anything consistently better.

But anybody with brains and money ought to be able just for one hour to put out a better show than the B.B.C. can in the nature of things put out continuously. To illustrate: suppose that the famous Mustard Club occupied an hour of Savoy Hill's time. The genius that invented the members of that imaginary club could give us a programme containing at least one or two novelties and the money behind him could buy the services of world-famous entertainers.

The "Club" would have just one hour to provide—once every now and then, not a hundred times every week of its blessed life, which is the task confronting the B.B.C. Programme Board. The Mustard Club programme would be heralded by press advertising; the public would be keyed up to expect something unusually good; and the Mustard Club would have to do its utmost to avoid disappointing the public's expectations, and incidentally it would reap a big advertisement.

If the B.B.C. were to look kindly upon the idea, as I hope they will, sponsored programmes might be the spiced morsels in the regular plain but nourishing broadcast menu and would add a new zest to listening. Their invention and arrangement would be work for keen brains new to broadcasting and programmes of such high entertainment value should be possible that the B.B.C. could easily use its powers of discrimination to limit what might prove to be the coveted privilege of the sponsored programme to firms proving themselves capable of presenting broadcast shows of outstanding merit.

The advertiser's sponsored programme is an idea which the B.B.C., in the light of the new competition, will be compelled to consider very seriously and very soon.

Bernard Jones

What They Think of

SUNDAY

A Variety of
Opinions Expressed
by Well-known
People on the Sub-
ject of British Sun-
day Broadcasts

Collected by

PEARKES
WITHERS

Broadcasts!

CONCERNING the Sunday programmes of the B.B.C., listeners seem to be divided into two very distinct groups—those who consider the programmes admirable, and those who consider them deplorable.

Which is the larger group? Those who enjoy church cantatas in the afternoon and religious services after they have just got home from church—or those who regard the occasional “outside” broadcast between 9.5 p.m. and 10.30 p.m. as the only bright spot in a thoroughly dull day?

It is very difficult to tell, and personally I am convinced that the B.B.C. doesn't know—even if it cares. The people who write to Savoy Hill, praising or condemning the Sunday programmes, are not sufficiently representative of listeners as a whole to be reliable as guides.

But the B.B.C. evidently considers it a duty (if not a pleasure) to uphold the Victorian tradition of Sunday as a day of pious gloom, complete with Bible reading, religious services, collection (on behalf of good causes), and epilogue—though there

may be a brass band of indifferent quality in the afternoon (to catch us napping), and frequently there is chamber music of a painful character, or a solid slab of Mozart, Handel, or Haydn, to swamp the more frivolous music of the Continent.

The B.B.C.'s idea of Sunday is a stereotyped idea, cast always in the same sort of mould, though the details may differ ever so slightly. But do the owners of wireless sets consider the idea ideal?

In all probability the question will never be answered conclusively, for so many of us, while perfectly honest about weekdays, are hypocrites about Sunday, and so many of us who are not hypocrites express our real views only in the privacy of our homes, or to our friends.

With the Editor's authority, however, I have endeavoured to shed a little light on the subject by coaxing a number of well-known people (including artistes) to express their opinions of the Sunday broadcasts. These opinions are distinctly interesting—but they are not by any means unanimous.

W. PETT RIDGE

The Popular Author

I think the Sunday programmes of the B.B.C. are well and decorously arranged, with a proper regard for the susceptibilities and tastes of most of the folk concerned.

The vague impression that listening-in, on Sunday or any other day, is compulsory, appears to be based on error.

BEN TRAVERS

The Humorous Playwright and Novelist

Your letter asking my opinion on Sunday broadcasting programmes arrived at the moment when my aerial was being dismantled in accordance with Post Office requirements, in the case of persons not desirous of renewing their wireless licences. I have seldom witnessed any work of destruction with greater relish.

BISHOP J. E. C. WELLDON

Dean of Durham

The attitude of the British Broadcasting Corporation towards the

observance of Sunday, so far as I know it, seems to have thoroughly merited approval.

Although I am not a strict Sabbatarian, naturally I am glad the difference between Sunday and the other days of the week should be so clearly marked. People who treat all the days of the week alike are, I think, deficient in imagination or appreciation; they would make life more monotonous than it is now.

To me, Sunday is valuable not only as a day of worship, or even of rest, but as a day which is in some degree unlike other days. For the change which Sunday brings is beneficial to the body and the mind as well as the spirit. It is my hope, then, that the Corporation will not abandon or diminish its practice of broadcasting sermons and services, for there are many persons who, being aged or invalided, do not and cannot attend services in churches and chapels.

The interest in religion is to-day so widely spread that I think the number of willing listeners to sermons and

services, if so broadcast, must be considerable. But I hold that some modification of the old Sunday is necessary in the circumstances of modern life; and I am glad, therefore, that the broadcasting on Sunday should include concerts, especially sacred concerts, and addresses not only upon sacred but upon secular subjects, so long as they are always elevating in their nature.

In a word, I am in favour not of a dull Sunday, but of a Sunday distinct from the other days of the week.

FRANK SWINNERTON

The Distinguished Novelist

I do not listen at all to the wireless, but if I were to do so on Sunday I should wish to have a good secular programme.

I do not want religious services or sermons; and although I see no reason why a distinction should not be made between Sunday and weekday programmes (to the exclusion of comedians and jazz), the general official view taken by those who

promote Sunday entertainments, that they should be dreary, does not appeal to me at all.

On the other hand, as I know that elderly people are grateful for the religious services provided by the B.B.C., I think that there might well be alternative programmes—one religious and gloomy, and the other secular and only moderately gloomy. There might also be a third, consisting of comedians and jazz *ad lib*.

All such programmes should be musical.

C. J. CUTCLIFFE-HYNE

*The Famous Creator of
"Captain Kettle"*

I like the church service generally, but the talk stuff is usually twaddle and so badly delivered that it is mostly inaudible, and the music bad.

How to make Sunday brighter? Cut off your wireless.

HORACE ANNESLEY VACHELL

The Distinguished Novelist

I think that the Sunday programmes of the B.B.C. should be, like the Sunday dinner, the "best" of the week, and entirely free from either religious or semi-religious matter.

REV. DINSDALE T. YOUNG, D.D.

The Well-known Wesleyan Minister

I am no authority about the wireless, as I hear it so little, but I hear many good folk complain that they get so little of the glad tidings of the Gospel over it.

TOMMY HANDLEY

The Popular Wireless Comedian

Personally I like the Sunday programmes and, from my point of view, they could not be much improved. To me, after a week of trying to be funny, I find the Sunday B.B.C. programme very restful and a pleasant change.

H. DE VERE STACPOOLE

*The Famous Author of
"The Blue Lagoon" and Many Other
Delightful Novels*

I am not in favour of altering the B.B.C. Sunday programmes so as to exclude religious services, but I think the services might be improved and made more cheerful.

Instead of relaying services from churches, the B.B.C. ought to have preachers of its own—what a pulpit for a really inspired speaker!

S. F. EDGE

*The Famous Racing Motorist
and Farmer*

I always think the service on Sunday is quite excellent and very desirable, but I do think there is no reason why there should not be some good music on Sundays, some good solo singing, and a series of lectures on travel and other interesting subjects. There are innumerable matters on which lectures could be given with pleasure to the listeners.

FRED BENNETT

*The Popular Humorous Artist and
Illustrator (who has depicted his scorn
for Sunday programmes on this page)*

The general run of the B.B.C. Sunday programmes bores me to tears, for which reason I like to enjoy my Sundays as far away as possible from the earphones and the loud-speaker—preferably with a really thrilling story by Edgar Wallace.

There is still a lot of the old Puritan about most of us, but I have a sense

of the fitness of things, and a scorn for hoary conventions and Victorian traditions; and if only I had sufficient courage to climb ladders and scale slates, I feel sure I should spend my Sunday afternoons, and summer Sunday evenings, on the top of the chimney-stack, with my back to a chimney-pot, hearing never a disturbing sound from the adjacent aeriels—save, perhaps the domestic differences of birds—because, thank goodness! the wireless waves cannot drench you in misery and generally upset your peace of mind till you have passed them through a set.

MAY EDGINTON

The Famous Woman Novelist

I am one of the very few people, I suppose, who are entirely contented with the Sunday programmes of the B.B.C. The silver voice of a boy chorister, the persuasive grandeur of organ music, or a sermon by a prominent divine, are to me intellectual



SO NEAR AND YET SO FAR!

Fred Bennett's ironic haven of rest from the Sunday broadcast—up among the aeriels, but away from all the noise

Sunday Broadcasts!—Continued



THE DISTURBING ELEMENT

W. Dewar depicts the devastating effect of Bach upon the peace and quiet of a Sunday afternoon

and emotional treats of the first order.

I am simple enough to be wholly satisfied in my heart when I hear a whole congregation singing "Abide with Me."

Why shouldn't one day out of seven offer us a different programme from that of the other six days? The panoply and rhythm of religion are what keep one fairly faithful to a religion. They comfort; they console; they uplift.

I do not want to alter the Sunday programmes.

WILLIAM DEWAR

The Distinguished Artist and Illustrator (whose pictorial criticism appears on this page)

As there are places of worship in every town, every village, and practically every hamlet, I have never quite understood why the B.B.C. should consider it desirable to provide religious services on Sundays, with Bach cantatas in the afternoon, Handel and Mozart to follow, and a wailing Epilogue to send us all to bed too early to sleep.

It is, of course, splendid that the

sick and the bed-ridden should be remembered, but for them a service is provided every morning in the week at an hour when the hale and hearty are at work. Sunday, surely, is the one day on which really popular programmes should be given—programmes such as the National Sunday League initiated.

Lively, cheerful stuff is what we need—and we have British composers in plenty whose work would fill the bill, instead of the stilted classics and the work of ultra-modern composers who seem to try to set atmospherics to music. Perhaps we get what we get on Sundays because we are a nation of hypocrites!

It has always amused me to note the expression on people's faces when Handel, Bach, Mozart and company are being played: some of them seem to be in agony, the rest settle down as though they were in church.

MARK LESTER

The Inimitable Comedian

As the Sunday programmes of the B.B.C. are no joke, I'm not at all sure we ought to laugh at them. Some people can laugh at anything—even their neighbour's troubles—but I can't get a single chuckle out of a whole Bach cantata.

And there's no accounting for tastes, anyway. A lot of people enjoy ill-health, chilblains, and being thoroughly miserable on Sundays. Evidently the B.B.C. is out to help these people, and there's not the slightest doubt that they need help.

But you may be quite sure that the people engaged for the B.B.C. Sunday broadcasts have no grim desire or design to saddle the innocent ether with sounds that would dismay even the deepest depression off Iceland. They're paid to make Sunday

what it is, and they do their—I mean to say, they earn their money.

Sunday, as everyone knows, is a day of utmost gloom in these islands, which nature itself has no right to wreck with a purely secular anti-cyclone. If you don't believe me, go down to some main road on the Sabbath morning and count the cars that pass you by! The people in them don't really want fine weather—they're going off to look for rain, because there isn't any in their own district. They want to be miserable, bless 'em, and if it isn't raining in Streatham, its probably pouring in torrents in Brighton.

If the truth were told, nobody wants to be happy on a Sunday in this country. What's the good of a portable set under the trees, among the wasps round the jam-pot, if there isn't a thunderstorm in the air, or a spot of Handel about? Why, if everything were perfect it wouldn't be Sunday!

This, as I imagine, is the way the B.B.C. view the thing—and very rightly. After all, the national tradition must be kept up.

What is the national tradition? Gloom! Impenetrable gloom! Let's all be good, even if we can't be clever—at all events till we've got out of the High Street of our own neighbourhood.

Hypocrites? Pardon me, but what is the meaning of that word? I seem to have met it before—in fact, I think a Frenchman once informed me (with a low bow) that it is the other name for the British Nation. A deadly insult, but then these Continental johnnies have got the wrong idea altogether. They don't understand us, any more than we understand one another. How can they, when we won't let them?

Hypocrites? Oh, shade of Oliver Cromwell, why weren't you on the broadcast? You might have made our Sundays even more so! And how you would have loved the announcer who does the little Epilogue at 10.30! Probably you would have promoted him to the job of cutting off King Charles the First's head—without extra pay, and expected him to enjoy doing it because it meant good-bye to Merrie England.

The trouble is that Sunday is Sunday in this country, and isn't in any way related to the rest of the

Nineteen Celebrities Give Their Opinions

week, though it's supposed to provide us with all the rest of the week. (Sorry! Quite an accident, I assure you!)

Personally, on a Sunday when the weather is Sundayish, I slip over to Paris, or some other foreign place, by just turning a couple of knobs on the domestic receiver, and there I have a lively time with excellent music and a guilty feeling.

But if the weather has made a mistake about the day I probably get out the car and run into a ditch, or do something equally reckless; wherefore, from my own distorted point of view, it's nice to be on the Continent when it's Sunday over here.

One last little word: I haven't heard *In A Monastery Garden* on the broadcast lately, and this disturbs me, because *In A Monastery Garden* is quite a solemn sort of affair, and entirely suitable for pious people. Why doesn't the B.B.C. have it played over and over again all day every Sunday, from early morn till dewy eve—and even later?

It wouldn't be any more monotonous than the programmes we're expected to enjoy—and we might get to know the thing in time!

DALE SMITH

The Popular Baritone

There is no doubt about the dullness and dreariness of the Sunday broadcast programmes in this country, though they may possess the odour of sanctity. It is the old-fashioned—and largely discredited—

tradition of best clothes, supreme discomfort, and general joylessness that the B.B.C. seems bent on upholding on the Sabbath, and this dictatorial attitude is no less evident on weekdays.

Fundamentally, the B.B.C. is the servant of the public, employed by licence-holders to entertain and amuse them. But though it lives on licences it deems itself supreme arbiter of the nation's wireless fate. This is because it has been permitted to become a monopoly, and knows no competition, except from abroad.

Doubtless a monopolistic wireless system has its advantages, but its disadvantages are great. If the B.B.C. had to compete with other broadcasting organisations for public favour the story would be a very different one. But monopoly cramps, discourages, stultifies, even destroys. It is not only the listeners who suffer: the artistes suffer, the members of the staff suffer.

There is, in the B.B.C. to-day, none of that wonderful spirit of adventure and noble enterprise which infused, inspired and united its pioneers.

Personally, I sympathise all round—with those who arrange the programmes, with those who perform, with those who listen. My only enemy is their enemy, and that is—monopoly!

The remedy is united action, not individual protest, or uncommunicated curses! Listeners must command, not complain. And they have a powerful weapon in their possession,

for what would the B.B.C. do if a million listeners were to tear up their licences and dismantle their sets?

HARRY ROUNTREE

The Clever Artist (whose characteristic drawing is reproduced on this page)

The transmissions of the B.B.C. are, in my opinion, the best in the world, both in quality and programmes.

Of course the Sunday "dronings" are awful "slop," but is it the fault of the B.B.C.? I doubt it—I think we must blame "the Old British Custom!"

HAROLD FRASER-SIMSON

The Distinguished Composer of "The Maid of the Mountains," "The Street Singer," etc.

There is nothing easier in this world than to pick to pieces something which you have not got to put together again.

It has always struck me that the task of the B.B.C. in compiling programmes, Sunday or otherwise, is like the story of the witch in the fairy tale—emptying the well by bailing with a sieve—in other words, impossible.

The chief difficulty is that they have to cater for all tastes; and how is that to be done in the course of one evening? Surely with each item someone's taste is bound to be offended?

Is it likely that the "Dean of Wigan" will enjoy the same type of broadcast as the members of the chorus of the "Frivolity," or that the man who makes life hideous with a



ALL AWASH! BRITISH FAMILY THOROUGHLY ENJOYING ITS SUNDAY

It's an old British Custom,
It's an old British Custom,
It's gone on now for years and years,
It's an old British Custom!

Harry Rountree's drawing gives an entirely new and original interpretation of a wet Sunday!

Sunday Broadcasts!—Continued



THE DAY OF REST!

Thomas Henry's idea of the beneficial effect of the Sunday programmes

road-drill for six days of the week will enjoy the same as the Professors of the Royal College of Music?

There are those who have no use for church, and who grumble at the Sunday service: but wipe out this and you will remove something which is prized enormously by many thousands of invalids and others who wish to go to church and are for some reason prevented.

south coast of England, who would sadly miss the Bach cantatas, which, but for the Sunday broadcasts, would seldom be heard in this country.

I think, however, that the rendering (of the cantatas) often leaves much to be desired.

There may be those who listen with pleasure to a military band playing indoors and to whom a cornet

I, personally, know of a case of a woman living in the wilds of Scotland, who, through ill-health, is unable to leave her cottage and go to the kirk a mile or two away, and who, if she could get there would never be able to sit through the whole of the service.

Every Sunday she lies in bed and listens to services from cathedrals, etc., where the music is exquisite, and to sermons which are doubtless better than those she could have heard in her own village.

Stop the Sunday services and you will deprive her, and many like her, of something they value and enjoy.

or piccolo solo gives joy—but, after all, one needn't listen to the items one dislikes. I feel, perhaps, one might be spared, on Sundays, the ear-splitting discords of the ultra-moderns: those to whom these give pleasure must be in such a minority as to justify one day off!

One thing, surely, will be written down in favour of the Sunday programmes—on that day we are spared "jazz"!

Six days do we switch off and do all that we have to do (at about 10.40 p.m.) to ensure that we shall not hear the over-blown saxophone and the insane nigger-beat of the banjo, but the seventh day is a day of rest, and in it we have no manner of "jazz"—we and our sons and daughters and the stranger within our gates—and for this I thank the B.B.C.

ALBERT SANDLER

The Popular Violinist and Conductor

In my opinion it is very essential to give the public a light and popular programme on Sundays. After all, we all work all the week round, and on Sundays, judging by the letters I receive, the majority of listeners like to sit down quietly and enjoy music that they know and understand. I think that it is a great mistake to try and give the public heavy music.

THOMAS HENRY

The Accomplished Humorous Artist (whose drawing appears on this page)

Personally, I am in favour of the dull drab Sunday programmes of the B.B.C. They are the means of getting me out into the fresh air, however inclement the weather!

When You Ask A Query

MANY readers who send queries to the WIRELESS MAGAZINE overlook the simple rules connected with the service; in consequence, replies are delayed and trouble is caused all round.

The rules are few and simple. Their proper observance greatly facilitates the work of the staff at the WIRELESS MAGAZINE offices and delays are obviated.

In the first place, no questions can be answered personally or by telephone. Were we to answer all

the inquirers who call at the "W.M." offices personally the whole time of the staff of the Information Bureau would be taken up by visitors. The same applies to telephone calls.

All inquiries must be made by letter, therefore, so that every reader gets exactly the same treatment.

Each inquiry, which must consist of not more than two questions, must be accompanied by the coupon

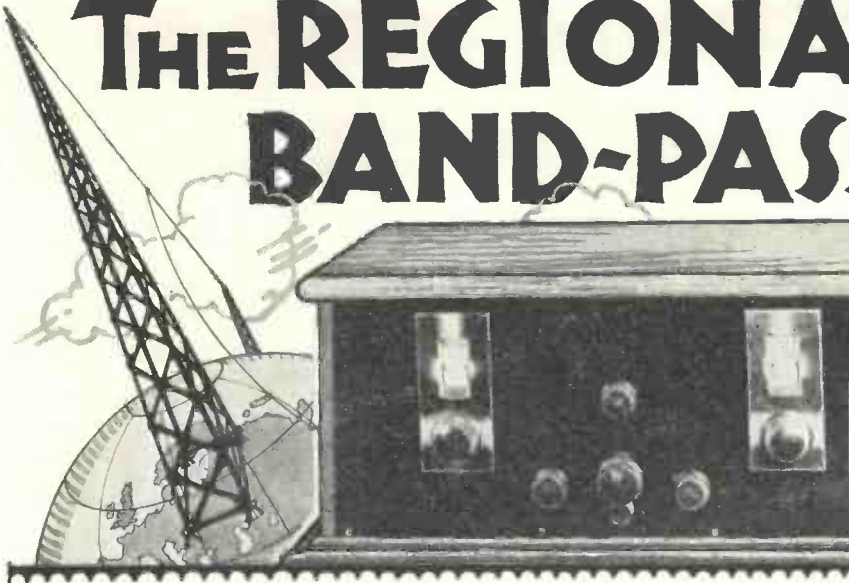
always to be found on the inside back cover and a postal order for is.

A stamped-addressed envelope should also be included and the whole sent to: Information Bureau, WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4.

It greatly facilitates the answering of the large number of questions on all radio subjects received every day if correspondents write on only one side of the paper and are as concise as possible.

THE REGIONAL BAND-PASS FOUR

By
W. James



SETS of advanced design for this season will be more selective, more powerful, and provide better quality of reproduction than the best of the popular receivers of last season.

There are various reasons why this should be so, but first I want to emphasise that the improved results are being obtained at very little increased cost and with no addition to the number of tuning knobs.

Practical Simplification

So far as my "star" set is concerned, the tuning has been simplified in a thoroughly practical way—one which does not demand many special parts and extreme accuracy.

Thus there should be 100 per cent. successes as compared with a proportion of failures had I gone out for one-knob tuning.

This "star" set, by the way, is the one set of a series of three or four which I normally describe during the year; the set upon which I place all my hopes. It is the set so far as I am concerned, well tried out, tested in numerous places, and easily built.

Repetition in Numbers

Much care and attention have been given to its design, and the practicality of its being repeated in large numbers has been most conscientiously considered with the able assistance of Mr. Relph and the staff of the queries section.

The sets which will follow are modifications—introduced for particular purposes to meet the rather special needs of groups of readers.

Now, why must this season's sets be better than the last? First,

because we must progress. We learn by the successes and failures of the last season, and strive to include only that which is worth while in the new sets. Available parts set a limit to how far we can go in certain directions, and so do the resources of the reader, but improvements have been made.

The second reason why better sets are now needed is because there are so many foreign stations transmitting really good programmes with good equipment. The transmitters and studios used in many foreign broadcast stations are excellent—quite as good as our own, if not a shade better. Rome, for example, is very steady, being crystal-controlled.

And there are others which could be mentioned to further the point that the programmes are there, ready to be received, provided our sets will deal faithfully with the signals.

We must have a set capable of providing good quality of reproduction or the finer points of the transmissions will be lost. The set must be powerful, too, in order to provide a margin. To force a set generally results in distortion, and the handling becomes too difficult for relatively inexperienced people.

Also, the selectivity must be ample, and the right form of selectivity is not of the "knife-edge" type, but rather must the set accept the full necessary band of frequencies and reject frequencies outside of this essential band. With tuning of this nature the interference will be the minimum, and the high-frequency amplifier will not distort to any noticeable extent.

In these pages W. James describes his "star" set for the new season. It has been specially designed for WIRELESS MAGAZINE readers and will create particular interest in all radio circles. It will receive thirty stations almost anywhere in the British Isles.

Many novel features have been introduced, but only where they are of real practical value. Here are the ten chief points of interest in the design:—

1. **Band-pass Tuning**, to give the necessary degree of selectivity under modern broadcasting conditions.
 2. **Uniform Selectivity** on all wavelengths is a feature of great practical value.
 3. **Uniform Magnification** ensures consistently good results.
 4. **Simplified Tuning** means that the set can be operated satisfactorily even by the inexperienced.
 5. **Two Volume Controls** are provided to avoid overloading, one for the high-frequency side, and another for the low-frequency side.
 6. **Both Medium and Long Wavelengths** are covered by the special Binowave coils, controlled by a single wave-change switch.
 7. **A Gramophone Pick-up** can be used without any alteration to the set at all.
 8. **Great Magnification** is provided by the Binowave coils and the special arrangement of the circuit.
 9. **Perfect Stability** is a feature of this as well as every set designed by W. James.
 10. **The Best Quality** is assured, provided the correct valves and anode voltages are used.
- Last, but not least, we believe that the thousands of constructors who will want to build this set will be able to get all the parts without delay. So start building this wonderful set to-day!*

We are, I know, unable to have a greater volume of sound from the set than the size of the power valve, the value of the high tension, and the characteristics of the loud-speaker will allow. This much depends upon the reader.

Valves and Batteries

With a small power valve, little anode supply, or a poor loud-speaker the volume will be restricted, and the quality of the reproduction will not be so good as when a larger valve with ample anode-circuit supply and a good reproducer are used.

The range of the set and its selectivity are not affected by the power stage, this stage being the one which

The Regional Band-pass Four—Continued

A Note to Brookman's Three Users

This receiver was made by thousands of readers during the last twelve months and I am most grateful for all the pleasant letters sent to me by enthusiastic builders.

I claimed that the set would normally bring in twenty stations. Hundreds of readers have written to say that the reception of thirty or forty, and often more, is easily accomplished.

Well, the new set is more selective and more powerful than the old. I claim thirty stations for it under normal conditions. I have had more, but we will leave it at thirty, and the quality, too, is excellent.

I want this new set to beat last year's record!

W. G. Mearns

converts the signals into the power which drives the loud-speaker

Having had this set under consideration for so long a time, there are naturally many points about which I could write an amount, for everything down to the smallest detail has received attention.

It would have been easy to have omitted a few knobs, but performance would have suffered. We must, first of all, have a filament-circuit switch. This is included in the centre, at the bottom of the panel.

Single Wave-change Switch

Then there is the wavelength switch. The knob of this switch is just above the filament switch. It is provided with lettering to show when the set is switched to long or short waves. There is only this one wavelength switch to control three tuned circuits. The switches of the circuits are therefore coupled together, a positive and reliable movement being used.

There are two volume controls, and both are needed for the best results

The second control, being fitted in the low-frequency circuit, should be used to regulate the amount of the low-frequency magnification. With these two controls it is possible to vary the effective selectivity of the set and to obtain the full loud-speaker volume with any desired combination of high- and low-frequency magnification.

Sometimes it is the better plan to reduce the amount of the high-frequency magnification and to increase the low frequency, and on other stations the reverse may be the best means of obtaining the best results.

Control of Local Station

For dealing with the local station, something really effective is needed, and in this set it is available, the volume being under such control that a signal may be brought down to a minimum, and without distortion into the bargain.

Reaction is provided to help in bringing in the more distant stations. It is not a vital control. I could have designed the set to be near the oscillation point without adjustable reaction, as numerous commercial sets are produced.

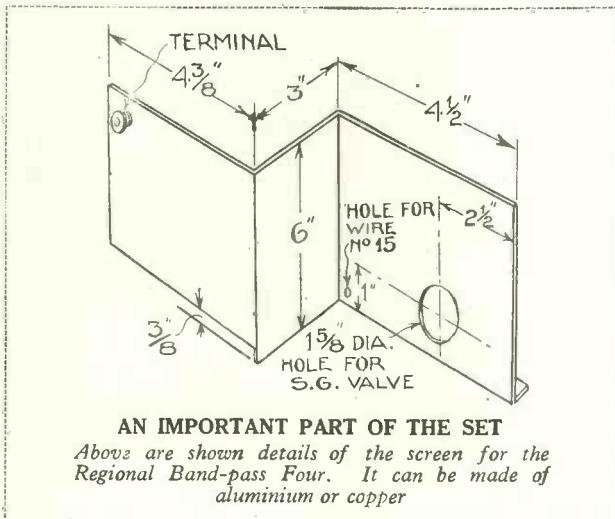
But a point which carries weight with myself, and I am sure with

other careful readers, is that the controls are separate in their effects. Thus neither the high- nor the low-frequency volume control affects the quality by altering the frequency characteristics to any extent.

Adjusting them does not cause howling or anything of that nature. And when the high-frequency con-

trol is full on there is no tendency for the high-frequency stage to oscillate. I therefore feel that the controls so far described are essential and that there would be a definite loss were one of them removed. We are now left with the tuning controls.

There are two. That on the right



AN IMPORTANT PART OF THE SET

Above are shown details of the screen for the Regional Band-pass Four. It can be made of aluminium or copper

in wireless reception, whilst one is useful for regulating the strength of the voltages applied to the set when playing gramophone records.

One of the volume controls is in the high-frequency circuit. Correctly used, the detector valve will not be overloaded with even the strongest of signals from the local station.

W. James' Star Set for the Radio Exhibition

is the single condenser, which tunes the high-frequency intervalve coupling. That on the left, being a dual condenser, tunes two circuits on the short waves and one circuit on the long waves. Actually, the two

Turning to the circuit diagram, you will see the aerial band-pass filter, coupling the aerial and the screened-grid valve. This in turn is coupled to the detector by a Binowave coil (adjustable transformer coupling), the detector being of the leaky-grid type.

The values of this detector are chosen to suit the rest of the set, both for quality and signal-strength handling capacity.

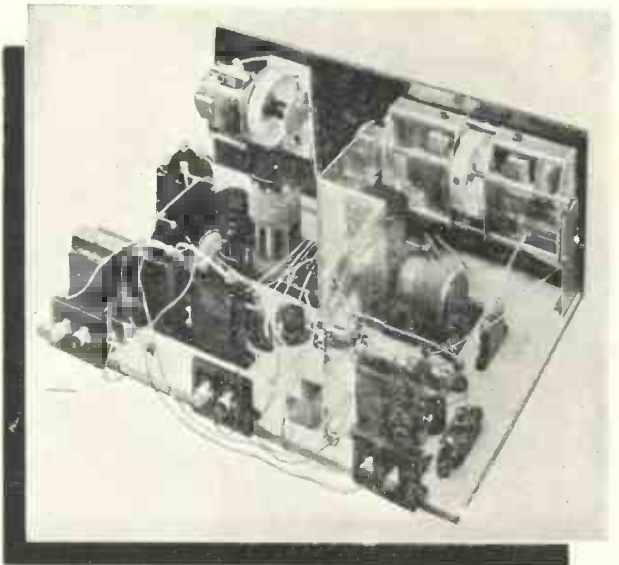
A differential reaction condenser is used from the detector to the anode circuit, and this circuit can be made to oscillate without creating oscillations in the aerial.

The detector is coupled to the first low-frequency valve by a resistance coupling, including an anode-feed circuit for the avoidance of feedback, which would affect the quality, and also the volume control. This control takes the form of a potentiometer-type "wire" wound grid leak, stable and uniform in action. For the third valve a transformer is used,

the type recommended having known characteristics.

Finally, a choke-condenser loud-speaker filter is fitted. The many advantages of this arrangement are probably too well known to need repeating here, but I will mention the chief, which is that it keeps the low-frequency currents out of the anode-circuit supply. This reduces the feed-back to other stages and helps make a perfectly stable amplifier.

Perhaps the greatest single factor of importance in the set is the



ACCESSIBLE ASSEMBLY OF GANG CONDENSER

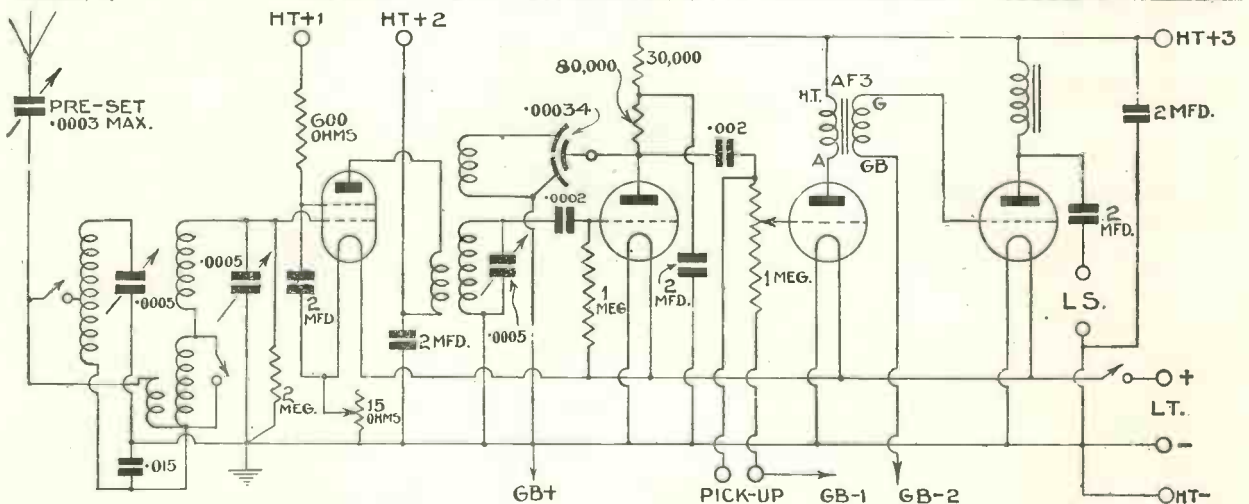
This view of the Regional Band-pass Four shows how accessible are all the parts, in particular the gang condenser and Binowave coils



REACTION CONDENSER

The position of the differential reaction condenser is clear from this photograph

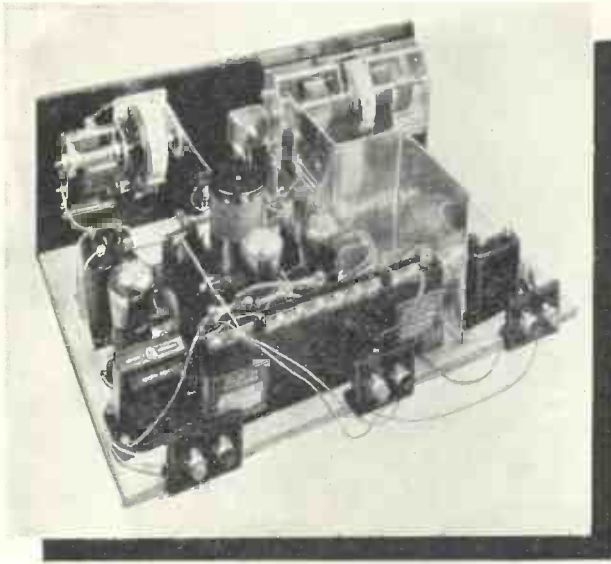
circuits form a filter—highly selective, with negligible distortion, a true band-pass effect being obtained. The two circuits of the filter are easily ganged and, indeed, must be for good results



CIRCUIT OF THE REGIONAL BAND-PASS FOUR

This set comprises screened-grid valve, leaky-detector and two low-frequency stages—resistance- and transformer-coupled respectively

The Regional Band-pass Four—Continued



A SUTFRB RADIO GRAMPHONE

W. James's new set is ideal as a modern radio gramophone and will fit most gramo-radio cabinets. Provision is already made for the connection of a pick-up

band-pass filter, about which much could be written. Briefly, it not only selects very thoroughly the signals collected by the aerial and reduces the chances of overloading the first valve to the minimum, but it is rather more selective at the higher frequency end of the tuning than at the opposite end.

Now the characteristics of the intervalve circuit are just the reverse. Thus the net result is practically uniform selectivity over the whole tuning range.

Uniform Sensitivity

Combined with this is the non-distorting property of the pair of circuits working properly together. And, again, we avoid the difficulty met with when ordinary circuits are used, namely, much greater magnification at the high-frequency end than at the low. Actually, the sensitivity is almost uniform.

The tuned circuits, therefore, are responsible for many desirable features; far more than one might expect without considering the problem in its many-sidedness.

With this brief review of the circuit we must pass to the layout and construction.

A piece of aluminium is used for the screen, suitably shaped and cut to clear the coil base.

The grid condenser is fitted to

holes provided in the anode circuit of the detector, and also the 600-ohm decoupling resistance connected to the screen of the shielded valve.

holes provided behind the centre of the switch and the grid leak is by the side of the top part of the screened-grid valve. A two-gang .0005-microfarad capacitor is used for tuning the filter, which also has a .015-microfarad fixed condenser and a 2-megohm grid leak associated with it. There is also a pre-set condenser in the aerial circuit.

Another point of interest is the pair of flexible resistances used

Anode-circuit battery wires and the filament battery wires are brought straight out and the grid-bias battery is mounted in the set.

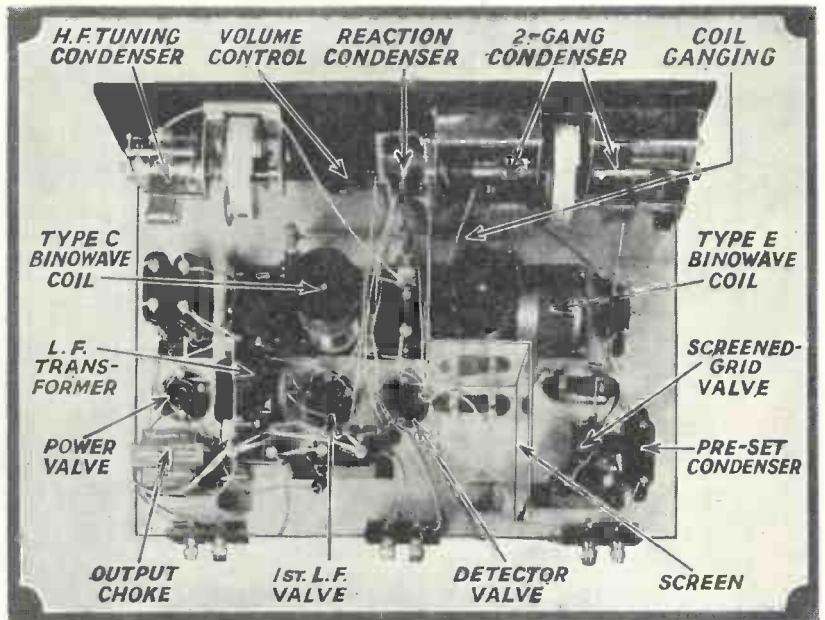
There will be no difficulty in arranging the parts on the baseboard, including the two-gang condenser. Holes in the front panel must be carefully arranged, as there is not much clearance between the reaction condenser and the two-gang model.

The particular size of panel was used, however, to suit the numerous readers who have standard cabinets of the gramophone type.

Uniform Appearance

It is necessary to fit the tuning condensers properly to obtain correct operation, and care must be taken with the switch movement. It is advisable when the parts are fitted to make sure the movements are satisfactory, and one or two extra knobs should be bought to make the front appear uniform.

The panel should be removed from the base before wiring. Wire the parts on the baseboard first. Then fit a number of wires to the parts on the panel. Afterwards fit



CLEAR INDICATION OF THE COMPONENT POSITIONS

Positions of most of the important components will be clear from this photograph. See also the wiring diagram on page 226. The coils used are of the famous Binowave type, as used so successfully in the "Brookman's" receivers

There are three terminal blocks. One is for aerial and earth terminals, another for the pick-up, and the third for the loud-speaker.

finish the wiring. The screen can be removed when connecting a few of the wires.

A Successor to the Famous Brookman's Three

The wiring is quite simple and straightforward if carried out as described. For wiring, use No. 24 or 26 tinned-copper wire and Sisto-flex; use good quality rubber-covered wire for the battery leads. Put on the plugs or connectors and fit labels to avoid mistakes.

Reaction Condenser

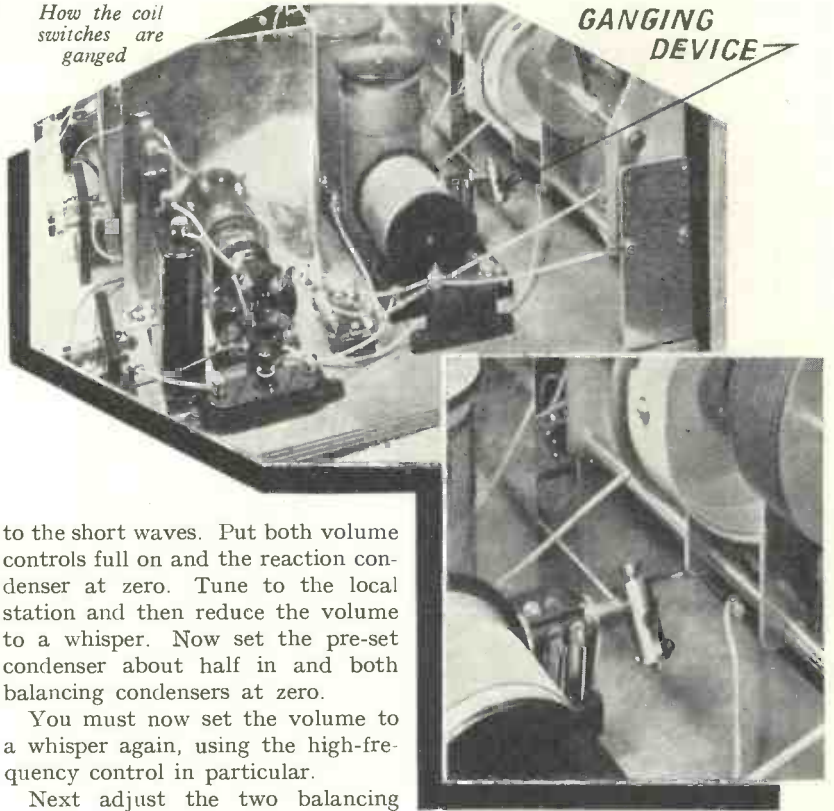
Once again, take care of the reaction condenser; if necessary, a piece of insulating material could be fastened to the end of the two-gang condenser.

The right valves are a screened-grid for the first position, one of from 20,000 ohms to 50,000 ohms for the detector stage, one of the medium-impedance class for the first low-frequency stage, and a power valve for the last stage. I have used a Mazda screened-grid, a Mazda HL for detection, an HL for the first low-frequency stage, and a P220 super-power valve in the last stage.

Apply from 120 to 150 volts to the anodes of the valves and 60 or 70 volts to the screen.

Switch the set on with the filament switch and set the wave-range switch

How the coil switches are ganged



GANGING DEVICE

to the short waves. Put both volume controls full on and the reaction condenser at zero. Tune to the local station and then reduce the volume to a whisper. Now set the pre-set condenser about half in and both balancing condensers at zero.

You must now set the volume to a whisper again, using the high-frequency control in particular.

Next adjust the two balancing

condensers to make the volume as great as possible. The aerial filter will tune over a few degrees and then cut off, but the balancing condensers must be suitably adjusted to compensate for the capacity of the aerial, on the one hand, and the capacity of the valve and the wiring, on the other.

After a little experience you will be able to decide whether, for your particular conditions, the pre-set condenser should be increased or decreased a little; but if a change is made the balancing condenser on the side connected to the aerial coil must be readjusted.

Playing Records

To play gramophone records, connect a pick-up to the terminals provided and turn off the screened-grid valve by the filament resistance.

With this set the quality is excellent, and so is the selectivity. I have tuning curves of interest, and will give them next month. The magnification is enormous, as might be expected, with the result that the thirty stations that I claim as normal reception are easily brought in even by a novice.

COMPONENTS REQUIRED FOR THE REGIONAL BAND-PASS FOUR

CHOKE, LOW-FREQUENCY

- 1—R.I. Hypercore, 17s. 6d. (or Climax Varley).

COILS

- 2—Wearite 1930 Binowave, types C and E with ganging device, £1 15s.

CONDENSERS, FIXED

- 1—T.C.C. .0002-microfarad, upright type, 1s. 6d. (or Dubilier, Trix).
- 1—T.C.C. .002-microfarad, upright type, 1s. 10d. (or Dubilier, Trix).
- 1—T.C.C. .015-microfarad, upright type, 3s. 3d. (or Dubilier, Hydra).
- 5—Ferranti 2-microfarad, 12s. 6d. (or Mullard, T.C.C.).

CONDENSERS, VARIABLE

- 1—Jackson two-gang Chassimount, .0005-microfarad, type C2, with drum dial, £1 6s. 6d.
- 1—Jackson .0005-microfarad universal log, with junior drum dial, 19s.
- 1—Lotus .00034-microfarad differential, 8s. 6d. (or Ready Radio).
- 1—Polar preset .0003-microfarad maximum, 2s. (or Formo, Lewcos).

EBONITE

- 1—Becol 18 in. by 7 in. panel, 8s. 3d. (or Lissen, Peto-Scott).
- 3—Junit terminal blocks, 2s. 3d. (or Lissen).

HOLDERS, VALVE

- 3—W.B. rigid type, 3s.
- 1—W.B. universal type, 1s. 3d. (or Junit).

PLUGS

- 7—Belling-Lee, marked: G.B.+ , G.B.—1, G.B.—2, H.T.—, H.T.+1, H.T.+2, H.T.+3, 1s. 9d. (or Ealex, Clix).
- 2—Belling-Lee spades, marked: L.T.+ , L.T.—9d. (or Ealex, Clix)

RESISTANCES, FIXED

- 1—Simmonds 600-ohm, 1s. 6d. (or Magnum, Wearite).
- 1—Magnum 30,000-ohm, flexible spaghetti type, 1s. 6d.

The prices mentioned are those for the parts used in the original set; the prices of alternatives as indicated in the brackets may be either higher or lower

- 1—Magnum 80,000-ohm, flexible spaghetti type, 1s. 6d.
- 1—Lissen 1-megohm, with holder, 1s. 6d. (or Dubilier).
- 1—Lissen 2-megohm, with holder, 1s. 6d. (or Dubilier).

RESISTANCES, VARIABLE

- 1—Rotorohm 1-megohm potentiometer, type M, 6s. 6d.
- 1—Wearite 15-ohm rheostat, 1s. 6d.

SCREEN

- 1—Parex to specification on page 222 (or Ready Radio, H. & B.).

SUNDRIES

- Tinned copper wire for connecting.
Length of Sisto-flex sleeving.
1—pair Bulgin grid-bias battery clips, 6d.

TERMINALS

- 6—Belling-Lee, marked: Aerial, Earth, L.S.—, L.S.—, Pick-up (2), 1s. 6d. (or Ealex, Igranic).

TRANSFORMER, LOW-FREQUENCY

- 1—Ferranti, type AF3, £1 5s. (or Varley, Philips).

ACCESSORIES

BATTERIES

- 1—Ever Ready power, 120 volts, £2 2s. 6d. (or Siemens, Pertrix).
- 1—Ever Ready 16-volt grid bias, standard type, 3s. 6d. (or Siemens, Pertrix).
- 1—Fuller 2-volt, type LDG, 9s. 6d. (or Lissen, Marconiphone).

CABINET

- 1—Pickett table model, £1 1s (or Camco, Digby).

LOUD-SPEAKER

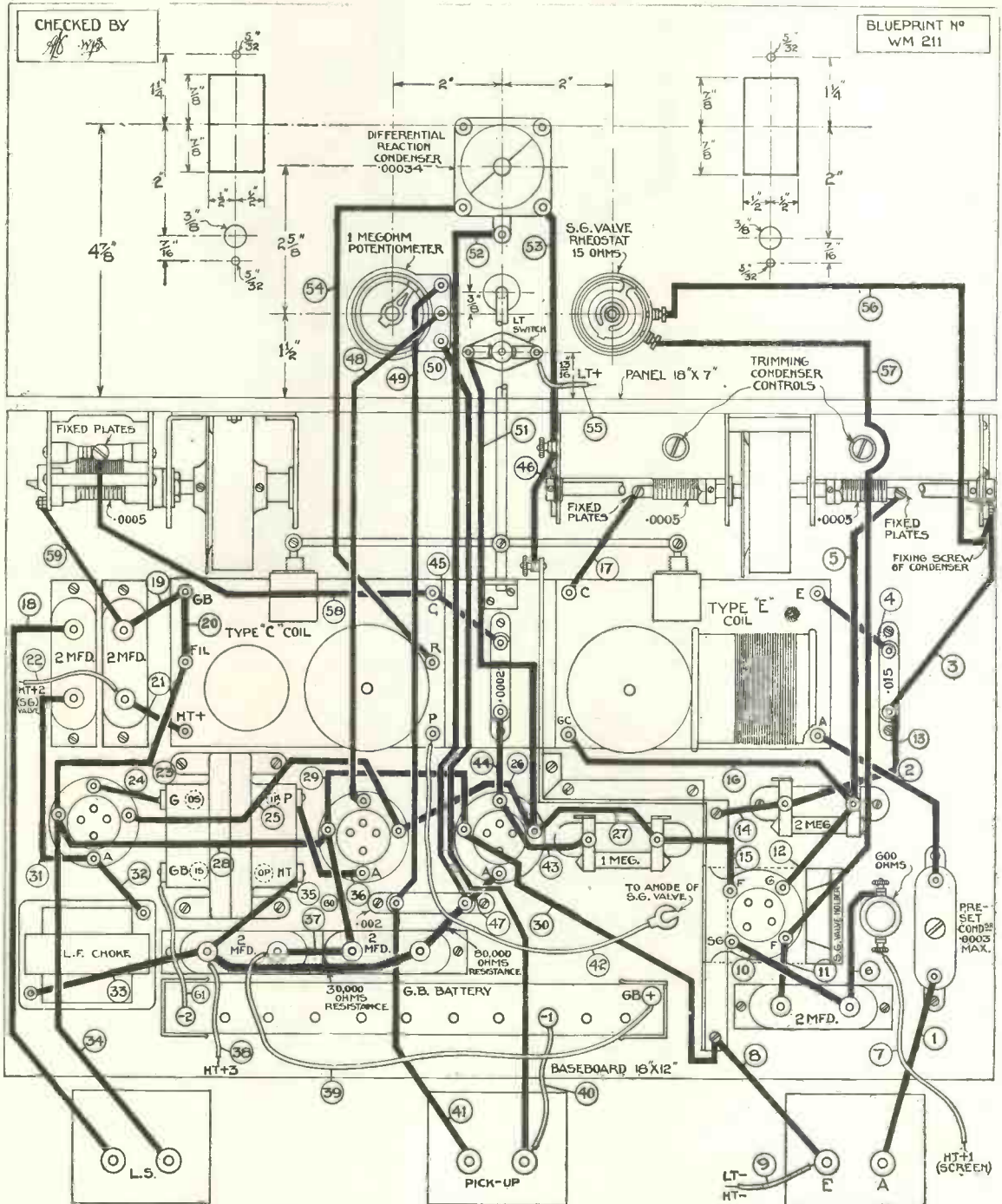
- 1—Ediswan cone, £3 (or Amplion Lion Celebration).

VALVES

- 1—Mazda 215SG, £1.
- 2—Mazda HL210, 17s.
- 1—Mazda P220, 10s. 6d.

The Regional Band-pass Four—Continued

ONE-THIRD SCALE LAYOUT AND WIRING DIAGRAM OF W. JAMES'S LATEST SET



This layout and wiring diagram can be obtained as a full-size blueprint for half price, that is 9d. post free, if the coupon on the inside back cover is used by October 31. Ask for No. WM211, and send your enquiry to Blueprint

Dept., WIRELESS MAGAZINE, 58-61 Fetter Lane, E.C.4. When wiring up connect all the leads in the numerical order indicated. In this way the possibility of making mistakes is obviated.

UNDER MY AERIAL

**HALYARD'S CHAT ON
THE MONTH'S TOPICS** ◆ ◆

**ILLUSTRATED BY
GLOSSOP**

New Captures

ONE of the very greatest things about wireless is that it keeps you happily busy all the year round. Other sports and pastimes have their definite seasons, but not so wireless. We may have to come indoors at this time of the year, but we bring our radio with us and know that we have another enjoyable season in front of us.

Well! what about the new season, any plans yet? If you are an energetic home-constructor, I dare say you are as full of plans as a condenser is of microfarads; new circuits, new components, new sets, new loud-speakers, and so on.

Suppose, however, that you do not



Tinker about with new sets

intend to tinker about with new sets this winter, but that you are going to rely on your old set. How can you add a little excitement to your reception? I'll tell you one way.

Make out a list of all the broadcasting stations you consider you have a reasonable possibility of picking up in your district, mark those you have already heard, and then go out deliberately to capture those you have not heard.

Such a course of action would, I venture to predict, be most fascinating.

The Other End

How many listeners who live in London or the Home Counties have



Other end of the ether

seen the Brookman's Park transmitting station? How many London listeners have seen the new Broadcasting House at Portland Place? How many Yorkshire listeners have seen the new Regional Station at Moorside Edge?

Three rather pertinent questions, the answers to which, if we could only get them, would surprise us. Don't you think it is rather strange how little interest the majority of listeners display towards the other end of the ether, the transmitting end?

Yet the transmitting end of the ether in our country could not possibly be in a more interesting state than it is at present, and I do think we ought to take advantage of any opportunity we have of seeing the progress now being made at the other end of the ether.

Broadcasting House ought to be seen if only for its central brick tower containing the studios. Brookman's Park ought to be seen because it is the first of our regional twin transmitters. Moorside Edge ought to be seen because of its high masts. Even the proposed Falkirk site for the Scottish Regional station might be worth a visit if one could see what has come out of the test holes which showed the "earth" unsuitable for a transmitting station.

Spotting Points

"George, old man, don't you think it would be rather nice of us if we gave our readers a few tips by which they might identify us at the exhibition this year?" I asked my technical adviser during the last of our talks.

"Very nice idea indeed," said George.

"We might have mystery photographs published, you know, photographs of the back of the head and shoulders."

"Not for me, thank you. I prefer to see the danger that confronts me, if any. Imagine the shock to my nerves if a policeman wireless enthusiast sneaked up behind me, tapped me on the shoulder and said: 'By George, spotted.' I don't think I



AN AMBITIOUS EFFORT

This aerial mast, which is a model of the Eiffel Tower, is 40 ft. high and has no guy wires. It was made by a young architect at Solihull, Warwickshire

could stand such excitement."

"Suppose we give a few descriptive hints, then. I'll start on you, George. A tall, thin man with prominent nose, blue eyes, thoughtful look, fair hair, obviously a serious——"

"Too general, too general. We are wireless folk. Let us be identified, as it were, by wireless."

"How do you mean, George?"

"Oh! well, we might swing fixed condensers at the ends of our watch-chains, or we might put grid leaks over our ears, wrapped in paper to

Under My Aerial—Continued



Wireless-workshop jackets

look like cigarettes, or we might——”

“I’ll tell you what, George, if you would only dare to go to the exhibition in your old wireless-workshop jacket with the bits of wire where the buttons used to be, you would be spotted in no time.”

“Yes, my lad, and if you would only go to the exhibition in that old hat of yours, the one with the black and red typewriter ribbon round it for a hatband, you’d be spotted before you’d passed the turnstile.”

“That will do, George, we’ll leave it at that.”

Long Waves Only

I have been wondering why there are not more wireless receivers designed simply and solely for long-wave reception. Among those wireless enthusiasts who live or travel in the remote parts of our islands, it is common knowledge that, as regards range, 5XX is far and away our best station.

What applies to 5XX applies to other long-wave stations. Any one of the European long-wave stations has a far greater range than a medium-wave station of the same power would have.

From my own experience during the past summer, I could tell you of three remote districts where wireless would be a poor proposition indeed were it not for 5XX. No doubt you could add to my list of districts where 5XX is the main stand-by.

A receiver designed solely for long-wave reception in this country is not tied down, of course, to the reception of 5XX. There are, as we all know, a number of excellent Continental long-wave stations, not the least feature of which is that we can use



Solely for long-wave reception

them to brighten up our Sunday reception.

The only disadvantage there is likely to be in a long-wave receiver is lack of selectivity. It is one of the inherent difficulties in wireless, that, the higher the wavelength, the harder it is to obtain selective tuning. Were more attention given to the design of receivers for long-wave reception only, this difficulty regarding selectivity would certainly be quickly minimised.

Talking Films

During the last two weeks I have



Used to good reception

heard two talking films. A sound-reproducing apparatus has been installed in our local cinema and, as everybody was going to the local talking films, I had to go, and go I did, twice.

Well! each time I came away far from satisfied. The reproduction of sound might satisfy some people, but it would certainly not satisfy a wireless enthusiast who is used to good reception.

I should think the best thing the management of a cinema could do, before deciding on a particular type of talking-film apparatus, would be to call in a jury of experienced listeners, and act according to the verdict of this jury. Such a jury would not pass the sound-reproducing machinery at our local cinema.

The great fault of the talking apparatus at the cinema here is the curious way it reproduces voices. A woman’s voice comes out in a booming tone similar to the tone of a distant drum, whereas a man’s voice comes out as rough as that of a corn-crake.

After I had been to the talking films the second time, I met the operator, and he asked me how I like the new “talkies.”

“Not very much,” I replied.

“Why?” he asked.

“Because the sound reproduction is so poor,” I replied.

“What is wrong with it?” he asked.

“I don’t know what it amounts to in your apparatus,” I replied, “but in wireless it would be a case of variable grid bias on the amplifying valves, too much grid bias one minute, too little the next, and never the right amount.”

The Silly Season

Did you notice that the silly season this year extended to wireless? You did. Splendid. Then you were as amused as I was over the accounts of a loud-speaker scarecrow invented by a gardener.

This scarecrow, you will remember, consisted of a loud-speaker skilfully hidden in the centre of that patch of garden most beloved of the birds. All day long the loud-speaker, bellowing out music and talks, frightened the birds away.

Jolly fine idea, wasn’t it? I know exactly what questions came to your mind. First question, what happened during the silent periods? Second question, did the loud-speaker suffer from the rain? Third question, what said the neighbours?

Another splendid silly-season wireless story concerned a French horticulturist who made his tomatoes ripen months before their appointed



Loud-speaker scarecrow

time by applying wireless oscillations to the plants.

I discussed this story with George, and to my surprise, George did not pour scorn upon it, but said:

“Judging from my own experience, I consider the story has an element of truth in it.”

“To what particular experience do you refer, George?” I asked. “You do not grow anything in the horticultural line.”

“No, but the man next door to me does. He has two long marrow beds, raised beds, you know. One of these beds is almost under and parallel to my aerial. The other is at the other side of the garden.”

“And I suppose the marrows on the bed under your aerial are twice as big as the marrows on the other bed.”

Halyard's Chat on the Month's Topics

"No, they are the same size, but the marrows grown on the distant bed have smooth skins. The marrows grown on the bed under my aerial have wavy skins—caused by the high-frequency oscillating currents from my aerial, I suppose"

A Thousand Pirates

Have you ever knowingly or unknowingly made the acquaintance of a wireless pirate? If so, what was he like? I don't think I have at any time during my wireless experience encountered one such pirate. Really,



A wireless-licence prosecution

were it not for an occasional reference in the press to a wireless-licence prosecution, I should be inclined to doubt the existence of the so-called pirate.

Wireless piracy seems to me to be such an insignificant form of misdemeanour that I cannot see how anybody can find the least satisfaction in so erring. Ten shillings a year, or twopence - halfpenny per week, how can it be worth while running risks by evading the payment of so small a sum?

How many pirates are there? At the very most I should have guessed fifty, yet the official figure for the number of people fined in the course of a year for working a wireless set without a wireless licence is a thousand. Just think of that, now. A thousand pirates caught and fined in a year. Here's the obvious question. If a thousand pirates are caught in a year, how many remain uncaught?

I don't know what you think about an answer to that question, but I'll give it up.

Bang Went—

It isn't often I make George look astonished at something I am doing in the wireless line, but earlier on this evening, when he came to my little workshop, he stood in the doorway and gaped.

With my left hand I was holding a valve over my discarded-rubbish box.

In my right hand I held a hammer.

"Have you ever both seen and heard a valve explode, George?" I asked.

"Whatever are you doing?" gasped George.

"Listen, George," I said.

Tap, tap, tap, TAP, TAP, TAP—BANG! The valve exploded beautifully and the bits of broken glass fell tidily into the rubbish box. There was a smell something like acetylene.

"I suppose you are so elated about the drop in the prices of valves that you are smashing all your old valves in order to have the pleasure of buying new ones at the new low price," said George.

"These are not my own personal valves, George," I said.

"And they're not mine," said George.

"No, George."

"Whose are they then?"

"I got them from my dealer."

"Pay for them?"

"No, George."

"On account?"

"No."

"Did he give them to you?"

"Yes, George."

"Are they dud valves?"

"Yes, George."

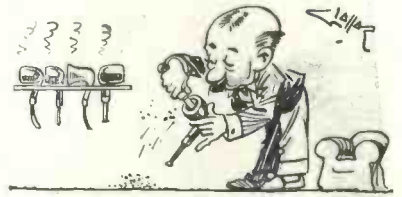


Smashing all your old valves

"What are you smashing them up for?"

"To obtain the valve bases. Very useful things, valve bases, George."

"Very, but next time you are banging off dud valves put a little red flag out of your workshop window to warn me. Such things are best broken gently, my boy."



Cleaning my accumulators

Accumulator Tops

A very messy afternoon's work, and I'm jolly glad it is finished. What have I been doing? Why, cleaning my accumulators ready for the coming winter, and if you have not done a similar piece of work yourself, I would suggest you do so the first free afternoon you get. Note that I said afternoon and not evening. You need good daylight for such work.

When I was cleaning my accumulators, it struck me that a little more thought might be given to the design of the top of an accumulator. Of the six two-volt accumulators I cleaned this afternoon, two had perfectly flat tops. The other four had what might be called sunken tops.

Now the flat-top accumulator is much easier to clean than the sunken-top accumulator, but any acid which collects on the top of a flat-top accumulator would drop off if the accumulator were tilted. The sunken-top accumulator is more difficult to clean, undoubtedly, but there is the decided advantage that the sunken top will hold the acid which collects there even if the accumulator is tilted over.

How could the cleaning advantage of the flat-top accumulator and the acid-holding advantage of the sunken-top accumulator be combined in one type, do you think? My idea is that it might be possible to make the top of an accumulator flat except for a groove round, and parallel to the four edges. This groove would hold any stray acid there happened to be, and it would also be very easy to clean.

HALF A GUINEA FOR A SUGGESTION

When you have read all through this issue just sit back a minute and try to think of some subject of special interest to yourself that is not dealt with.

Then jot your idea down on a postcard and send it to "Suggestions," WIRELESS MAGAZINE, 58/61 Fetter Lane, E.C.4.

A prize not exceeding half a guinea each month will be given for the best suggestion for the title or subject of an article.

The closing date for this month's competition is October 31.

Do not write a letter; a postcard only is required.

Getting What You Want



A fine Kolster Brandes radio gramophone

WHEN YOU BUY A RADIO SET

Every prospective buyer of a radio set should read this article by Alan S. Hunter, who has had a unique experience in testing commercial receivers and has handled many of those at present on the market.

BUYING a wireless set can be a perplexing business unless the set-buyer knows what reception he wants and the particular method whereby such reception is to be achieved. Without going into deeply technical points, I am explaining in this article just what a set-buyer should know before spending his money.

Greatest Satisfaction

A knowledge of these facts should assist the set-buyer to obtain the greatest possible satisfaction for his outlay.

Price is itself often the greatest distinction between the few sets that fully meet individual requirements and the many sets that for various reasons are unsuitable.

I find £20 is a common datum line above which a large number of set-buyers will not go under any circumstances. Below this price limit I can think of plenty of good portables, many excellent table-cabinet sets working from batteries, but very few of the most efficient sets of all—those driven by power derived from the domestic electric-light supply.

My first main theme is this; if you want to take advantage of the very latest radio practice, be prepared to spend more money than anticipated. There is a popular belief that

radio is too expensive; in my opinion, based on a year's study of factory-built sets, radio is attempting to justify itself too cheaply. Good cabinet work, costing an extra pound or so, would bring into the set-buying market large numbers of home-lovers who simply refuse to house the mediocre cabinets of so many sets now being sold.

A natural tendency among lay-minded set-buyers is to look for the most simply-operated models. It is thought that a set with two knobs is more easy to work—and therefore more likely to give foolproof reception—than a set with one knob. Simplicity in a set is all too often an illusion; as an example I might cite the omission of a volume control to

aid simplicity. Then if the volume of sound required is too great, one must mis-adjust one of the tuning dials, a much more tricky operation than turning round an additional knob specially included for controlling volume.

Essential Controls

Essential controls I recommend every set-buyer to look out for are the following: Volume; one or two knobs, preferably two in a radio gramophone. Tuning, either one or two knobs. Wavelength switch, which should also combine the function of on-off switch.

Further controls are not necessary in a really efficient set; but unfortunately the majority of medium-priced sets are only efficient with an additional control called reaction. This is said to increase the range of a set; in practice, reaction increases the strength of a distant station that would be too weak to hear without it.

Some makers call the reaction control "volume," rather inadvisedly, I think, because although a weak station can thereby be increased in strength a strong station cannot be decreased in strength. Moreover, where reaction is called volume, there is very often no separate knob for a real control of volume.

Among the medley of sets



GRAMO-RADIO MAINS TWO-VALVER

This Dubilier A.C. two-valve set costs £15 inclusive of royalties. Indirectly-heated valves are utilised and a switch is provided for the use of a pick-up; another switch sets the set for medium or long waves.

on the market, we can trace certain broad divisions that should help to narrow down the final choice. For convenience, we will group all sets under the following four headings: (1) Self-contained sets. (2) Table-cabinet sets. (3) Radio gramophones. (4) Short-wave sets.

Portable Sets

Under self-contained sets can be included all portables, whether working from batteries or the electric-light socket. Two shapes are common in portable sets, the suit-case shape and the upright case with a carrying handle on the top.

If the portable is purchased on account of its portability, the suit-case shape has a strong appeal, because the set can be carried about quite unobtrusively. Quite a lot of people feel self-conscious when carrying what is obviously a radio set; pandering to the English trait of reticence, the suit-case portable enjoys a considerable vogue.

Appearance

The upright cabinet shape of portable is more attractive if the object in buying a portable is primarily to ensure convenience of installation. Cabinet portables, mounted on a turntable, look much more appropriate in the living-room than does an open suit-case.

One thing about portables must never be forgotten—they are not really portables. That is a trite way of saying the bulk and weight of a good-quality portable is considerable, much greater than with a portable gramophone.

Circuit arrangements do not often interest the set-buyer, but when buying a battery-operated portable one broad circuit distinction should be remembered. Four-valve portables usually have a screened-grid high-frequency stage and two tuning controls. They are more selective than five-valve portables having two untuned high-frequency valves and only one tuning dial.

Tests Before Purchase

If the portable is to be worked near to a broadcasting centre, as at Brookman's Park or Daventry, the four-valver may, because of its selectivity, be greatly preferable to the five-valver. One big incidental advantage of portables is that they can be heard

before purchase, not always possible with other sets.

The selectivity of a portable is usually easy to determine; it should be easy for the London purchaser to find out whether both Brookman's Park stations are working and let the dealer tune in one of them; then note whether any background of other music or speech can be heard; if so—reject the set at once.

Assuming the set passes this test—as it probably would—ask the dealer to tune in Radio Paris (always providing it is transmitting) and note whether a background of Daventry can be heard. If so—well do not reject the set, for so many would fail, but make certain the background noise is negligible in strength.

Selectivity troubles are not usually encountered in all-electric portables, of which two or three good models are now on the market. These sets cannot be taken away from the house, since they depend for their operation on the electric-light supply.

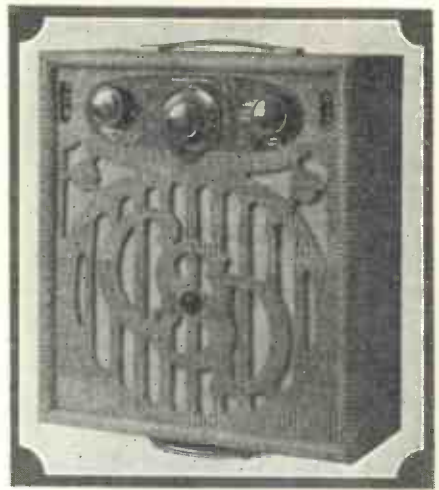


A SUITCASE PORTABLE

Known as the Ariel Pigmy four-valve screened-grid portable, this set, made by the Classic Radio and Gramophone Co., Ltd., is priced at 18 guineas. Note the loud-speaker grille

But they can be taken from room to room and attached to a convenient plug. To set-buyers whose only attraction towards a portable is that this type of set is entirely self-contained, I commend the all-electric models.

Many of the battery-operated portables on the market can also be run



A HANDSOME TRANSPORTABLE

This Dunham model includes five valves and is fitted with a turntable to facilitate operating. The price is 17 guineas in oak. A set of this type is very convenient for moving from room to room

from the mains by substituting the normal high-tension battery for one of the recently-developed portable mains units.

Leaving portables, we come to table-cabinet sets. Here I would include battery and all-electric sets mounted in table cabinets, needing the addition of a loud-speaker and an aerial and earth to operate them.

Life of Batteries

The best battery-worked sets have sufficiently large cabinets to house the batteries, which are rather unsightly if they have to be externally connected. The thing to inquire about when buying a battery set is how long the batteries will last.

They ought to last at least three months; if not one can assume that the batteries supplied with the set are too small for their job, a form of economy quite favourable from the salesman's point of view, but costly to the set-buyer. All-electric sets, as sets deriving their power from the electric-light supply are popularly known, offer complete freedom from battery troubles, because all the batteries are eliminated.

Low Maintenance

These sets are more expensive than battery sets, but are in every way preferable. Set-buyers with an electric-light supply should remember that an all-electric set has negligible maintenance costs. Occasionally, one has to replace a valve, but apart from that the cost of running the set can hardly be noticed. The

When You Buy a Radio Set—Continued



A RADIO GRAMOPHONE

A handsome radio gramophone, H.M.V. Model 520, made by the Gramophone Co., Ltd. It incorporates a four-valve screened-grid receiver and has proved itself to be very popular

addition to the electric-light bill is very small.

Running Costs

The average all-electric set may take 30 watts, compared with sixty watts of the average electric lamp. A unit of electricity costs, at most, 6d., and this unit is 1,000 watts per hour. A 30-watt all-electric set would therefore give 33 hours reception for 6d. Many houses have very much cheaper rates, implying a correspondingly lower running cost.

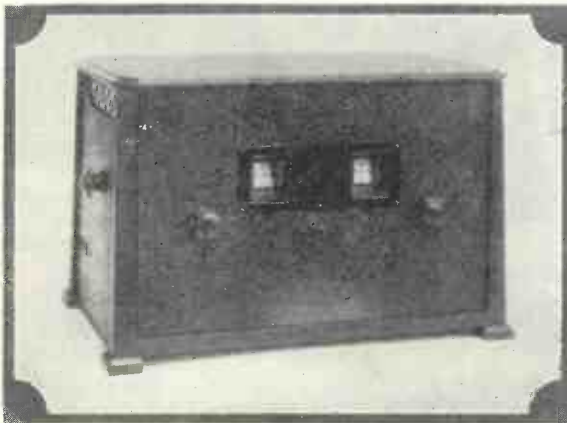
For the two types of mains supplies in this country, D.C. and A.C., two types of all-electric sets are marketed. The A.C. sets are more efficient than the D.C. sets, due to the inclusion of A.C.-leaked valves, which have better characteristics than battery-heated valves. D.C. sets are, even so,

more efficient than battery sets, for they have the advantage of a considerable high-tension current, providing good quality and great sensitivity.

Some of the D.C. mains supplies in this country are notoriously "noisy"—and a few discreet inquiries among other set-users on the supply would be wise before buying a D.C. set; alternatively, the dealer might be asked to demonstrate the set on the proposed supply. Alternating-current mains are usually above suspicion and most supplies can be utilised with great success to drive an all-electric set.

Radio gramophones are combination instruments becoming more popular every season. The average radio gramophone is expressly designed for A.C. mains, although some firms have been quite successful in bringing out D.C. models. Coming within the de-luxe category, the radio gramophone is, to my mind, the ideal mechanical music maker; when the broadcasting programmes do not appeal there is no need to switch off—merely to switch over to favourite gramophone records.

Radio gramophones usually need an outside aerial, although in the more expensive models only a short wire is required to bring in a good number of home and foreign stations. If one is prepared to spend, say, £70 on a radio gramophone, dozens of stations can be expected at full loud-speaker strength.



A NEW ALL-ELECTRIC TABLE CABINET

Finished in ebony black, this handsome receiver is a Gecophone A.C. three-valver (type BC3130), which sells at £18 complete

Gramophone records are reproduced with a realism not even remotely approached by the best mechanical gramophone. One of the most disconcerting experiences is to listen to a good mechanical gramophone, commend its powers of reproducing—and then to hear a really good electric radio gramophone; the difference immediately condemns the mechanical machine.

Fine Cabinet Work

The most prominent makers put fine cabinet work into their radio



SIMPLE MAINS RECEIVER

The controls of this Kolster Brandes two-valve A.C. mains set are extremely simple, as can be seen from the photograph

gramophones, presumably because they are in competition with the established gramophone industry, which has long since learned that the surest way to put off a buyer is to offend his "furnishing" sense.

After all, a radio gramophone takes up a big space in the drawing-room or living-room; its external appearance is usually of particular importance to the lady of the house. Some beautiful cabinets are, I am happy to say, enclosing the latest radio gramophones.

Short-wave Receivers

I have included short-wave sets in this article, in spite of their specialised appeal; such sets are in great demand among overseas listeners wishing to pick up broadcasting from the B.B.C.'s short-wave station. And in this country the interest in the reception of antipodean short-wave stations, as well as the well-known American short-wavers, has created a demand for reliable short-wave sets.

Sound Advice for Non-technical Listeners

Several are available, in two classes; there are the simple three-valvers and the more elaborate super-heterodynes. The simple sets do amazingly well when conditions are good, but more stable reception is possible with the super-heterodyne. Just as a baby car is often purchased to augment the function of the big family car, so a short-wave set is often worth considering quite apart from the family set.

A Guide to Prices

Mainly, for the guidance of prospective purchasers, I give the average prices that must be paid to buy reliable models of the types discussed. These prices have been worked out from the sets tested and approved by the WIRELESS MAGAZINE Set Selection Bureau:—

Battery portables: £22, between limits of £17 and £33.

All-electric transportables: £31.

Table-cabinet sets for battery operation: 11 guineas.

Similar sets for mains operation: £21.

Radio gramophones: £70 (much cheaper models are available as well as much more expensive models).

Short-wave sets: £15 to £30

Service Rights

Early this year I made a thorough investigation into the service rights of set-buyers. This important matter of service should be gone into before buying *any* set. Some firms give a six months' or one year's guarantee with their sets, but even then the method of putting the guarantee into effect needs attention.

In general, if anything goes wrong with a set, the best plan is to get into touch with the dealer from whom it was purchased. He will be able to diagnose simple faults, such

as a broken lead, a worn-out valve, or a run-down battery—frequently the main cause of reception troubles.

If he finds there is something radically wrong, the set will be returned to the makers. Most of the big firms are waking up to the need for an effective and speedy service department. Usually the central organisation works through the firm's accredited dealers, who are competent to deal with all minor troubles.

As batteries are the biggest cause of faulty reception, buyers of battery

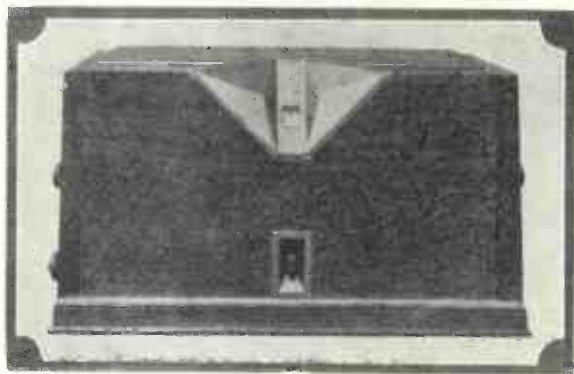
sets would be well advised to make some arrangement with the local dealer to maintain them at regular intervals. The accumulator will need re-charging every two or three weeks and the high-tension battery will need renewal every two or three months.

All-electric sets are much more trouble-free; the only servicing

likely to be required is an occasional renewal of a valve, which every dealer can undertake to do. The need for a valve renewal in these sets is usually manifested by the development of a "hum" background to the reproduction, by a gradual deterioration in quality, or by a complete breakdown.

Set Selection Service

Before buying any set I strongly recommend the WIRELESS MAGAZINE reader to take advantage of the free advice offered by the Set Selection Bureau. This unique service has helped hundreds of readers to choose a satisfactory set, having regard to the price, the stations wanted, and the locality in which the set is to be installed. Further details of this service will be found on another page of this issue.



ONE-KNOB ALL-ELECTRIC SET

Unusual but attractive is the A.C. four-valve Gecophone model. The price is £30 in a solid walnut cabinet



A CONSOLE CABINET

This fine gramo-radio combination (80 guineas in oak) incorporates the standard Columbia 304 radio set with three screened-grid high-frequency stages

Special Service of Free Advice to Prospective Set Buyers

ALTHOUGH this article gives a very clear general idea of the many different types of radio sets on the market, individual set-buyers may still occasionally find themselves perplexed in the choice of a suitable receiver.

It was to help "Wireless Magazine" readers in all aspects of set-buying that the Set Selection Bureau was organised. This bureau has helped hundreds of readers to choose the right set. If you are a prospective set-buyer you may save many pounds hard cash by conforming with the rules given on page 245 and availing yourself of this special "Wireless Magazine" service. It will only cost a 1½d. stamp for a reply.



"OH!" ejaculated Mu, standing just inside the entrance to Olympia, and surveying the glittering stands on all sides. It was the first time he had attended a radio exhibition, and he was proposing to make a tour around with his friend Amp.

Amp is getting quite grown-up now. He has graduated from the awkward, somewhat shy, very inquisitive youth who used to worry Professor Megohm with his queries, to a somewhat quiet and really quite clever youth, although, perhaps, we had better not let him hear us say so.

Incredible Joy

Whatever we think of him, Mu, his new friend—who is several years his junior—was in the most severe stages of hero-worship, and the idea of being able to go round the Radio Exhibition with Amp was an almost incredible joy. So having got over the first shock, they went together down the centre to see what they could find of interest.

Before very long Amp stopped at a stand and picked up a small component, which he proceeded to examine very critically

"Mm," he said at length, "form of variable grid leak."

"Yes," replied the representative behind the counter, "it has several advantages, as you see." Here he went off into a discussion of various novel features of the product.

"Not much call for variable grid leaks, is there, these days?" said Amp in a superior way.

"A fair amount," was the answer, "particularly for use in quality detectors. Of course, we also make resistances in much lower values for volume controls and things like that."

"Oh, you do, do you," said Amp. "That's interesting. Perhaps I could have one of your leaflets."

"Certainly, sir," was the reply "Good afternoon."

The two moved on in silence. Young Mu thought it was marvellous the way Amp had discussed such very weighty matters with such obvious insight. He did not know quite what a grid leak was, and he was wondering whether he dared ask. He decided that he would, and so said rather timidly: "I say, Amp."

"Yes."

"What is a grid leak?"

Amp hesitated. What a question to have to answer in a few words. Finally he said: "You know what a valve is?"

"Yes," came the reply.

"Well, it is necessary in a valve, except in very special circuits, to have a connection of some sort from the grid to the filament. Sometimes the circuit itself provides this connection, but at other times it does not. If not, we have to connect a high resistance between the grid and the filament in order to stabilise the circuit, and we call this resistance a grid leak."

"Why?" said Mu.

Amp groaned inwardly. Was he ever, he wondered, as persistent as this in the old days when he used to worry Professor Megohm?

However, he was ready with a reply, and he said: "If the grid is not connected to the filament a certain charge accumulates on it, and this charge is allowed to leak away if we have a high resistance connected as I have just mentioned."

"Oh!" said Mu, thoughtfully. "How big would the resistance be, roo ohms?"

Standard Values

"Oh, heavens, no! Usually 2 or 3 megohms, although somewhat lower values are sometimes used."

He glanced at Mu, who was looking sorely perplexed. "You know what a megohm is, I suppose," he said.

"No," confessed the other.

"It's one million ohms."

Mu's eyes grew round with surprise. It seemed an awful lot of ohms. Amp confirmed this feeling by saying: "We have to use a very large resistance, just sufficient to provide the necessary leak without affecting the circuit across which it is connected."

Any further discussion on this point was interrupted because Amp suddenly caught sight of some fixed condensers. "By Jove!" he said, "two mikes that size are not too bad!"

Mu, bringing up the rear, stood first on one foot and then on the other, trying to obtain a better view, and wondering what on earth this new animal was, about which Amp was so interested.

He could hear snatches of conversation like "breakdown voltage" and "sealing," but it was some time before he was able to get a view of the stand, on which he found a number of queer metal cases, each containing two terminals.

Mu Is Puzzled

In a lull in the conversation, while Amp was looking at one of the gadgets with interested eyes, he said: "What did you say these were, Amp, mikes?"

Amp laughed, as also did the representative on the stand. The latter gentleman, indeed, made some facetious remark about "potted farads," and, still smiling, attended to another customer.

"No," said Amp at length, "these are paper condensers. You know what a condenser is."

Mu nodded. He had an idea, albeit somewhat hazy.

"These are fixed condensers, made up by interleaving sheets of thin foil and paper, and they are actually relatively large in capacity—this one here is 2 microfarads."

A glimmer of understanding passed



EXHIBITION!

Our old friends, Professor Megohm and Young Amp, run into each other at the Radio Exhibition. Amp is accompanied by a new friend—Mu—who is very intrigued by what he sees and asks Amp some awkward questions that must occur to many other people. If you are a beginner you will like this report of their conversation.

over the features of Mu, for he was not by any means an unintelligent lad. "Then——" he exclaimed, and broke off.

"Yes," said Amp smiling, "we usually shorten microfarads to 'mikes' and talk about a 'two-mike' condenser."

Mu pondered for a bit. "How much is a mike, anyway?" he asked.

Unit of Capacity

"Heavens!" exclaimed Amp. "You do ask awkward questions, don't you? All I can tell you now is that the farad is the unit of capacity and is much too large for usual purposes. Therefore, we use a more convenient unit, which is one millionth part of a farad or a microfarad, as we call it."

"I see," said Mu, drinking it all in avidly. "Then how many microfarads is an ordinary variable condenser like this?" pointing to a representative sample which was displayed on the same stand.

"None," replied Amp, and laughed at Mu's look of astonishment.

"As a matter of fact, when we come down to wireless work even capacities of the order of microfarads are much too large, and we have to deal in small fractions. The maximum capacity of that condenser is only half of one thousandth of a microfarad, or, as we say, .0005 microfarad. Still," he continued, "if we don't get a move on we shan't see anything."

The two boys wandered round the Exhibition again, seeing the new loud-speakers, gramophone accessories, until Mu began to feel dazed with the enormity.

At this point whom should they see but their old friend, Professor Megohm, who was engaged in earnest conversation with a young man on one of the valve stands. Megohm greeted them with delight. "Hello, Amp!" he said. "I knew, of course, you

would be here quite a lot of your time, but I did not think I should run into you. What do you think of it, anyhow?"

"So-so," said Amp, nonchalantly. This, in Mu's eyes, was a true sign of greatness, as indeed it was intended to be. He himself was thrilled to the marrow, whereas Amp only thought it "so-so!"

Megohm, being a very understanding man, grinned to himself and said nothing. They all continued their wanderings together. Shortly they passed a stand of battery manufacturers, where there were a large number of accumulators set out.

"There," said Megohm, "is a stand which most people pass by. They say, 'Just another bunch of batteries.' I wonder if they appreciate the efforts that the manufacturer has made to give them satisfactory accumulators. A battery lives on its work, as you probably know, and if you don't use it enough it will not last as long as if you use it regularly and hard."

"Yes," said Amp, "I remember you told me that. Your point is that these people have produced special batteries, which will give good service, even though the current taken is only quite small."

"Yes."

By common consent all three drifted towards the stand, and Mu examined the exhibits with interested gaze. Professor Megohm was immediately recognised by the assistant and they started to speak. Mu pulled Amp's sleeve to attract his attention.

Ten "Ah's"

"I say, what does 'ah' mean? This battery says it will do ten continuous 'ahs,' or twenty intermittent ones."

Amp could not help laughing again. The idea of the customary low-tension accumulator emitting twenty inter-

mittent yelps appealed to his sense of humour.

Eventually, having recovered his dignity, he said: "Ah is really two letters, A and H, and is short for ampere hours. A battery is rated in accordance with the number of ampere hours that it will give. For instance, a ten-ampere-hour battery gives one ampere for ten hours, or half an ampere for twenty hours—or perhaps a bit more."

"Why a bit more?" said Mu, not taking anything on chance.

"Because the smaller the current consumption, the longer the battery will last, up to a limit where the current consumption gets so small that the battery begins to deteriorate on its own account."

Mu thought it over to himself, still regarding the label on the side of the accumulator.

Increased Life

"That's where the intermittent comes from," exclaimed Amp, thereby anticipating the question which was on the tip of Mu's tongue. "If the battery is only used for short periods, its life before it needs re-charging is longer than if it is used continuously. It is only twice as much when it is used very occasionally, such as for bells, but with the normal use on a wireless set the life will be a little bit longer than the figures lead one to expect."

"What do they use the intermittent rating for then," objected Mu. "It seems rather silly."

"It isn't used much these days," agreed Amp. "Most manufacturers class the battery by its continuous rating."

At this point Megohm finished his conversation and turned round to the boys. "Well, lads," he said, "I don't know what you feel about it, but I have a distinct hunger. What about getting something to eat?"

LOOKING AHEAD!

In this article WHITAKER-WILSON, the "W.M." Music Critic, discusses in lighter mood the possibilities of radio developments in 1940. You will enjoy his good humour!

I THINK it is true to say that we all like to see into the future. In playing the part of the sage this month, I must confess I am no Old Moore though, now I come to think of almanacs, I can lay some claim to being a *Whitaker*. So that you must simply take the views I express here for what they are worth.

The development in wireless transmission in the last year or eighteen months has been so rapid that I am really concerned as to where it may lead us during the next decade. By that time I feel in my own mind that wireless will be the only important thing in the world.

B.B.C.'s Complete Control

The B.B.C. will, by then, have taken over the complete control of affairs, which will be much better than letting the present parliamentarians choose the programmes. Of course, we may live to see Mr. Lloyd George conducting the National Orchestra of Wales and Mr. Snowden producing opera, and I look forward to reviewing Mr. J. H. Thomas's next Overture to the N.U.R.

It is more than likely that Jack Payne will be Prime Minister in 1940; Sir Henry Wood will be Chancellor of the Exchequer; Tommy Handley will be at the War Office; and the Gershom Parkington Quintet will all be in the Cabinet.

There are bound to be some changes in the programmes; we must expect it, otherwise Art will not progress. I understand that the Co-Optimists will be regularly engaged for the Bach Cantatas on Sunday afternoons, and that Wish Wynne and A. J. Alan will be responsible for most of the Foundations of Music.

The dance music on Saturday evenings will consist of the Bach Suites, and the Children's Hour will be devoted to readings from the classics and be transmitted at a popular hour, 2 a.m., being more in keeping with the requirements of modern children.

The Sunday programmes will have at last undergone strict revision. Sets will have become so perfect that it will be possible to radiate a

dozen different programmes at once, so that a dozen different sermons will be coming through at supper time on Sunday evenings. This will enable those who have already done their duty (by hearing two, at least) to take their further choice.

Tom Jones and Albert Sandler will only consent to broadcast so long as it is simultaneously from Eastbourne and Mayfair. It is also known in certain circles that there will be a little dance music of a Sunday night for depraved listeners, but this will be clearly marked 1,554 metres only.

Music itself will, naturally, have developed considerably. Composers like Stravinsky and Bartok, who are now considered ultra-modern, will have become the backset of back numbers; in fact, all who are now composing will have been relegated to history with those who are decomposing.

The very scale itself will have altered. As I pointed out in an article some months ago, it contains, at present, twelve semitones. This will all be done away with in 1939. There will be twenty-four quarter tones instead. I think it is a good idea and I believe I am right in saying that it will be adopted specially for those vaudeville sopranos who now sing rather out of tune.

With twenty-four quarter tones to the octave, it is thought that the best of them may stand some chance of hitting the right notes.

Wonderfully Effective

Saxophones will be obsolescent if not actually obsolete; oscillophones will have taken their place. These will be wonderfully effective instruments played by two performers, one plus and the other minus, and will sound very much like your neighbour tuning in to the National programme.

Announcers will have long been abolished owing to their futile attempts to speak English; one or two may be retained as curiosities, but they will mainly operate on the East Dulwich Regional.

I am informed, however, that due provision will be made for the "Goodnight everyone, goodnight," as

it is part of the British constitution. It will be done automatically and will come through on all loud-speakers in the country whether sets are switched on or not.

The news will be transmitted through televisions by means of electric lettering, so that you can read the Fat Stock Prices and listen to a Beethoven symphony at the same time.

Orchestral Changes

There will be a great change in the B.B.C. orchestra. There will shortly be another audition, but nobody who has been in the band before will be allowed to apply. The personnel of the 1940 B.B.C. Super Orchestra will be as follows, no deputies being allowed:—

FIRST VIOLINS :
Amy Johnson (leader)
Jack Hobbs
Gladys Cooper
George Robey
SECOND VIOLINS :
Ernest Newman (leader)
Lady Oxford
Dean Inge
Steve Donoghue
VIOLAS :
Lord Beaverbrook (leader)
Tom Webster
Bernard Shaw
VIOLONCELLOS :
Gordon Selfridge (leader)
Beachcomber
DOUBLE BASS :
St. John Ervine
FLUTE :
Davy Burnaby
OBOE
Hannan Swaffer
CLARINET
Mary Pickford
BASSOON :
A. P. F. Chapman
TRUMPETS :
Tallulah Bankhead
Bishop Barnes
TROMBONES :
Will Hay
Ethel M. Dell
DRUMS :
Carnera

There will be no regular conductor, but when difficult dance music is being played, either Compton Mackenzie or Yvonne Arnaud may take a turn at the wheel

I hope everyone will now place his order for the great Exhibition Number of the WIRELESS MAGAZINE for 1940. By that time it will be the only

journal in the country and the offices will be at the Mansion House.

Exhibition in 1940

I shall go to the Exhibition that year and will be pleased to answer technical questions. I now know the difference between a valve and a condenser and am likely to learn a lot more later on.

There will be some marvellous exhibits, of course. One of the cheapest and most effective sets is now being constructed in our laboratories. It is to be called the No-battery-no-earth - no - aerial - telo - gramo - radio Ten and will be worked off the gas mains.

In addition to the usual advantages of a perfect wireless receiver it will have some novelties on its dash board, such as electric immersion heaters for the bath, rear lights that switch on automatically at dusk, vacuum cleaners, etc., etc. It will also heat the radiators and cook a joint.

Nineteen-forty will be a wonderful year for England. Empire Free Trade will be out of date by then and foreign merchants will pay us to take their goods. Lords and the Oval will be closed to the public as the Test Matches will be played by wireless.

Age of Progression

These things are bound to come in time; we live in an age of progression. All microphones in the studios at the B.B.C. will have their own televisors so that the broadcasters can see their audiences. Also it will be possible for the listeners to transmit their opinions of the broadcasters into the studios, which will save them writing to the Director General.

The D.G., by the way, will not be a human being. It will be found that no ordinary mortal can stand the strain.

Finally, no humour will be allowed. The present B.B.C. humour will be found to have been responsible for such serious results in regard to national health that it will be decided that it is more beneficial for people to have their own little jokes at home than to be expected to laugh at what are really serious vaudevilles.

If it is found that the health of the nation has improved by 1940, two official back-chat comedians will be engaged—Epstein and Einstein—who will broadcast properly constituted government humour.

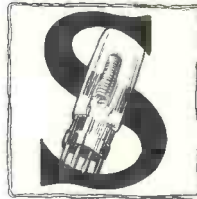
A WIRELESS ALPHABET

By Leslie M. Oylet



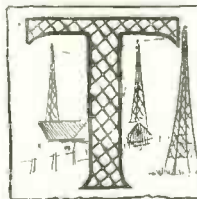
*the Rejector Circuit, she
Is most exclusive, all agree,
For she discriminates with care
'Twixt oscillations everywhere :
She is in tune with some, they pass,*

*But others she rejects en masse.
And yet she keeps them in their place
With nicely balanced tact and grace,
For she selects just whom she should,
Her judgment is extremely good.*



*the Soft Valve, a charming lass,
Although she is inclined to " gas " :
She's most efficient as we see
Just when it pleases her to be !
She is uncertain, like her sex,*

*If anyone should chance to vex
Her ladyship, they should take heed,
She's very difficult indeed.
Yet she's soft-hearted after all,
The kind of valve for whom we fall.*



*the Transmitter ; here we find
A fellow eminently kind,
He transmits signals, also news,
I've never known him to refuse.
'Britannia rules the waves' of course,*

*But he, assisted much by morse
Signals, controls electric waves,
Yet no publicity he craves,
He says " My job is to transmit,
I am content to do my bit."*

WHAT "W.M." SETS WILL DO!

THE NEW CRUSADER

MANY listeners do not realise the results that can be obtained with a really good two-valver such as the New Crusader (WIRELESS MAGAZINE, March, 1930). Here is an excellent report from a South London reader:—

I hooked up the New Crusader at Easter using spare parts, and I feel I must write and tell you of its performance. Up to date I have had the following stations on the loud-speaker at good strength: Rome, Turin, Toulouse, Leipzig, Nürnberg, Hörby, and, of course, the local, and many more on the phones.

I have, however, mostly worked below 200 metres, and have received the following stations: Zeesen, Prague, Vienna, W2XAF, Constantine (8KR), and the following amateurs:—

Great Britain

6AM	6NF	6QC	5OA	5PM	2IB
5TM	6IO	5WB	2QF	6NU	5IA
6TA	5QH	2HB	5GM	5TJ	5YM
6OH	5BC	2AX	5YJ	6RG	2XO
5BG	5PS	5VG	5NR	6WF	5DQ
	6RL	2HC	2DQ	2LZ	

France

8ACL	8ACD	8PRG	8JRD	8CG
8GOG	8LPC	8FA	8APZ	8PQZ
8DG	8CAR	8EB	8LO	8DD
8NOR	8LVQ	8JDB	8KG	8BA
8YMA	8SUJ	8AM	8KB	8BP
8CL	8CID	8BAX	8HUT	8IO
8WAC	8AD	8ATZ	8CLG	8KCO
8GRD	8VAL	8LAP	8ABA	8HLD
8GAL	8SCH	8ABR	8AMA	8CAC
8AEP	8JL	8KW	8CCO	8BRC
8AGN	8CW	8ZAL	8BQ	8AJK
		8FY		

Algiers: 8WZA

Belgium

4DA	4ND	4GQ	4IY
4HI	4FZ	4LU	4PA
4EN	4IR	4EP	

Spain

EAR-94	EAR-54	EAR-104	EAR-161
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Italy

KX	DI	ARAW
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Portugal

iCZ	iBA	iCV	iDI
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Nearly all these have been heard several times.

I also heard a French amateur at Oran, but could not get his call sign. Also an unknown station with the call sign ACK.

A FURTHER report on the New Crusader comes from Ireland, where it is giving good results on the ultra-short waves:—

In building the New Crusader I placed components on a panel after the old style and wound the three ultra-short-wave coils on a 2 in. by 4 in. Paxolin tube mounted on a Peto-Scott five-pin coil holder, using bare copper

wire and spacing each turn about ¼ in. I also used an old Sterling .00025-microfarad variable condenser and added an extra low-frequency stage.

This is my first attempt at ultra-short-wave work, and from the results with this set I am convinced that it is by no means my last.

To those, like myself, who have a well-filled "junk box" and desire some new field, I would say: "Try the short

In these pages we publish reports from twenty readers about their "W.M." sets. These letters are something more than just praise for the WIRELESS MAGAZINE; they are good indications of what various types of set will do in different localities.

They are therefore of great value to the prospective builder of a set.

Half a guinea is paid for each photograph of a home-constructed "W.M." receiver printed in these pages.

If you have recently built a "W.M." set let us know what it will do—other constructors will benefit from your experiences.

waves and start off with the New Crusader." It is sure to create a brand new interest in wireless.

EXCELLENT results are also reported by a reader at Raniganj (India). This reader also uses an Economy Screened-grid Four:—

I beg to inform you that I made the New Crusader as soon as I received my copy of WIRELESS MAGAZINE, and after a fortnight's trial I am of opinion that this receiver is an excellent one for the reception of ultra-short waves.

I got the Java stations on the loud-speaker, Phohi (Holland) at full phone strength, and there are many stations which can be heard on the headphones.

I am using the Economy Screened-grid Four, which was also published in the WIRELESS MAGAZINE, and I have the pleasure to inform you also that it is a very efficient, stable set, and enables me to receive the Indian stations on the loud-speaker, some foreign stations on the loud-speaker, and many on headphones in the winter.

I have picked up Brookman's Park at full phone strength.

Wishing you every success.

ABC TWO

BBUILT partly from components used in a 1925 receiver, the ABC Two (WIRELESS MAGAZINE, October, 1929) is giving fine results in Ireland:—

Built from parts already used as long ago as the first edition of "As Good a Set as Money Can Buy," the ABC Two results came as a surprise to me.

Living eighty miles west of Belfast (local), I need hardly say signals are not over strong.

On the first night's trial I logged fifteen stations on the loud-speaker at good strength, using 100 volts high tension. Quality was of a high order so long as reaction was not forced too far.

For a two-valve set, I am convinced that it cannot be beaten; it is easy to build and cheap. Certainly it is the first two-valve set I have handled that will work a loud-speaker from more than the "local" in this district.

I may add that the wiring and layout in my case was carried out in a very rough manner.

I have since used the set in conjunction with the Concentrator H.F. Unit as described in December (1929) issue of WIRELESS MAGAZINE, and find it makes a splendid set for family use.

AT Winchester the ABC Two is also giving satisfactory results, as this letter proves:—

A few months ago I constructed the ABC Two described in your magazine dated October, 1929, and the results were beyond expectations; in fact, everyone who has heard it considers it the best two-valver produced.

Your Technical Staff are to be congratulated in designing such a good two-valve circuit.

CONTINENTAL TWO

MANY stations at loud-speaker strength is the experience of a Coshm (Hants) reader with the Continental Two (WIRELESS MAGAZINE, June, 1929):—

Having made up the set in January, 1930, after experience with several shop-made one-, two-, and three-valvers, I thought you would be interested to know results, at least, to the commencement of Summer Time.

I have made certain alterations in components, such as Pye L.F. choke, the use of a 1-2 ratio L.F. transformer and pentode valve, all of which I had in an old two-valve straight circuit (except, of course, the L.F. choke, which I purchased).

Davertry 5XX, 5GB, and National and Regional need the use of a volume control working with a 40-ft. aerial 30 ft. high (our height above sea-level is approximately 200 ft.), and so do

Radio Paris and Eiffel Tower. All these stations can be obtained at any time and anywhere, and will give full volume on an Ormond loud-speaker unit.

The following stations have also been obtained at excellent loud-speaker strength, but at present are doubtful in several cases (realising this is now summer weather): Algiers, Barcelona, Belfast, Berlin (long and short waves), Budapest, Breslau, Dublin, Frankfurt, Göteborg, Hörby, Hamburg, Motala, Langenberg, Leipzig, Milan, Oslo, Rome, Toulouse, Turin, Vienna, Moscow (freak), and Brussels new H.P., Copenhagen, and Katowice.

Also Morovska Ostrava, Warsaw, and Kalundborg at fair strength, and, last but not least, Cork. Several of the former need volume control.

I think the set is excellent for a two-valver, and, incidentally, I made a similar set for a friend, using components as your list, and results on my aerial were identical.

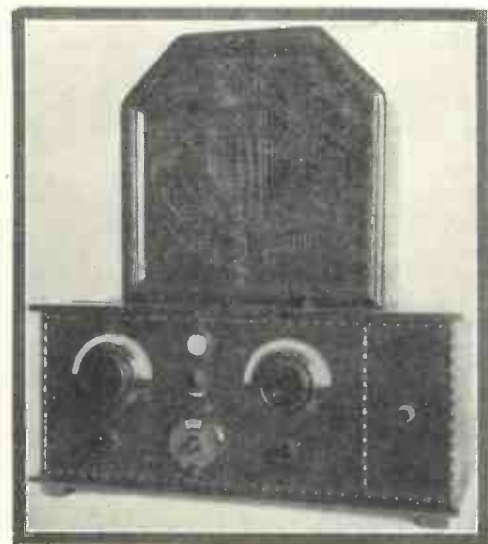
I may add that the tone of music received has only been equalled in my experience by a set built for quality loud-speaker at ten times the price of my unit.

I cannot say more than the set is a wonder, and I am converting it to an eliminator from H.T. dry batteries, because recently a three-valve all-mains set of reputable make brought to my house for demonstration did not equal my set for volume or tone.

PROGRAMME TWO

MANY constructors would think it very ambitious to expect results from a two-valve radio gramophone, but a Bedford constructor is getting good results with the Programme Two (WIRELESS MAGAZINE, February, 1930), which he has used in this way:

I am sending details of my radio gramophone which incorporates the Programme Two, described in your February issue. The cabinet, which was made by myself, is of Austrian oak.



THIRTY LOUD-SPEAKER STATIONS

Another photograph of the Brookman's Three made by a Plumstead reader with great success. The loud-speaker is a Celestion

Although only a two-valver, the results are astounding, the quality and volume being excellent, and the selectivity all that could be desired. The reproduction of gramophone records is very good and the volume adequate.

I am enclosing a list of stations received up to date:

Long Waves:

5 XX, Eiffel Tower, Radio Paris, Hilversum, and Huizen.

Medium Waves:

London 1 and 2, 5GB, Toulouse, Radio Paris, Rome, Milan, Barcelona, Bournemouth, Cork, Copenhagen, Breslau, Vienna, Budapest, and Hörby.

All these are at good loud-speaker strength.

PEDLAR PORTABLE

A NORTH Finchley reader took his Pedlar Portable (WIRELESS MAGAZINE, June, 1930) outside the gates of Brookman's Park and—well, read his letter for yourself:

Being struck by the novel design of the Pedlar Portable (det. and two trans.), I made it up from old parts that I had by me, the two transformers being over seven years old. The case I made up myself. The loud-speaker unit is an old Hegra (cheap model).

The results are simply wonderful for such a simple circuit. Also, taking into consideration the fact that it is built of "junk," I get excellent loud-speaker results up to forty miles from B.P.

Last night I took it out in the car and tried it right outside the gates of B.P. under the aerials. To my great surprise it separated the National from the Regional quite easily without a trace of background from either. Thanking you for such a topping little set.

BROOKMAN'S THREE

TOO many stations to count on the medium waveband is a Plumstead reader's experience with the Brookman's Three (WIRELESS MAGAZINE, October, 1929). Here are his remarks:

I thought you might be interested in my set, the James Brookman's Three. This is a very fine set, bringing in at least thirty stations on the loud-speaker.

As you will see by the photograph, I am using one of the Ferranti 1 to 7 transformers, which certainly improves reception. Also, I am using a second aerial terminal connected via a .0001-microfarad fixed condenser to the G terminal on coil base; this is an advantage on the long waves, but seems to mix things up on the medium waves.

There is one of the small Bulgin milliammeters on the panel, too, which I do not keep

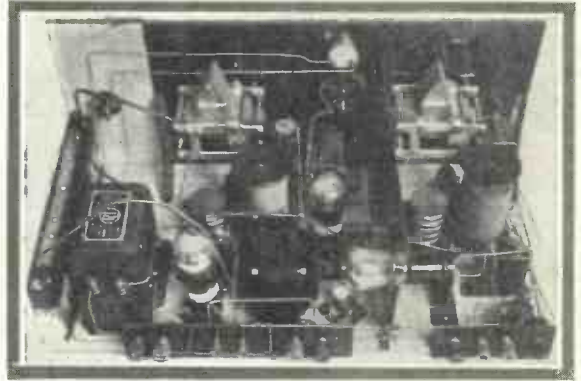
in circuit, being shorted by the panel switch near the grid-bias battery.

There are eight or nine stations on the long waves, and so many on the medium waves that I have not bothered to log them properly.

In conclusion, let me thank you for a really fine set, and also for the courtesy you have extended to me when seeking information.

NEARLY seventy stations is the record of a Middlesbrough reader with the Brookman's Three. Can anybody beat this?

I am very highly pleased with the Brookman's Three, and doubt if there is a



A NEAT CONSTRUCTIONAL JOB

On the left can be seen the choke-capacity output added to his Brookman's Three by a Plumstead reader

three-valve set to beat it. It gives excellent quality at good loud-speaker strength on practically all stations that are worth having on the medium and long waves.

One great feature in my opinion is that I can get, in daylight, seven or eight stations on the long waves at good strength, giving a variety of countries, namely, England, France, Holland, Germany, Denmark and Sweden, a very useful feature these long days.

It must remain until the dark nights before I can determine its full capacity, but I have had nearly seventy stations already.

TWENTY-SEVEN stations on the loud-speaker is what a Ranmoor reader gets with his Brookman's Three, of which a photograph appears at the top of the next page:

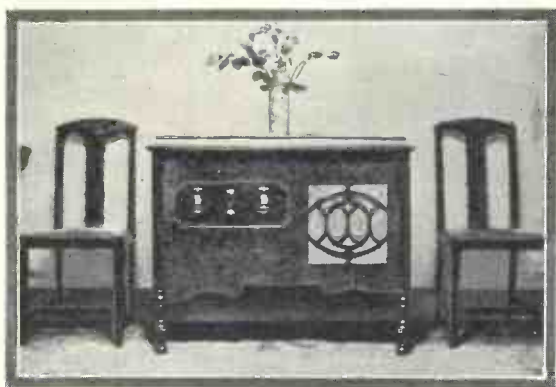
Being a regular reader of your wonderful WIRELESS MAGAZINE, I thought you and other readers would be interested to know what a wonderful set the Brookman's Three is. Although I built the set and cabinet in November last year, I only decided last week to try a photograph, which I am enclosing.

I am using a home-made eliminator (metal rectifier) and trickle charger (metal rectifier), incorporating a four-pole double-throw change-over switch. All the components are to specification, with an addition of an output filter circuit.

The volume is terrific and an average of twenty-seven stations can be obtained. The loud-speaker is an Ormond unit fitted to a 12-in. fibre sheet cone. Wish- ing the magazine every success.

Further letters on the Brookman's Three are held over.

What "W.M." Sets Will Do!—Continued



TWENTY-SEVEN STATIONS ON LOUD-SPEAKER

Note what an impressive job has been made of the Brookman's Three by a Rammoor (Sheffield) constructor (see letter on page 239)

BROOKMAN'S PUSH-PULL THREE

WITH a log of over fifty stations, an Edinburgh reader is justly proud of his Brookman's Push-pull Three (WIRELESS MAGAZINE, December, 1929):

Just a short note to congratulate you on the Brookman's Push-pull Three. I built the set about three months ago, and as I could not have an outside aerial, I added an extra L.F. transformer-coupled stage.

During the next three months I was very busy, so I took quite a long time before I could make a log of the chief European broadcasters.

I've built several sets before, but the Brookman's Push-pull Three has given me by far the best reception.

The stations given below were received on an indoor aerial, about 30 ft. in length:

LONG WAVES	
Kaunas	Warsaw
Huizen	Motala
Lahti	Karkov
Radio Paris	Kalundborg
Zeesen	Hilversum
London (5XX)	Leningrad
Eiffel Tower	
MEDIUM WAVES	
Budapest	Petit Parisien
Munich	Posen
Vienna	Breslau
Milan	Göteborg
Oslo	Hilversum
5GB	Turin
Langenberg	Edinburgh
Aachen	Bratislava
Rome	Konigsberg
Dublin	Barcelona
Katowice	Moravska
Glasgow	Brookman's Park
Frankfurt	Leipzig
Toulouse	Hörby
Manchester	Toulouse (PTT)
Hamburg	Gleiwitz
Algiers	Belfast
Brookman's Park	Nürnberg
Barcelona	Cork

ANOTHER reader at Wolverhampton also gets excellent results. He uses a linen-diaphragm loud-speaker:

I recently built the Brookman's Push-

pull Three, as described in the December issue of WIRELESS MAGAZINE. I experienced a little trouble at first, but traced this to one of the power valves being faulty, which the makers replaced.

The set is now working perfectly and reproduction (both quality and volume) is really excellent on a double-diaphragm linen loud-speaker. Although I made the 1930 Binowave coils myself, Continental stations can easily be tuned-in and at very good strength. The set is also very selective: Radio Paris can be

heard without interference from 5XX.

I obtain high tension from A.C. mains and voltage on push-pull valves (read with Ferranti 1,000-ohms per volt meter) is 160, with 24 volts grid bias.

CELERITY THREE

GOOD loud-speaker signals from many Continental stations and interesting possibilities on the ultra-short waves are reported by a Thundersley (Essex) reader with the Celerity Three (WIRELESS MAGAZINE, January, 1930):

I have now had a Celerity Three set running since the early part of February, and in it I find a set which is extremely satisfactory as regards range, volume, and selectivity.

Rome, Barcelona, Paris, Hilversum are regular stations for the loud-speaker, in addition to the Regional and National programmes; all tuning is done on the loud-speaker and heaps of stations could be tuned-in on phones.

Using an outdoor aerial, a faint background is heard of either Regional or National when tuned in to either, but nothing serious enough to call real interference; with an indoor aerial interference vanishes.

Slight alterations made to the original layout consist of putting a fixed .0002-microfarad condenser in the aerial lead and a 30-ohm rheostat in the filament lead to the screened-grid valve, as a volume control.

Included in the stations I have received are several short-wave stations:

- G2LZ Wickford
- G2SN Southend
- G2KT?
- G5AR?
- G2PX East Ham
- 5SW Chelmsford
- W2XAF Schenectady

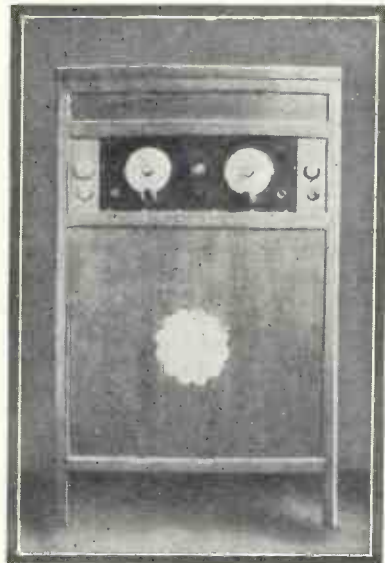
The wavelength range of this set, using suitable coils, seems to be remarkable, but in view of its all-round efficiency I would suggest, in the interests of users (possibly some of whom, like myself, would like to indulge in short-wave work, but have not the time to spare making investigations) that your laboratories investigate the short-wave possibilities of this layout and publish

the result of their investigations in either the WIRELESS MAGAZINE or *Amateur Wireless* (of which I am a regular reader). Thanking you for a real "International Station Getter."

FANFARE THREE

MORE and more readers are using WIRELESS MAGAZINE sets as the basis of radio gramophones. Here is a report from a South London constructor who has a Fanfare Three (WIRELESS MAGAZINE, September, 1929):

I enclose herewith a photograph show-



A RADIO GRAMPHONE

Record reproduction without needle scratch is the thing that most pleases a South London constructor of the Fanfare Three

ing the Fanfare Three, as fitted to a home-made oak cabinet to form a complete gramo-radio set.

Working with a Blue Spot pick-up, Collard motor, and Mullard valves, the reproduction is far superior to several well-known gramophones, and the entire absence of needle scratch has led several people to ask what type of filter I am using, and I have to show them the inside of the set to convince them that there is no filter.

This is a really good set and for family use wants some beating. You will see from the photograph that I have fitted a milliammeter for checking distortion and a voltmeter to check the accumulator, this obviating opening the back of cabinet till necessary. Wishing the WIRELESS MAGAZINE every success.

P.S.—You can, of course, use this letter should you so wish. The radio is as good as the gramophone.

YET another reader at Sheffield is using the Fanfare Three as a radio gramophone:

I feel that I must tell you of the fine results I am getting with the Fanfare Three, which was described as being particularly suitable for pick-up work.

Twenty Special Reports from Readers

I must say that your claims are fully justified, as I think that the special circuit arrangement is particularly well suited to the electrical reproduction of gramophone records, the usual method of coupling transformers giving too much treble.

I made the set as described, except that I fixed the pick-up switch inside the set, as I do not like a long grid lead. I also fitted a high-frequency choke and an output filter.

I built the set into a home-made cabinet and included a gramophone motor and pick-up as the photograph shows.

The loud-speaker, which is fitted in the bottom of the cabinet, is a linen-diaphragm speaker, made to your specification, and I must say that it is the best type of speaker I have heard, both the treble and the bass being there in perfect proportion.

I have got over twenty stations at good loud-speaker strength on the medium waves and five on the high waves. The high tension is provided by an eliminator. Thanking you for a splendid set.



ANOTHER GRAMO-RADIO SET

The Fanfare Three has also been used as the basis of a radio gramophone by a reader at Sheffield

COMMUNITY THREE

A SATISFACTORY gramo-radio outfit for about £12 is the accomplishment of a Scunthorpe reader, who has assembled the Community Three (WIRELESS MAGAZINE, November, 1929):

I am enclosing a photograph of my Community Three, which you described in your November number. Except for



"KING OF THEM ALL"

That is how a Scunthorpe reader describes his Community Three, which exceeded his expectations. It cost only £12 or so

the condenser dial, the set is built to specification, and I used a blueprint published by the WIRELESS MAGAZINE to ensure a correct layout.

This set has exceeded my expectations of purity, and there is plenty of volume, both with radio and gramophone. I have constructed a good number of sets with the object of purity, and this is king of them all.

I have quite a large selection of stations, which include most of the well-known Continental ones. Brookman's Park is received with very little fading at a distance of about 180 miles, whilst Daventry and Birmingham are excellent.

The set is housed in a cabinet which I have myself constructed, the overall measurements being 3 ft. 9 in. high, 2 ft. wide, and 16 in. deep. The bottom portion contains a Blue Spot unit and cone, together with all batteries, the all-inclusive cost being between £12 and £13.

P.S.—Selectivity is very good.

TOUCHSTONE FOUR

ALTHOUGH it is now two years old, we still get letters of appreciation about the Touchstone (WIRELESS MAGAZINE, November, 1928):

In my opinion the Touchstone is about the best four-valver I have ever heard. For selectivity and volume, combined with tone, I have yet to hear a set that can compare with it.

It takes Mr. James to give us the right stuff. He is the best designer of wireless receivers in England to-day and I wish him every success.

A PRESTON reader has converted his Touchstone into a dual-wave receiver by incorporating Binowave coils:

I have made a big improvement in the Touchstone by making it into a long- and medium-wave set. I have put two of W. James's Binowave coils in it, type A and type D. I have tuned them with .0005 - microfarad condensers—separately, not ganged. I have put a plywood panel the length of the set, stained and polished. I have laid it out exactly like the Lodestone Four.

I have altered the position of the detector valve and the first L.F. valve. I have arranged them as they are in the Lodestone Four.

I have wired up to the Touchstone blueprint.

It is now a set *second to none*. I have added reaction. It is quite as good as before, if not better. Daventry 5 XX comes in at terrific strength.

You may publish this letter in WIRELESS MAGAZINE if you wish for the benefit of others who wish to make the Touchstone into a dual-wave set. I am running from A.C. mains, with 160 volts on the last valve, a Mazda super-power.

ECONOMY SCREENED-GRID FOUR

BUILT up in a glass cabinet, with a glass panel, a Reading constructor has made an attractive job of the Economy Screened-grid Four (WIRELESS MAGAZINE, December, 1928):

I am sending a photograph of the Economy Screened-grid Four, slightly modernised, with modifications taken from the Globe DX Two.



ATTRACTIVE IN A GLASS CABINET

Most attractive is the Economy Screened-grid Four built up by a Reading reader; it is in a glass cabinet

The cabinet (which is entirely home made), also the panel, is of ¼ in. plate glass. The set is of attractive appearance and attractive performance. Stations are "brought in" all around the dial on three valves, for which a five-point push-pull switch is mounted to cut out the fourth valve.

Recently I distinctly received an American station giving the result of the Scott-Sharkey fight. This, again, on three valves.

The set is admired by all who have seen and heard it. I have constructed various types of receivers, but thanks to the WIRELESS MAGAZINE and Amateur Wireless, I am in possession of a real "star" set. Wishing you all success.



UNDER the scheme for an Empire short-wave broadcasting station which was submitted by the B.B.C. to the Colonial Office Conference in June and July last, a properly designed station will provide the dependencies overseas with a service which, though not comparable with that given in England, will yet supply a 60 per cent. to 80 per cent. guaranteed reception.

The annual cost of the service is estimated at £22,000, the lowness of the figure being due to the fact that the B.B.C. will put at the disposal of the Empire service, without charge, the whole of the material contained in the British programmes, and Reuter's Agency will accept the modest annual payment of £2,000 for the news bulletins.

While no objection will be raised by the B.B.C. to local broadcasting agencies receiving the Empire service and relaying it from their local stations, the co-operation of colonial governments is expected in preventing the unfair commercial exploitation of the news bulletins and the general programmes.

Colonial Contributions

The colonial representatives have agreed to contribute to the scheme, provided that they are assured of a reasonable service.

After the matter had been discussed by a Committee of the Colonial Conference, it was recom-

In this article are discussed for the benefit of WIRELESS MAGAZINE readers the more important activities at Savoy Hill, the headquarters of British broadcasting.

It explains the conditions under which the new Empire short-wave service will be operated; the question of programme referendums; and a new style of "radio reporting" being tried out on the Continent.

mended that the Colonial Secretary should give his approval. It was held to be impossible for the colonies to bear the whole cost in the first instance; but if the service is satisfactory, it is hoped that eventually they will be able to defray practically the whole.

How are the colonies to pay for this service? The recommendation is that a levy of five shillings shall be imposed on each colonial licence, the proceeds to be paid to the B.B.C. in some manner yet to be determined.

The first essential is that the colonial governments shall adopt the British method of making it illegal for any person to install or work a wireless set unless he holds a licence from the government of the territory in which he is domiciled.

While the British Treasury can arrange a grant without further delay

for the erection of a short-wave station in this country, it may decide that as a matter of etiquette the dominion Prime Ministers shall have an opportunity of discussing the scheme at the Imperial Conference which meets next month (October), in London; for the listener in Canada, in South Africa, in India, and Australia will stand to benefit from the service equally with the listener in British Guiana, Southern Rhodesia, Straits Settlements, or any other of the dependencies represented at the Colonial Conference. At the moment, therefore, the question of dominion reaction is in abeyance.

No provision will be made by the B.B.C. for the widening of programme hours necessitated by difference of longitude, which is 320 degrees, or twenty-one hours of time as between Western Canada and New Zealand. Nor is the B.B.C. likely to enter into any relay commitments, for example, repayment by way of programme exchanges in lieu of cash.

Programme Exchanges

Relays of overseas programmes, if at any time they are possible, will be accepted as a policy gesture rather than from considerations of programme value. In considering exchanges, the B.B.C. must take into account the probable loss of goodwill among British listeners in the likely event of failure.

A point which generally escapes

listeners' attention in connection with relays from abroad is the considerable cost involved in cabling. After the preliminaries have been agreed, further communications are rendered necessary in respect of tests, atmospheric conditions, and other technical data.

On the programme side, items and names of artistes have to be discussed, as well as the copyright position. All this sometimes means the exchange of a dozen or more cables, which alone costs more than an hour's first-class programme material. Is it worth it? becomes then a burning question and in the event of disappointing reception the discouragement is as great to the B.B.C. as it is to the listener.

Overcoming Difficulties

So far as the proposed Empire station is concerned, whether it is erected at Daventry or elsewhere, difficulties in reception owing to fading, atmospheric and other factors will, it is expected, be overcome under the scheme which has been put forward. And the extension of British broadcasting activity will cost the British listener nothing.

Many valuable sidelights on human nature and character unfold themselves to the Savoy Hill officials whose duty it is to handle the nearly two thousand letters which come from listeners every day. Letters

referring to programmes form the bulk of the postbag and they are always interesting, sometimes instructive and sometimes amusing.

But one has only to keep in mind the dimensions of the licensed followers of broadcasting to realise that imposing as a daily correspondence of two thousand may sound, the inarticulate portion of the audience is infinitely greater.

It is wrong to infer that the B.B.C., while inviting correspondence, ignores the voice of the critic. The programme builder really knows very little more than the writer of a letter as regards what a million listeners want. The letter, however, when read in conjunction with numerous other letters, does enable the B.B.C. to gain some idea of the individual peculiarities which have to be catered for and of the constant changes in the national tastes.

In one respect, critical opinion seems constant and that is in the refusal to acknowledge the existence of any taste other than the individual critic's own. Now, however, the B.B.C. is searching around for some means of finding out definitely what listeners in the mass want. The theatre programme remains the same, but the audience changes nightly; the B.B.C.'s programme changes nightly, but the audience remains unchanged.

There is nothing revolutionary in the B.B.C.'s plan to find out what its



A POPULAR CONDUCTOR

Sir Landon Ronald conducts some of the B.B.C.'s most popular concerts. Last season he conducted at the People's Palace

regular audience desires. It has watched various referendums in the British and American Press during the past years and has noted how these have been influenced by the general tone of the paper by which they have been conducted.

Biased Preferences

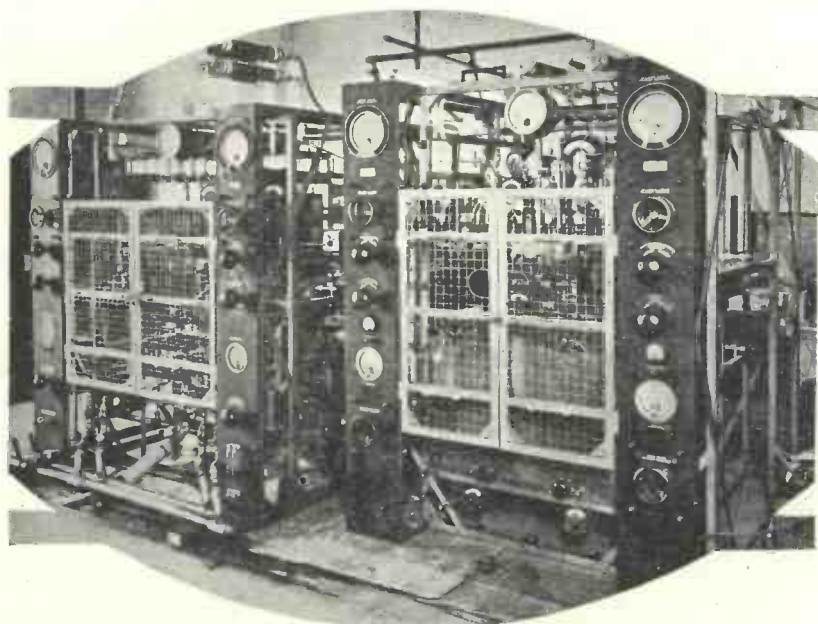
Thus the readers of one paper placed religious services at the top of the poll, others elsewhere gave variety first place, while a third referendum favoured brass band concerts. A fourth referendum, if the wishes of the voters had been obeyed, would have resulted in all soprano vocalists being for ever barred from the microphone.

The B.B.C. therefore has decided to explore afresh the possibility of conducting a referendum which would have a real meaning in relation to three million listeners.

Statistical Survey

The matter has already been approached in this way: At a meeting of the Central Council for Broadcast Adult Education, a suggestion was raised that a statistical survey should be made of the listening public as to the tastes, habits and requirements of listeners in the field of broadcast education.

Ways and means of making such an inquiry were delegated to the Executive Committee of the Central Council, the B.B.C., and statistical experts.



B.B.C.'S EXPERIMENTAL SHORT-WAVE TRANSMITTER

Situated at Chelmsford, G5SW has a power of twenty kilowatts. The installation consists of two panels of a Marconi short-wave beam transmitter

Empire Broadcasting At Last!—Continued

No immediate action need be contemplated; indeed, it is unlikely that anything will be done for another year; but by that time the original suggestion may be enlarged and consideration given to widening the scope of the investigation to cover all forms of broadcast programmes.

One of the matters which the B.B.C. would gladly call in the help of listeners to solve is the most generally acceptable method of presentation and timing of each item in the programme; for this has been hitherto one of the greatest difficulties of the programme builder.

Onus on the Listener

If the onus of settling this point can be thrown back on the listener himself, so much the easier for the programme staff.

The B.B.C. has been following with interest an experiment conducted for some months past by the German broadcasting stations under the title of "Zeitbericht," or "Reporting." This is not the plain, straightforward reporting known in the newspaper world.

For information and education purposes, a political event of domestic or international importance is taken and treated in the form of a radio play, the actors attempting, often with mixed results, to imitate the vocal characteristics of the persons whose public utterances they are repeating.

Among other matters touching British interests which have been dealt with have been the last conference on reparations and the Indian problem—"Gandhi's March to the Salt Sea," the latter was called.

The presentation of this Indian dramatisation was spoken of in scandalised tones by a section of the Berlin Press, which described it as anti-British propaganda.

"Most Improper"

Mr. Gandhi, says one critic, was heard addressing the Indian people "in what, to the well-informed, was a most improper manner." The people were heard lamenting The Viceroy, who was addressed as "Royal Highness," was heard speaking in a harsh and dictatorial manner. "A rather stupid MacDonald was

heard in the House of Commons. It was all done in a tentative and cheap and nasty way."

So shocked were some British listeners at this international "outrage," that the B.B.C. was asked what was going to be done about it.

The B.B.C.'s answer is "Nothing." Savoy Hill hopes to preserve its sense of proportion by recognising a genuine attempt to introduce by means of artistic presentation a topical note into the German programmes; and while the feature is one which Savoy Hill will not imitate, it does appear to possess that quality of originality after which all broadcasting officials, English, German, or American, are constantly striving.

The German intention, obviously, is to keep listeners abreast of the times, and dramatisation is the method chosen.

The B.B.C.'s method is more direct. It aims, in the plainer "Way of the World" method of Mr. Vernon Bartlett, to chronicle political and social affairs for the information of listeners. It holds that to dramatise current happenings is laborious and, to

British listeners, would be unconvincing.

So far as the British wireless audience was concerned, it would be of small moment in what manner the original spoke, or what incidental peculiarities attached to him; the essential thing would be to give a faithful representation of his views and opinions, with, perhaps, a certain amount of considered comment by the speaker.

Fiction Wedded to Fact

The B.B.C. regards a matter of this kind from the broadcasting point of view alone; hence it believes that when dramatisation is introduced into broadcasts of a political nature, fiction becomes wedded to fact.

The microphone is merciless and will reveal the divergencies between dramatisation and analytical reporting, eventually unmasking the speaker who is trying to adopt another's personality and characteristics. And listeners object to a broadcast with the slightest suspicion of a hoax about it, as Savoy Hill knows only too well.

A Pentode Point

THERE'S just one thing to remember when using a pentode, and that is, to switch off the H.T. and L.T. before changing any of the connections.

Some folk change over the leads on the output transformer, for example, while the current is still on. This causes enormous voltage surges to build up, which may be dangerous.

Moral: Be careful! U.

A. Copenhagen Competition

IN order to attract custom, the proprietors of a big hotel in Denmark (from which O.B.'s of orchestral music are often made via Copenhagen and Kalundborg) have successfully run a novel stunt competition.

Mystery programmes have been broadcast, no names being announced, and the prize of a free dinner at the restaurant was offered to those successful in guessing the titles.

May Fair Hotel, Kit Kat Club, and others, please note! B.

'Strawdinary!

"I'M getting most extraordinary results with my indoor aerial," said a man to me recently.

"Most 'strawdinary! When I put up a bit of wire round the room to please the wife, who hates the outdoor aerial, I thought I should lose all the Continental stations. But no. There's practically no difference in results—except that tuning is sharper, of course. I'm quite converted to the indoor aerial, and I'm taking down the outdoor wire."

"So you haven't scrapped the outdoor aerial yet?" I inquired.

"Why, no," he said. "I wanted to try an indoor affair first of all. But it doesn't make any difference, does it?"

Induction Effect

So I had to dash his hopes to the ground and explain. For, you see, the outdoor wire *does* make a difference. It picks up signals and passes them on to the indoor aerial by induction; that is, if it isn't too far away.

Nevertheless, indoor aerials are good things to try. K. U.

We Test Before You Buy

THAT NEW RADIO SET!

COVERS for portable set cases have become quite a fashion; we welcome the idea for several reasons. A cover hides the rather ugly-looking turntable fitted to the outside of an otherwise admirable container. For another thing, during transportation, the polish and general finish of a good cabinet is preserved by these waterproof covers.

Mains units for portable sets have evidently come to stay. Several of the makers plan to market high-tension units and trickle chargers for their portables during the coming season. The popularity of these units proves the contention that portables and mains power often go together.

It is easy enough to design a 120-volt unit suitable for supplying the five valves of a portable set; it is not much more difficult to include a trickle charger; but do users know how much more advantage could be taken of the electric-light supply?

The great superiority of A.C.-heated valves is quite lost in following the plan of running a battery set from a mains unit. We rather think our criticism can be answered by the increasing number of all-electric transportables now being marketed.

Medium-power radio gramophones costing about £35 to £40 would fill a definite need to-day. Apart from one famous firm, there seems little attempt to satisfy this particular market. The combined gramophone and radio set has a universal appeal, but there is not enough money about to command a universal sale of £100 machines.

These high-priced radio gramophones are, nevertheless, selling surprisingly well; no doubt public places, such as teashops and restaurants, find them an excellent investment. They are not displacing musicians, but they are providing good music, well rendered, at low cost.

In spite of the undeniable fact that the majority of listeners in this country is still without an electric-light supply,

This feature, conducted by the "W.M." Set Selection Bureau, is intended for the guidance of non-technical listeners who wish to buy their radio sets. In the following pages will be found detailed reports on five commercial receivers, while on this page we summarise some of the impressions gained during the month's work.

there is a great demand among set buyers for all-electric sets. While we realise that correspondence is never a truly safe index to conditions, there is

Radio gramophones are, we find, generally more effective as reproducers of gramophone records than as receivers of broadcast programmes. Many of the models on the market have only one stage of high-frequency amplification, which means using a fairly good external aerial if a long range of reception is wanted. Moreover, the operation of a set with only one high-frequency stage, involving an inevitable application of reaction, compares unfavourably with the very simple process of reproducing gramophone records.

There are one or two notable exceptions, where the high-frequency side



THE OPEN-AIR LIFE IS NOT COMPLETE WITHOUT RADIO!

Radio music forms an entertaining background to this alfresco meal on the banks of a pleasant lake

some significance in the result of a recent analysis by the WIRELESS MAGAZINE Set Selection Bureau.

It was found that 50 per cent. of all requests from set buyers related to all-electric sets. These included radio gramophones, transportables, and table-cabinet models, with and without enclosed loud-speakers.

consists of two or three stages of high-frequency amplification, with a corresponding simplicity of operation.

An exception that might well become a rule is a self-contained radio gramophone. Most of the radio gramophones are advertised as being "all in," but it is an untrue designation unless the aerial equipment is included. Looking into the spacious interior of the average radio gramophone cabinet, we can usually find plenty of room for a frame aerial of quite useful dimensions.

But the inclusion of a frame aerial would mean a big sacrifice of range unless two or three stages of high-frequency amplification were employed.

FREE ADVICE TO PROSPECTIVE SET BUYERS

To take advantage of this service it is necessary only to mention (1) the maximum price and whether this is for a complete installation or the bare set; (2) where the set will be used; (3) what particular stations are desired; (4) whether a self-contained set (with or without aerial), or an ordinary set with external accessories is preferred; and (5) in the case of mains-driven sets, whether the mains are A.C. or D.C. A stamped-addressed envelope for reply is the only expense.

Amplion Screened-grid Four Portable

Maker: *Graham Amplion, Ltd.*

Price: £24 15s.

Power Supply: *Batteries.*

Power Consumption: *10 milliamperes at 108 volts.*

Valve Combination: *2 S.G., D, Pen.*

THIS self-contained Amplion four-valve set is constructed in the form of a suitcase. Listeners who carry sets about with them some-

type of movement provides good-quality signals, and considerable volume can be handled without rattle. The loud-speaker winding is specially designed to give good results with the pentode type of power valve included in the set.

As one would expect from Graham Amplion, Ltd., the loud-speaker is a great feature of this portable set. The controls are quite easy to understand. Above the four-valve set is a panel on which are mounted three drum dials, worked by the thumb. The centre and right-hand dials are for tuning. Both of them must be moved to bring in a broadcasting station, although there is no need to move them simultaneously.

The tuning is simplified by the fact that the readings on each of these dials are very similar for any given station. For example, Daventry comes in at 70 degrees on the middle dial and 68 degrees on the right-hand dial. If another station

comes in at, say, 30 degrees on the middle dial, one can be fairly sure that the correct adjustment for the right-hand dial will be just above or below 30 degrees.

On the left of the centre tuning dial is a similar one marked as "Volume." Actually, this is a reaction control, which means that when a weak station is wanted more strongly, an increase in the so-called volume control will produce the desired effect. But where a strong station, such as the local broadcaster, is required at diminished strength, it will be found that even at its zero setting this volume control does not reduce the strength sufficiently.

The reaction control is not really a volume control, since it does not provide for the necessary wide range of audibility required to cope with the widely varying strengths of the many broadcasting stations within range of the set.

There are two ways of reducing the volume of a strong station received on the Amplion portable. One way is to mis-adjust one of the tuning dials. Another way is

This set will appeal specially to those who want a self-contained radio receiver that is readily transportable in an unobtrusive way. Considering its power the running costs are very low.

We suggest that, to begin with, the owner of an Amplion should take advantage of the long waves. We were able to bring in Huizen, Radio Paris and Hilversum at any time of the day or night, at great strength and with extreme clarity. This fact is not only a compliment to Amplions; it is a reiteration of the superiority of long waves for reliable, non-fading, long-distance transmissions.

On the Amplion we have listened to Budapest, Vienna, Rome, Oslo and many other medium-wavelength stations. Sometimes they have suffered from fading or from more interference; but when conditions have favoured their reception the Amplion has reproduced them with great success. In general, we have not had to resort to increasing the volume control to bring in these stations, which have nearly all been available by turning the two tuning dials.

Accessible Batteries

Batteries in the Amplion portable are moderately easy to get at. From measurements of the total high-tension battery current, we can agree with the makers, who say this unit will last for about three months with average use. The accumulator will have to be charged every three weeks or so. The battery lid is backed with explicit instructions on maintenance and operation.



ATTRACTIVE CABINET

Particularly pleasing is the Amplion portable set, which is contained in a real leather case

times prefer this type of container; it is certainly inconspicuous. That the makers do not intend the set to be carried very far at a time is obvious from its general weight and bulk. The outward appearance of the leather-covered case is dignified; its strong oxidised locks and handle are also attractive.

Waterproof Cover

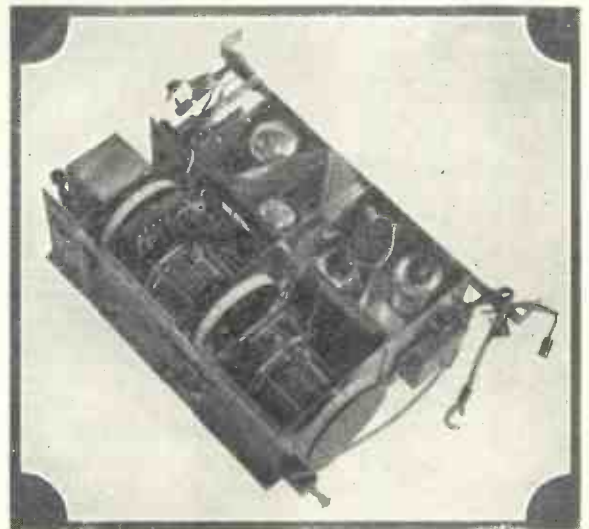
Over the case is fitted a detachable waterproof cover, very useful as a protection during transport. The general layout of the set can be gathered from the pictures. In the lid of the case is the loud-speaker and the frame-aerial winding. The main part of the case is taken up by the four-valve set, at the front, and by the batteries and valves at the back.

The loud-speaker is a new Amplion model, having what is known as a balanced-armature movement. This

to turn round the set (and thus the enclosed frame aerial) so that its direction is at right angles to the incoming signal.

The Amplion portable is intended to provide a long range of reception. The first two screened-grid stages give a great boost to incoming signals before they are detected. This boost is needed because the frame aerial, wound round the loud-speaker in the lid, is not very susceptible to weak signals. A further increase in amplification is given by the pentode power valve.

Our tests show that the Amplion portable can reach out far beyond the confines of the B.B.C.'s service area. Practically every station worth hearing has been logged. We do not mean that sixty stations are available every evening, but many alternatives to the local stations, approaching them both in tone and power, are always available.



AN INTERESTING INTERIOR

Even the uninitiated will be able to appreciate from this photograph that the Amplion set is really well designed

Tannoy Radio Gramophone

Maker : Tannoy Products.

Price : Oak, 55 guineas; walnut or mahogany, 60 guineas; de luxe model, 65 guineas.

Power Supply : A.C. mains.

Power Consumption : About 60 watts.

Valve Combination : S.G., D., L.F., and P.

AS we are often asked for a radio gramophone giving moderate volume, as distinct from one giving enough volume to fill a large

hall, we have recently tested the Tannoy machine. This gives enough volume to provide entertainment from radio programmes or from gramophone records. One can hardly gauge with any degree of fairness the potentialities of a radio gramophone at a single hearing.

Accordingly, the Set Selection Bureau arranged to have a Tannoy radio gramophone delivered to a member of the staff in south-west London. A few outstanding impressions gathered during these tests are given. Voice records

have been reproduced with great realism. Turning one's back on the machine created the illusion that the original was actually present. This is high praise, but justifiable. Piano music from both broadcasting and gramophone records was also reproduced well, bass and treble notes coming out with great clarity. In the reproduction of orchestral music, we were impressed with the absence of blare and we appreciated the way in which the individual instruments of the orchestra could be distinguished.

The backbone of the Tannoy radio gramophone is a four-valve chassis, consisting of a screened-grid valve, a detector and two low-frequency amplifying valves. This chassis is unusually neat in design and robust in construction.

From a service point of view it has the great advantage that it can be bodily removed from the radio gramophone, in the unlikely event of a breakdown. Moreover, the whole chassis is shielded by a metal cover, only the valves projecting. There is no fear of any one coming into contact with the mains supply.

Like most radio gramophones, the Tannoy model works from A.C. mains. It was tested on a 200-volt supply, although connections are available to make it suitable for all normal A.C. supplies in this country. Some of the points in the design of the chassis have been well thought out. For example, entirely separate tuning coils are switched into circuit for medium and long waves and all coils are entirely cut out during gramophone reproduction. This means that there is no possibility of wireless signals leaking through when gramophone records are being reproduced.

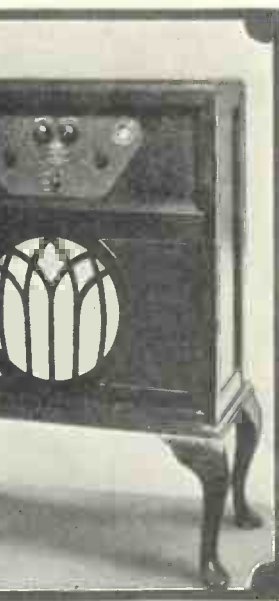
The volume control has a special circuit so designed that when the volume is decreased there is no appreciable loss of quality. This is a notable feature of the instrument.

As will be seen from the pictures, the control panel is fitted just above the loud-speaker opening, which is situated at the bottom part of the front of the cabinet. To make the radio work, two knobs must be rotated. Although the tuning knobs actually handled are rather small they actuate very clearly engraved dials. There are two other controls besides those for tuning.

One is for reaction, which increases the strength of weak signals, but is not involved when gramophone records are being reproduced. The volume control works all the time and varies the strength of radio or gramophone reproduction over a wide range of audibility. There is a lever situated between the two tuning dials with three clearly marked positions; the lever is pushed up for long-wave reception, down for medium waves and in its central position the high-frequency amplifier is cut out of circuit so that the rest of the chassis acts as a gramophone-record amplifier.

We appreciate the fixing of the volume control on the panel instead of under the lid of the cabinet. There is thus no tedious raising of the lid when alterations to gramophone volume are required. Under the lid on top of the cabinet is the turntable, driven by an induction motor working from the mains. The motor is notably smooth, silent, and regular in action.

There are three useful controls fitted to the gramophone motor. One is a lever to start the motor, another is a speed-regulating lever and the third is an automatic stop arm. A B.T.H. pick-up and pick-up arm are fitted. The moving-coil loud-speaker fixed behind the opening at the bottom of the cabinet is of American make—the Rola. It takes considerable volume without any sign of distress. We could detect no boom in the bass-note reproduction, which on the whole is very natural. The treble notes are also well reproduced without shrillness.



AN ALL-ELECTRIC CONSOLE

This Tannoy set, without gramophone, incorporates the same circuit as the radio gramophone reviewed on this page

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Small Aerial

Taking note of our whole experience with the radio side of this machine, we are able to say that at least a dozen stations can be brought in with quite a small aerial. An external aerial wire and a good earth are required for the radio function of the instrument. We used a 40-ft. length of wire, on which signals from Radio Paris and Toulouse were received at sufficient strength to be reproduced at great volume.

Easy Separation

We had no trouble in cutting out the Brookman's Park stations which were, of course, very strongly received. The radio side is equally good on medium and long waves.



FINE MODERN DESIGN

This complete all-electric radio gramophone is the model actually tested by the Set Selection Bureau. It gave excellent results and can be thoroughly recommended

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A few outstanding impressions gathered during these tests are given. Voice records

Marconiphone All-electric Four—Model 47

Maker: Marconiphone Co., Ltd.

Price: £24 complete.

Power Supply: A.C. mains.

Power Consumption: 35 watts

Valve Combination: S.G., D., L.F., P.

IN a metal container, cleverly finished to resemble wood, is housed a

extraneous noises.

Connecting up a 60-ft. aerial and a good earth to appropriate sockets at the bottom left-hand side of the cabinet, and plugging in a suitable loud-speaker into sockets at the back, we brought Model 47 into action by means of a strong mains switch fitted at the bottom

that would come in at 33 degrees on a 100-degree dial comes in at 3.3 degrees on the 47. In the booklet with the set is a useful tuning chart.

To make up for any discrepancy between the two tuning circuits, a small lever marked "Fine Tuning" is fixed to the bottom left-hand end at the front of the cabinet.

At the bottom right-hand end is a similar lever with two positions, "Short" and "Long" on left and right respectively. This provides tuning on two ranges; 200 to 600 metres, and 800 to 2,000 metres.

As advised in the booklet, we first tuned in a local station—the National 261-metre transmitter. The lever just mentioned was set at the short position, the "AC" lever was pulled down and the "RC" lever pushed up, the dial in the middle being set at 1.8 degrees. National came in at great strength, quality being very pleasing.

The "RC" lever had been pushed to its minimum because it controls reaction, the application of which is, we find, quite unnecessary when receiving near-by stations. In its down position the AC lever provides greatest signal strength, since it controls coupling between the aerial and the valve amplifiers. Moving up the AC lever decreased signal strength and also decreased the number of degrees on the dial over which the National could be heard.

This AC lever exerts a good control on selectivity; by moving up the lever to half way, National signals dis-

appeared entirely, just before the dial approached the setting for Toulouse. The RC lever had to be brought into action for distant stations.

All three controls—the AC and RC levers and drum dial—work so easily that distant stations were brought in with the same facility as the locals.

Foreigners

The National, full strength at 1.8, went out entirely at 2.5, so that there was plenty of clear space for receiving foreign stations between the National and the Regional, which came in at 4.4, disappearing quickly at 5.5, leaving a further dial space for other foreigners before Midland Regional at 7 was reached. Above this, at 7.3, we had a further half-dozen stations without interference.

These readings proved that Model 47, even when worked near a powerful centre like Brookman's Park, or Daventry, is capable of bringing in signals from many Continental stations.

On the Long Waves

With the bottom right-hand lever at its long position, we got eight good programmes at full loud-speaker strength, without any loss of the excellent quality experienced in receiving locals. From Hilversum on 2.8, Kalundborg on 3.8, Motala on 5.3, to Eiffel Tower on 6, there was no interference. Daventry 5XX on 6.8 was a little troublesome to Königswusterhausen on 7.1, but Radio Paris on 7.6 and Huizen on 8.4 were both clear.



AN IDEAL SET FOR THE FAMILY

So simple are the controls of the Marconiphone Model 47 that a child could operate it without difficulty.

powerful four-valver—Marconiphone Model 47. Controls, though unconventional, are simple. Besides the set itself, an aerial and earth, and a loud-speaker, must also be purchased.

In our opinion, based on a thorough examination and test, Model 47 is very good value for money. The set suits present-day conditions; it is able to cut out a powerful near-by station in favour of more distant stations—many of which, we find, are within its range.

A.C. Valves

The four valves are worked from the electric-light supply in this way: the filaments of the first three valves are heated by stepping down the mains voltage to four volts; this low-voltage A.C. affects heater elements in the first three valves, but is applied directly to the filament of the last valve.

No "hum" interference from the mains is heard during reception. The high-tension current of all four valves is derived from a valve rectifier; its function is to convert the A.C. into direct current. We can say that under normal conditions Model 47 is free from all

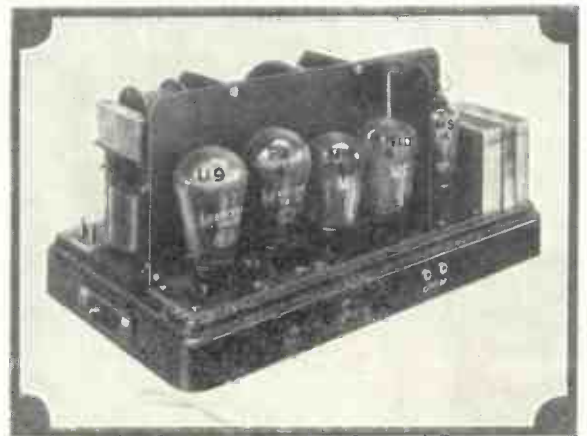
right-hand end.

The supply was 205 volts A.C., in south London. We had previously made sure that the set was suitable for our supply by removing the cover (undoing four screws) and clamping a loose flex under the correct of three possible mains connections.

Exactly half a minute after switching on the mains, a short-lived noise like "motor-boating" occurred, after which music was heard, as the set happened to be correctly set for the National station. This preliminary interval of silence is due to the time taken for A.C. valves to heat up.

Control of the 47, we soon realised, was going to be easy. On the sloping front is an escutcheon plate, carrying a large thumb-operated dial in the centre; on its left is a lever marked "AC" and on its right a similar shaped lever marked "RC." The dial is knurled so that it can be delicately moved up or down: It is a large dial, divided up into ten sections of ten divisions each.

There are 100 separate logging points in all; as the divisions are only numbered at every ten, one must log by decimal points; so a station



NO DANGER OF SHOCKS WITH THIS SET

When the cover of the set is removed the electric mains are automatically switched off. This view is taken from the back.

Osram Music Magnet Four—Kit Set

Maker: General Electric Co., Ltd.

Price: £11 15s., including valves.

Power Supply: Batteries.

Power Consumption: 14 milliamperes at 130 volts (on test).

Valve Combination: 2S.G., D., P.

THIS year's Osram Music Magnet differs greatly from its two predecessors. Although it is a kit set, the parts being assembled by the home-constructor, all the latest advances in radio technique are embodied.

First Model

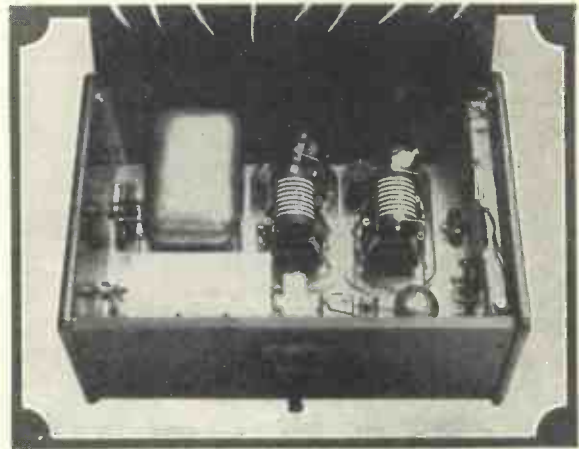
We have been specially favoured with the loan of the very first model of the Music Magnet Four released to the Press. It was received completely assembled, so at present we are not able to comment upon the ease of construction.

It is apparent, though, that the average constructor

Associated with the two screened-grid valves are three tuned circuits, one for the aerial and two for the inter-valve couplings. This triplification of tuning circuits usually involves some complication of tuning; but by the inclusion of a triple condenser unit all complication is eliminated. A single knob actuates three sets of moving plates and a tuning dial.

In this kit set the two screened-grid valves provide two definite advantages: they increase the range of the set, by providing much amplification before detection; and they make the set selective, by enabling three separate tuning stages to be employed without loss of energy.

Volume is controlled very effectively by a small variable condenser in the aerial lead. This prevents the transference of too much energy to the detector valves, which might well be overloaded on a strong signal. Even with two stages of high-frequency amplification, reaction is still



VERY SIMPLE TO PUT TOGETHER

So well arranged are the various units of this kit set that it almost falls together on its own!

To open the lid of the Osram Music Magnet Four is to experience a genuine pleasure; ranged in line at the back of the cabinet are three aluminium covers, beneath which are the tuning coils and valves of the first three stages. Taking up one of these covers reveals a further precision of workmanship that will delight the eye of every keen constructor.

Just behind the panel on the left is the condenser unit—a mechanical triumph, with a foolproof slow-motion device projecting from the left-hand end. On top are three small knurled wheels, which "trim" each tuning stage so that the whole set works in unison. Underneath the metal base-plate is quite an amount of wiring, with a long rod running the length of it, working coil switches mounted under each coil unit.

Our first test of the Osram Music Magnet Four was to check the anode-current consumption, found to be 14 milliamperes with 130 volts high-tension supply. The G.E.C. are producing triple-capacity 60-volt batteries to supply the set with this fairly considerable anode current.

Switching on a battery set during an August evening, one does not expect many distant stations; but we had no trouble in logging Budapest at 95 degrees, Brussels at 87 degrees, Milan at 85 degrees, Oslo at 83 degrees, Langenberg at 80 degrees, Rome at 79 degrees, Toulouse at 60 degrees, Hamburg at 57 degrees—and there we

stopped, having proved beyond doubt that the Osram Music Magnet Four has a phenomenal performance. The time of this test was 8.25 p.m., when still quite light.

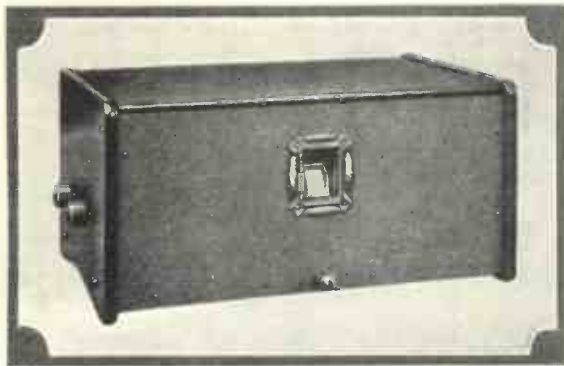
The three tuning circuits are very accurately matched, for later on stations came in at nearly every degree on the dial. There was no interference between adjacent stations. The medium- and long-wave calibrations were a great help in logging stations. Home stations, such as the London Regional, came in and went out within five degrees; this set overcomes the disadvantage of local high-power stations, cutting them out with great ease.

Volume Control

The volume control is surprisingly effective, cutting down strength without appreciable loss of quality—which was found to be excellent. As the volume control is a series aerial condenser, it is also effective as a selectivity device, helping to separate transmissions on very adjacent wavelengths.

Turning the switch on the right of the cabinet to long waves, the whole gamut of high-power stations was readily covered. From Huiszen we were able to go down the scale through Paris, Germany, Scandinavia and Hilversum; performance on the long waves equals that on the medium band.

The Osram Music Magnet sets a new standard in kit sets; it is sure to cause a big stir this season; it deserves its inevitable success.



AN OAK CABINET IS INCLUDED IN THIS KIT

The main tuning dial and switch are on the front panel, there are two controls at each end of the cabinet

would be able to assemble an Osram Music Magnet without much, if any, previous experience of set-building. The instruction chart clearly explains the successive stages of assembly; the part relating to sub-baseplate wiring is particularly well done.

Two S.G. Valves

The circuit of the Osram Music Magnet is ambitious for a kit set; two screened-grid high-frequency valves precede a detector coupled to an output power valve by a transformer. The four valves therefore provide a great amount of amplification, particularly effective when the signal is initially weak.

deemed necessary; it is controlled by a small variable condenser.

If the circuit of the Osram Music Magnet Four is interesting, the structural details are doubly so. We found it hard to realise this is a kit set and not a factory-built set. The exterior cabinet is not exceptional—a simple construction consisting of two end pieces, a back, and a lid. The gold and black crystalline finish of the metal panel is an improvement on last year's model. Most of the subsidiary controls have been removed from the front panel to the two sides of the cabinet, only the calibrated dial and on-off switch being left.

Brown Regional Two-valver

Maker : S. G. Brown, Ltd.

Price : £6 5s.

Power Supply : Batteries.

Power Consumption : 7.5 milliamperes at 120 volts.

Valve Combination : D, P.

As its name implies, this set is designed for use in a B.B.C. regional area. This means that, at the present time, the set will provide the two London stations at good strength on a loud-speaker

sets designed purely for local-station reception, for the selective property exhibited by the Brown two-valve set.

On our own standard test aerial in London, we have had no difficulty in getting the National station on 261 metres, which came in at 25 degrees on the tuning dial, and the Regional station on 356 metres, which came in at 44 degrees.

Both were good strength signals, clear of interference

action and easy to adjust. No reaction was needed on the Regional, but 20 degrees was used for the National and a little more for the Midland.

The makers state that the Brown set "is designed to give single-dial tuning in most districts." What they mean is that with the Brown set, whatever the district, there is only a single tuning dial, but in some districts, badly situated for reception, the single-dial tuning may need augmenting by an adjustment of the reaction dial on the right.

We found the right-hand dial had some influence on the tuning, so if this control is touched after a station has been brought in on the left-hand dial, a slight readjustment is worth trying.

Besides the two dials, whose operation is quickly mastered, there are three subsidiary controls mounted in between. At the top is a switch with "short" and "long" positions, providing medium-wave tuning for such stations as London and Midland regionals, and for long-wave tuning for Daventry 5XX, which under normal conditions is the only loud-speaker long-wave station in the set's range.

Below is a similar shaped switch which turns the set on or off. Below these switches is a volume control, useful

If a 20-ampere-hour-capacity low-tension accumulator were used, it would give nearly seventy hours service per charge. The batteries of the Brown set are connected by coloured wires coming from the back of the cabinet; all are clearly distinguishable, so that there is no chance of confusing them.

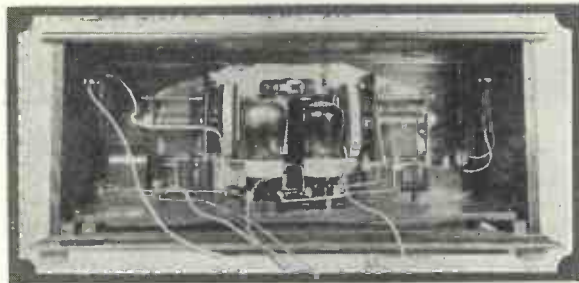
Use of Pentode

The makers suggest using a pentode valve instead of the normal power valve supplied, if greater signal strength is wanted. Our tests show that under average conditions the pentode, which costs more to buy and to run, is not necessary. But it is an excellent means of making up for poor conditions of reception.

The valves used, supplied with the set, are a Mullard PM1HF as detector and a Mullard PM2 for the power stage. The price of £6 5s. includes the valves, but no batteries.

Those who are not already in possession of a loud-speaker will get a good bargain by buying a Brown Duckling with the set; the two are supplied at the special price of £7 10s. This represents a saving of 10s., for the Duckling loud-speaker costs £1 15s. if purchased separately.

This Duckling loud-speaker is of the cone type and is of pleasing appearance. It is



A SIMPLE SET FOR THE BEGINNER

This Brown two-valve set has been specially designed for the reception of regional transmissions and is very selective

almost anywhere within fifty or so miles of Brookman's Park, where the London programmes are radiated.

Similarly, the two Midland stations could be received if the set were installed in the Birmingham area. And when the two Northern regional stations open early in the new year, they could be equally well received within the area covered.

Two Programmes

The Brown two-valve set is specially designed for regional centres, which differ from such broadcasting centres as Glasgow or Bournemouth in providing two programmes instead of one.

So while the Brown set would, of course, receive the Glasgow station if installed in Glasgow, its special design makes it able to discriminate between two powerful transmissions coming from the same source.

Ever-growing Need

This selective property of the Brown set is essential for London and Midland regional listeners, though not as yet for listeners to other local stations. But when we remember that the Manchester twin regional stations will soon be starting, we see the ever-growing need, among

from one another and of pleasing quality. One hardly asks more of a two-valver, unless a specially good aerial is available; but even on our moderately efficient aerial the Brown two-valve set brought in the Midland Regional station at 71 degrees, with quite fair strength.

We found the two alternative aerial terminals gave the set a useful adaptability to varying aeriels. When we tried the set on a much shorter aerial a change of aerial-terminal connections brought up the strength of signals, which would otherwise have been sadly diminished.

In general, we think a full 80-ft. aerial will give excellent results on the Brown set. Sometimes a very short aerial is recommended to improve selectivity, but the tuning coil of the Brown set is quite selective enough with a longish aerial.

Moreover, with only two valves, one should take as much advantage as possible of the energy in the ether; and there is no cheaper way of so doing than by putting up a really good aerial.

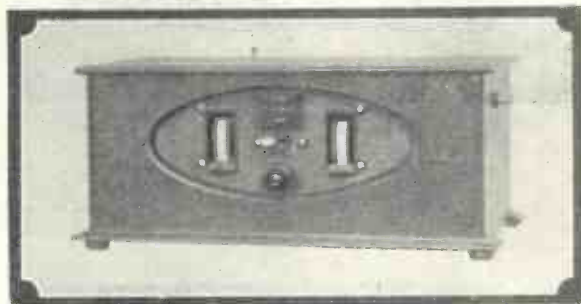
The control of the Brown set was duly noted during tests. We found the slow-motion dials on the left and right, for tuning and reaction respectively, quite smooth in

when the local station is overpoweringly loud.

A good point to remember about a set such as the Brown two-valver is the low running cost. The total anode current was found to be 7.5 milliamperes, so a standard-capacity high-tension battery (the cheapest capacity) would last several months with average use.

supplied in mahogany or oak (it should be noted that the set is supplied in oak only) and measures 9½ in. high by 11 in. wide and 3½ in. deep.

The Brown two-valve set will appeal to those non-technical listeners who want a simple receiver for the reception of the local station at good loud-speaker strength.



ATTRACTIVE IN APPEARANCE

The dial on the left is for tuning, while that on the right controls reaction. A volume control is also provided

Radio in Review

JUST about now, all good listeners and true feel a stir of curiosity as to what new developments may be in the offing for the winter season. During the summer months—when the home set has its idlest time—the manufacturer and designer are at their busiest, incubating new ideas and making ready for the final hatching-out at Olympia.

One may perhaps be allowed to speculate upon one or two possible lines of development.

"Band" Tuning

The principle of "band" or filter tuning, for instance, offers some interesting possibilities on the high-frequency side. Instead of using a sharply-tuned input or intervalve-coupling circuit, the resonance curve is deliberately flattened so as to cover a definite "band" of wavelengths.

This at first sight seems to be in direct opposition to the general idea of selectivity. On the other hand it has the advantage of "accepting" the side-band frequencies necessary to ensure a high quality in reproduction, instead of cutting most of them out. In practice a compromise is effected, the coupling elements being so designed as to maintain a reasonable standard of selectivity combined with an exceptionally high musical response.

"Shaping" Circuits

Closely allied in principle are the so-called "shaping" or compensating circuits, of which the well-known Novotone is one example.

Their chief purpose is to emphasise or favour the reproduction of the higher notes which have been by-passed or lost at a previous stage, thus restoring the original balance as between high notes and low. Generally speaking, the use of correcting or shaping circuits, either in the high- or low-frequency stages of amplification, is fairly certain to be a feature of any broadcast receiver or electric gramophone reproducer that aims at a high standard of performance.

The Super-het

It is also quite on the cards that we may see a distinct revival of interest in the super-heterodyne circuit. When first introduced, this type of receiver

lay outside the reach of the average listener, who very naturally objected to the cost of installing and maintaining a minimum of seven or eight valves.

Nowadays, however, the question of expense is by no means formidable. The initial cost of the valves has been halved, patent royalties have been greatly reduced, and the difficulties of L.T. and H.T. supply have practically disappeared.

In spite of using a local oscillator, the super-het circuit is just as easy to handle as any receiver using a tuned high-frequency stage. There are only two tuning controls, one governing the local oscillator and the other the aerial or input. The selectivity of the set is amazing, whilst the quality of reproduction is certainly as good as can be obtained with any other type of long-distance receiver.

As regards compactness, there is a seven-valve super-het set now in use in America, fitted with small "peanut" valves, which measures no more than 18 in. by 10 in. by 6 in. Such an outfit, if marketed at a reasonable price in this country, should find no lack of purchasers. It may not be available this year, but one may confidently anticipate the appearance of something very similar in the near future.

Mains-driven Sets

The steady growth of electricity in the home, combined with the rapid extension of electric-supply mains to new districts, is bound to widen the demand for the all-mains type of receiver. At the present time the popularity of this type of set is to some extent handicapped, chiefly because of its initial cost, and also in part because of existing differences in the voltage and nature of the electric supply in various parts of the country.

Once a standardised A.C. supply at a definite voltage is available throughout the country—and this is rapidly coming into being—the all-mains set will rule the market. With increased demand and standardised construction, mass-production methods will soon bring the price of such sets within reach of even the most modest purse.

A Musical Novelty

It is an interesting test of one's musical powers to "accompany," either on the piano or other home instrument, a selected broadcast item as it comes through on the loud-speaker. Properly done, the effect can be very pleasing, though it demands some practice and not a little skill.

Curiously enough the idea of linking-up a piano with a loud-speaker as a definite musical combination has already been carried out. The ordinary perforated roll used to control an automatic piano-player is provided along one edge with a magnetic "sound" record of the song to be reproduced. The magnetic record is used to energise a loud-speaker at the same time as the perforated strip plays the piano.

In this way both voice and music are reproduced separately, in perfect accord and synchronisation.

Transatlantic Telephony

One of the most interesting features of the recent meeting of the Royal Society at the McGill University in Montreal was a radio address delivered to the assembled members by Sir Ernest Rutherford, F.R.S., from his home in England.

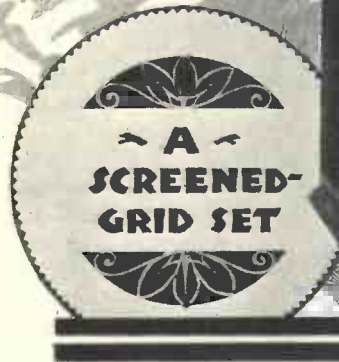
The whole of Sir Ernest's speech was heard clearly and distinctly.

Grid Leak or Anode Bend?

In the earlier types of broadcast receiver, grid-leak rectification was almost invariably used. Then came the cult of anode-bend rectification, whose supporters claimed that the method gave practically distortionless rectification. The grid leak, they said, involved grid current, and this inevitably produced distortion, quite apart from its damping effect on the preceding tuned H.F. stage.

P. K. Turner has recently shown that, at its best, anode rectification produces perceptible distortion. Grid rectification, he claims, gives better all-round results than its rival, besides affording a more desirable coupling characteristic, both to the preceding H.F. stage and to the subsequent L.F. stage. M.B.

The Five-point Three[★]



★ Five Special Features

IT is often difficult for newcomers to radio to decide which type of set will be the easiest for them to construct and, also, to find out what circuit will give the best results under any particular circumstances.

A large number of beginners want to build screened-grid valve sets because they have heard so much about them from their friends. It is specially for beginners that the WIRELESS MAGAZINE Technical Staff has produced the Five-point Three which, as its name implies, is a three-valve set which has five special features that will appeal to the constructor making his first acquaintance with modern radio practice.

To assure beginners that the Five-point Three is the best screened-grid three for them to build, we cannot do better than explain its five special advantages.

1.—The set is **very simple to construct**. There is no need for any soldering at all and there are in all only thirty-four connections to be made. These will present no difficulty if use is made of a full-size blueprint, about which more will be said later.

Alternative Programmes

2.—Not only is the set simple to build, but it is also **simple to work**. There are four controls on the panel, but only one of these has to be turned to bring in a selection of programmes from all over Europe.

3.—The set has **good range** and covers, without the changing of any coils, a range of approximately 200 to 550 metres on the medium waveband and 1,000 to 2,000 metres on the long waves (with the coils specified):

1—Construction has been specially simplified for the benefit of beginners.

2—There is only one dial to turn for the reception of many European stations.

3—The screened-grid valve gives good range, and both medium and high wavebands are covered with coil changing.

4—Excellent volume is obtained with ordinary standard valves.

5—The cost of the parts, which are all standard and easily obtainable, is roughly £11.

Used almost anywhere in the British Isles a good selection of foreign stations can be confidently expected.

4.—Owing to the specially designed circuit **excellent volume** is obtained in spite of the small number of controls (it is well known that reducing the number of controls on a set often results in impaired efficiency).

5.—The **cost of construction** is very **low** indeed, and a complete installation (including valves, batteries, and loud-speaker) can be got together for approximately £11.

The circuit employed is quite simple and all the components used are of standard types that can be obtained from stock at almost any wireless dealer's.

A prominent feature is the use of two-pin plug-in coils, which for many years now have been so popular with home-constructors. Only three such coils are needed to cover both medium and long wavelengths, so it will be seen at once that the set in this respect is both simple and inexpensive.

Another feature, which we regard as of considerable importance where the set is to be used by the whole family and not only by the constructor himself, is that the switches on the front panel are clearly marked.

For instance, when the wave-change switch is adjusted for medium-wave reception the word "Short" appears in a slot under the switch knob, while when it is adjusted for the long waves the word "Long" appears. Similarly with the on-off switch, the words "On" and "Off" appear when the knob is moved.

Those with a little technical knowledge will be interested in examining the circuit in detail.

First of all in the aerial circuit we see a semi-variable condenser with a maximum capacity of .0003-microfarad. This acts as a most efficient control of selectivity and can be adjusted to give the best results with any particular length of aerial.

Practical Compromise

When the screw on the condenser is undone the minimum capacity is obtained and the set is in its most selective state. This results in a slight loss of signal strength, however, and in practice it is necessary to screw the knob down a little until the best compromise between selectivity and volume is obtained.

The arrangement of the tuning circuit is simple, two plug-in coils being used for long-wave reception while one is shorted out for medium-wave reception. The short-circuiting action is accomplished by means of a simple single-pole switch of the ordinary on-off variety. It will be seen that

this is placed directly across the long-wave coil.

In practice it is desirable to use a double-tapped coil of about 60 turns in conjunction with a plain coil of 150 turns, this giving a total of approximately 200 turns for long-wave reception.

The greatest volume is obtained when the aerial lead is connected to that end of the 60-turn coil which goes straight to the grid of the first valve. If the aerial is connected to either of the two tappings on the coil (or a centre-tapped coil can be used, of course, if desired) the set is made more selective.

Normally another tuned coil would be used in the anode circuit of the screened-grid valve, but for the sake of simplicity this has been dispensed with and in its place is used a high-frequency choke which, of course, does not need any tuning and thus obviates at least one extra control.

Adequate Results

It should be understood that we do not claim this arrangement to be as efficient as if a proper tuned circuit were used, but nevertheless the results are adequate for all ordinary purposes.

We have previously used this system with some success in a set called the Celerity Three, details of which were published in January of this year. We have received many gratifying reports from constructors of that receiver during the past year and we are able to publish one in this issue (see page 240.)

Some readers by now will be wondering how reaction is obtained without a coil in the anode circuit. The answer is that reaction is applied straight into the grid circuit of the shielded valve. In other words, the reaction coil is coupled directly to the two plug-in coils in the aerial circuit.

In order to avoid switching in separate reaction coils for each waveband a single coil is placed between the medium- and long-wave coils so as to produce the tightest coupling on the long waves.

For medium-wave reception it may sometimes be necessary to loosen the coupling a little; this is easily accomplished by turning the medium-wave coil a little away from the reaction coil.

The effect of applying reaction straight into the aerial

circuit is to increase the efficiency of the aerial-earth system considerably and this extra efficiency to a large extent makes up for anything that is lost by using a choke instead of a tuned coil in the anode circuit of the screened-grid valve.

Every care has been taken to ensure that the screened-grid valve is stable. For this reason de-coupling resistances of 600 ohms and 1-microfarad condensers are incorporated in the leads to the screening grid and the anode of the valve.

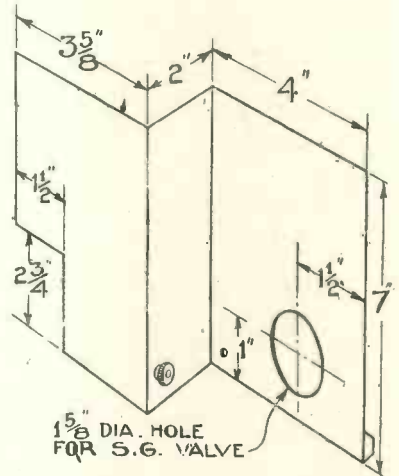
For the sake of selectivity, and also simplicity, the detector valve is arranged on the leaky-grid principle, the condenser and leak used having values of .0002-microfarad and 2 meg-ohms respectively. It will be noticed that one end of the grid leak is connected to low-tension positive in order to give a small positive bias to the grid of the valve and so improve its rectifying action.

The coupling between the detector valve and power stage is an ordinary intervalve low-frequency transformer, which can have a step-up ratio of anything from 1 to 3 to 1 to 7. Actually, in the original set we have used a transformer with a ratio of 1 to 6, which is a good compromise for all-round use.

Many beginners do not realise exactly what this step-up ratio means, but the point is easily understood. Suppose, for instance, that the detector valve has a magnification of 20, as it may well do in this particular case. If the grid of the power valve were connected directly to the detector every 1-volt change in the grid circuit of the latter would

produce 20-volt change on the grid of the power valve.

If, however, we insert a transformer with a step-up of 1 to 3 the voltage applied to the power valve will be increased to 60, while if the transformer has a step-up of 1 to 7 the voltage on the grid of the power valve will be 140.



TO STABILISE THE SET

This metal shield, which can be of aluminium or copper, acts as a capacity screen

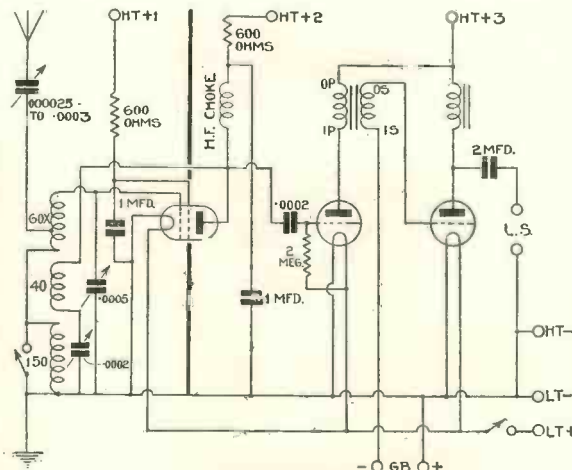
It will thus be realised that the higher the ratio of step up the greater will be the volume obtained from the set. There are certain practical limitations to the amount of amplification that can be thus obtained, however, because if the ratio is made too high the quality of reproduction will suffer badly.

In the anode circuit of the power valve is a choke-filter output. This incorporates a low-frequency choke, which presents an easy path to current from the high-tension battery, but a high impedance to the signal currents which, however, are passed to the loud-speaker through a 2-microfarad fixed condenser.

Loud-speaker Protection

A great advantage of this system is that the loud-speaker is isolated from the battery circuit and the heavy anode current which may flow cannot do any harm to the windings.

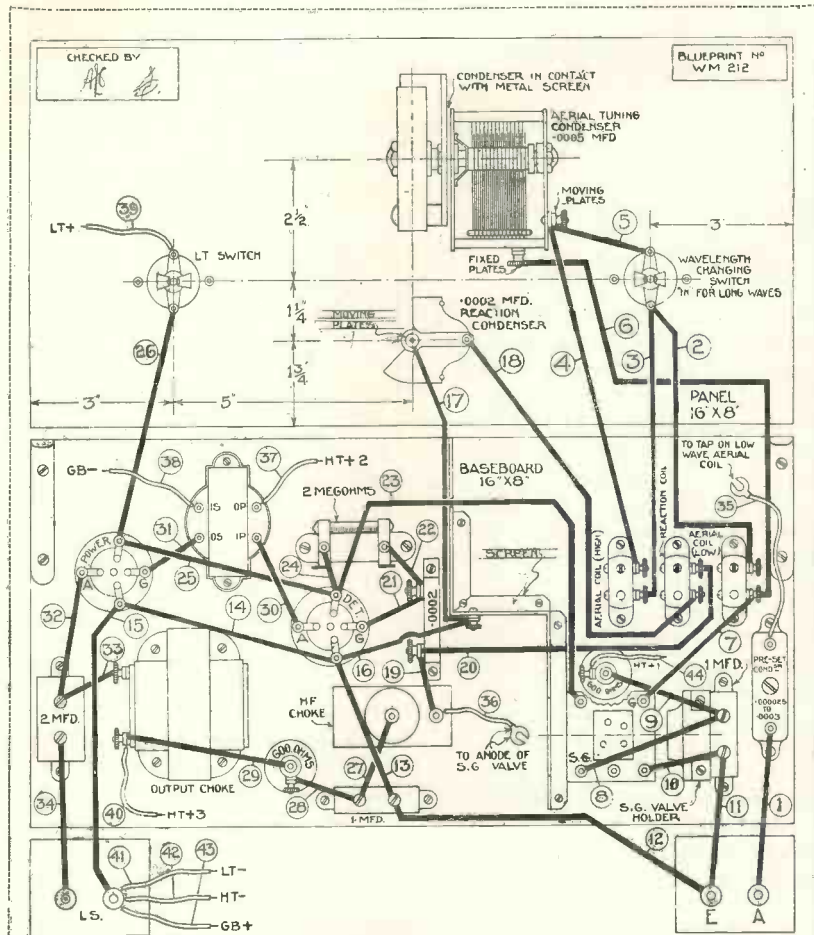
Tests of the set in South London have proved that it is particularly selective and the volume compares very favourably with that obtained



SIMPLE AND STRAIGHTFORWARD CIRCUIT

The combination consists of a screened-grid valve, leaky-grid detector and transformer-coupled power stage

The Five-point Three—Continued



LAYOUT AND WIRING DIAGRAM OF THE FIVE-POINT THREE

This quarter-scale layout can be obtained as a full-size blueprint for half-price (that is, 6d., post free) if the coupon on the inside back cover is used by October 31. Ask for No. WM212. Wire up in the numerical order indicated.

from other screened grid three-valvers, with the additional advantage in this case of much simpler tuning.

Stations received at good loud-speaker strength on an ordinary outdoor aerial included Daventry, Eiffel Tower, Motala, Berlin, Hilversum, Radio Paris and Huizen on the long waves; and London National, London

Regional, Midland Regional, Langenberg, Rome, Turin, Toulouse and Brussels on the medium waves.

It will thus be evident that a very good selection of foreign programmes is always available. This is largely due to the fact that the reaction control, whilst being critical, is smooth in action.

So much for general points about the design. Let us now consider the actual construction of the receiver.

The arrangement of the parts will be quite clear from the photographs reproduced in these pages: every component is indicated by name.

Baseboard Components

Looking from the back of the set it will be seen that the three plug-in coils and screened-grid valve are arranged on the right of an aluminium screen; the valve itself projects through a hole in the screen and is connected to the high-frequency choke, grid leak and condenser, and detector valve, which are placed approximately in the centre of the baseboard.

On the left of the baseboard are the low-frequency choke and filter condenser, the intervalve transformer and the power valve.

Only four terminals are provided, these being for the aerial and earth, and loud-speaker. Connections are made to the high-tension, low-tension and grid-bias batteries by means of flexible leads that can be cut to any desired length.

Panel Components

On the panel itself there are only four components, the tuning condenser with its thumb-controlled dial, the small reaction condenser and two simple switches, one for turning the set on and off and the other for changing the wavelength range.

The exact positions of all these components, and sizes and locations of the holes that have to be drilled to fix them, are shown on the layout and wiring diagram that appears on this page.

If desired, this can be obtained as a full-size blueprint for half-price (that is, 6d., post free) if the special coupon on the inside back cover is used by October 31. Address your inquiry to Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, E.C.4, and simply ask for No. WM212.

Beginning Construction

The first part of the construction to be undertaken should be the drilling of the panel. This is best accomplished by placing the top part of the blueprint squarely over the ebonite and marking through with a sharp point the centres of the holes to be drilled. As soon as these

LENGTHS OF INSULATED SLEEVING NEEDED FOR CONNECTIONS

Below are indicated the lengths of sleeving required for making the connections in the set. The numbers correspond to those of the leads on the wiring diagram (see reproduction above or full-size blueprint). The wires should project half an inch at each end to allow for screwing under the terminals. Lengths are given in inches:—

(1) 1 3/8	(6) 7 1/2	(11) 1 1/2	(16) 2 3/4	(21) 1 1/2	(26) 2 1/2	(31) 1 5/8
(2) 3 1/2	(7) 2 1/4	(12) 9 1/4	(17) 2 1/2	(22) 3/4	(27) 2 1/4	(32) 3
(3) 3 1/2	(8) 3 1/2	(13) 3 1/4	(18) 6	(23) 8 1/4	(28) 2 1/4	(33) 2 1/2
(4) 3 1/2	(9) 2 1/2	(14) 4 3/8	(19) 1 1/4	(24) 3/4	(29) 4 1/2	(34) 2 1/2
(5) 2 1/4	(10) 1 1/4	(15) 4	(20) 6 1/2	(25) 4	(30) 2 1/4	

Leads No. 35 to No. 43 are of rubber-covered flex, cut to any convenient length.

A Screened-grid Set for Beginners

holes have been made the panel components should be firmly fixed into position.

After this the remainder of the components should be placed on the baseboard in the positions indicated, when the panel and baseboard should be fixed together by means of a pair of brackets.

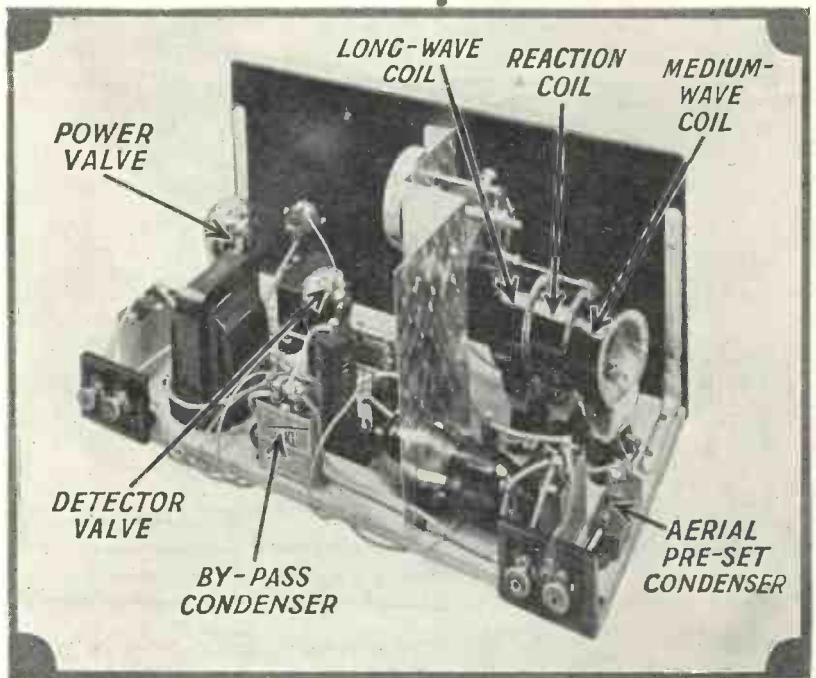
The actual wiring of the set will present no difficulty if full use is made of the blueprint (or the wiring diagram that appears in these pages) and the table of sleeving lengths on page 254.

Method of Wiring

First pick out wire No. 1 and cut off a piece of Sistoflex sleeving of the length indicated on page 254. Thread a piece of wire through the sleeving, leaving enough at each end to screw under the terminals.

As soon as the wire has been fixed cross through No. 1 on the blueprint and proceed with the next connection, cutting off the correct length of Sistoflex as indicated. If the wiring is carried out in the numerical order indicated, there is no chance of a mistake being made.

A number of readers who are not beginners will, no doubt, have many of the parts needed already in their possession, and they will be able



NOTHING IS CRAMPED IN THIS SET

Even when the valves and coils are in position every part is easily accessible and there is no overcrowding

to build the set at very little expense.

Almost any components of good quality can be used in the construction, but particular care should be taken in the choice of the high-frequency choke. If this is not of the

very best quality results will suffer and the constructor will be disappointed with the receiver.

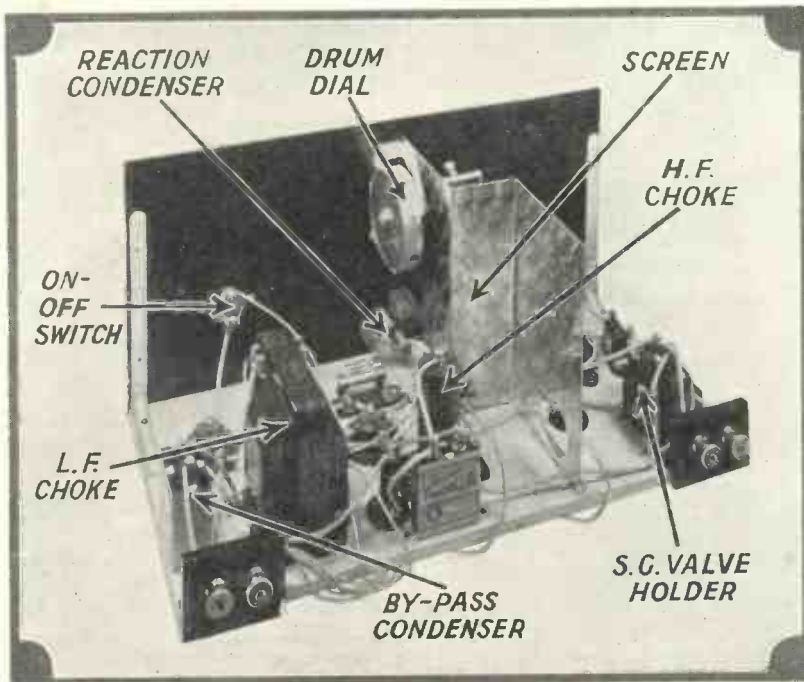
Almost any screened-grid valve of standard make can be used in the first position, while the detector valve, with a 1 to 6 transformer as used in the original set, should have an impedance of approximately 20,000 ohms.

With a 1 to 3 transformer, which some readers may already have in their possession, the detector can have a higher impedance, say, 25,000 to 30,000 ohms, while with a 1 to 7 transformer a 15,000-ohm valve will probably give the best compromise between volume and quality.

Suitable Power Valve

Next we must consider the question of a suitable power valve. If economical running is desired the source of high tension must be taken into account, for some power valves take a very heavy current and a small size of battery would be run out very quickly indeed.

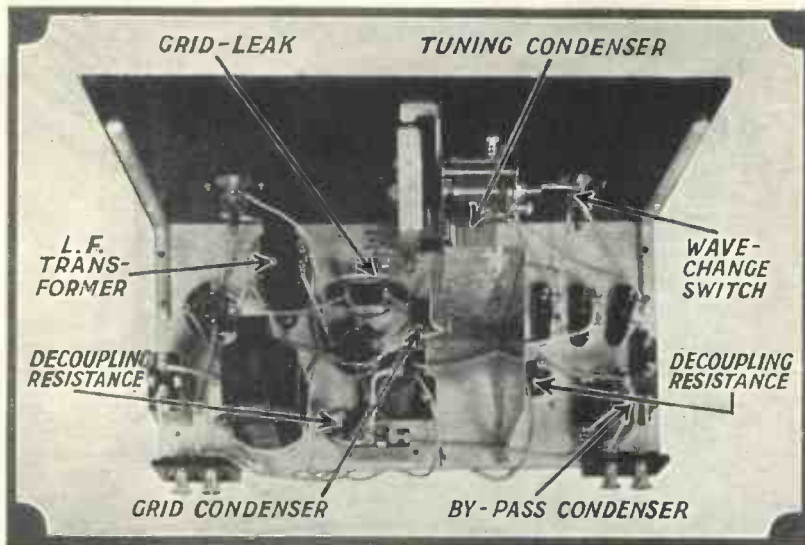
It is desirable for the sake of quality that the impedance of the power valve should be fairly low, say, in the neighbourhood of 3,000 ohms. Actually, good results will be obtained in most cases with any valve between 2,500 and 5,500 ohms.



STRAIGHTFORWARD CONSTRUCTION IS A FEATURE OF THE DESIGN

It will be clear from this photograph that the assembly of the set is very simple and well within the capabilities of the beginner

The Five-point Three—Continued



NO SOLDERING NEEDED TO BUILD THIS SET

Every component has terminals and all the connections can be screwed without difficulty

The valve is best chosen by picking from within these impedance limits a type of which the normal anode current is not greatly in excess of the capacity of the high-tension supply. Where batteries are to be used it is desirable that these should be at least of the double-capacity type, which will normally stand a drain of 12 milliamperes without running out too quickly.

Battery Economy

It should be clearly understood that it is much more economical to take 10 milliamperes from a battery capable of giving 12 milliamperes than to try to force 10 milliamperes out of a 7-milliamperer battery (which is the capacity of what is known as the "standard" type of cell) although the latter may be cheaper in first cost.

A glance at the list of valves that appears on page 188 of this issue will show what power valves come within the capacity of the high-tension source to be used. To be on the safe side, 4 or 5 milliamperes should be allowed for the screened-grid and detector valves.

Running from the Mains

If a mains unit is to be used for giving the high-tension supply, the question of the anode-current consumption will not be of nearly so great importance, for most mains apparatus will stand a drain of at least 20 milliamperes. A suitable A.C. unit for running a receiver of this type is

described in detail elsewhere in this issue.

It is of very great importance that the correct grid bias, as recommended by the makers of the power valve, should be applied to the set. Not only will quality suffer badly if too little bias is used, but the high-tension

current will be much higher than it should be; this will result in the life of the valve being shortened and also in the running out of the high-tension battery (if one is used) long before its proper time.

Voltage of Valves

Most constructors will want to use 2-volt valves with the set, because of the convenience of handling a 2-volt accumulator. If there is no objection to using a larger low-tension battery, it is an advantage to use 4- or 6-volt valves, which have better characteristics in the main than two-volters and will give improved results. This is a matter of individual choice, however, and the set will work equally satisfactorily with 2-, 4-, or 6-volt valves.

Before operating the set it is, of course, necessary to place the appropriate valves and coils in their respective holders; these will be clear from the photographs and layout diagram that appear in these pages. Next the batteries should be connected up; it will be noted that there are three high-tension positive wires.

The first of these, marked H.T. +1,

COMPONENTS REQUIRED FOR THE FIVE-POINT THREE

CHOKE, HIGH-FREQUENCY

- 1—Lewcos, 7s. 9d. (or British General, Watmel DX3).

CHOKE, LOW-FREQUENCY

- 1—Lissen, 12s. 6d. (or Igranico, Telsen).

COILS

- 1—Atlas No. 40 plug-in, 2s. 6d. (or Lewcos, Edison Bell).
- 1—Atlas No. 150 plug-in, 3s. 6d. (or Lewcos, Edison Bell).
- 1—Atlas No. 60 double-tapped plug-in, 5s. 6d. (or Lewcos, Edison Bell).

CONDENSERS, FIXED

- 1—Edison Bell .0002-microfarad, 1s. (or T.C.C., Graham-Farish).
- 1—Franklin 1-microfarad, 2s. (or Dubilier, T.C.C.).
- 1—Franklin 2-microfarad, 2s. 8d. (or Mullard, T.C.C.).

CONDENSERS, VARIABLE

- 1—Ormond .0005-microfarad, small log, 8s. (or Lotus, Polar).
- 1—Formo Midget .0002-microfarad reaction with knob, 3s. 3d. (or Dubilier, Bulgin).
- 1—Sovereign preset, .0003-microfarad maximum, 1s. 9d. (or Lewcocondenser, Formocondenser).

DIAL, SLOW-MOTION

- 1—Ormond drum, 5s. (or Lotus, Polar).

EBONITE

- 1—Potter 16-in. by 8-in. panel, 6s. (or Ready Radio, Raymond).
- 2—Junit terminal blocks, 1s. 6d. (or Lissen, Belling-Lee).

HOLDERS, COIL

- 3—Lissen two-pin, 3s. (or Magnum, Lotus).

HOLDERS, VALVE

- 2—Telsen, 2s. (or Lotus, Igranico).
- 1—Junit Universal, 1s. 9d. (or Parex, W.B.).

PLUGS

- 8—Belling-Lee, marked: L.T.+, L.T.—, H.T.+3, H.T.+2, H.T.+1, H.T.—, G.B.+, G.B.—, 2s. 4d. (or Eelex, Clix).

The prices mentioned are those for the parts used in the original set; the prices of alternatives as indicated in the brackets may be either higher or lower

RESISTANCES, FIXED

- 2—Bulgin 600-ohm, 3s. (or Wearite, Magnum).
- 1—Lissen 2-megohm, with holder, 1s. 6d. (or Watmel, Dubilier).

SUNDRIES

- Tinned copper wire for connecting.
- Length of Sistofolex sleeving.
- 6 yd. of rubber-covered flex (Lewcos).
- 1—Pair Keystone panel brackets, 2s. (or Camco, Bulgin).
- 1—Parex screen to specification on page 253, 4s. (or Ready Radio, H. & B.).

SWITCHES

- 1—Gripso single-pole, marked "on-off," 2s. 3d.
- 1—Gripso single-pole, marked: "short-long," 2s. 3d.

TERMINALS

- 4—Eelex, marked: —Aerial, Earth, L.S.+ L.S.—, 1s. 6d. (or Belling-Lee, Igranico).

TRANSFORMER, LOW-FREQUENCY

- 1—Igranico, type J, ratio 1-6, 17s. 6d. (or Telsen, Burton).

ACCESSORIES

BATTERIES

- 1—Pertrix 120-volt, type 295, 15s. 6d. (or Lissen, Columbia).
- 1—Pertrix 9-volt grid bias, 1s. 6d. (or Lissen, Columbia).
- 1—C.A.V. 2-volt accumulator, type 2AG7 11s. (or Exide, D.P.).

CABINET

- 1—Neophone, table model, £1 (or Ready Radio, H. & B.).

LOUD-SPEAKER

- 1—Blue Spot cabinet, type 41K, £2 10s. (or Wates, Loewe).

VALVES

- 1—Mullard PM12, £1 (or Six-Sixty 215 SG, Cossor 215 SG).
- 1—Mullard PM1HF, 8s. 6d. (or Six-Sixty 210 H.F. Cossor 210HF).
- 1—Mullard PM252, 10s. 6d. (or Six-Sixty 230SP, Cossor 220P).

No Connections to Solder!

supplies the screening grid of the shielded valve and should be plugged into the 60- or 70-volt tapping on the high-tension battery. The lead marked H.T.+2 feeds the anode of the detector valve and should be plugged in at about 90 to 100 volts. The anodes of the screened-grid and power valves are supplied by the H.T.+3 lead, which should be plugged in at the highest tap of the battery, usually 120 volts.

There is no need to explain in detail how to connect the aerial and earth or loud-speaker, which are taken to their respective terminal blocks at the back of the receiver.

Operating the Set

The operator will now be ready to tune-in some stations. First of all pull out the knob of the right-hand switch on the panel and adjust the left-hand switch for long or short waves, whichever may be desired.

Now set the thumb-controlled condenser at zero and turn the knob of the reaction condenser (underneath) until a slight rustling or hissing sound is heard from the loud-speaker. This indicates that the set is on the verge of oscillation and in its most sensitive condition for reception.

Stations will now be tuned-in by turning the main dial slowly with the thumb, but as this dial is advanced it will also be necessary to turn the reaction condenser a little to the right to keep the set still on the verge of oscillation. Care should be taken not to turn the reaction knob too far round or the set may start to whistle, when reception will be quite impossible.

To begin with, the semi-variable condenser in the aerial lead, which is mounted on the baseboard of the set, should be screwed right down so that

it is at its maximum capacity and selectivity is at a minimum. This will also give the greatest possible volume.

Under such conditions it may not be possible to separate the stations properly as they are tuned-in on the thumb-controlled dial. If this is so, the knob of the baseboard condenser should be slowly unscrewed a little at a time until the best compromise between selectivity and volume is attained.

When the set is being used very close to a regional transmitter it may not be possible to obtain the necessary selectivity by this means. It is then necessary to connect the aerial lead to one of theappings on the 60-turn coil and not to the grid end, which is the position that gives the best signal strength.

If reaction is too fierce on the medium waves the 60-turn coil should be swung away from the reaction coil slightly until the control is smooth in action.

It is quite easy to move the 60-turn coil in this way. Simply remove one of the screws that fix the holder to the baseboard and use the other screw as a pivot on which to swing the whole assembly.

European Programmes

After a few hour's experience with the set it will be found quite easy to tune-in a number of programmes from all over Europe. As you receive the stations it will be a good plan to note the readings on the special station identifier given free with this issue.

Start at once and show your friends just what you can do in radio reception. The Five-point Three will give you all you want in the way of alternative programmes—and remember that it is a quite inexpensive set to put together!

Now the Dealers Complain!

RADIO dealers never get a rest, do they? Either someone's grouching about accumulator charging, or the ignorance of the multitudes of investors who have gone in for the business, *sans* radio knowledge and *sans* a feeling of responsibility towards the public they serve.

Or else someone's complaining of

price cutting. Or someone is complaining that prices are too high.

Now the dealers themselves are complaining. Their butt is the B.B.C., which, they grouse, doesn't give decent programmes in the morning and afternoon—programmes of the type which will help them to sell sets.

And, when you come to think of it, the Regionals are silent for about an hour and a half every afternoon, and the National "alternative" is—school lessons!

K.P.

BAIRD

versus

BELL

IN a recent letter from the United States, Paul B. Findley, of the Bell Telephone Laboratories, says:

"It may be too much to ask a Britisher to compare his fellow countrymen's achievements with ours, but I do feel that in some open-minded British magazine there should be recorded the fact that the latest model of Bell System television apparatus employs 5,000 image elements scanned at twenty times a second.

Resolving Power

"A recent issue of your weekly, *Nature*, in a note on the Baird system, says that it employs 2,100 elements, scanned twelve times a second. The resolving power of the two systems is of course proportional to their respective numbers of elements, while their ability to follow motion is proportional to the number of complete scansions per second."

Being nothing if not open-minded, we give prominence to the above extract. The recipient of the letter, Alan Hunter, adds:

"The Bell Laboratories seem to me to be perfectly justified in their claim. My eye-witness experience of Bell television in New York last year was a revelation in progress. Up to the present, with all due respect to the fine efforts of Mr. Baird and his associates, I have seen nothing in this country to compare with the Bell results."

We ourselves ought to remind readers that both the Baird and the Bell systems of television are essentially similar, employing scanning discs, neon lamps and photo-electric cells. The amount of detail obtainable by this system depends as much as anything upon the frequency channel—wire or wireless—available for transmission.

Short-wave Television

When the Baird Co. start transmissions on short waves, as they propose doing quite soon, the frequency channel available in the ether will be much wider; so we may justifiably look forward to more detail in our Baird televisions, comparable, perhaps, with the best efforts of the Bell Laboratories.

Two-way Telephony in the Air!



The rod aerial and wind-driven generator can be seen in this photograph of the Laboratories' plane

It is now a recognised fact that a wireless set is an indispensable part of the equipment of an aeroplane. If for no other reason, the necessity for a rapid means of communication with the ground stations made it so.

In America, where the question of air transport has made enormous strides of late, a great deal has been accomplished to overcome the difficulties inseparable from the production of a radio set which should adequately meet aircraft needs. The Bell Telephone Laboratories have done pioneer work in this field of research.

In the following article D. K. MARTIN tells exactly what the programme has been and what has been accomplished. We are certain that his information will be read with interest by everybody genuinely interested in wireless development in this country.

THE first step in the development programme here was taken two years ago, when a thorough survey was made of the communication requirements of aircraft. This was followed by the purchase of a cabin monoplane with which extensive studies have been made under actual flying conditions. The use of the plane has led to a better understanding of the problem, and a quantitative study has been made of transmitting conditions encountered in aeroplane operation.

Such transmission studies, including radio field-strength measurements, have been made for many

years in connection with broadcasting stations and the transatlantic radio telephone circuits. In this work, however, data was required only of transmission efficiency between two points on the earth's surface.

For this new undertaking a third

dimension, altitude, was involved, and there was an additional difficulty due to the rapid change in position of the plane.

The first transmission measurements were made with the laboratories' plane, flying from Hadley Airport, in New Jersey, as a base.

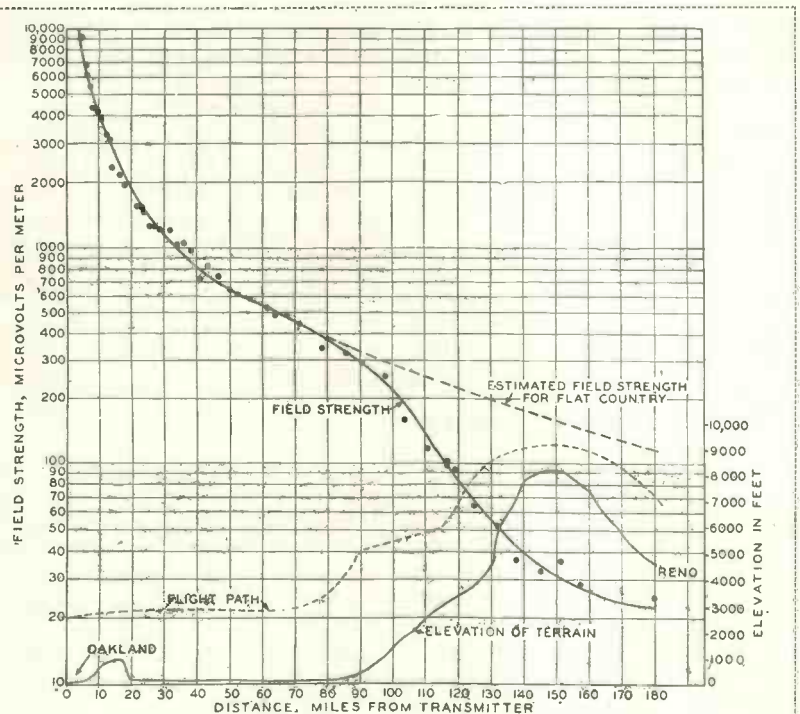


Fig. 1.—Mountains decrease the intensity of signals received in a plane as they do those at land stations

These tests were made in the frequency bands of from 285 to 315 and from 315 to 350 kilocycles, which have been set aside for radio beacons and weather transmission service respectively.

For measuring the signal received in the aeroplane the Western Electric field-strength measuring set, of the type developed for the use of the American Department of Commerce, was employed. This instrument was adapted for use in the aeroplane by substituting a short vertical-rod aerial for the loop generally used. Similar tests were made on the Pacific coast by a field party. The curve of Fig. 1 is typical of the many obtained from these tests.

This particular curve is especially interesting, as it shows the reduction in field strength encountered in mountainous country. From data of this kind a determination has been made of the sensitivity necessary for an aeroplane radio receiver to make possible the dependable reception of beacon signals, and also weather broadcasts transmitted by radio telephone.

Little Difference

In general it was found that at these frequencies transmission conditions between ground and an aeroplane were not greatly different from those between two points on the ground.

A one-way radio telephone beacon service provides all the communication required for many of the smaller planes, but a two-way communication system is essential to the larger transport planes,

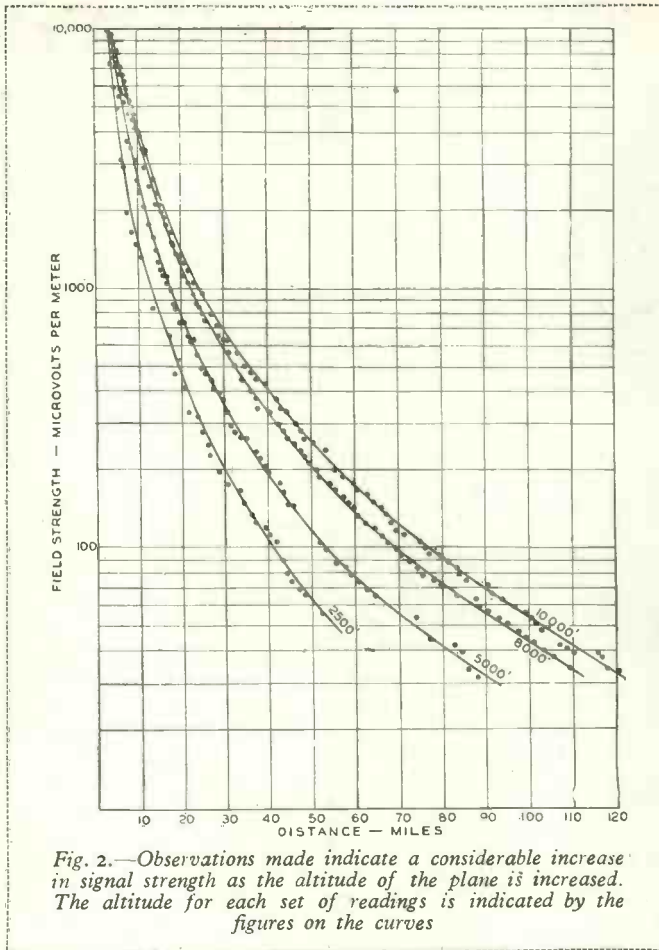


Fig. 2.—Observations made indicate a considerable increase in signal strength as the altitude of the plane is increased. The altitude for each set of readings is indicated by the figures on the curves



Operating the test set in the Laboratories' plane

particularly when carrying passengers.

It is generally agreed among air-transport operators that radio telephony should be used rather than telegraphy for this dispatch service. The reasons are obvious. With the telephone no special training in signalling is required, and there is the additional advantage of having an immediate and personal assurance that the information has been received and understood.

Speed

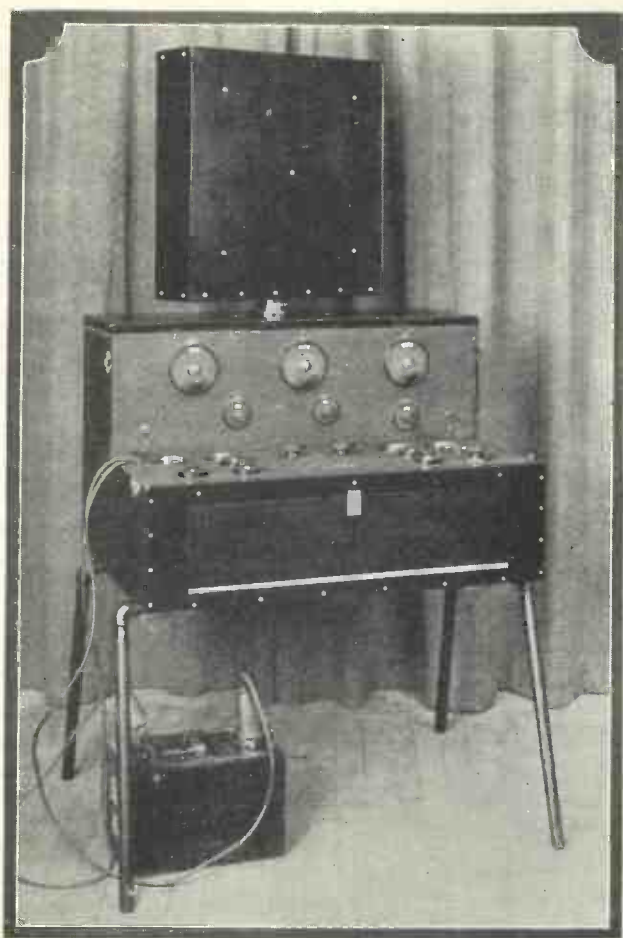
Of no less importance is the speed with which information may be transmitted with the telephone. It is expected that the dispatch system for the more important American air lines will develop in a similar manner to that of the railway systems, where telephony has long been widely used for dispatching.

An accurate knowledge of the transmission characteristics of that portion of the frequency spectrum available for this two-way service is the foundation upon which a system must be built.

The second step in our development programme consisted, therefore, in a quantitative transmission study covering the frequency range of from 1,500 to 600 kilocycles, preliminary consideration having shown that this frequency range was the best that could be used without encroaching on other radio services.

In these tests transmission measurements were made both from plane to ground and from ground to plane—employing the field-strength measuring set

Two-way Telephony in the Air!—Continued



Although the test set is designed for use with a loop, a rod aerial was used in the tests for reasons mentioned in the article

in both cases. (285 to 350 kilocycles) the signal strength is a function of altitudes.

The curves of Fig. 2 show graphically the results of one of these tests made at a frequency of approximately 1,600 kilocycles. These data were taken while transmitting from the Bell Telephone Laboratories' experimental station at Whippany, New Jersey, the aeroplane flying in the general direction of Baltimore.

These curves are typical of the large amount of data taken during flights in both the eastern and western experiments mentioned above. In contrast with the conditions found in the lower frequency band

Data taken at a frequency of approximately 5,600 kilocycles at distances of from thirty to forty miles showed the intensity of the signal to be approximately proportional to the height of the aeroplane, the signal increasing tenfold as the aeroplane ascended from 1,000 to 10,000 feet.

The field-strength measurements have been supplemented by quantitative intelligibility tests in which disconnected lists of words have been transmitted and a record kept of the accuracy of reception at the distant point.

Designing Complete Apparatus

The data obtained from these transmission tests have enabled the Bell Telephone Laboratories to proceed with assurance to the design of a complete two-way radio telephone system for aeroplane dispatch service. The design of this apparatus has closely paralleled these transmission studies, and the equipment is being designed for Western Electric manufacture which will adequately meet all transmission requirements.

All the regulations, such as that of the Federal Radio Commission decreeing that the transmitter be maintained to within .025 per cent. of its assigned frequency, are being strictly obeyed.

A Radio Stock Exchange at Sea

EUROPE and America are now joined by a ribbon of ticker tape. The *Berengaria*, the *Ile de France*, and now the *Leviathan* are all carrying the Stock Exchange down to the sea in ships.

No brokerage office is more luxurious than the one installed on the "B" deck of the *Leviathan* in what was once the tea lounge. One may sit in a luxurious arm-chair in a gorgeously panelled and deeply carpeted room.

This is the final gesture of convenience for the financier or the speculator. He can know the best or the worst at any time now.

At one side, behind a glass screen, sit two radio operators, one receiving and one sending. Transmission is made through the radio station at Tukertown, N.J., and the short-

wavelength service in code keeps up constant quotations of stocks on the market. Only 120 of the most active issues are quoted regularly at sea. Those not listed may be obtained by request without charge; the office can send an order from the ship and receive a reply for the customer in five minutes.

Stock Rises and Falls

Travellers can go on deck and word will be dispatched to them immediately as to the rise or fall of certain securities, if they do not wish to watch the board. Or they may keep in touch with the office by telephone from their state-rooms.

On one voyage on the *Leviathan* from Europe to America, when the bottom dropped out of the market, investors were better off than their

brethren in New York. When the jammed ticker tape was hours behind the actual trading on the floor, the brokerage office on the *Leviathan* were getting prices less than five minutes late. There are two men on the stock-exchange floor giving their entire time to radio quotations, and they do not have to wait for the tape to show the figures. Thousands of shares were bought and sold aboard the ship.

In view of the wonderful adaptability of radio to the requirements of those who dabble in stocks and shares, we may look forward to the day when each *Leviathan* of the ocean-going Mercantile Service will carry instruments tuned to record prices from the Stock Exchanges at London, Berlin, and Paris, as well as from New York. F. P.

Sir John Reith on

A CHALLENGE TO THE B.B.C.!

The Director-General of the British Broadcasting Corporation Writes from Berlin

WHEN melody was being demanded of them at an inappropriate moment, the children of Israel pointed out to their oppressors and to posterity that it was at least tactless to expect them to sing the songs of Sion when they were strangers—and incidentally captives—in a strange land.

Not that my position or sentiments at the moment are the least like those of the children of Israel. Very much the reverse in fact. I would not, however, choose Berlin as the spot in which to write anything about British broadcasting. There are other things—other broadcasting things to do.

But a promise made in one capital is presumably equally binding in another, so here is Berlin and here am I, and here—after a late stroll through the comparative solitudes and under the tall trees of the Tiergarten—is the discharge of the promise.

Now this week (I write towards the end of August) there comes the opening of the annual wireless exhibition in Berlin and this—according to reports which I have received and read in earlier years—is a very interesting and splendid affair.

The same may be said about German broadcasting in general,



Two months ago the Editor invited Sir John Reith, Director-General of the British Broadcasting Corporation, to contribute an article to what was to be—and now is!—the biggest and best issue of WIRELESS MAGAZINE yet produced.

This article is Sir John's fulfilment of his promise. It was specially written while the Director-General was on holiday in Berlin—and will be read with all the more interest for that reason.

to see something of which, the exhibition included, is the purpose of my present visit. But if the Editor wishes any information on matters of that sort he has doubtless made other arrangements to get it all.

Again, if he wanted to present a critical analysis of the relative merits of the German and British systems, or of German and British performance, it is unlikely that he would ask me to undertake its preparation or have any hand in it.

I imagine, however, that—other factors such as time and inclination being assumed—I might do it as satisfactorily as another, certainly with no more prejudice or bias than another.

An enthusiasm for one's own particular work, manufacturing and marketing soap or motor cars, or compiling and transmitting wireless programmes, or editing and selling journals, or whatever it may be, must mean the study of the products and the methods of others in the same line of business and a particularly acute look-out for clever achievements on their part.

There are few new departures of interest or significance in the broadcasting field of any country of which the B.B.C. is not sooner or

A Challenge to the B.B.C. !—Continued

later—and usually sooner—aware; and being aware, does not consider for home application. The Germans are in particular well worth watching. And they are extraordinarily courteous and anxious to put all their practice and experience at one's disposal.

It seems also that most, if not all, other countries are watching England, too—and closely and consistently at that. And this, perhaps, is good.

Representative of England

To a young man about to visit a foreign country for the first time—and when relations between those two countries were not all that the League of Nations, had it been in existence, could have wished—the following counsel was given: Remember in all you say and do that you will be regarded as the representative of England. This was no member of the diplomatic service either.

Rather a serious thought that—exaggerated though it may perhaps seem. But not necessarily so—and it is certainly better to exaggerate a responsibility in this matter than not to recognise it at all.

However, the point is that it appears—and this has run true for some years past—that the Englishman abroad has no special need to be ashamed of his broadcasting service, whatever he may think of it at home and by his own fireside. Daventry, and now Brookman's Park, to large numbers of people in Eastern Europe at any rate, mean England, and according to that and according to them this is also, perhaps, good.

England is on the whole fortunate in not possessing particular and standing irritations against her neighbours in the way of frontier and estranged minority problems. But even if she did I do not imagine that it would be considered either possible or desirable—at least, under normal circumstances—to give vent to them over the ether and through the medium of any or all of her broadcasting stations. At any rate one hopes not.

It is a delicate matter, but one looks to the Union Internationale de Radiodiffusion, over which Admiral Carpendale of the B.B.C. presides for the sixth year in succession, to deal with it if and when it should arise, as

it has dealt and is still dealing with the distribution of "wave channels and many other very important questions.

Apart from matters of policy between one country and another, their internal problems vary greatly. Some are common to all countries—three in particular, two of which are the relationship of the broadcasting authority to the State and its relationship to other interests which its activities affect or may affect.

Germany has, in addition, problems more or less of her own and they are serious ones. To start with, the Reichs Post Office retains a much larger share of the annual licence fee than is the case in any other country. The Reichs Post Office is also responsible for the transmitting stations, and it is not so long since the whole of the technical work was in its hands.

Then, again, the control of the central authority, the Reichs Rundfunk Gesellschaft, over the provincial companies and what they do is by no means clear. In general, it can only operate definitely through the possession of 51 per cent. of the provincial companies' capital. I cannot believe that this will continue for long. I believe they will move fairly quickly to something much more akin to the British system.

The most interesting problem, however, and the most important, and one common to all countries, is the relationship between the broadcasting authority and the great body of listeners sometimes called the public.

Who Are "the Public"?

Now the term "the public" is in pretty common use in England and in most countries. It may mean something. It may mean—and occasionally does—a good deal. But often it means nothing at all, and those who employ it most frequently have not always the most justification.

In other words, they sometimes do it not for the public's purpose, but for their own. Sometimes they "get away with it." Sometimes they do not. People, in fact, are becoming increasingly apathetic to its use.

But there is perhaps no connection to which at first sight it might more reasonably be applied than to the broadcasting clientele. Herein there are representatives of every class, circumstance and standard, of every

outlook and interest. They are united in this—that in one way or another and to some degree or other they expect to get something from the wireless programmes. But the something varies; the way varies and the degree varies.

So it is not at all unusual to read that the public demands more of a certain element in broadcast programmes and a little later, in another quarter, that it demands less.

Mr. A. G. Gardiner has put it trenchantly and concisely. It is fatuous, he said (or some expression to the same effect), to speak of the public as if it were a unit of interest or emotion. And whether or not this applies to the interests and emotions of individual men and women in general, it most undoubtedly does with respect to their wireless "reactions." No one realises that better than those whose task it is to produce programmes day after day and year after year.

Public's Requirements

The requirements of the travelling public may be—and according to railway managers are—very exacting; but they are comprehended within a small compass. They are limited to such ordinary factors as speed, punctuality, comfort and courtesy.

The real difficulties of broadcasting, respecting its public, might almost be said to begin where those of most, if not all, other public services stop.

The more I know of conditions in foreign countries the more I realise how fortunate is the position in England. Now that is a good sentence for someone to misunderstand or to misinterpret.

It is not to be read as a compliment to the B.B.C. but as a challenge. It has no immediate reference to the work of the B.B.C. It applies to the position in which that body now stands with respect to those other factors, some of which I have mentioned; to the general circumstances under which the great possibilities of broadcasting await still further development and realisation.

Certainly this has not come about without effort—much effort; but that they are favourable—compared to many countries exceedingly, and to some of them almost incredibly so—is an encouragement, but, as I have remarked, it is a challenge, too.

Wireless Magazine *Gramo-Radio Section*

A SPECIAL SECTION FOR THOSE INTERESTED IN ELECTRICAL REPRODUCTION

WE TEST BEFORE YOU BUY

A Loftin-White Amplifier for Gramo-Radio

COMMANDER E. H. LOFTIN and Mr. S. Y. White are already well known to WIRELESS MAGAZINE readers as prominent American inventors, by whose combined efforts the Loftin-White system of constant coupling was produced.

These two inventors have a further claim to fame by the development of the Loftin-

the correct *relative* positive and negative potentials are obtained, in spite of the fact that the grid of the second valve is very much positively biased through the direct connection of the preceding anode.

Although the system was developed over two years ago by Loftin and White, various snags have been encountered,

£12 5s. and is suitable for A.C. supplies of 110 volts or 220 volts.

The power pack and other components are housed within two metal boxes mounted on an aluminium platform, beneath which are wired various resistances. The three valves are readily accessible. Near them are input and output terminals. To use the amplifier for gramo-radio work a pick-up with associated volume control is required and a good loud-speaker, together with an output transformer.

With these accessories, we gave the amplifier a test on the laboratory A.C. supply, adjusted to 220 volts. We were candidly surprised at the

great volume and the high degree of quality. The system of direct coupling more than justified itself.

Eliminating Mains Hum

Hum from the mains was entirely eliminated by adjusting a knob at the back of the unit. The amplifier must be well earthed, otherwise some mains hum is heard. There is an earthing terminal near the knob just mentioned.

In addition to its use as a gramophone-record amplifier the Loftin-White unit can, by the addition of a tuning coil and condenser, be converted into a local-station radio set.



A NEAT AMPLIFIER WITH AMERICAN VALVES

It will be evident from this photograph how neatly the amplifier is constructed. It is handed in this country by the Rothermel Corporation, Ltd.

White system of direct-coupled low-frequency amplification.

Special interest will be taken in this system, because it has many points in common with the "simpler" wireless system invented by J. F. Johnson, who was at one time a member of the WIRELESS MAGAZINE Technical Staff. Briefly, the principle involved is the direct connection of the anode of one valve to the grid of the next, without the intervention of transformer, choke or resistance-capacity components.

Automatic Bias

The bias on anode, grid and filament of each valve is corrected by calculating suitable values of resistances and inserting them in circuit so that

but with the introduction of the latest high-magnification A.C.-heated valves, the whole principle has been brought to a practicable commercial stage.

We have recently had on test a Loftin-White two-valve amplifier, made by the Electrad Co., of America, distributed in this country by the Rothermel Corporation Ltd., of 24-26 Maddox Street, London.

Considering that the amplifier includes its own A.C. power-supply unit, the overall size is remarkably small; length 9 in., depth 8 in., and height 7½ in. Employing American valves, including a high-voltage A.C. rectifying valve and a new A.C. screened-grid valve, the Electrad amplifier is listed at

Radio-Gramophone Chassis

MANY gramo-radio enthusiasts will be interested in a somewhat novel radio-gramophone chassis that is being manufactured by Pickett's, of Bexleyheath, Kent.

The chassis consists of a well-made oak framework on which is fitted a Collaro double-spring motor capable of playing two 12-in. records without rewinding and a 12-in. turntable. A B.T.H.

pick-up, which is well known for its good reproduction, is mounted on the top of the chassis. Compactness has been taken into consideration, the size being 13½ in. by 16 in. by 4 in. deep.

As usual with Pickett's products the price is kept to a reasonable level. The chassis, complete with motor, costs £3, and £2 5s. extra is charged for the gramophone pick-up.



FOR CONVERTING YOUR SET TO GRAMO-RADIO

By the use of this unit any set with one or more stages of low-frequency amplification can be adapted for the electrical reproduction of gramophone records

Making Your Own Records!

A SIMPLE SYSTEM DESCRIBED by J. H. REYNER, B.Sc., A.M.I.E.E.

THE idea of being able to record for oneself has appealed to many experimenters for some time past. Probably most readers will have seen or heard of the various forms of apparatus which have made their appearance in some of the big stores, where on payment of a nominal sum one is able to make a souvenir record of any piece which one likes to perform.

"Microfright"

The difficulty about these occasions is that usually one forgets entirely what one wishes to do or leaves out some particular twist which one meant to introduce into the anecdote, and one has, of course, to visit a recording studio.

If we could obtain the results in our own home without too much expenditure, the proposition becomes vastly different.

With this idea in view I got in touch with a firm who have been making souvenir records and recording apparatus for some considerable time, and as a result of our deliberations a very simple piece of apparatus was evolved, which fulfils the requirements laid down in the preceding paragraph to a nicety.

The gadget can be fitted on to any existing gramophone of standard manufacture, and with a little experience excellent records can be obtained, either from broadcast programmes or of one's own voice or musical performance.

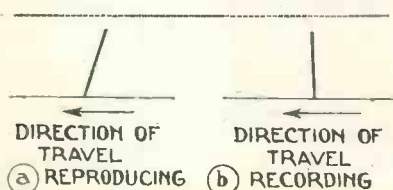
Price was, of course, an important point. In the end, however, the cost did not prove too much, the whole outfit including tracking device, electrical cutter, cutting needles and a number of discs being only a few pounds. Since one can pay that amount of money for an electrical pick-up alone, it will be clear that the price is distinctly

reasonable, which, of course, adds to the attractiveness of the system.

Let us first examine what is necessary in recording as opposed to reproducing. A record consists of a groove running spirally in towards the centre of the record. This groove, however, is not a uniform spiral, but deviates from its mean path from time to time.

A soundbox or pick-up carries the needle which rides in the groove on the record, and these deviations from the mean path cause vibrations to be set up (either mechanical or electrical), as a result of which we obtain the speech or music which is recorded on the disc.

Obviously if the deviations are



Figs. 1 a and b.—Showing the difference in needle angle for reproduction and recording

relatively slow the notes will be low in pitch, but if the deviations are rapid the deviations will have a high frequency and be shrill.

Now if we wish to record instead of reproduce, the first thing to be done is to provide a means of obtaining the spiral cut running into the centre of the record. This is known as the tracking of the record and is usually obtained by the use of a fine-thread screw engaging with a suitable portion of the mechanism. The exact procedure will be discussed in more detail later.

Having thus arranged to feed our cutting device from the outside to the inside of the record at the required rate, our attention must next

be turned to the cutting device itself.

An electrical pick-up contains a small armature to which the needle is attached; the vibrations of this armature (due to the needle following the deviations on the record groove) cause variations in the magnetic field, in consequence of which electrical currents are set up in the pick-up winding.

Clearly if we reverse the process and pass electrical currents through the winding, the armature will vibrate and the motion will be communicated to the end of the needle point.

I have considered the electrical case because the best results are obtained with electrical recording, and because most radio-set users have at their disposal all the necessary equipment for electrical recording. I therefore propose to disregard the possibility of mechanical recording altogether.

Our electrical cutter consists in essence of a gramophone pick-up used the wrong way round, as it were. At first sight one is tempted to inquire whether one cannot use an existing pick-up. While this is possible under certain circumstances there are certain characteristics necessary in an electrical cutter which are quite different from those necessary in a good pick-up.

Electrical Cutter

It seemed desirable, therefore, to provide with the apparatus a special electrical cutter which, while not unduly expensive, has the necessary properties for making a good record. This will avoid disappointment in the first instance, as with the apparatus described in this article good records can be made from the outset.

The final point for consideration

is the actual cutting itself. A material is required which is sufficiently soft to be cut satisfactorily with a sharp tool, and is yet hard enough to remain permanent in use.

By using certain alloys of aluminium these necessary qualities can be obtained. With a specially-shaped steel cutter, or even better, a sapphire or diamond cutter, a groove can be cut on the record without difficulty and with a relatively small power expenditure.

Playing with Fibre Needle

The record must subsequently be played with a fibre needle. The use of a steel needle tends to damage the metal, which is not as hard as the ordinary record, but the reproduction with a fibre needle is perfectly satisfactory, and in these days of electrical amplification the slight loss of strength is immaterial.

Either the usual triangular fibre needles may be employed, or special needles like the Burmese Colour needles may be used. In any case, provided a fibre needle is used in this manner the record can be played over fifty times and more without any appreciable deterioration.

The angle at which the electrical cutter must be fixed relative to the record is, of course, important. The ordinary pick-up or sound box is set to give a trailing angle, as shown in Fig. 1a. The record already carries its groove, and in rotating drags the pick-up needle along the groove.

In recording we have to cut the groove as we go along and, therefore, not only must the cutter be shaped, but it must be arranged to dig into the metal in its travel. Clearly, this dig-in must be kept within bounds or the whole apparatus will jam, but the cutter needle should be placed vertical or very slightly leaning as shown in Fig. 1b.

Standard Tonearm

In order to facilitate this, the electrical cutter has been made to fit a standard tonearm in just the same way as many electrical pick-ups are arranged. The angle may then be adjusted relative to the record in order to obtain a slight lead when the cutter is introduced, while the same pick-up may be used, if desired, to replay the record, in which case it should be arranged to give a slight lag, as already explained.

The cutter, incidentally, is provided with a special holder for the needle which will take standard fibre needles or the steel cutter, whichever is required, so that it may be used as a play-back if necessary.

Let us now turn our attention once again to the tracking device. As we have seen, the electrical cutter is arranged to fit on a standard tonearm of an existing gramophone.

We have also seen that by the insertion of a cutting tool placed in the usual needle carrier and adjusted

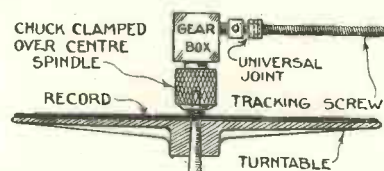


Fig. 2.—Diagrammatic sketch of the special gramophone attachment for making records

to the right angle, we are able to cut a groove on the record and so record any electrical impulses applied to the cutter.

We have, however, to arrange to track the cutter in towards the centre of the record at a uniform rate, so obtaining the usual spiral.

This is done in an extraordinarily simple manner which avoids the necessity for making any alteration whatever to one's gramophone. The standard gramophone turn-

tables are made to fit over a centre pin, and this pin projects for anything from $\frac{1}{4}$ to $\frac{3}{8}$ in. Over this centre spindle is fitted the tracking gadget as illustrated in Fig. 2.

It really consists in a small self-contained gear box, the bottom of which is provided with a small split collar which tightly clips around the centre spindle on the turntable.

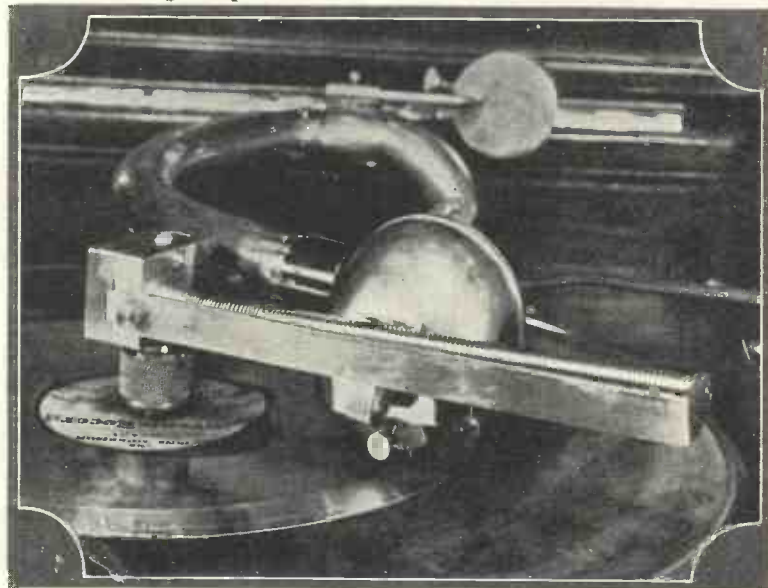
The rotary motion of this spindle is then converted through a system of gears to drive a small lead-screw that runs out from the centre of the record. There is a small tie-rod provided for rigidity.

How the Gearing Works

If one simply clamps this device on a turntable, and sets the turntable in motion the whole device will, of course, rotate with the table. Provided one holds the device at some point or other, preventing it from rotating, then the centre part in actual contact with the turntable will rotate and through the gearing will drive the tracking screw round.

All that we have to do, therefore, is to fix this tracking screw to the cutter in a suitable way, so that as it revolves it gradually speeds the cutter in towards the centre.

This is achieved very simply by having a small clip fixed on the front of the cutter; this has a knife edge which engages with the thread of the tracking screw. As the tracking screw revolves the cutter is



EXTREME SIMPLICITY IS A FEATURE OF THIS DEVICE

This photograph shows a special experimental tracking device. Minor alterations—and improvements—have been made in the models made by Cairns Morrison Co.

Making Your Own Records!—Continued

gradually fed along, so arranging to cut the spiral grooves on the record.

Any small motion of the pick-up up and down is allowed for by the provision of a universal joint, so that the pick-up can be lifted clear of the record, either at the beginning or at the end, or at any intermediate point, without disengaging it from the tracking screw.

Movement in Arc

The fact that the pick-up moves on an arc going from the outside to the inside of the record is also taken care of, since the only point at which the gadget is fixed is at the pick-up

studio, and record either one's own voice or a band or song, or any desired performance.

The volume should not be too great or the cut will be excessive and there will be a danger that one groove will run into the next, in which case the arrangement will not play back properly. The symptoms of this are that when one endeavours to play the record the needle remains in one groove all the time unless it is gently assisted by a very light pressure.

If, on the other hand, the signal strength is too weak, the modulation will be small relative to the

Having prepared the record take the gadget and place it over the centre spindle of the turntable, which is projecting through the hole in the record. Press it down firmly.

Placing the Cutter

Now place the cutter about $\frac{1}{4}$ in. in from the outside of the record and engage the cutter with the tracking screw. This is done by simply pushing the latter under the spring. Make sure that the cutter needle is dead vertical or slightly leading as already explained. The apparatus is now ready to record.

Switch on the source of signal which is to be recorded, lift the cutter slightly off the record and start the turntable revolving. Then drop the cutter lightly on the record. If everything is in order the cutter will now track gradually in towards the centre of the record and will record on the disc as it does so.

Having come to the end of the piece it is only necessary to lift the cutter off. Stop the turntable, disengage the cutter from the tracking device and remove the tracking device completely from the turntable.

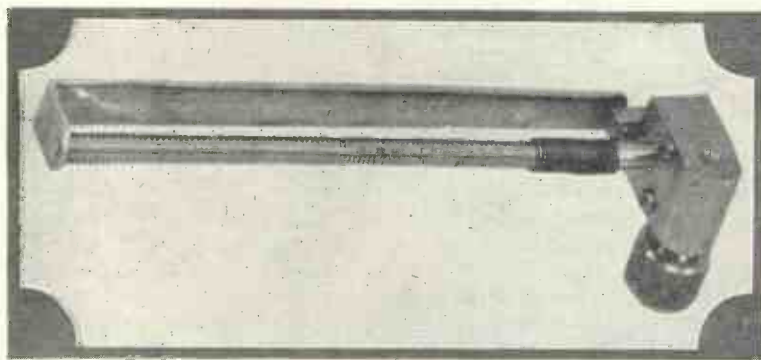
The record can now be replayed, either on the cutter, used as a pick-up or any other gramophone. Do not forget that *fibre needles must be employed* or the record will be damaged.

It is advisable to wipe off the surplus oil before replaying the record; also it will be found that the record improves after the first two or three playings, as the oil gradually wears out of the groove.

Time Factor

The length of time which the record will play is, of course, important. The tracking on this device is somewhat finer than the normal and an 8-in. disc will play as long as a standard 10-in. gramophone disc. In fact some of my early experiments consisted in re-recording standard 10-in. discs. They could be obtained easily on the 8-in. disc with this apparatus, so that one can reckon a three-minute run on each side of an 8-in. disc.

Later on I hope to give further details of the use of this interesting apparatus, and to show how microphones can be used.



GEAR BOX AND TRACKING THREAD

The special gear box is on the right, while the tracking thread is seen on the left. The gear box clips over the motor spindle of any machine by means of a special split collar which gives a firm grip

itself, and all that happens is that the whole tracking device moves round slightly and then comes back again.

In operation, therefore, the device is extremely simple, and requires no alteration whatever to an existing gramophone.

So much for the description of the gadget itself. From the diagram and the photographs which accompany this article its operation should be quite clear.

Strength of Signal

Some other points need explanation, however. First of all, as regards the strength of signal which needs to be applied to the cutter. Any good loud-speaker signal will suffice. It is, indeed, a good plan during the early stages to use broadcast programmes for one's experiments.

Having got the apparatus working satisfactorily one can then introduce one's microphone and

unavoidable surface noise and the best results will not be obtained. Generally speaking, therefore, choose comfortable volume and experiment until the best results are obtained.

For satisfactory results one can just feel the needle of the cutter moving with one's finger under the influence of the applied currents if the strength is of the right order.

Having obtained the signal which is to be recorded the next thing is to take one of the metal discs and to place it on the turntable. Then take an oilcan and scatter a few drops of thin oil over the surface, and distribute this evenly with a rag. This is to assist the cutting and to minimise friction.

Make sure the motor is fully wound if a clockwork type is being used, as otherwise this may slow down at the end. With an electric motor, of course, there is no trouble, and there will be ample power for recording quite heavy passages.

Around the Turntable

REVIEWS of RECORDS by WHITAKER-WILSON, the "W.M." MUSIC CRITIC

Light Orchestral Music

Daisy Bell, International Novelty Quartet, 2s. 6d.
ZONO 5644

This is Daisy with counterpoints which, after all these years, improve her. On the other side we have the good old chestnut, *After the Ball is Over*. If you want them, with brass fittings to them, here they are excellently recorded.

Morris Dance, Athenaeum Symphony Orch., 2s.
PIC 5061

This, and the *Torch Dance* from Edward German's *Henry VIII* music, is well represented by the Athenaeum Symphony Orchestra. Lovers of light orchestral music will find this worth two shillings.

Light Opera & Songs

At Dawning, Sydney Coltham, ten., with orch., 2s.
PIC 5068

His is an expressive voice and this song suits him. On the other side he sings *Absent*, which I had imagined dead and buried long ago. Decca, keep up to the times, please! Either record classics that are popular or something new! Stale ballads will lead you, and us, nowhere.

By the Fountain, Tommy Sandilands, ten., 2s. 6d.
ZONO 5657

This is a stupid song; the words are rubbish and the music no better. If we must have these old chestnuts roasted up for us again, I prefer *Down the Vale* on the other side.

Couldn't Hear Nobody Pray, Emory University Glee Club, 2s.
PIC 5072

I like these people; they produce some of the best records Piccadilly issue. This is a very good part song of the Negro Spiritual type. The other side is the popular *I Got a Robe*.

H'llo Baby, Max and Harry Nesbitt, 2s.
DEC F1859

Quite a jolly little tune and certainly rhythmical. On the other side *My Baby's Fine and Dandy* (I do hate that last word!) is the other effusion. Candidly, neither tempt me to recommend the record, though the first is quite passable.

Ideale (Tosti), Tito Schipe, ten., with orch., 6s.
H.M.V. DA1114

This is an interesting record; it is so Italian! It is a pleasant, suave theme that stands out by contrast with the swiftly-moving Neapolitan song called *Marechiaro*, also by Tosti. A thoroughly good record.

Laird o' Cockpen, Stuart

Robertson, bass-bar., with piano, 3s.
H.M.V. B3477

A good vigorous song—well-known, of course, and well worth hearing, on record here by Stuart Robertson. *Pretty Creature* (Lane Wilson) is splendidly sung on the other side. Young students, who are themselves baritones, could do worse than have this; there is much to learn from an excellent vocal style.

Left My Girl in the Mountains, Bud and Joe Billinger, with Novelty accompaniment, 2s. 6d.
ZONO 5647

The accompaniment is certainly novel and quite interesting. A good "dashy record"; I like it. *Birmingham Jail* is a queer title for a pleasant waltz theme which I think you will like. Excellent recording.

Love's Old Sweet Song, Blodwen Caerleon, con., with orch., 2s.
PIC 5066

Hers is a pleasant voice and she records well. I need say nothing about the song, of course; *Silver Threads Among the Gold* is the other side of the record. I recommend her; that is enough in the instance.

Merely Medley, Westminster Singers, 2s.
DEC F1853

Drink to me only, Tavern in the Town, Annie Laurie, all appear in the first sixteen bars. I am not keen on running one tune into another; it seems rather a silly pastime to me. The Westminster Singers are worthy of something more brainy, for they sing well. *Grandpa's Adventure* is a kind of imitation in quartet form of a child's account of her grandfather's visit to London. Not bad, but not good enough for the Westminster Singers. Come on, Westminster—don't insult our intelligence!

Watchman, What of the Night? Herbert Thorpe and Foster Richardson, 2s. 6d.
ZONO 5653

This is well sung by the two artists who sing an arrangement of Sullivan's *Lost Chord* as a duet, which misses the mark entirely so far as I am concerned.

When Dull Care, Foster Richardson, bass, with orch. 2s. 6d.
ZONO 5639

This is by Lane Wilson. It is a

pleasant ballad in dialect; Fester Richardson sings it very well. His voice, by the way, records excellently. On the other side he sings the *Stein Song*, of which I personally am now very tired.

When It's Springtime in the Rockies, Lou Abelardo, with orch., 2s.
DEC F1855

This is a good song of its type, but in this particular recording the accompaniment is too loud for the singer. A pleasant variation of the rhythm appears in the latter half of the work. The other side is *It Happened in Monterey*, which I like very much. The same faults, however, appear.

Organ Music

Le Cygne, Reginald Goss-Custard, organ, 3s.
H.M.V. B3437

A bit stodgy—for him—but the Alexander Palace organ does not sound amiss by any means, though there is very little pedal-tone. On the other side he plays McDowell's *To a Wild Rose*—why, I can't imagine, as there is so much good organ music unrecorded. Come, sir, you are a good technician; let us have something worth while from you!

Chamber Music

Humoresque, Erica Morin, violin, with piano, 6s.
H.M.V. DA1104

This is Tchaikovsky's not Dvorak's *Humoresque*. Erica Morin's attack is exceptionally fine, but in the second part of the first theme the tone seems to me a little harsh. Still, it is a good rendering. On the other side (*Hubari's Zephyr*), the playing is very brilliant though, again, the tone is not unimpeachable.

Hymne au Soleil, Peggy Cochrané, violin, with piano, 2s.
PIC 5064

This is by Rimsky-Korsakov and arranged by Fritz Kreisler; personally I think it is a beautiful melody and I do not dislike her playing of it. On the other

side she plays *Heyre Kati* (Hubay). I fancy she was too near her microphone for the high F natural (on which she enters) blasts horribly. I think, personally, this is worth her doing again. It is not nearly good enough for her, Hubay, or Piccadilly!

Vienna Blood, Underhayé Octet, 2s.
DEC F1854

This is a Johann Strauss waltz and very pleasant it is after some of those I have heard of more modern invention. The other side is Gaugh's *My Happiest Day in Berlin*, which makes pleasant lunch-time music. I like the Underhayé Octet.

Classical Orchestral Music

Carnival Suite Op. 9 (Schumann), London Symphony Orch., Parts 1 and 2, 6s. 6d.
H.M.V. D1840

Parts 3 and 4, 6s. 6d.
H.M.V. D1841

Parts 5 and 6, 6s. 6d.
H.M.V. D1842

There is no denying the excellence of these records, and I should be the last to do so. I am disappointed in the lack of bass tone; where are the L.S.O. and double basses? The opening seems all top heavy to me. I may be wrong, but I don't think it's wonderful. The music is so attractive that I feel I have been cheated out of something. Mind you, on a powerful electric machine it may improve a little (though I am listening to a pick-up at the moment). The recording, as is usual with Ronald, is quite conventional; some of it sounds as though he does not understand it.

Humorous Records

How Does a Black Man Know When He's Dirty? George Buck, com., 2s.
DEC F1857

A splendid tune; the words are a little personal, but quite amusing. George Buck's words are not always quite clear. The other side is *Over the Garden Wall*. It is quite pleasant, though not particularly amusing.

Dance Music

All Alone Monday (f.), Rhythm Maniacs, 2s.
DEC F1860

This is decidedly original and very taking; I imagine it will be popular. I do not care quite so much for *I Love you so Much*—its title alone is enough to put anyone off—but the record is worth getting for this side alone.

THE MONTH'S BEST RECORDS

PERHAPS the holiday season has been responsible for the lack of really good records, but I can only find three which I consider up to standard.

The first two are H.M.V.'s—the Casali 'cello record of Chopin which must be recommended for the beauty of his playing (D.B. 966), and also in the Tito Schipe record (Ideale: D.A. 1114).

I also recommend Broadcast 5173-5 which contains the Saint-Saëns Piano Concerto in G minor played by Reginald Paul.

WHITAKER-WILSON

Around the Turntable—Continued

Exactly Like You, The Rhythmic Eight, 2s. 6d.
ZONO 5649

These people make excellent dance records. I need say nothing about this fox-trot nor, indeed, about *On the Sunnyside of the Street*, which is on the other side of the record!

Happy Feet (f.), Philip Buchel with Spike Hughes and his Three Blind Mice, 2s.
DEC F1856

The Three Blind Mice are not

as quiet as most mice, and have here produced rather a jazzy effusion. I prefer the other side (*You Know What I'll Do*), which is a little more definite in character.

Harlem Madness (f.), Spike Hughes and His Dance Orch., 2s.
DEC F1861

A good title for the opening, at all events. The instruments are so harsh that I am going to shut it off—now. Moreover, I don't care *what's* on the other side!

Telling It to the Daisies (f.), Bernie Cummins and his New Yorker Hotel Orch., 3s.
H.M.V. B5860

I am not very impressed with this tune; I have certainly heard better. I prefer *Minnie the Mermaid*, which is a real rouser. It ought to be popular and is an excellent dance number. I thoroughly recommend it for dance purposes.

To My Mammy (f.), Rhythm Maniacs, 2s.
DEC F1858

Not particularly original, but

not at all a bad tune. *Let me sing, and I'm Happy*, on the other side, is perhaps less original still, but it is quite a good dance number. That is all one can honestly say about it.

Valse Margherite, Andy Sannella, saxophone, 2s.
PIC 5065

Those who like saxophones will be pleased with this, as it really shows off the technique of the instrument. On the other side Sannella plays *I Need You More each Day*.

A Revolutionary Soundbox *By H. T. BARNETT, M.I.E.E.*

IN the past we with experience have been able, given knowledge of the components and their dimensions, very closely to estimate the performance of any gramophone soundbox that might be put into our hands.

Sizes of Boxes

For example: For a long and constricted acoustic system with a slow flare we chose a soundbox of small diameter. For a short acoustic system with a rapid flare we chose a big box.

If the box were of large diameter and fitted with a very thin aluminium diaphragm we expected it to be "woolly." If the stylus bar proved to be mounted on a stiff spring instead of on free turning trunnions we should have expected the small compliance to check the production of deep bass tone.

We attached too little importance to the effect produced by sweeping the curves or lines of the contour of the middle of the diaphragm right up and into the neck of the box so as to get what may perhaps be termed "obturator effect."

The coming of the Edison-Bell Electrotone Grand soundbox (12s. 6d.) calls for an entire readjustment of thought on the subject of soundbox design.

In the first place it is a big box (55 mm. diaphragm). Secondly, the diaphragm is very thin. Thirdly, the stylus bar is mounted on a stiff spring.

I have tried the box out fully with every kind of record on every

type of amplifier I know, as follows: The Peridulca, a 3 ft. acoustic system with wide and rapidly flared paper horn. The Wonderphone, an uncased straight rapidly flared wide paper horn. The No. 30 Perophone, comprising a 4 ft. 8 in. metal amplifier plus sympathetically arranged soundboards. The new and very wonderful Limit 4 ft. metal amplifier for cabinet machines. Old H.M.V. models.

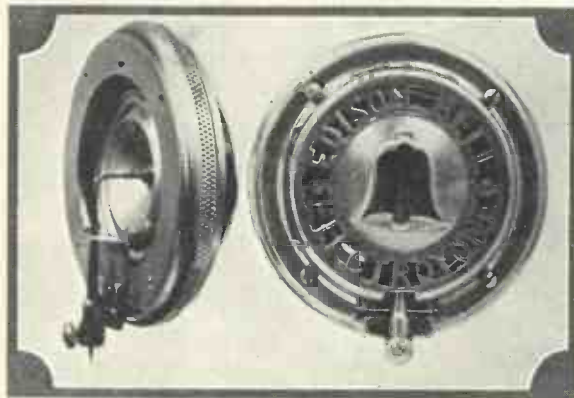


Fig. 2.—Front of the box with the protecting cover removed

Fig. 1.—The new Electrotone Grand Soundbox. Made by Edison Bell, Ltd. It has a 55 mm. diaphragm

Re-entrants. Reflex tone-arm models. All kinds of portables.

Enormously to my surprise there has only been one kind of result from every test, the best soundbox I could pick for each machine (usually a different box for each type) has been beaten by the Grand *all over the scale*, for volume by from 20 per cent. to 50 per cent., and also markedly in definition.

The box appears to be self-adjusting as regards its *effective* diameter to best suit whatever type of acoustic system it may have to work upon.

Fig. 1 shows the box as sold, with diaphragm protection in place. Fig. 2 shows the front of the box with the protection removed.

It will be seen from Fig. 1 that the shield is sufficiently perforated to prevent too much repercussion. Referring to Fig. 2 it will be seen that the contour of the middle of the diaphragm renders it very rigid and that the inseting of the cone favours "obturator" action.

Outside the piston-like and relatively rigid middle of the diaphragm there will be seen a set of concentric angular corrugations: I can only suppose these have some reflex action as against the back of the box and so produce that universal compensation in *effective* diameter in which the box is unique.

The spring mounting for the stylus bar can be seen; stiff as it is and sufficiently so as to prevent any danger of the diaphragm becoming deformed, nevertheless it does not hinder the production of deep bass tone to the maximum that can be recorded and yet mysteriously and still to me incomprehensibly, at the same time its rigidity seems so to have added to the characteristic of the diaphragm as to favour some frequencies and to give an extraordinary clarity to those high-rate vibrations constituting consonant sounds and instrumental characteristic.

The box requires rather more than three ounces weight on the needle when ordinary loud needles are used. It gives really amazing results in my opinion.

THE LETTERS OF Priscilla Playne-Smythe

AN OFFER OF HELP!

Stewcombe Manor,
Little Bodley,
Near Hurdham.
August 15, 1930.

DEAR MR. EDITOR,

The extraordinary interest which you have taken in my artless outpourings encourages me to send you another small report. I may be overbold in speaking of your interest as extraordinary, but since you publish my letters in your highly scientific magazine, it would seem that even my small contribution to science is not negligible.

Strangely enough, until you proved the reverse by publishing my letters, I was under the impression that I knew really very little about wireless. I am rather reminded of the person who, upon being asked whether he played the violin, replied that he didn't know because he'd never tried.

However, by now I consider myself quite your special correspondent and if you care to consult me about any little wireless problem which may be worrying your staff, please do so. I shall be so very glad to help you.

I am astounded to find what a lot of people there still are who have never enjoyed the blessings of wireless. In our village, for instance, I asked a lot of boys and girls a few days ago whether they would care to hear my set and partake of tea in my garden and the response was so overwhelming that, in the end, I had to make it a condition that only those might come who had never heard radio before. Would you believe it, Mr. Editor, I could not find a single one who had!

So, my little garden party took place and was a great success.

My nephew, who is home on leave from his ship, made the whole thing go with a swing and improvised some delightful outdoor sports. Then we had our little wireless diversion but, and this is just what I wanted to consult you about, reception was not really so very good. Not nearly so strong as it is in the long winter evenings by the fireside.

My nephew explained to me that this was quite normal and that daylight reception in summer is never so

strong as evening reception in winter, but really I don't see how this can possibly be. For, Mr. Editor, consider the homing pigeon. It travels miles and miles towards its loft by day, but cannot find its way by night at all.

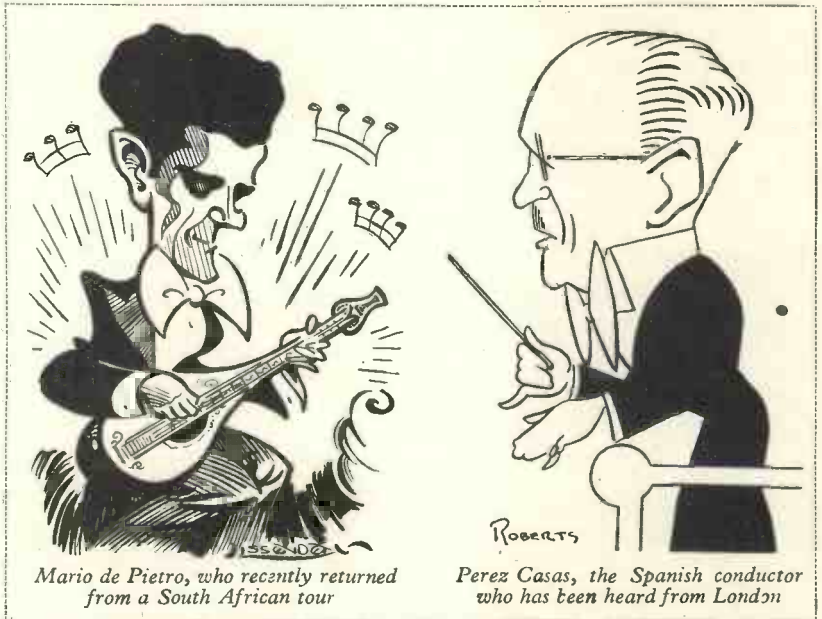
Surely this must hold good also for the tiny, weak little wireless waves which are released from the sending stations. How can they possibly travel faster and find their way better in the dark than on a fine June afternoon? And how can they arrive safer and in better condition when my expensive adenoid barometer points to "Stormy" than to "Set Fair"? It seems nonsense to me.

tions are most bewildering to me.

I am not quite sure whether the right word is osculation or oscillation, but Tom says it doesn't matter, as both sometimes give rise to squeaks.

I have decided that, perhaps, I shall get better results if I sell my set and purchase a more modern one. Mine, you may remember, though considered most efficient a few years ago, was only an amateur attempt after all, constructed inside the lid of my sewing machine.

But the more I ponder over the advertisements in your magazine, the less I seem able to make up my mind. The intimate views of their



Mario de Pietro, who recently returned from a South African tour

Perez Casas, the Spanish conductor who has been heard from London

However, we had a most instructive talk on the effect of the new American tariff upon deportations from Europe and what with this and the cakes and games, the children had a delightful afternoon. It is pleasant to think, that in my small way, I have been instrumental in awakening their young souls to the marvels of modern science.

Reception was further disturbed by loud osculation, but my nephew explained that this also was inevitable at a wireless seance attended by young people of both sexes, in a shady garden. Really, his explana-

entrails, which you publish, all seem excessively complicated.

However, after much thought, I have almost decided to select one of fumed oak, unless you should consider mahogany better? Do, please, let me have your views about this point which, somehow, your diagrams never seem to touch upon.

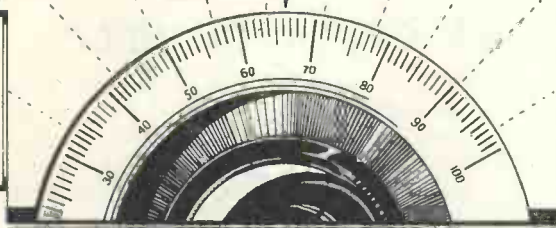
In exchange for your kind advice, please remember that I am ever so willingly at your disposal for any technical information which you might require from time to time.

Yours most sincerely,
(Miss) PRISCILLA PLAYNE-SMYTHE.

Tuning versus Twiddling!

HOW ANY LISTENER CAN GET BETTER ENJOYMENT FROM HIS RADIO SET

A SPECIAL ARTICLE, FULL OF VALUABLE HINTS AND TIPS, BY JAY COOTE



Whether you use a commercial set or a home-constructed receiver, you will get greater enjoyment from listening by following the advice given in this article.

These notes should be used in conjunction with the special station identifier and broadcast map that is given free in this issue.

Tell your friends about this useful gift before it is too late—this issue of WIRELESS MAGAZINE will be in great demand and will soon be unobtainable, although thousands of extra copies have been printed.

IDLE twiddling of the condenser dials seldom leads anywhere; possibly, by chance, you may capture a transmission, but in most instances not the wanted one.

In their early days most tyros twiddle; later, by experience, they find that actual tuning of a receiver is necessary if results are to be obtained.

There is a vast difference between the two methods; one mostly causes disappointment to the set owner and annoyance to his neighbours, and the other, in a few moments, brings to the operator "all the joys of wireless." Why not start right?

Ask for Hints

Tuning a receiving set is not a difficult matter—watch an expert or, if none be handy, ask one of your friends or acquaintances (an old stager) to give you a demonstration—and a few hints.

At the outset you will notice, if he really possesses experience, that as the dials are slowly twirled, station after station is captured without so much as a slight squeal.

The set will never be roughly thrown into oscillation; at the utmost,

you may hear a slight rushing sound as the reaction condenser is brought into action with a view to boosting up a required signal.

By twiddling the dials there exists a one hundred to one chance that you will lose the majority of these transmissions. Similarly to the railway station sandwich, either you haven't got to the meat or you have bitten over it—after all, it's the meat you want.

Now, to-day, most receivers possess an aerial (open) and a closed circuit, both tuned by condensers; in some instances there are two dials, in others one only—most sets are also equipped with a reaction condenser and a volume control.

For the purposes of actual tuning we need not now consider the question of volume or loudness of a signal.

Personally, if a new or strange receiver is thrust into my hands, invariably I adopt the same method, in every case—I work from the bottom of the condenser upwards, namely, I set them, as a start, with the vanes fully out and gradually turn the dial or dials, thus bringing the condenser slowly into action.

As regards reaction, begin with the condenser half in. Most probably you will have to reduce it so soon as you have picked up a carrier wave, but as a rule you will find that as the readings of the condensers increase, or as the capacity becomes greater, so the reaction will have to be strengthened.

My next step, then, is to search for a well-known and powerful transmission, say, Midland National (late 5XX) if on the long waves, or London Regional (late 2LO) on the broadcasting band.

If your house is situated within two or three miles of these transmitters, it would be wise to choose other stations as you may not obtain accurate condenser readings. By this I mean that the transmissions may be

received over many degrees of the dial and consequently true logging of the dial readings may be difficult.

Suppose, therefore, our readings for London Regional are (hypothetic) 35 and 40 degrees. Well, we know the wavelength of this broadcaster is 356.3 metres and we have established a landmark.

Noting the Readings

Carefully, we adjust the dials and reaction condenser and volume control until we are perfectly satisfied with the strength and quality of signal. Then, and then only, we make a note of the readings.

What is the next station we want? Say, Radio Toulouse. Right. We know this French station works on a longer wavelength, namely, 385 metres. Carefully, again, we turn our condensers round, keeping them either actually in step or with the same separation; for example, 10 degrees higher on the second or closed circuit.

Possibly, the difference may be slightly greater when we have actually "struck" Toulouse, for it will be found that in most receivers, although the condensers may be in step part of the time, at both the top and bottom of the dial they may show differences.

Adjusting Reaction

What we first hear, if our reaction is too strong, is a howl rising, falling and rising again, according to whether we turn the dials forwards or backwards.

Adjust them to the bottom of this howl, or to what may sound clearer, the *trough* of the wave, and slightly throw back the reaction condenser. You should immediately hear speech or music.

Again adjust the condensers slightly, use as little reaction as possible and with the volume control secure the strength of signal desired—

and then log the readings exactly.

It is always easier to explore a small portion of the waveband than to try and cover 250 to 600 metres at one sitting. On the one hand, the movement, either backwards and forwards, of the condensers will be limited to some 10 to 20 degrees or less; on the other, it will entail the complete rotation of the dial through its 100, 120, or 180 degrees, as the case may be.

Picking Up Hamburg

Between London on 356 metres and Radio Toulouse on 385 metres, there is a difference of, say, 30 degrees. Turn your condensers to a reading half way between the dial numbers you logged for these stations.

Roughly speaking, within a degree or so, you should find Hamburg on 372 metres.

Then, again, between the German station and London, you should pick up Radio Alger (Algiers).

You will therefore see that, having established definite landmarks on the "wireless route," it will not be a difficult task to search between them and as the exploring is over a very small portion of the dial, and consequently entails but slight movements of the condensers, the search is a very thorough one.

Definite Loggings

Do not limit yourself, of course, to one section of the waveband, but work in this manner in various portions of it. After an hour or so on a favourable evening you will have logged a number of definite positions, that is, readings of settings necessary to pick up certain well-known and reliable transmissions.

With this data in front of you, as in each case you narrow your search, so you will find it an easy task to set your condensers approximately for tuning to a given wavelength. One point, however, is of major importance.

Don't jot these condenser readings in a slipshod manner on the back of an envelope or on any odd piece of paper. Take a good-size sheet of generous proportions—foolscap paper will do—and rule a few columns.

Start in the first with the wavelength, followed, if you like, by the frequency, the power of the transmitter, its situation, and leave plenty of space for the call you may pick up.

Make a note of any interval signal you may hear, and an extra column for the time at which the trans-

mission was captured as well as nature of the broadcast (for example, music, speech, etc.) will be found invaluable.

Do not jot down the condenser readings in any order, but *keep them in sequence of wavelengths and of frequencies.*

A well-kept log will give you pleasure every time you handle your set; on the other hand, if the readings have been written down "all over the shop," when you do want to search for a station you will lose valuable time in finding out its *possible* readings on the dials.

If the log is in sequence of wavelengths, you will be able, at the outset, to say: "The station I require is between so-and-so and so-and-so, therefore my

condenser readings should be roughly ——" and the log will provide the basis to start upon.

The identification of a given transmission will be acquired rapidly by practice; in fact, one becomes very soon familiar with certain calls and even voices of announcers are readily recognised after a short time.

The map given away with this issue, with its fifty notes giving useful data for each individual station,



TO MAKE BROADCAST SOUND EFFECTS

No, this is not a junk heap; it is the gear used at Munich for producing "off" noises when broadcasting radio drama. The glass cheese cover in the foreground is used to imitate a church bell

should prove of great assistance.

As you pick up each broadcast so you may draw a connecting line joining up the square at the side and the respective position of the transmitter on the map.

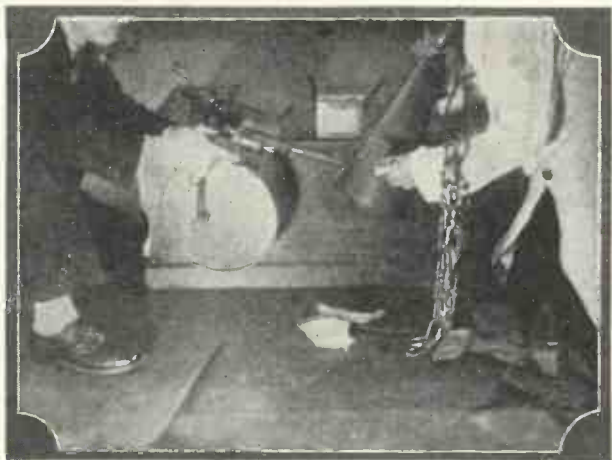
Noting the Readings

If, in this square, you insert the correct condenser readings, at any future date you may refer back to them with the assurance that, unless the station's wavelength has been changed, such a setting of the condensers will bring in that particular transmission.

There need be no blind "twiddling," but accurate tuning will be ensured in each instance.

Moreover, you will capture your transmissions accurately without the accompaniment of the squeaks, howls and moans that are so unpleasant to both near and far listeners, and which unearthly sounds always stamp the operator as a beginner and a very poor one at that.

Interesting information about foreign stations appears in "Leaves from a Listener's Log" on page 282



A MOTOR-CAR ROBBERY IN A WOOD!

That is the effect these weird instruments produce when you hear them broadcast. The product of noises for radio drama is an art in itself and needs considerable ingenuity

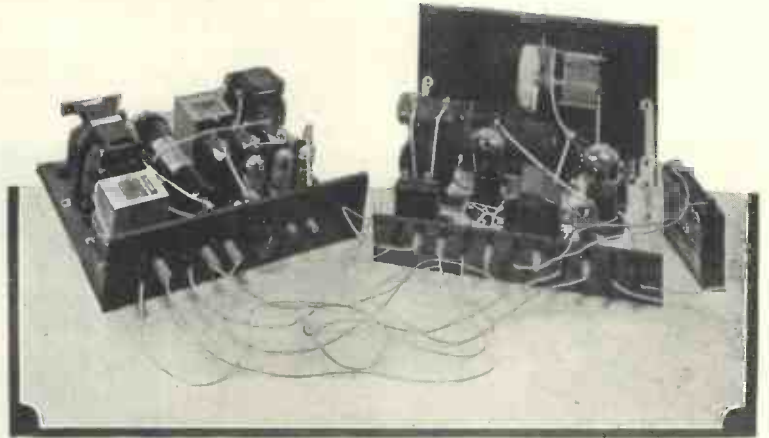
THE MERLIN TWO

This set is intended for operation from A.C. mains, but it can be worked from batteries if desired

High tension can be obtained from an existing mains unit, and the A.C. valves run from a separate filament transformer

For the best results the set should be used with the "W.M." Standard A.C. Unit (see page 276) which gives high- and low-tension supplies

It incorporates an all-wave tuner, covers all wavelengths from 200 to 2,000 metres, and is more than usually selective



A NEAT AND EFFICIENT COMBINATION

Here you see the Merlin Two connected to the "W.M." Standard A.C. Unit, the result being an efficient mains two-valver for local-station reception

MANY constructors have refrained from building mains receivers up to the present because they feel, for some reason or other that is not very clear, that such sets are much more difficult to put together than are battery-operated models.

Actually, it is no more difficult to build a set for direct operation from A.C. mains than it is to build a battery receiver and mains unit for high tension, which is a combination popular with hundreds of readers.

Separate Power Unit

In this case we have designed a straightforward two-valve set with A.C. indirectly-heated valves and a mains unit that gives both high tension and the necessary current for running the valve filaments.

These are described separately in this issue because, if desired, an existing mains unit can be used for supplying the two-valve set with high tension, the only additional apparatus necessary being a mains transformer with a four-volt secondary winding to heat the A.C. valves.

As the set is intended more particularly for the reception of local and regional stations, the combination utilised is a simple detector and power

valve; apart from the special wiring of the filament circuits for the use of mains valves, the set is straightforward in every respect.

For the sake of convenience we have used a new type of all-wave tuner which covers, without a break, a wavelength range of 200 to 2,000 metres. Adjustments for reception on

any one of five positions, which are indicated on the panel as "AG," "CT," "3," "2," and "1." When the lever is placed opposite one of these points the selectivity of the set is controlled to any desired degree.

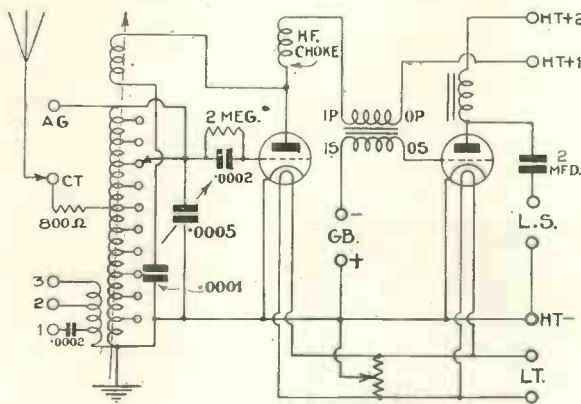
For instance, when the aerial lead is connected to "AG" the aerial is led directly to the grid of the detector valve; this results in maximum volume but minimum selectivity.

The position "CT" is a centre tapping, so arranged that when the lever is put opposite this mark an 800-ohm resistance is put in series with the aerial to prevent medium-wave transmissions from breaking through when long-wave reception is being undertaken.

Normal Working

Under normal conditions it will be found that this position of the lever will give the required degree of selectivity.

When the set is used very close to a broadcasting station the tapings "3," "2" and "1" should be utilised. The least selective of these is "3," but it should be understood that this is very much more selective than the "CT" position. The point marked "1" is the most selective. It is so arranged that a .0002-microfarad fixed condenser is put in series with the aerial.



CIRCUIT OF THE MERLIN TWO

The combination is a detector and power valve; the set can be used with mains gear or ordinary batteries

various wavelengths are made by means of a ten-point selector switch placed at the left-hand side of the panel.

The selectivity of the Merlin Two is of a very high order, because of the special design of the tuner used. Just at the right of the selector switch there is a lever that can be placed in

Perhaps it will be as well to emphasise the fact that the more selective the receiver is made the lower will be the strength of signals received. Everything has its price and in radio selectivity can, as a rule, only be obtained at the sacrifice of volume.

Great Selectivity

Nevertheless, the Merlin Two will be found sufficiently powerful to give good loud-speaker results within fifty miles of a local station or a hundred miles of a regional transmitter. The chief characteristic of the set is its selectivity, which enables it to be used with success almost next door to a broadcasting station.

In order to avoid complications, which would result from the use of the anode-bend system, the detector is arranged on the leaky-grid principle, with a 2-megohm grid leak and .0002-microfarad condenser.

As the tuning unit is already provided with a movable reaction coil, which is suitable for reception on all wavelengths, there is no need for a variable reaction condenser, as is normally the case when a fixed coil is used.

Reaction is, however, obtained by a modification of the Reinartz principle, with a .0001-microfarad fixed condenser.

Anode-circuit Wiring

In the anode circuit of the detector valve there is a high-frequency choke; this effectively blocks the passage of signal currents, which are forced through the reaction coil and to the cathode of the detector valve through the fixed reaction condenser. We

have not put a separate anode by-pass condenser on the detector valve because the fixed reaction condenser acts in the same way.

The coupling between the detector and power valve is made by means of an intervalve low-frequency transformer, almost any standard production being suitable for this purpose.

In order to isolate the loud-speaker from the high-tension circuit, and thus from the mains, which obviates any possibility of a shock while loud-speaker adjustments are being made, a choke-capacity output system is incorporated in the set.

This consists of a low-frequency choke placed in the anode circuit of the power valve and a 2-microfarad fixed condenser, which passes signal currents to the loud-speaker, although it insulates the latter from the direct current flowing in the anode circuit.

We have not thought it worth while to provide grid bias from the mains. The cost of doing this is considerable, and out of all proportion to its advantages. The cost of a standard grid-bias battery is so low and its life so long that it is really a much better proposition in a small mains receiver at any rate, in the ordinary way.

So far, it will be seen that the circuit is no different from that of an ordinary battery receiver,

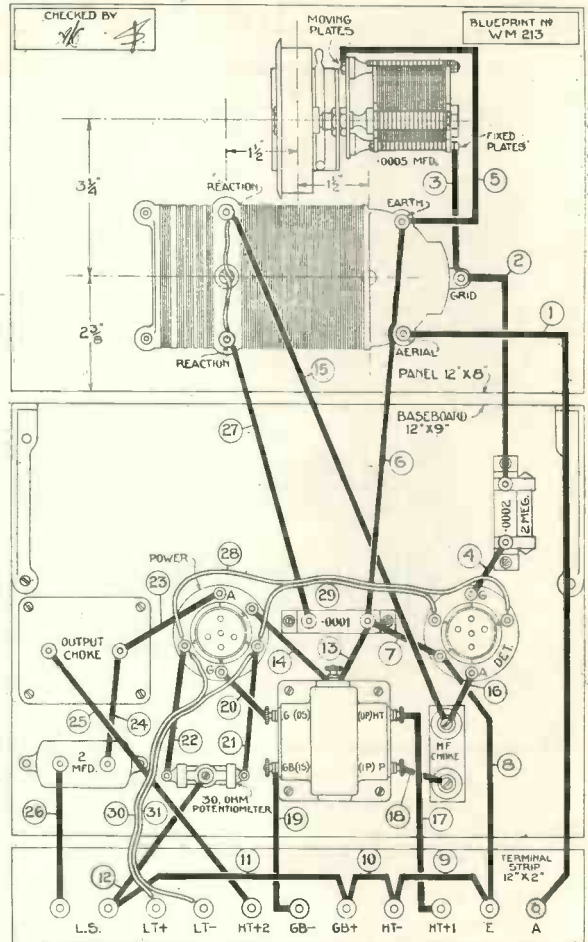
but some modification is necessary for the wiring of the filaments and cathodes of the mains valves. Readers are reminded that the filament of a mains valve is simply a heater element to raise the cathode to a sufficiently high temperature to emit electrons.

Low-tension Supply

The filaments, or heaters, as they are more correctly called, can be considered quite independently of the cathodes. All indirectly-heated mains valves can be fed with unrectified A.C. current, the consumption of each valve being 1 ampere at 4 volts.

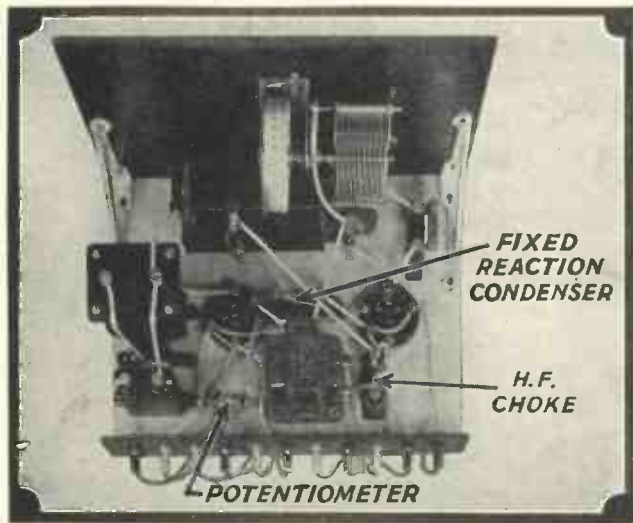
To run the filaments of this set, therefore, it is only necessary to connect the low-tension terminals to the 4-volt secondary of an A.C. mains transformer.

This can be either an entirely separate component (as it will have to be in most cases if an existing unit



LAYOUT AND WIRING OF THE SET

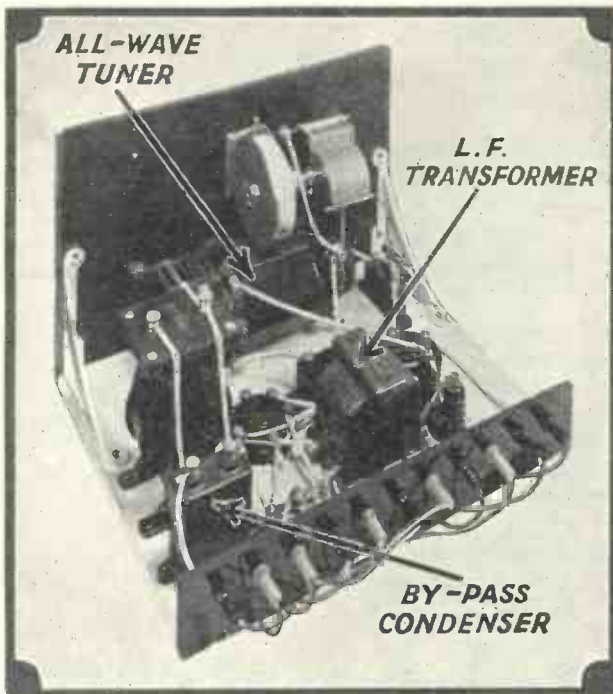
This quarter-scale layout and wiring diagram can be obtained as a full-size blueprint for half-price (that is, 6d., post free) if the coupon on the inside back cover is used by October 31. Ask for No. WM213



POSITIONS OF THE BASEBOARD COMPONENTS

The simple arrangement of the parts will be clear from this view. Every component has terminals and no soldering is required

The Merlin Two—Continued



A TROUBLE-FREE SET FOR THE FAMILY

This set takes all its power from the mains with the exception of grid bias. It is cheaper to use a small battery for this purpose than to get it from the mains

is used for providing high tension) or use can be made of the 4-volt winding on the secondary of the mains transformer incorporated in the "W.M." Standard A.C. Unit, which is described in detail on page 276.

When mains valves are supplied directly with alternating current, as is the case with this set, it is necessary to provide some adjustment to cut out any mains hum that may be introduced.

Cathode Equivalents

This is done by placing a low-resistance potentiometer across the low-tension leads and connecting the slider to the cathodes of the valves. It will be seen that the cathodes in a mains set are equivalent to the negative sides of the filaments in a set with ordinary battery-operated valves.

The photographs and layout that appear in these pages will convince even the beginner that there is nothing difficult about the construction of the Merlin Two.

The only two components mounted on the panel are the .0005-microfarad variable condenser for tuning and the tuning coil itself.

On the baseboard there are the

grid leak and condenser, high-frequency choke, fixed reaction condenser, two valve holders, low-frequency transformer, low-frequency choke and filter by-pass condenser.

The 30-ohm potentiometer which is adjusted to cut out any mains hum that may be experienced is not actually fixed to the baseboard, but is held in position by the wiring itself. It is a very small and light component and is quite satisfactory fixed in this way.

Although all

the essential details are reproduced in these pages, a large number of readers will prefer to work from a full-size blueprint. This can be obtained for half-price (that is, 6d., post free) if the coupon on the inside back cover is used by October 31. Ask for No. WM213, and apply to Blueprint

Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, E.C.4.

It will be found that the panel plate supplied with the tuning coil can be used as a template. It is necessary to drill one hole for the spindle of the selector switch and another hole for the spindle of the movable reaction coil.

Selectivity Lever

Just at the right of the first hole, a slot must be cut for the selectivity lever, which has already been referred to in detail.

The mounting of the remainder of the components on the baseboard will not present any difficulty whatsoever. There is no overcrowding and all the terminals are easily accessible.

Every component used in the original set built in the WIRELESS MAGAZINE Laboratories is provided with terminals, so that there is no need for any soldering. It will be found convenient to use insulated sleeving, through which connecting wires can be threaded, when wiring up.

No Wiring Mistakes!

If full use is made of the blueprint or the reduced reproduction that appears in these pages, there is no chance of making a wrong connection.

It will be seen that each connection bears a number; these numbers indicate the best order in which to carry out the wiring. If the leads are

COMPONENTS NEEDED FOR THE MERLIN TWO

CHOKE, HIGH-FREQUENCY

1—Walmel, type DX3, 6s. (or Ready Radio, Igranic).

CHOKE, LOW-FREQUENCY

1—Lotus type AM/30, 15s. (or Parmeko, Igranic).

COILS

1—British General tuner, 14s. 6d.

CONDENSERS, FIXED

1—Dubilier .0001-microfarad, type 620, 2s. 6d. (or Graham Farish, T.C.C.).

1—Dubilier .0002-microfarad, type 620, 2s. 6d. (or Graham Farish, T.C.C.).

CONDENSER, VARIABLE

1—Utility .0005-microfarad, Drum Mite type, 11s. 6d. (or Polar, Lotus).

EBONITE

1—Resiston panel, 12 in. by 8 in. by $\frac{3}{16}$ in., 6s.

1—Terminal strip, 12 in. by 2 in.

HOLDERS, VALVE

2—Benjamin 5-pin, 3s. 6d.

PLUGS

2—Belling-Lee wander plugs, marked: G.B.+, G.B.—, 7d. (or Clix, Eelex).

11—Clix plugs and sockets, marked: L.T.+3, L.T.—, H.T.+1, H.T.+2, H.T.+3, H.T.+4, H.T.—, A, E, L.S.+ , L.S.—, 3s. 2½d. (or Belling-Lee, Eelex).

The prices mentioned are those for the parts used in the original set; the prices of alternatives as indicated in the brackets may be either higher or lower

RESISTANCE, FIXED

1—Walmel 2-megohm gridleak, 1s. (or Lissen Igranic).

RESISTANCE, VARIABLE

1—Clarostat 30-6hm potentiometer (Hum Dinger), 2s. 9d.

SUNDRIES

Tinned copper wire for connecting.

Length of Sistoflex sleeving.

6 yd. of rubber-covered flex (Lewcos).

1—Pair Keystone panel brackets, 2s. (or Lissen, Bulgin).

TRANSFORMER, LOW-FREQUENCY

1—Telsen Radiogrand, ratio 1 to 3, 12s. 6d. (or Burton, Lissen).

ACCESSORIES

BATTERY

1—Lissen 16-volt grid bias, 2s. 9d. (or Siemens, Pertrix).

CABINET

1—Clarion, 19s. 6d.

LOUD-SPEAKER

1—Celestion D12, £5 (or Lamplugh, Brodersen)

VALVES

1—Cossor 41MRC, 15s. (or Marconi MH4.

Osrarn MH4).

1—Cossor 41MP, 17s. 6d. (or Marconi ML4, Osrarn ML4).

An A.C. Mains Set for Local-station Reception

put in position in the numerical order thus indicated, there is no possibility of a mistake being made.

The choice of suitable valves for the Merlin Two is not difficult. The most important point to watch is that the anode-current requirements are not in excess of the capacity of whatever source of high tension is used. If the set is used in conjunction with the "W.M." Standard A.C. Unit, as is recommended, the combined anode current for the two valves must not exceed 20 milliamperes.

Choose by Impedance

Provided that the limitations of anode current are kept in mind, the valves can be chosen by their impedance. The detector valve should have an impedance between 10,000 and 25,000 ohms, while the power valve should be between 2,000 and 5,000 ohms, these values not being at all critical.

It should be remembered that when the current taken from a mains unit is not the maximum, the voltage developed may be higher than the actual rating. It is therefore advisable to over-bias the power valve by a small amount to make sure that it is not being overrun.

Connecting Up

It is a very simple matter, indeed, to connect the set up ready for use. If it is to be used with an existing high-tension unit, so arrange the connections that H.T.+2 is supplied with approximately 120 volts, while H.T.+1 should preferably be connected with a variable tapping that will give anything from 90 to 120 volts.

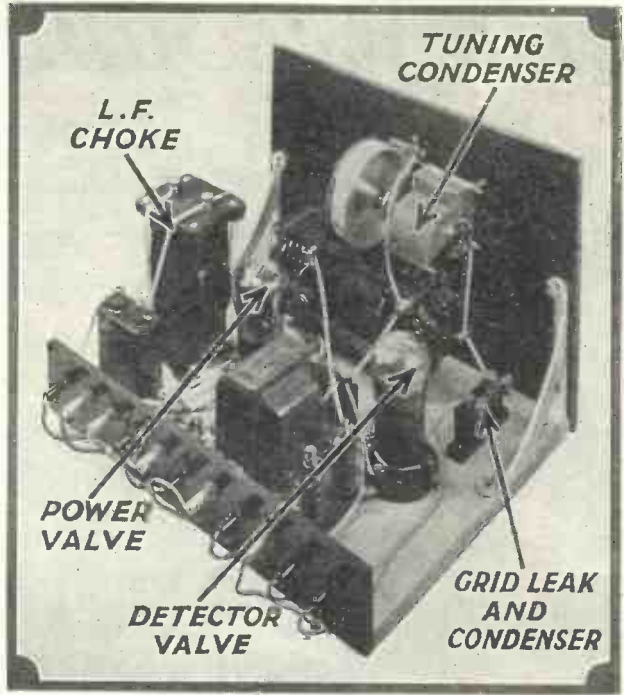
We recommend that the Merlin Two should be used in conjunction with the "W.M." Standard A.C. Unit, in which case H.T.+2 on the set should be connected to H.T.+4, while H.T.+1 on the set should be connected to H.T.+2 on the unit, which has a 10,000-ohm resistance circuit.

Low-tension Connections

The low-tension connections on the Merlin Two should be made to the secondary of a mains transformer giving a 4-volt output. In most cases

this will have to be bought separately if an existing high-tension unit is utilised; if the "W.M." unit is used, it is only necessary to connect the L.T. terminals on the set to the L.T. terminals on the mains unit itself. It will not matter which way round these connections are made.

It will be observed that there is no on-off switch on the Merlin Two itself, the mains being switched on and off at the power unit. If a



A.C. MAINS OR BATTERIES

Although designed as a mains set, the Merlin Two can be operated from batteries by making one extra connection and removing the potentiometer

received at good loud-speaker strength during a daylight test of the set at the "W.M." Laboratories in Fetter Lane:—

Huizen: Selector Switch, 10; Condenser, 154 degrees.

Midland National (5XX): Selector Switch, 10; Condenser, 120 degrees.

Midland Regional (5BG): Selector Switch, 3; Condenser, 130 degrees.

London Regional: Selector Switch, 3; Condenser, 92 degrees.

London National: Selector Switch, 3; Condenser, 58 degrees.

Reaction is controlled by the right-hand knob on the panel. Although this knob actually moves a coil, it is adjusted in exactly the same way as if it were an ordinary reaction condenser.

Searching for Stations

When searching for stations, it will be found that some come in at several positions of the selector switch, but the condenser readings will, of course, be different. It is a good plan, when a station is picked up, to try and get it on several tapings, because one will in all probability give better strength than the others.

Readers will be interested to know
(Continued on page 286)



THERE ARE ONLY FOUR CONTROLS

At the top of the panel is the main tuning condenser. Below, on the left, is the selector switch for various wavelength ranges; in the centre, a selectivity lever; and, on the right, the reaction control

separate low-tension transformer is used for running the valves, a switch should be inserted in a flexible lead between the electric-light socket and the primary of the transformer.

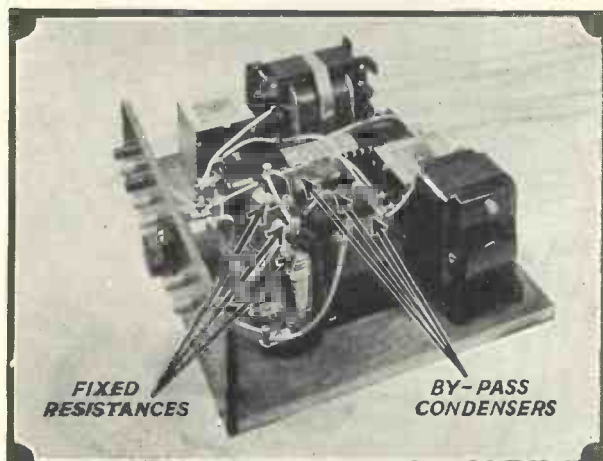
The operation of the set is simple. First, adjust the selectivity lever in the centre of the panel to the "CT" mark. Then adjust the selector switch on the left for the particular wavelength range required. As a guide, we give here the selector-switch positions and condenser-dial readings for five stations which were

The "W.M." Standard A.C. Unit

PROVIDES A CONSTANT SOURCE OF 20 MILLIAMPERES AT 120 VOLTS FOR MOST TWO-, THREE-, AND FOUR-VALVE SETS

GIVES HIGH-TENSION AND LOW-TENSION SUPPLIES FOR THE ALL-WAVE A.C. TWO-VALVE DESCRIBED ON PAGE 272 OF THIS ISSUE

FOUR POSITIVE OUTPUTS ARE PROVIDED — THREE FIXED FOR ANODE CIRCUITS AND ONE VARIABLE FOR SCREENED-GRID VALVES



WITHIN THE CAPABILITIES OF ANY CONSTRUCTOR

So simple is this high-tension unit that any beginner can build without difficulty. The metal rectifier is almost everlasting and with no trouble of any sort

APART from the initial expense, the cost of obtaining high-tension current from A.C. (alternating current) mains is negligible. Indeed, an ordinary three-valve set consumes so little power that in many cases the meter will not register at all unless there are some lights burning at the same time!

In designing this unit we had in mind the desirability of producing a standard job that could be used with the majority of WIRELESS MAGAZINE receivers to be described during the new season.

Constant Supply at 120 Volts

Although a certain number of constructors like to run their sets with very high anode voltages, we considered that the majority of readers would be content with a constant source of 120 volts.

Voltage is, of course, not the only consideration in a mains unit, for the question of load is of equal, if not greater, importance. The unit as shown on these pages will provide 20 milliamperes at 120 volts, while if the load is of the order of only 10 milliamperes, the voltage available will rise slightly to something in the neighbourhood of 140 volts.

Not for Use on D.C. Mains

It should be clearly understood that this high-tension unit is only of use in places where A.C. mains are installed. It will not work at all on D.C. (direct current) mains. Moreover, when the mains transformer is being ordered it is essential to specify the exact voltage and frequency of the supply.

An interesting feature of the unit is that the mains transformer used is provided with a 4-volt secondary

winding which can be utilised for supplying power to the heaters of indirectly-heated A.C. mains valves. Thus the unit can be used as the basis for an all-electric receiver, as is the case when it is combined with the Merlin Two, described elsewhere in this issue.

Essentials in A.C. Mains Units

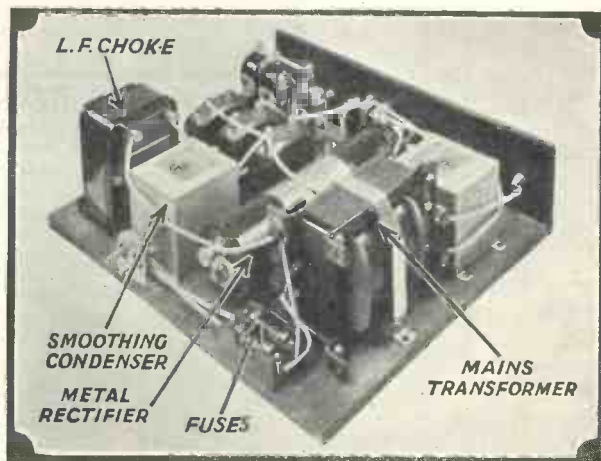
The essential requirements in any apparatus to obtain high tension from A.C. mains are: (1) a rectifier to convert the oscillating mains current to a direct current, (2) low-frequency choke and condensers to smooth out any of the irregularities in the output from the rectifier and so prevent humming noises from the receiver, and (3) resistances to break down the voltage to the values required for feeding different stages in a set.

In this unit a metal rectifier is used. This consists of copper and copper-oxide discs interleaved and mounted on a common spindle. The construction is particularly robust and the life of the rectifier when in use seems to be indefinite. We have never yet heard of one of these units wearing out or becoming "exhausted," as it were.

Need for High-voltage Condensers

For the sake of simplicity, the rectifier is of the half-wave type and smoothing is carried out by a 30-henry low-frequency choke and two 4-microfarad fixed condensers. It is essential that these condensers should be of the high-voltage type in order to avoid breakdowns and possible short-circuits.

Four positive output terminals are provided. One of these gives the maximum voltage possible; two give



SUITABLE FOR ALMOST ANY RECEIVER

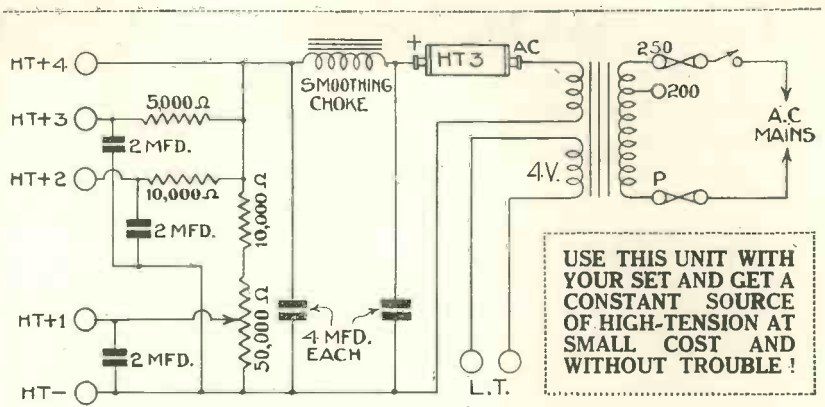
With its three fixed and one variable tapping, this "W.M." Standard A.C. Unit can be used with almost any set with success. Use it for the Regional Band-pass Four and the Five-point Three

lower voltages which are controlled by the values of the fixed resistances placed in circuit; and the last gives a variable voltage (from 0 to approximately 100 volts) from an adjustable potentiometer. This variable tapping is intended for supplying the screening grid of a shielded valve.

Extra Output Point

Space has been left in the unit for the insertion of an extra variable resistance if another variable output should be required for any purpose.

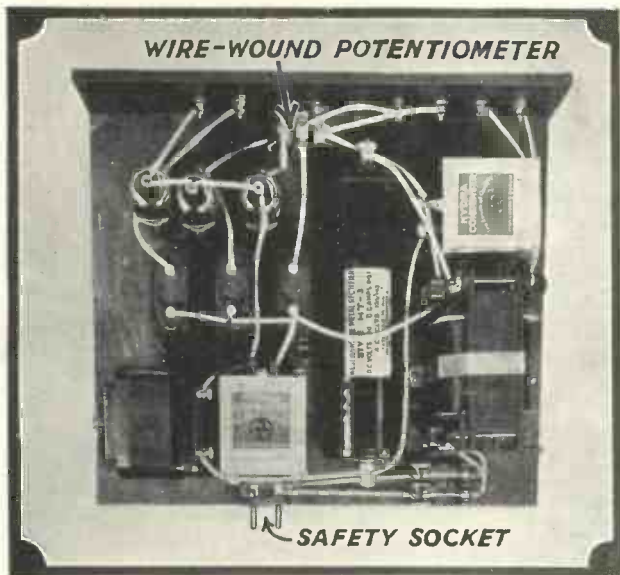
An important point to notice is that each tapping point on the unit is by-passed to earth by means of a 2-microfarad condenser. This is done to prevent the possibility of motor-



USE THIS UNIT WITH YOUR SET AND GET A CONSTANT SOURCE OF HIGH-TENSION AT SMALL COST AND WITHOUT TROUBLE!

CIRCUIT OF THE "W.M." STANDARD A.C. UNIT

It should be clearly understood that this unit can be used only with A.C. mains and will not work at all with D.C. mains



EVERY PRECAUTION TAKEN FOR SAFETY

This unit should be used with the type of metal box specified, where the mains are automatically disconnected as the unit is withdrawn. Fuses are provided in the main leads to guard against damage from accidental short-circuits

boating when the unit is used with a set not already provided with de-coupling resistances.

It will be seen from the photographs and layout reproduced in these pages that the construction is particularly simple and can be tackled by anybody. All the essential details are reproduced in these pages but, if desired, a full-size blueprint can be obtained from the Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, E.C.4.

Special Half-price Scheme

This is No. WM214, and can be obtained for half-price (that is, 6d., post free), if the coupon on the inside back cover is used by October 31.

We strongly recommend that this unit should be used in a metal box, which will avoid the possibility of shocks being sustained by uninitiated members of the family.

On this page we give complete dimensions for a suitable case, which should preferably be made of

tinplate. It will be seen that the unit slides right inside the box, at the back of which a hole is provided for the connection of a lead from the most convenient electric-light socket.

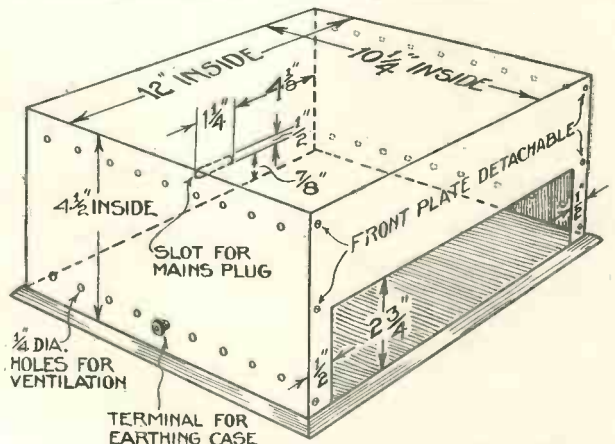
The mains plug should never be connected to the socket on the baseboard *except* through the hole in the back of the case. If this is always done the mains will be disconnected automatically whenever the unit is withdrawn from the box for the purpose of making an adjustment. The box should be earthed by connecting it to the negative terminal of the unit itself.

Well Insulated Leads Essential

Little need be said about the actual construction, but great care should be taken to see that all the leads are well insulated.

In case of an accidental short-circuit a fuse is provided in each of the mains leads to the primary of the transformer. In case of accident, these will blow before any serious damage is done either to the unit or to the set with which it is connected.

It is now time to consider the voltages that can be obtained from the respective tappings provided. Starting with the output marked H.T. +1 it will be seen that this is taken from the slider of a 50,000-ohm



METAL SAFETY BOX FOR THE UNIT

All constructors should use a metal box of the type shown here. It is made of tinplate and can be obtained from the Neophone Engineering Co.

The "W.M." Standard A.C. Unit—Continued

COMPONENTS REQUIRED FOR THE "W.M." STANDARD A.C. UNIT

- CHOKE, LOW-FREQUENCY**
 1—Lewcos, 17s. 6d. (or Ferranti B1, Regentone).
- CONDENSERS, FIXED**
 3—Hydra 2-microfarad, 8s. 3d. (or T.C.C., Dubilier).
 2—Hydra 4-microfarad, 500 volt A.C. test, 12s. (or T.C.C., Dubilier).
- FUSE**
 1—Bulgin twin fuseholder complete with fuses, 2s. 6d.
- EBONITE**
 1—Terminal strip, 12 in. by 3 in.
- METAL RECTIFIER**
 1—Westinghouse, type HT3, £1 1s.
- PLUGS AND SOCKETS**
 7—Belling-Lee, safety type, marked: L.T.+ , L.T.—, H.T.+1, H.T.+2, H.T.+3, H.T.+4, H.T.—, 5s. 3d. (or Clix, Eelex).
- RESISTANCES, FIXED**
 2—Varley 10,000-ohm, with holder, 14s. (or Ready Radio, Lissen).
 1—Varley 5,000-ohm, with holder, 7s. (or Ready Radio, Lissen).
- RESISTANCE, VARIABLE**
 1—Colvern 50,000-ohm wire-wound potentiometer, 5s. 6d. (or Regenstat, Rotorohm).
- SUNDRIES**
 1—Baseboard, 12 in. by 10 in. Tinned copper wire for connecting. Length of Sistoflex sleeving.
 1—Bulgin safety mains plug and socket, 3s. 9d.
 1—Neophone metal case, 12s. 6d.
- TRANSFORMER**
 1—Regentone W.R.3 (stripped type), £1 1s.

The prices mentioned are those for the parts used in the original set; the prices of alternatives as indicated in the brackets may be either higher or lower

potentiometer. This potentiometer is connected in series with a 10,000-ohm fixed resistance and the two placed directly across the output from the rectifier.

The total voltage from the rectifier is therefore always available across these two resistances. Suppose with the particular load being taken the voltage is exactly 120 volts, then the voltage across the potentiometer itself will be five-sixths of the total; in other words, one-sixth of the total voltage will always be lost across the 10,000-ohm fixed resistance.

0 to 100 Volts

When the maximum voltage on the rectifier is 120 volts the potentiometer will give any value between 0 and 100 volts by moving the slider round. Care should be taken when using this tapping for supplying voltage to the screen of a shielded valve that it is not turned too far round or too high a voltage will be applied; if continuous, this will result in the life of the valve being shortened.

Second Output

In series with the lead marked H.T.+2 there is a fixed resistance of 10,000 ohms. This value can, of course, be changed as desired for varying conditions.

The point to remember is that every milliamperere flowing in the anode circuit of the valve will produce a drop of one volt for every thousand ohms in circuit. Thus, if the current

taken from H.T.+2 were 1 milliampere, the voltage lost across the resistance would be 10; on the other hand, if the anode current were 3 milliamperes as much as 30 volts would be dropped by the resistance.

Similar reasoning applies to the

The tapping marked H.T.+4 will give the maximum voltage obtainable from the rectifier. There will be a small drop in voltage caused by the resistance of the smoothing choke, but this will be negligible if a good component with a low resistance is used.

The D.C. resistance of the choke used in the original unit is only 170 ohms.

Maximum Load

It is most important to remember that the maximum load that can be taken from this unit is 20 milliamperes; this figure must not be exceeded or the metal rectifier will be damaged. Before connecting the unit to a set it is advisable to look up the anode currents of the valves at 100 to 120 volts in order to make sure that the total current required is not in excess of 20 milliamperes.

Another point that should be watched is the fact that when the load is less than 20 milliamperes the maximum voltage will be over 120, although it will never exceed 150 volts (with a load of 4 milliamperes).

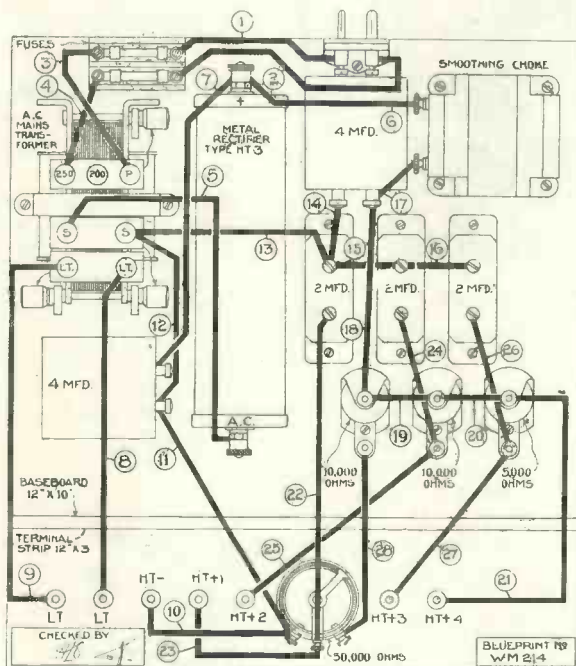
When applying grid bias to low-frequency valves it is therefore as well to assume that the anode voltage is slightly on the high side. It will be better to apply a little too much bias to the valves than run the risk of overrunning them by applying too little.

New Metal Rectifiers

In order to avoid confusion, it will be as well to explain the exact position with regard to the metal rectifier, which is a Westinghouse type HT3. By the time this issue of WIRELESS MAGAZINE is published, announcements will have been made of a new Westinghouse unit with the same characteristics as the HT3. The new model will be smaller in size and cheaper in

price, because the metal case will be of a less robust character than that used for model HT3.

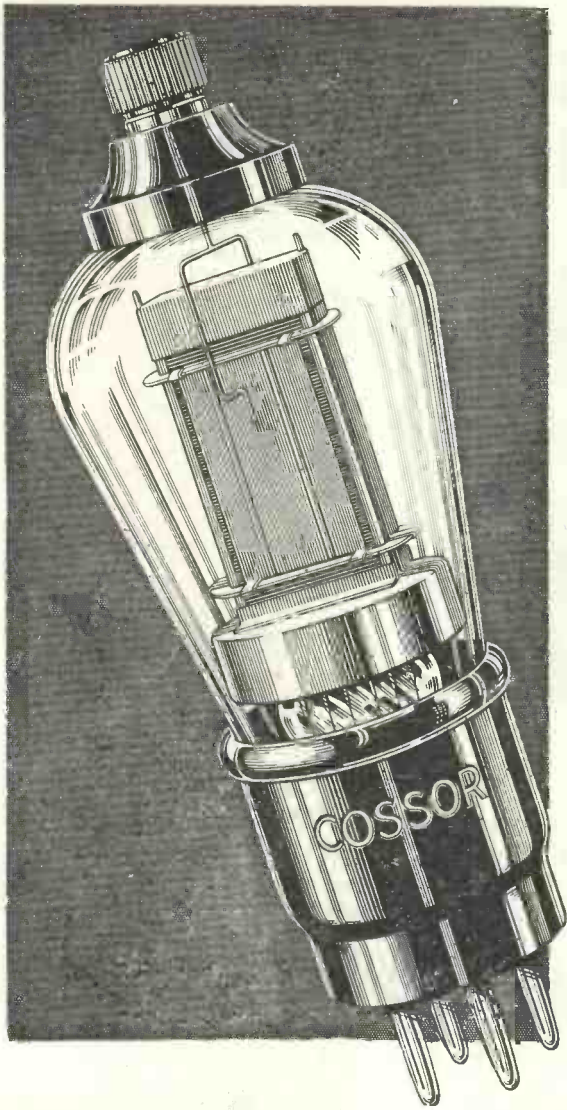
The new unit will be quite suitable for use in the "W.M." Standard A.C. Unit provided a slight alteration is (Continued on page 286)



LAYOUT AND WIRING OF THE HIGH-TENSION UNIT

This quarter-scale layout and wiring diagram can be obtained for half-price (that is, 6d., post free) if the coupon on the inside back cover is used by October 31. Ask for No. WM214

H.T.+3 tapping, which in this case has a 5,000-ohm resistance in series. Used with a low-frequency valve taking 4 milliamperes, a voltage drop of 20 would be produced, so that the voltage actually applied to the anode would be about 100 volts.



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HIGHEST ACTUAL AMPLIFICATION

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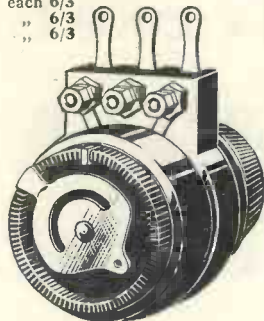
Remember when you purchase wire-wound high resistances be sure to specify Electrad Royalty, the original units used by the leading manufacturers, experts and in laboratories throughout the world. Do not accept imitations and infringements. Manufacturers should note that special models are available for production use.

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" C	500 "	50,000 "	7.5 "	...	"	6/3
" D	10,000 "	700,000 "	2 "	...	"	6/3
" E	0 "	500,000 "	2.5 "	...	"	6/3
" F	0 "	2,000 "	37.5 "	...	"	6/3
" G	0 "	10,000 "	16.5 "	...	"	6/3
" H	0 "	25,000 "	10.5 "	each	6/3	6/3
" J	0 "	200,000 "	4 "	"	6/3	6/3
" K	0 "	5,000 "	23 "	"	6/3	6/3

Complete with bakelite arrow knob.

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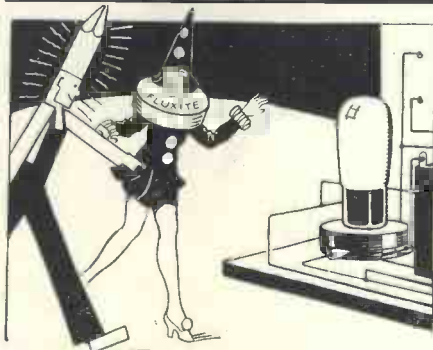
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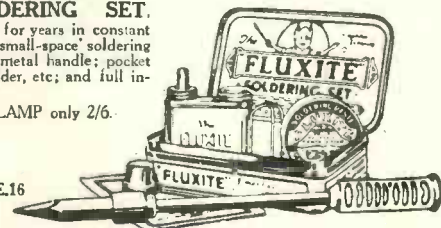
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The price is exceptionally reasonable when the remarkably fine reproduction is compared with that of other speakers and therefore offers excellent value for money. There are three other R.K. Reproducers—the Senior with built-in rectifier for use with A.C. mains, price £11 10s., and the Standard Senior, price £7 7s., and Junior Model, price £6 6s., all of which are obtainable through your radio dealer.

Ask your dealer for particulars of hire purchase terms.

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LEAVES FROM A LISTENER'S LOG

By JAY COOTE

IN France and Belgium, the burgo-master or mayor of a locality is empowered to fix the time after which the police may forbid all street noises.

Loud-speakers, as a whole, apparently come under the heading of "nuisances" and in many towns owners of wireless sets are forbidden to leave the windows of their flats or houses open if music is being broadcast.

Bitter Complaints

In the principality of Monaco, possessors of radio receivers are bitterly complaining regarding the regulations made by the police authorities which forbid them to use loud-speakers after 10 p.m.

As soon as this hour has struck, unless all their windows are hermetically closed to make the rooms sound-proof, they must switch off, failing which they are liable to heavy penalties.

Unfortunately, most of the Continental stations broadcast their main—and often only interesting—programmes toward the hour at which silence is enforced.

Pity the French radio-fan who *up to that time* may have been compelled to listen to umpteen publicity puffs, whilst waiting for a musical programme.

Radio critics beware! Although considerable liberty is granted to journalists in France in respect to their comments on the programmes broadcast by the numerous studios, adverse criticism of a singer or even of an announcer may cause serious trouble.

Faulty Enunciation

Recently the editor of a wireless journal in Morocco drew the attention of his readers to the faulty enunciation of a lady announcer at the Radio Maroc studio (Rabat).

The speaker in question happened to be the station director's wife. The husband was forthwith commissioned by his better half to take the next train to Casablanca to seek redress.

He met the editor seated outside a café on the main boulevard and, without seeking any explanation, kicked

him, slapped his face, pulled his nose and generally gave him to understand that criticism in future would be considered unwelcome.

History tells us that the episode ended before the local magistrate who inflicted fines all round but, according to a French newspaper, honour was satisfied.

As most of you will have gathered from the broadcasts emanating from French stations, the bulk of the income necessary to run the studio is derived from publicity given to local and even foreign commercial firms.

In the case of Radio LL Paris, the transmitter was installed to boost the wares of a manufacturer of wireless receivers and components. For this reason the studio is laid out as a permanent private exhibition and is always open to visitors.

The musical programmes are broad-

**Look Out for the
Next Issue of
WIRELESS
MAGAZINE
on Wednesday,
October 22**

cast not only for the benefit of customers but also with a view to bringing the manufacturer's name to the ears of more distant listeners. Transmissions are carried out simultaneously on 369 and 61 metres.

Radio LL is also responsible for the installation and operation of the broadcaster at Nice-Juan les Pins, on the French Riviera. In consideration of its commercial utility, Radio LL is possibly the only station in Paris which will not be removed to a site outside city limits.

Where we habitually captured the high-power Kharkov transmissions we now find Moscow, the 100-kilowatt operated by the Soviet's professional trades unions.

Whether this "giant" will continue to remain on 1,304 metres, I cannot say, but there is no doubt that on that particular wavelength the

broadcasts are received at great volume throughout the greater part of Europe.

It is mainly this channel which is used by the Soviet authorities to encourage revolutionary and communistic propaganda in French, German and English.

Now and again from this station you may pick up first-class orchestral and vocal concerts, but they are few and far between.

Connecting Links!

If anything, these musical interludes appear to have been adopted as a connecting link between red-hot Bolshevik talks.

And how they can spout! The Hyde Park tub-thumper is a back number.

Germany has got away with the reorganisation of the present broadcasting system and work on the construction of at least two of the 60-kilowatt transmitters is being hurried along with a view to bringing them into daily operation by the coming winter.

It seems, however, that possibly the full programme, namely nine new stations, may not be carried out but that the scheme may be developed on common-wave relay lines.

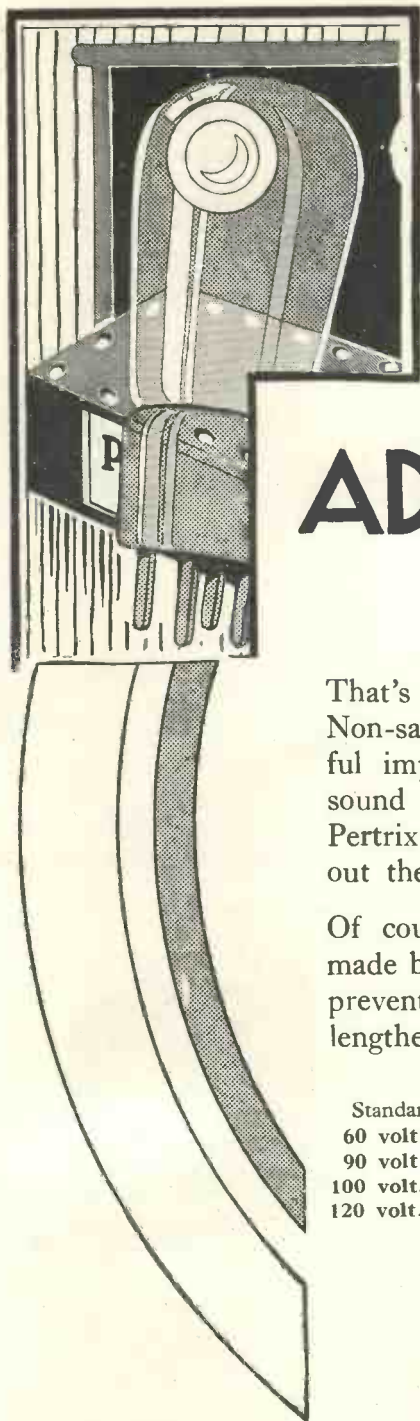
There is a question of putting up a number of smaller transmitters at such places as Leipzig, Halle, Chemnitz, Zurich, Erfurt, Plauen, all to take their programme from a common studio.

Crystal Control

The quartz-controlled stations at Cologne, Aachen and Münster as well as those at Berlin, Stettin and Magdeburg have given satisfaction and such installations, with the possibility of tapping local studios, is considered more likely to please all listeners.

Have you noticed also that although Cologne works on a wavelength jointly with Münster and Aachen, it is still possible to enjoy the broadcasts; in fact, on many evenings I could detect but little difference with those before the change was

(Continued on page 286)



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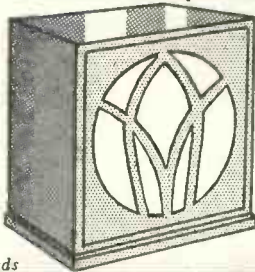
There is news in the "Wireless Magazine" advertisements

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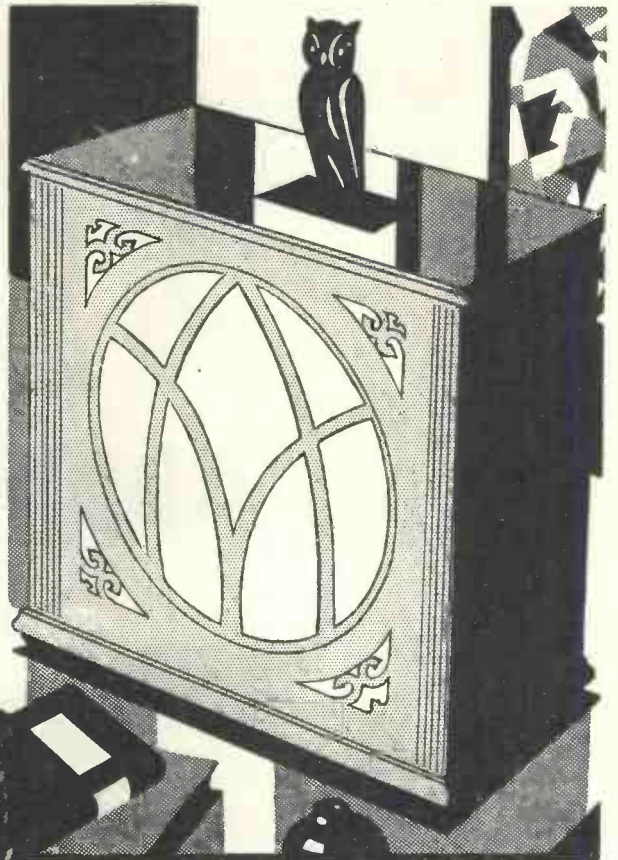
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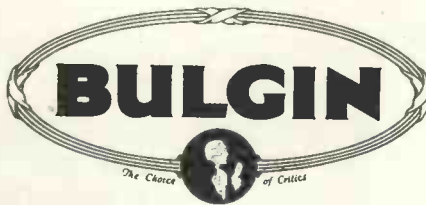


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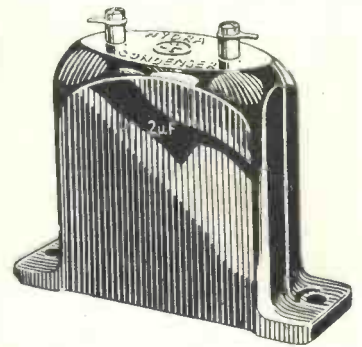
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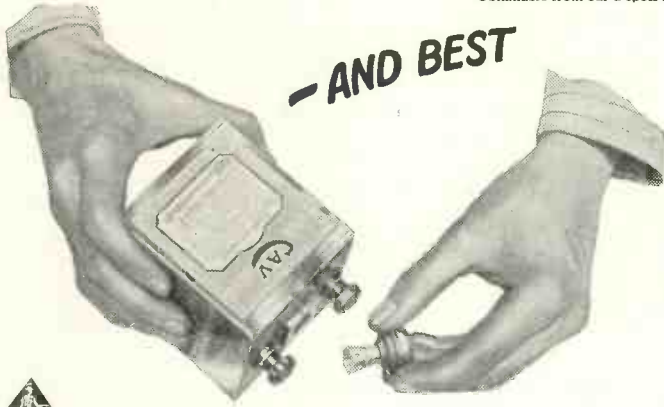
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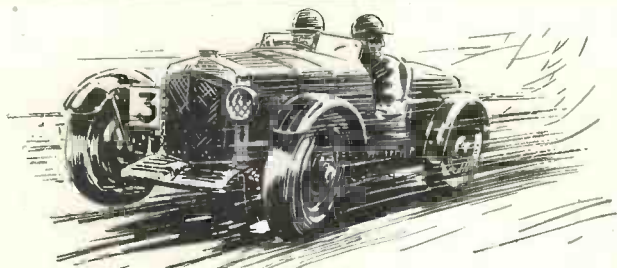


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Leaves from a Listener's Log

Continued from
page 282

made; there was no wobble whatever.

Do you ever listen to Lahti (Finland)? If you experience any trouble in that direction try, as an alternative, the Kelsinki station on 221 metres.

It has recently been endowed with a 10-kilowatt transmitter and the broadcasts are coming through well on favourable nights.

With the exception of Tuesdays and Fridays all announcements are in the Finnish language; on those evenings they are given in Swedish, as the Finns are still a bi-lingual nation.

Foreign Languages

As regards foreign languages, most of the European announcers to-day are capable of at least two or three and in many instances their studio duties call for this knowledge. The record, however—so far as I know—is held by the "speaker" who presides at the Kosice (Yugoslavia) microphone; he speaks Serbian, Czech, Polish, Russian, Roumanian, Magyar. German and French equally well.

At some of the newer stations, following the American plan, the announcer is allowed to retain his identity, and his name is well known to listeners. At others, he hides it under a *nom de guerre*.

In France, *Radiolo*, of Radio Paris, became a household word, and on the transfer of its originator to Juan les Pins, his successors bore the same name.

Three Nombres de Plume

At the Ecole Supérieure (PTT), Paris, Mon. Auxiétre fulfils these duties under the *nom de plume Microvox* (the voice of the microphone); if he gives a talk he does so as *Jean Toscane*, and when called to take a part in a play, he appears in the programme as *Jean Taragone*. *Vox* as a pseudonym has caught on with the French, for the Rennes announcer now styles himself *Renovox*, and at Bordeaux, his colleague has adopted the title *Arcavox*, and so on.

Complete anonymity, however, does not exist, as the majority of these speakers make it a habit of writing to the local paper and so let the general public into a not very closely guarded secret.

Recently, I was asked by an acquaintance how long it would take for a wireless message to travel around the earth and I was prepared to work out the answer.

Curiously enough, on the same evening the information was passed on to me. It happened "thuswise." The voice of an official of the General Electric Company was broadcast by Schenectady (W2XAD) on 19.58 metres, picked up by Huizen (PH1), Holland, and relayed by this station to PLW (Bandoeng, Java), which in

its turn transmitted it back to the American station via 2ME Sydney (New South Wales).

Reflection of Voice

As a matter of fact, C. D. Wagoner, the staff engineer in question, heard his own voice come back to Schenectady (N.Y.) as an echo *one-eighth of a second* after he had uttered the words.

For your guidance the distance actually covered in that period of time was 22,900 miles.

The "W.M." Standard A.C. Unit

Continued from page 278

made to the layout of the components and that a special mains transformer is obtained. The input voltage required for the HT3 rectifier is 135 volts A.C., but we understand that the new model will require a slightly higher input than this.

A number of manufacturers make suitable transformers for use with these metal rectifiers, but so far as we are aware the Regentone model (as used in the original unit) is the only standard production having a 4-volt winding for running A.C. valves.

If this unit is to be used with a set using ordinary battery-operated valves, then the mains transformer need not have this 4-volt secondary and any other production will be suitable.

In some cases the constructor may desire to have two variable outputs instead of only one. This is easily accomplished by replacing either the 5,000- or 10,000-ohm resistance at present shown with a variable resistance.

Normally, a maximum resistance of 50,000 to 100,000 ohms will be suitable, but the minimum resistance should be low.

Suitable components for this purpose are the wire-wound resistances (not potentiometers) sold under the names Regentone and Rotorohm. Either of these can easily be fixed on the ebonite strip.

Not for Ordinary Valves

For the sake of beginners we feel it desirable to emphasise the fact that the output marked "L.T." on this unit *cannot be used under any circumstances for running the filaments of ordinary valves.*

The only types that can be supplied from this source are the indirectly-heated A.C. valves taking 1 ampere at 4 volts. The method of wiring up such valves, which have special filament circuits, will be clear from the description of the Merlin Two, the all-wave A.C. receiver described on page 272 of this issue.

The Merlin Two—Continued from page 275

that this set can be used with high- and low-tension batteries in the ordinary way by making one extra connection in the set. This connection is between the terminals marked "4" and "5" on the power-valve holder.

When these two points are connected together an ordinary high-tension battery can be employed, an accumulator being used to supply filament current to the valves which, of course, should be of the ordinary

battery type and not A.C. mains valves.

In order to conserve the life of the accumulator it is desirable also to disconnect one end (not the slider) of the potentiometer connected across the low-tension leads.

There is little more to be said about the Merlin Two. It is an ideal set where local-station reception and a trouble-free receiver needing the minimum maintenance attention are the chief features required.



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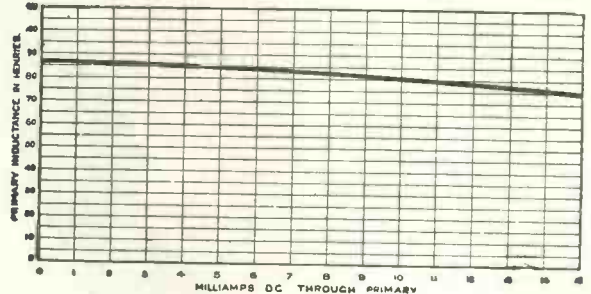
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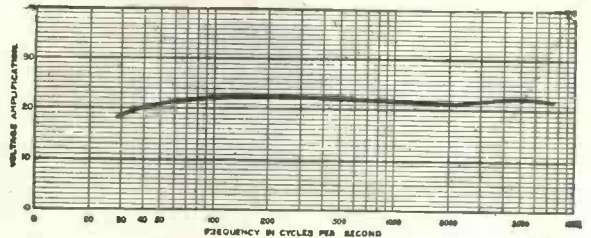
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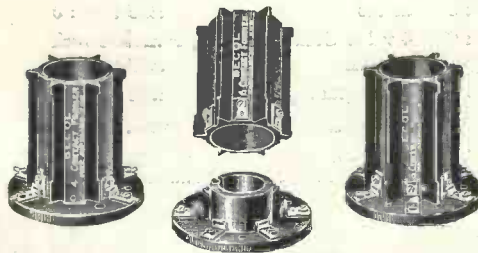
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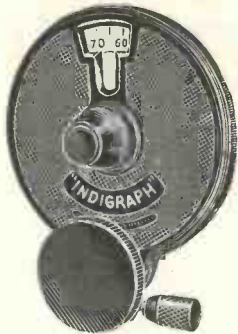
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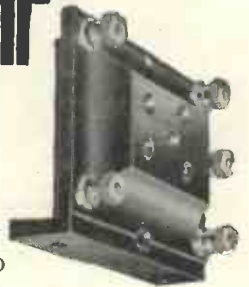
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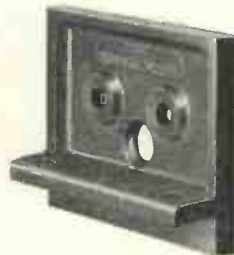


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The Co-optimists, who have recently been broadcasting again

WITH the approach of winter, the season of real listening, coupled with good reception that is only obtainable in the dark evenings, is about to begin. Whether or not this season will be a success partly rests with the programme department of the B.B.C. Programmes must still be brightened up a great deal more and a better use made of the regional system by providing suitable alternative programmes.

No Change in Sunday Programmes

As forecast before, there is still no apparent change in Sunday broadcasting. We do not think, however, in spite of all criticisms to the contrary, that the British listening public want the gay Continental type of programme. In fact, the nature of the Britisher would rebel against it. Surely there is enough dance music broadcast every evening in the week to warrant its total exclusion from the Sunday programme entirely?

Provincial Station Orchestras

Rumours have been in circulation recently regarding the disbandment of the provincial station orchestras.

We understand from official circles that the Birmingham Studio Orchestra is to be the first to come to an end this autumn and that the Northern Wireless Orchestra will follow at the close of this year or the beginning of next. Manchester citizens will be quite indignant, as this orchestra is a very popular feature in the northern programmes. However, the B.B.C. has decided that they must all be disbanded, as the new B.B.C. Orchestra gets into the general run of its duties.

Plans are well advanced concerning the arrangements

BROADCAST MUSIC *of* the MONTH

for the B.B.C. winter season of symphony concerts, which will again be held weekly at the Queen's Hall from October 22 till May 6, 1931.

One of the most outstanding successes at this year's promenade concerts was the performance of the "Bolero for Orchestra," composed by Ravel, who is one of the French modern composers. This work was played on the opening night, and again, by request, on August 23.

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The work is very simple in design, only one small theme being used throughout, but fascination is centred in the way in which this small theme works up, step by step, to a tremendous climax by the introduction of one instrument after another playing it, till it becomes almost an uproarious entertainment. This piece of music created a

sensation in the musical world when it was first played in London at the B.B.C. concerts last winter. Everyone will appreciate this work when it is played again.

Performances by the new B.B.C. Symphony Orchestra have been excellent and we offer to it and its famous conductor, Sir Henry
(Continued on p. 294)



(Top) Myra Hess, one of the most famous of British pianists

(Middle) Marion Anderson, a gifted contralto

(Bottom) Horace Stevens, bass-baritone



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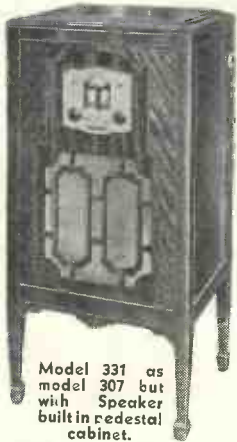
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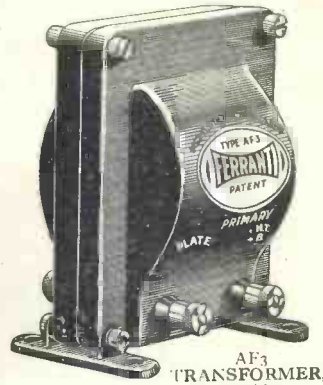
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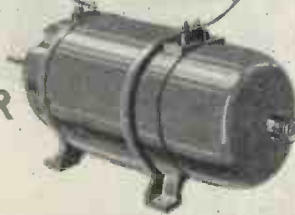
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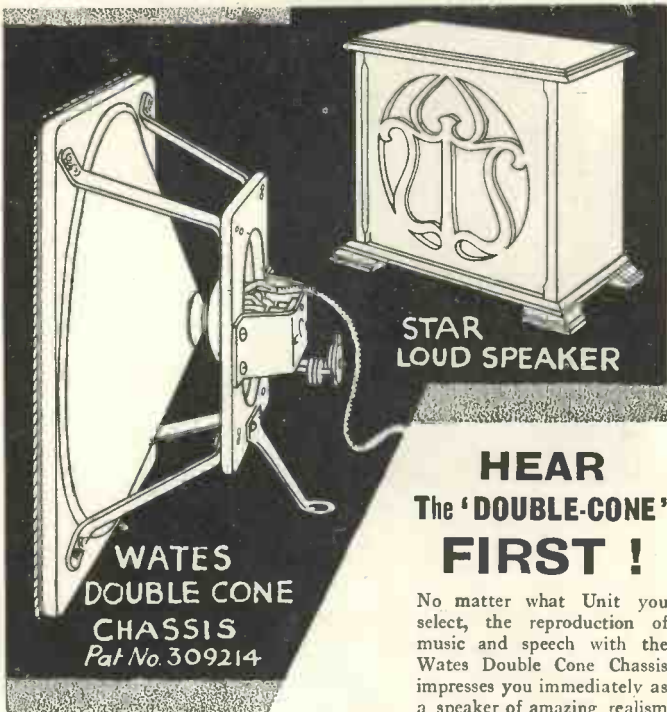
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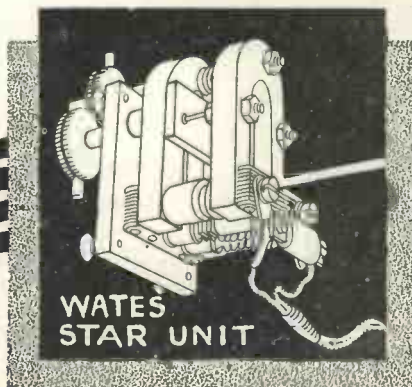
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Music of the Month—Continued



Harry Pepper, pianist to the Co-optimists

Wood, our hearty congratulations. There is still plenty of time to hear this fine orchestra at the Queen's Hall, the final concert being on Saturday, October 4.

A great deal, perhaps too much, modern music has been played at the "Proms." at Queen's Hall this year.

Point of Controversy

Whether this policy is detrimental to them or not matters a great deal to everyone interested in them. The growls against the B.B.C. programmes have contained a great deal of matter on this point.

Our representative who has been at the Queen's Hall on these nights reports that a great deal of boredom, fatigue, and even amusement was evidenced by the audience in all parts of the hall.

From views obtained from reliable musical sources we have formed the opinion that this new and increasing introduction of modern music is likely to put even the "Proms." themselves amongst the places that are shunned by lovers of good music.

A Great Success

Although a great deal of symphony concerts broadcast this month have come from the Queen's Hall, there have been fine concerts heard from other sources, notably that from the Kursaal, Ostend. This was a marvellous success and gave us an opportunity of hearing Marcel Journet, the famous singer, of the Paris Opera, and La Scala, Milan; the singing was excellent.

Light orchestral music, always a very popular feature, has been well provided by Frank Westfield and his Orchestra from the Prince of Wales' Playhouse, Lewisham. Their programmes have always included old melodious tunes, such as "The Blue Danube Waltz," by Strauss, and selections from the *Merry Widow*, by Lehar, and probably this is the backbone of the popularity which they have gained.

Mention must also be made of the very delightful music that has been supplied by the J. H. Squire Celeste Octet. Their melodious tunes are

Other notable singers who have been heard include Stiles Allen, Winifred Davis, Horace Stevens, and John Morel, who is now fulfilling singing engagements in Vienna and Berlin.

Instrumentalists

Some fine instrumentalists have been heard this month. Amongst them we may include Solomon, the famous pianist; Orrea Pernel, the violinist, who played the concerto for violin and orchestra, by Delius, a remarkable performance; Berkeley Mason, the organist, and accompanist; and Sidonie Gossens, the harpist in the B.B.C. Symphony Orchestra.

Marcel Dupré, the famous organist of Notre-Dame Cathedral, was announced to play the solo organ in the performance of his new work, "Symphony for Organ and Orchestra," at the Queen's Hall, on September 9. Marcel Dupré recently gave a recital at All Saint's, Margaret Street, and many will remember his excellent playing.

Cinema Organs

The cinema organ is one of the recent introductions to the field of general entertainment and, like all other modern instruments, has undergone a "blasting" from the most "highbrow" of the music critics.

Some of the remarks passed may be justifiable to a certain extent. This instrument is in existence solely for light entertainment purposes and, as such, is quite enjoyable, but we agree entirely with the critics.



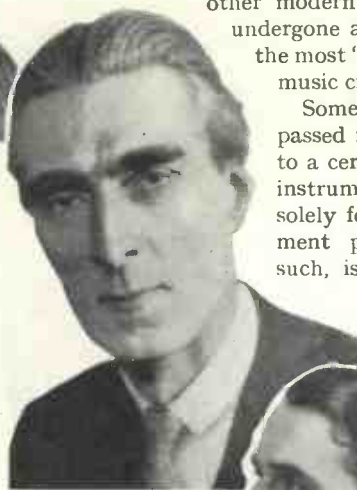
(Left) Dorothy Silk, soprano



Orrea Pernel, an impressive violinist

well worth listening to.

Amongst the vocalists there have been some very outstanding recitals broadcast. Oda Slobodskya, the famous Russian singer, met with tremendous success at the Queen's Hall, together with May Blyth, Harold Williams and Arthur Fear. Dorothy Silk, whose clear enunciation is remarkable, has delighted many audiences this month and many will look forward to hearing forthcoming recitals with great pleasure. Negro spirituals are always enjoyable and Marion Anderson, the coloured contralto, has given us, at the Queen's Hall and in the studio, some very pleasant singing.



(Above) Berkeley Mason, the popular B.B.C. accompanist



Angus Morrison, pianist

LISTEN —

THE WORLD'S MUSIC — LIVING AND REAL!



It is wonderful. What colour and verve . . . K-B has brought radio to life for you. You realise that as you hear. This is nothing at all like the radio you once knew. There are no troublesome leads: no batteries to bother about: the power comes straight from the mains.

This is the K-B 4-valve all-electric Transportable Receiver. It is entirely self-contained, and ready for instant operation by simply connecting to the nearest electric lamp holder or power socket.



There are two models

K-B 214. 200-250 volts A.C. } 40-60

K-B 224. 100-120 volts A.C. } cycles

PRICE . . . (OAK) . . . 39 GNS.

(WALNUT or MAHOGANY) 42 GNS.

(Including valves and royalties).

Kolster-Brandes

For full information and catalogue of these and other instruments of the K-B range, write to Kolster-Brandes Ltd., Cray Works, Sidcup, Kent.—Or make a note of **Stand No. 55** and come and see them at the Olympia Radio Exhibition, September 19—27.

You will get prompt replies by mentioning "Wireless Magazine"

VIBRANTI BAFFLE BOARD



for quality reproduction

The newest baffle, constructed for the latest power units.

The Vibranti Baffle Board is made in one piece and so cannot rattle or distort. It positively improves tone and is of handsome appearance.

24 in. x 24 in. x 3/8 in.
Oak or Mahogany Finish ... 9/6
Oxidised Silver or Copper Finish 10/6
The Board can be converted into a Screen.

Fittings:
Oxidised Copper Set, 5/3
Oxidised Silver Set, 6/-

From all radio dealers or

CHARLES BORST & SONS
306-308 Euston Road, London, N.W.1

WHAT IS NEW IN CABINETS

BETTER workmanship characterises many of the new cabinets, both for radio gramophones and for loud-speakers. More attention has been paid to the furniture aspect of the radio cabinet, some really fine examples having been produced for radio gramophones.

General Form

Here, the general form is a main compartment at the bottom for housing the loud-speaker cone or moving-coil and above it a smaller compartment for the radio set.

New designs for loud-speaker cabinets harmonise much better with the sets requiring an external aerial. E. K. Cole, Ltd., have designed a range of loud-speakers for mounting on top of Ekco set cabinets.

To house the innumerable loud-speaker chassis and movements now on the market, many excellent low-priced cabinets have been produced.

In set cabinets there is still a lack of the type with sufficient room underneath the control panel for housing double-capacity high-tension batteries. The idea of running a set from self-con-

tained batteries has been greatly popularised by portables.

But between the normal table-cabinet set, with a cabinet just big enough for the set, and a portable "all-in" set, is a set requiring an external aerial and earth and a loud-speaker, but having all



The Waverley radio-gramophone cabinet, made by Camco; price £5 10s. in oak and £6 5s. in mahogany (Stand 140)

the batteries enclosed. Very few of the cabinets designed to house the batteries are actually big enough to accommodate the new large high-tension batteries so widely recommended.

THE BIG

ANODE H.F. UNIT
Specially designed for use as H.F. valve coupler and suitable for every type of aerial tuning. The unique construction affords greatly improved performance. Wavelength range, 500 to 2,000 metres. Suggested circuits supplied with every unit. Price 11/6.

H.F. CHOKE
A choke of high inductance, low resistance and self-capacity, resulting in a performance curve which is almost perfect. Totally enclosed in handsome bakelite case, giving complete protection against atmospheric deterioration. Price 5/6.

AERIAL TUNING UNIT
A new Tuning Unit, which effectively replaces all the old-fashioned plug-in coils. Loose coupled, effectively covering the whole waveband from 200 to 2,000 metres. Simple to connect easy to tune. Price 14/6.

From all dealers of repute or direct from:
BRITISH GENERAL MFG. CO. LTD.,
Brockley Works,
London, S.E.4.

TRIUMPH TRANSFORMER
A triumph of design and production, giving the performance of a transformer costing three times its price. Ratio, 3.5 to 1, suitable for first or second stage work. A genuine product, offering ample margin of safety without any sign of distortion. Price 6/6.
7 to 1 ratio model, price 12/6.

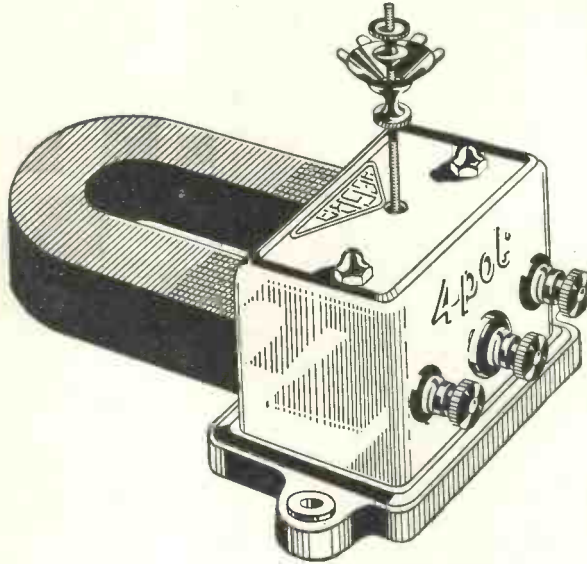
MIDGET TRANSFORMER
The most advanced production in L.F. Transformers. Made from a special alloy, which gives a transformer of very small dimensions and weighing only 4 oz. capable of a performance of the older type model weighing six to eight times as much. Remarkable reproduction. Made in two ratios, 2:1 to 1 and 4:1 to 1. Price 11/6.

BRITISH GENERAL

STAND 19

THE NEW HEGRA SPEAKER

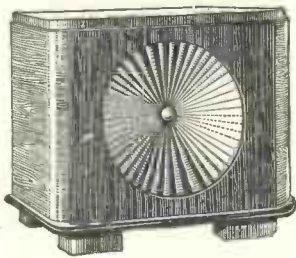
MODEL E



This new Hegra Speaker comprises a 4 pole balanced armature unit. The lightly mounted armature, made of special iron, moves within particularly powerful pole pieces. The distance between the armature and the pole pieces is relatively great. This unique arrangement renders an adjusting device superfluous, while at the same time linear distortion, so frequently a cause of bad reproduction in loud speakers, is entirely absent even at the extreme frequency ranges. The unit is provided with a suitable base-plate, and is enclosed in a dust-proof casing.

The unit is of a flat type, particularly suitable for portables and other speakers where space is restricted. The resistance is tapped in three places, thus making it perfectly suitable for any type of circuit, since the right resistance can be made use of for any particular last stage valve.

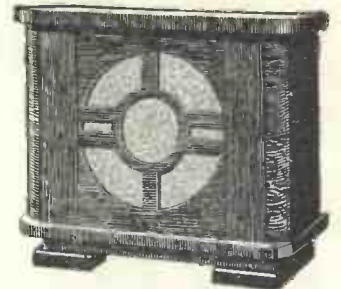
Unit alone, complete with clips 15/9
 In Chassis form, mounted on new bronze finish chassis. Particularly strong and light construction 27/- complete



CABINET "T" TYPE

This complete loud speaker incorporates the "E" type Unit illustrated above, and is very soundly made of well-seasoned wood in Walnut finish.

Speaker complete
 £2 . 12 . 0



CABINET "V" TYPE

Incorporating "E" type Unit. Walnut finish.

Price complete
 £3 . 5 . 0



HEGRA TYPE "A" TONE CONTROL

This is a specially developed volume and tone control for use in conjunction with gramophone pick-ups, and also for any wireless set employing a loud speaker. The winding is specially designed to be induction free and silent in operation; and gives a perfect straight line characteristic.

Complete with flex and two plugs, and mounted in exceptionally well-finished black moulding ... 9/-

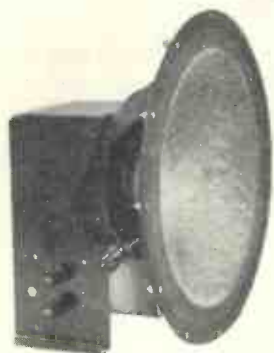
NOTE.—Special model for amateur constructors for incorporation in radio gramophones.
 In metal case with one hole fixing ... 6/9

HEGRA PRODUCTS ARE STOCKED BY ALL REPUTABLE DEALERS. ASK FOR FULL PARTICULARS OF THE NEW SEASON'S HEGRA RANGE.



Advertisers like to know you "saw it in the Wireless Magazine"

WHAT IS NEW IN LOUD-SPEAKERS



The Baker Standard model moving-coil loud-speaker (Stand 137)

FOR that very susceptible link in the chain of broadcast reproduction—the loud-speaker—we can claim some improvements; prices of cone loud-speakers are lower, and quality of reproduction is appreciably better.

Moving-coil loud-speakers exhibit the most decided improvement, more especially the permanent-magnet type. Here we find much greater confidence among makers; the Epoch permanent magnet moving-coil loud-speaker, for example, is guaranteed against perceptible loss of magnetism for two years.

The disadvantage of the



This new Kolster Brandes moving-coil loud-speaker has a permanent magnetic field (Stand 55)

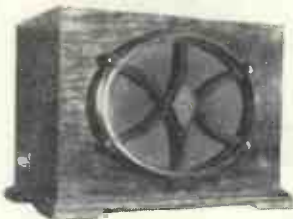
moving-coil has always been a limitation to its universal use. We refer to the need for external excitation either by means of the electric-light supply or a six-volt accumulator. With the development and improvement of moving-coil loud-speakers with permanent magnets, requiring no external power, listeners can now enjoy the best possible reproduction.

Although moving-coil loud-speakers have been improved the ordinary cone type of loud-speaker is by no means ousted. In fact, the new cone loud-speakers driven by improved balanced-armature

movements give amazingly life-like reproductions. They are inexpensive and will do justice to good power valves and well-designed low-frequency amplifying equipment.

The cabinet work of all loud-speakers shows a better appreciation of the need for avoiding "box resonance." Several firms have produced loud-speakers for sets of their manufacture, showing that the advantage of matching the set with the loud-speaker is now more generally appreciated.

To this same end we find several loud-speakers with



His Master's Voice moving-coil loud-speaker, model 4

tapped windings, having two or three alternative impedance values.

Loud-speakers in portable sets are more robust in construction and more capable of handling speech and music without distortion.

The bass-note fetish has died down, and many loud-speakers exhibit a pleasing balance of tone, whereby the crispness of top notes is not sacrificed to bring out the bass notes.

Constructors are still as keen as ever on the home assembly of loud-speaker chassis and movements. Cabinets for these home-made loud-speakers are announced by several of the leading radio cabinet makers. The Camco is a good example.

Baffle boards for moving-coil units are available in artistic designs—conceived with an eye to acoustical re-



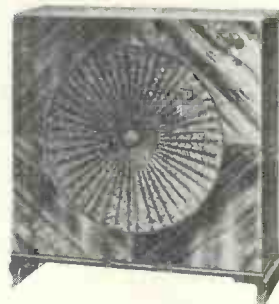
The Brown Grosvenor moving-coil loud-speaker, which can be raised and lowered in its stand at will (Stand 78)



A new Pickett baffle board with a Blue Spot chassis; price £1 5s.

quirements. Fire-screens and the like form very effective loud-speaker baffles, particularly useful in homes where space is restricted.

Notes on some of the loud-speakers on view at Olympia follow: One of the most revolutionary loud-speakers this year is the inductor dynamic model, recently detailed in this magazine. S. A. Lamplugh, Ltd. are marketing a special cabinet model at £6 10s., although the chassis is available for home constructors at the very moderate price of £3 10s.



This new loud-speaker is the Loewe cone (Stand 207)

This loud-speaker can be used on any set and works well with an output valve having an A.C. impedance of between 1,500 and 3,000 ohms.

The General Electric Co., Ltd., are also marketing an inductor type loud-speaker. In brief, the principle of operation is somewhat similar to a moving-coil, except that the coil is replaced by an iron armature. Full details are given in the June issue of WIRELESS MAGAZINE.

Celestion are introducing some very reasonably priced additions to their well-known range. The D10, and D12, are respectively £3 and £5. They are claimed to be able to handle considerable vol-

ume and to be very sensitive. The well-known Z20 is now available in two different types of cabinet. The price, in oak, is £7 15s.

An entirely new Celestion, known as the D50, claimed to reproduce well below 100 cycles, is to be shown at Olympia.

One of the largest moving-



The Blue Spot model 41K; good value for £2 10s. (Stand 217)

coil specialists in this country, the Epoch Co., announce a model of sensational properties, in addition to their permanent-magnet moving-coils.

Another well-known firm making moving coils is Bakers, who have a wide range of 1931 super-power models. There is the cinema model for A.C. mains, price £25, having an exponential horn. Special features are a moving-coil unit with a 6-inch cone and a 40-watt electromagnet. The horn has a 4-foot flare.

One of the cheapest loud-speakers of distinction is the Ormond corner cabinet model, price 79s. 6d. in oak. This includes the Ormond four-pole adjustable loud-speaker unit together with a large cone chassis.

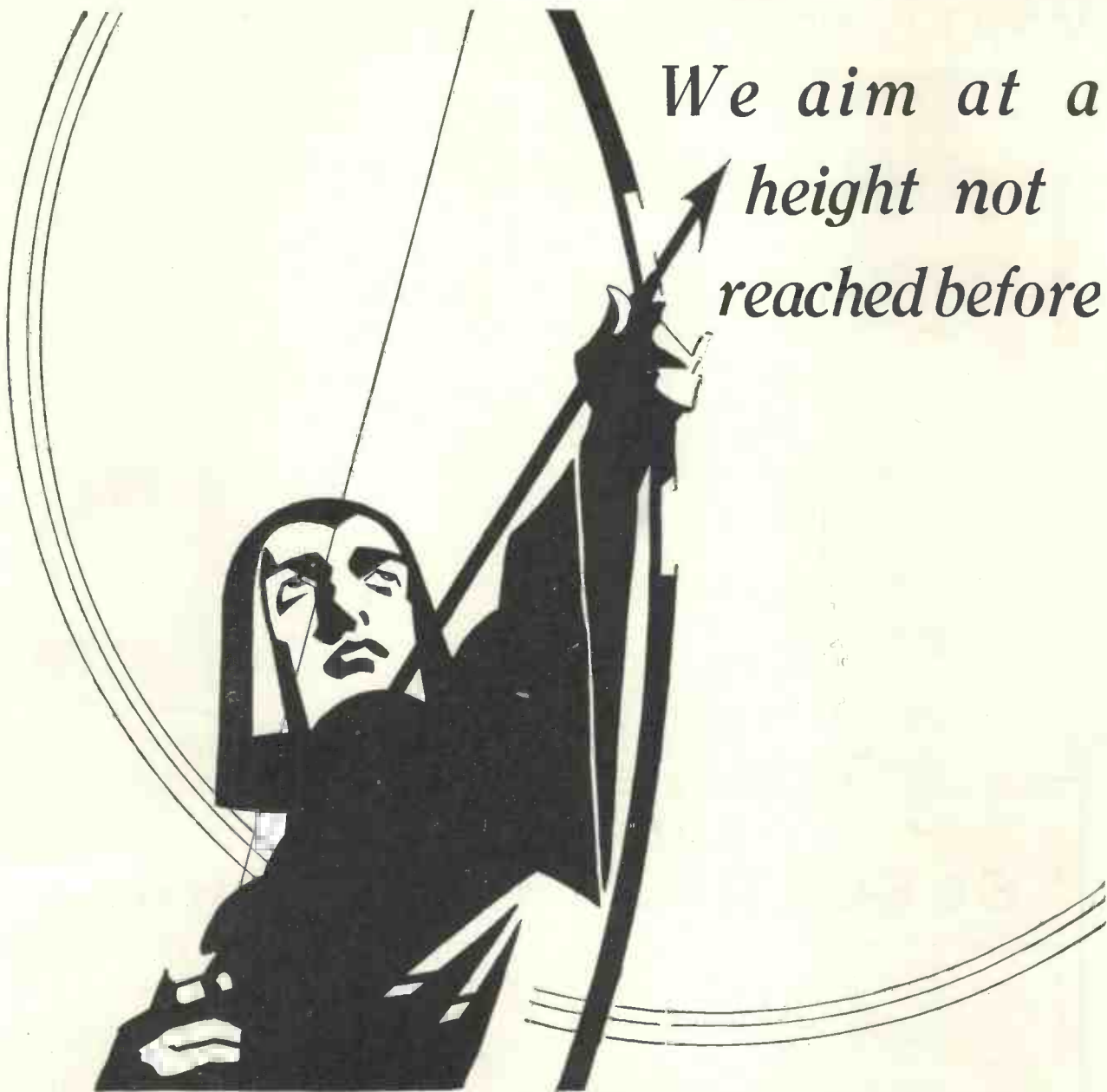
Of special interest to the



A new Donotone loud-speaker—the Ideal—priced at £6 6s. (Stand 139)

constructor are the products of Whiteley, Boneham & Co., Ltd. There is the W.B. cone chassis and stand, price 10s. 6d., and the W.B. four-pole balanced-armature cone

(Continued on page 300)



*We aim at a
height not
reached before*

When you replace an old valve with a new Mullard valve, you're putting in a better valve. You are aiming at, and achieving better radio. It is probable that the old valve is also a Mullard. Still it is definitely giving way to a better Mullard valve. Can you recall what radio was like in 1924 and 1925, before Mullard P. M. Filament Valves made radio a practicable and listenable reality?

There is safety in buying Mullard

Mullard
THE · MASTER · VALVE

Advt. The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Rd., London, W.C.2

**Should you visit
the 1930 Radio
Exhibition at
Olympia, Sept. 19
-27, we invite
you to Stand No.
36 to discuss your
receiver and Mul-
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**Stand No. at Olympia—36
Radio for the million 101
Demonstration Room B.**

WHAT IS NEW IN LOUD-SPEAKERS—Continued



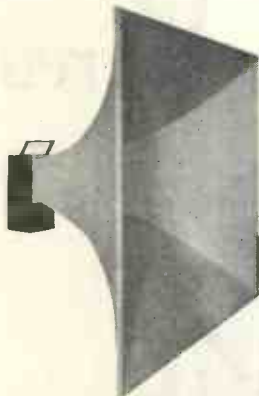
A new Celestion model, the D50 (Stand 53)

loud-speaker unit, price 12s. 6d. The famous Lodestone moving-coil chassis, designed by W. James for WIRELESS MAGAZINE, is available for a six-volt accumulator, price 4 guineas, and for D.C. mains, price £4 14s.

S. G. Brown, Ltd., are prominent again this year with a range of popular-priced cone loud-speakers housed in good-looking cabinets. We are very interested in the new Brown moving-coil chassis. Fitted with an input transformer, model A, for use with a six-volt accumulator, is listed at £9.

Model C, for D.C. mains, is £7 12s. 6d.

Burndepth Wireless, Ltd., have a good range of cabinet cone loud-speakers. They still retain the Ethovox horn type of loud-speaker, price 2 guineas and £4. The cabinet cone loud-speaker



has a handsome appearance, and costs only £2 10s. More expensive are the console cabinet loud-speakers fitted with a Rice-Kellogg moving-coil loud-speaker, price £12 10s.

Another new moving-coil

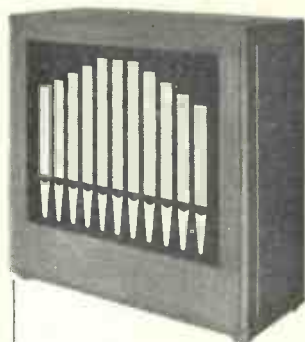
permanent magnet loud-speaker is that introduced by L. McMichael, Ltd. It has adjustable tapings so that the loud-speaker impedance can be made suitable for various types of output valves. This firm have also introduced a balanced-armature cabinet cone of moderate price.

The Magnodynamic loud-speaker is an important development due to Ferranti, Ltd. The makers feel that this new type will supersede the A.C.-mains-operated type.

In Metal Cabinets

The makers are producing all their loud-speakers in metal cabinets as well as in the standard wood cabinets in order to harmonise with Ferranti sets.

To go with the numerous Marconiphone sets, the Marconiphone Co. offer an excellent cabinet cone loud-speaker in mahogany, price £3. For those who can afford a more expensive loud-speaker, Marconiphone moving-coils are available in well-finished cabinets, price £7 for working from a six-volt accumulator and 12 guineas for A.C.-mains operated.



Unusual in appearance is the new Philips loud-speaker, model 2024



Truetone moving-coil loud-speaker cabinet, finished in mahogany colour, price £1 18s., made by the Carrington Mfg. Co., Ltd. (Stand 140)

EDISON BELL "ELECTRIC" GRAMOPHONE

Model No. 446.
OAK.

Specification

Cabinet. Highly polished Oak with fretted front over a Screen of gold-gauze; panel-covered recesses at sides furnish space for eight record albums; piano-hinged cover regulated by an automatic lid-stay (see illustration) needle boxes and controls on either side of turntable.

Motor. Induction type electric motor.

Pick-up. New Edison Bell model with special counterbalance arm minimising record wear; a filter-circuit to reduce surface noise is also built into the set.

Speaker. Specially designed moving-coil type fed through a transformer circuit suited to its impedance. Approximate undistorted A.C. output 2½ watts.

Circuit. Resistance-coupled stage; transformer stage and super-power output stage. Valves supplied: Mullard 354V, 164V and DO/20. Rectifier Mullard D.W.30.

Controls. Mains switch; pick-up volume control and automatic stop to break current and stop record.

Voltage. Adaptable for operation from 200, 220 or 240 volts 50-100 cycles — A.C. Mains. Other voltages to special order. N.B. A fuse is incorporated to protect transformer and mains.

Dimensions Height 36 in., width 30 in., depth 18 in.

Code. "ELECT."

Price - £50 : 0 : 0

Send for Catalogues

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WHY BUY

NEW DRY BATTERIES?

We will keep you continuously supplied with fully charged C.A.V. High Tension Accumulators for less than the cost of the lowest priced dry battery.

This Accumulator Service definitely guarantees improved reception and is equal to a new dry battery every month at less than one-third the cost.

Specimen of Service.

H.T. 120 volts, discharge up to 15 Ma. exchange monthly for 14/10 per quarter, inclusive of collection and delivery anywhere within twelve miles of Charing Cross.

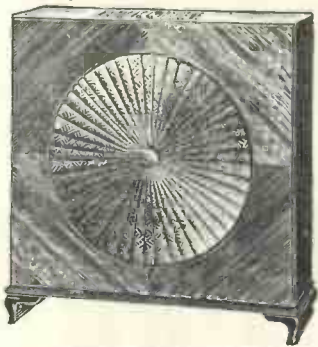
Call at

Stand No. 235
Empire Hall,
Radio Exhibition,
Olympia.

Over 10,000 London Listeners now using this time, trouble and money-saving service, which caters for the hire and maintenance of every possible high and low tension wireless accumulator requirement. Full particulars of this economical service post free.

Write for folder No. 13

RADIO SERVICE (LONDON), LTD.,
105 Torriano Avenue, Camden Road, N.W.5
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**FAITHFUL
TO
NATURE!**

KING of SPEAKERS

Unquestionably the "King of Speakers"—this new LOEWE RADIO model EB85 will give unending delight. The built-in 4-pole magnet is practically insensitive to mechanical influences. Absolutely faithful to nature! Price 42/- complete. Unit only, price 12/-. Unit and Chassis, 16/6.

Write for full details.

**LOEWE RADIO
CONE SPEAKER**

THE LOEWE RADIO CO., LTD.
4 Fountayne Road, Tottenham, N.15
Phone: Tottenham 3911/2

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Identifying foreign stations
is made easy with the

POLAR TUNING GRAPH

A 2½d. stamp (to Dept. W.M.) will bring you, post free, this Tuning Graph which enables you to record and immediately identify any station by its wavelength.

Polar Pre-set Condenser for the "REGIONAL BAND-PASS FOUR"

Knob control is easy and accurate, always giving the same capacity for the same number of turns. Setting is secured by locknut. Neat, compact, totally enclosed in moulded case. Strong terminals. Base-board mounting



Max. Cap., .001 or .0003. Price 2/-

Ask for complete list of new condensers.

WINGROVE & ROGERS, LTD., 188/9 STRAND, W.C.2
Polar Works, Old Swan, Liverpool

WHAT IS NEW IN RADIO GRAMOPHONES



Philips Lamps, Ltd., announce a new range of receivers. This is the radio gramophone, type 2811

THERE is nothing new this year in radio gramophones, but there are many small improvements. Moreover, we note a general tendency to moderate prices. More medium-priced radio gramophones of average power are now available, but



The Selector Vox radio gramophone, made by Selectors, Ltd., has two turntables (Stand 114)

the very elaborate instruments are still well to the fore.

What is immediately obvious in examining this season's radio gramophones is the great improvement in the cabinet work. At long last the makers of 100-guinea instruments seem to have realised that prospective purchasers of their products have fastidious furnishing tastes. The cabinets of the really high-class radio gramophones have now come into line with the very best examples of modern furnishing.

Interior Improvements

Quite apart from the exterior finish of this year's radio gramophones, there is ample evidence of interior improvements. A.C. valves have been much more extensively utilised this year, with the result that both gramophone reproduction

and the reproduction of broadcast programmes are considerably more powerful. Quality also has been improved, notably by the use of better types of moving-coil loud-speakers.

Mechanical Items

Mechanically, the radio-gramophone of 1931 will be found better in every way. For example, the turntable, which is electrically operated, is now almost exclusively of the induction type, very much more steady and constant in action compared with the commutator type. All unsightly connecting leads have been eliminated—from the pick-up in particular.

Another welcome improvement in the pick-up is a swivel action whereby needles can be more conveniently inserted.

Self-contained

So far, very few radio gramophones can be truthfully called completely self-contained. Most of them still require an externally-connected aerial for radio reception. This is sometimes a drawback, especially when the radio gramophone is wanted in a room where an external aerial could only be brought in with difficulty.

One or two radio gramophones are now provided with two separate turntables. By this means a continuous entertainment can be provided, and many artistic mergings of different records can be readily accomplished. For big public functions where a continuous supply of



This is the Lissen radio gramophone (Stand 40)

music for, say, dancing is required, these radio gramophones with dual turntables have an obvious application.

One or two examples will serve to show the main tendency in this season's radio gramophones. The General Electric Co., Ltd., announce a £70 radio gramophone; this consists of two high-frequency screened-grid valves, a power detector, and a 10-watt output valve.

Controls are fitted in recesses at the sides of the cabinet, so that when the radio gramophone is not in use they are completely covered.

No aerial is required when receiving powerful signals, because a special non-direct-



The new K.B. single-turntable radio gramophone, made by Kolster-Brandes, Ltd. The price is 150 guineas (Stand 55)

tional device is incorporated in the cabinet. For more distant stations a small external aerial is necessary. An electric gramophone motor and a moving-coil loud-speaker are included.

For those needing a much less expensive machine, the Chakophone radio gramophone is worth noting. This is listed at 35 guineas, and is probably one of the least expensive of its type.

Mechanical Motor

A moving-coil loud-speaker is used, but the gramophone motor is a mechanical one. The set works from A.C. or D.C. mains, requiring no batteries; but an external aerial and earth are wanted.

The Kolster-Brandes K.B. 239 is an exceptional radio gramophone because it includes a frame aerial. This machine is really a magnificent product, specially suitable for public entertainment.

Two Turntables

It has two turntables and ample room to store gramophone records. The makers of this instrument have produced a whole range of radio-gramophones, the less expensive ones being very good value for money and more

particularly suitable for domestic use.

Edison Bell have produced a £50 electric gramophone in an oak cabinet, suitable for home use. An induction gramophone motor, a moving-coil loud-speaker, a



The Dubilier radio gramophone incorporates the Dubilier A.C.3 receiver (S.a.d 50)

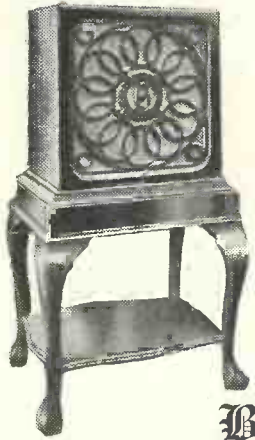
volume control and a tone control are included. This machine can also amplify signals from a small wireless set.

Burndept Wireless, Ltd., are continuing their very successful Ethogram; this is one of the very few radio gramophones designed for use by listeners not provided with an electric-light supply.



The new Columbia radio gramophone (Stand 71)

Before you buy a set read the article on page 230 and the reports on pages 245-250.



The Greatest Achievements of a Great Firm



Brown Grosvenor Moving Coil Receiver

Handsome walnut cabinet! Pitch control fitted. Price, fitted with 6 volt field coils and high resistance speech coil, £17. 17. 0. Fitted with permanent magnets and high resistance speech coil, £20. 0. 0. Energized direct from A.C. mains, complete with rectifier and high resistance speech coil £21. 0. 0.

Brown Screen Grid 4 Valve Portable Set

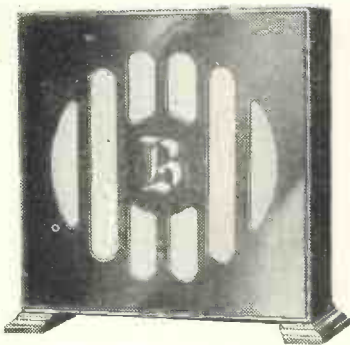
In handsome walnut cabinet. Ball-bearing turntable, special Brown Movement for Portable Sets, coils covering all wavelengths. Provision for connecting to additional speaker and pick-up. Complete with valves, batteries, unspillable accumulator £19. 19. 0.

NEW Speakers  NEW Receivers

100% BRITISH THROUGHOUT

Brown Austral Loud Speaker

Placed on market for first time after an overwhelming success in Australia. An unusually good loudspeaker for the price. Dimensions: 12½" high, 11½" wide, 4" deep. Supplied in oak only. Price £2. 10. 0.



WE ARE EXHIBITING AT



THE NATIONAL RADIO EXHIBITION OLYMPIA (W.3) SEPT. 19th - 27th 1930

STAND 78

S. G. BROWN, LTD., Western Avenue, N. Acton, London, W.3.

Brown Royal Loud Speaker

Cabinet designed to avoid box resonance common to a number of speakers. Gives remarkably clear reproduction. Fitted with the famous Brown "Vee" Movement and Duplex diaphragm. Price mahogany only . . . £12. 10. 0

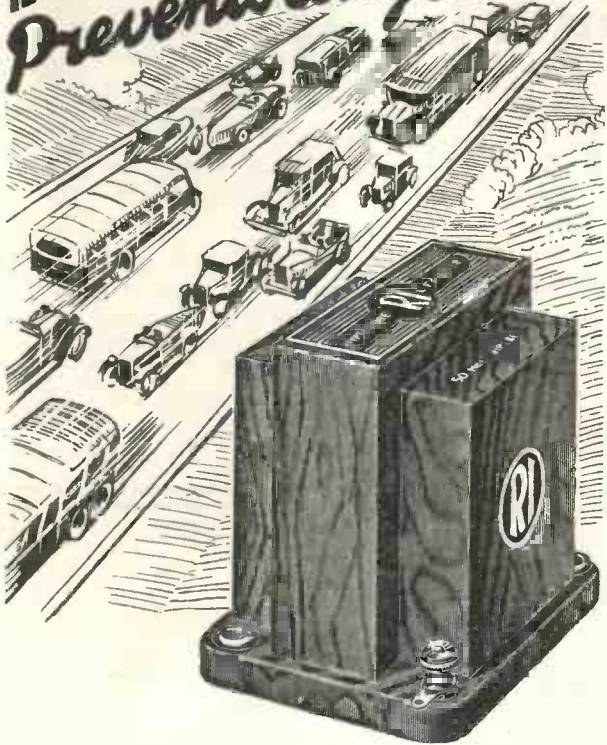


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When you send your order don't forget to say you "saw it in the 'W.M.'"

HYPERCORE

Prevents congestion



Just as an arterial, by-pass road prevents congestion in a busy town, so does the "Hypercore" Smoothing and Output Filter Choke relieve the speaker of all distortion and other interferences, leaving the pure, loud volume of reception to flow unimpeded.

"Hypercore" is one of the famous Big Three, and like the "Hypermu" and "Hypermite" its secret of success is the special utilisation of "Nickel-Alloy" cores which give a performance in the choke and transformers positively unequalled by imitations or other types.

Write for leaflets giving full details of the Big Three.

The "HYPERCORE"
Smoothing and Output Filter Choke

17/6
It gets the best from your speaker

See the Famous Big 3 and other NICKEL-ALLOY components

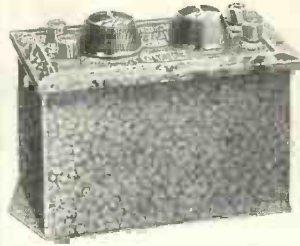
STAND No. 61
RADIO EXHIBITION,
SEPT. 19 to 27.

Ground Floor, Main Hall,
Olympia.



R.I. LTD., "MADRIGAL" WORKS PURLEY WAY, CROYDON

WHAT IS NEW IN GRAMO-RADIO



This compensating device for record reproduction is called the Tiltatone, and is made by Celestion, Ltd. (Stand 53)

WITH the universal use of electrically-produced gramophone records, everyone is attempting to bring out their inherent quality. This can be done by electrical reproduction, using a separate valve amplifier or the low-frequency amplifying side of a radio set.

To this end many accessories have had to be developed. This year we see great improvements in gramophone pick-ups. They are less wearing to the record, being either inherently light, or counter-balanced so that no more weight than necessary is imposed upon the groove of the record.

A tonearm for electrical reproduction is, of course, not necessary, but the pick-up arm must be designed for correct tracking of the pick-up across the record. Here, again, improved designs are evident. The wires for connecting the pick-up to the



Several excellent gramophone motors are made by the Garrard Engineering Co., Ltd. (Stand 256)

amplifier are, in the best examples, now led through the arm, so that no unsightly connections are shown.

Special amplifiers for gramoradio have been developed. The new Loftin-White is a good example. Working entirely from A.C. mains, this amplifier provides ample volume to fill a small hall.

Volume controls are absolutely essential in gramoradio outfits; several good variable controls for this purpose are now available. Apart from the volume controls, the need for some

method of tone control has been discovered during the last year. So now we find more than one special unit for interception between the pick-up and amplifier.

The Gambrell Novotone was the first tone modifier to be introduced; it greatly adds to the brilliance of high notes and brings up low notes considerably.

High-note Response

The Celestion firm recently brought out an interesting tone gadget called the Tiltatone, which, by controlling the amount of high-note response, in practice provides a wide range of tone values.

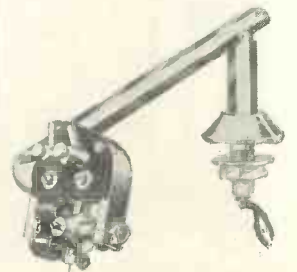
Induction motors are a welcome development in



A new pick-up developed by S. G. Brown, Ltd., known as Model No. 4. It has a twisting head to facilitate the changing of needles and costs 3 guineas (Stand 78)

radio gramophones. Driven from the electric-light supply, they maintain an extremely constant speed for the turntable of the radio gramophone. Several big firms are marketing these induction motors, which are a great improvement on the old type of electric gramophone motor.

Every month there is a special gramoradio section in WIRELESS MAGAZINE. Besides technical matters, it includes a monthly review of records by Whitaker-Wilson, which will be found invaluable when buying new discs. This month a special system of home-recording is described. Turn to page 263 for details of gramoradio developments



Our old friend the Celestion Woodruffe pick-up with a new type of arm (Stand 53)

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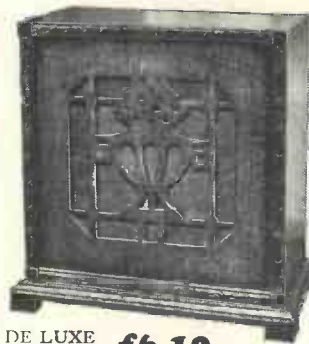
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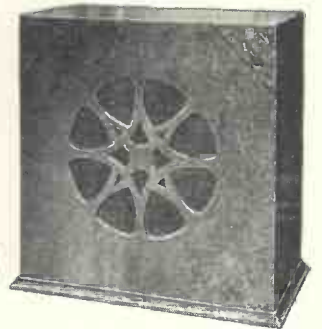
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DE LUXE
CABINET **£6.10**



STANDARD
CABINET **£5.10**

This is the latest conception of the Inductor principle, invented by the American radio pioneer, Farrand, and is as great a step forward over present known types of speakers—whether balanced armature or moving coil—as the original cone was over the horn type. It possesses all the advantages of a moving-coil speaker, has a better response at the lower frequencies, and has none of the disadvantages associated with the M.C. type.

ADVANTAGES

- There is no moving coil to pick up field current.
- There is no field excitation coil, therefore no introduction of hum from that source.
- There is no heat generated.
- Requires no Rectifier, Transformer, Smoothing Condenser associated with Moving-coil Speakers on A.C. operated Sets.
- Only a quarter the weight of a M.C. Speaker.

AMATEURS

will realise at once the enormous saving in cost that the Lamplugh Inductor Dynamic offers without sacrifice in performance—which is indistinguishable from that of the finest M.C. Speaker. It must not be confused with the many Balanced Armature Movements on the market at the moment designed to give Moving-coil effect by artificial methods?

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*It's a
"SILVER GHOST"*

**Read what the "WIRELESS MAGAZINE"
says about this Speaker!**

LAMPLUGH

INDUCTOR DYNAMIC SPEAKER

Send for full details and
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There is news in the "Wireless Magazine" advertisements

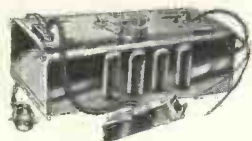
WHAT IS NEW IN POWER SUPPLY



A 10-volt high-tension accumulator block made by the Fuller Accumulator Co. (1926), Ltd. (Stands 26 and 221)

NEW tendencies in power supply are hardly to be expected annually, but we can say of 1930 that it began the new idea of using bigger-capacity batteries in all battery-operated sets.

For many years the standard-capacity battery has



The special high-tension unit and trickle charger for portable sets made by Regentone; price £5 17s. 6d. (Stand 117)

been widely utilised for multi-valve sets, really requiring double- or treble-capacity batteries for economical operations. One can hardly blame listeners for this state of affairs, because the larger batteries were very expensive.



A type LDG 2-volt Sparta accumulator made by the Fuller Accumulator Co. (1926), Ltd. (Stands 26 and 221)

Now we find low-priced high-tension batteries of ample size to run large sets with considerable economy. Following the general lowering in cost of large-capacity high-tension batteries, we can surely look ahead to their standardisation in all but the very smallest of sets. The 12 to 15 milliampere high-tension battery will improve

most of the battery-operated sets introduced this season.

Specially-shaped batteries for portable sets have been developed, so that although only of small capacity—still a portable drawback—they fit very conveniently into the small available space of the average portable cabinet.



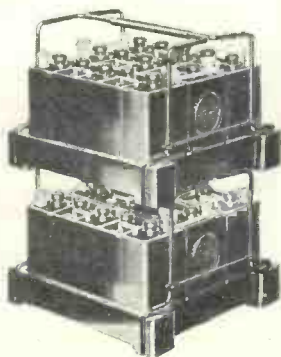
Specially made for portable sets, this new Sparta high-tension battery costs 15s. for 100 volts; it will stand a discharge of 20 milliamperes. (Stands 26 and 221)

Developments are announced in low-tension accumulators. It is well known that in the average set with,

Wednesday, October 22, is a date to note in your diary. On that day the November issue of WIRELESS MAGAZINE will be published. This will be another fine issue, full of features indispensable to every listener. It will include a special "Easy Steps in Radio" Supplement that will help you to improve your knowledge of radio. Better order a copy from your Newsagent now!

say, three dull-emitter valves, the accumulator is subjected to a long, slow discharge, due to the economy of the modern valve filament. Special thick plates have been developed to cope with the situation and better service can confidently be expected.

Another accumulator development is the non-spillable case, whereby the acid is prevented from running out, irrespective of the position of the accumulator. Here is an



An all-moulded high-tension accumulator made by C. A. Vaidervell and Co., Ltd. Two 30-volt blocks are shown. (Stand 7)

obvious aid in portable sets.

Still another method of making accumulators safe for portable sets is to use a solid jelly electrolyte instead of acid. New accumulators of this type exhibit a better performance compared with those first introduced. The capacity is now greater than before for a given size of plate.

All accumulators for radio sets are now extremely cheap, especially the small 2-volt ones for portables and table cabinet battery-operated sets.

Apart from batteries, power supply covers mains units for the elimination of batteries. Here we find more progress, especially in the direction of cutting down unnecessarily high outputs.

A good example is the new Westinghouse rectifier at 15s., giving 120 volts at 20 milliamperes, quite enough for most three-valve sets described in this magazine or purchased ready made.



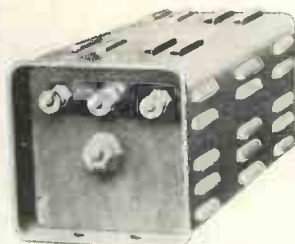
A new Exide jelly-electrolyte 2-volt accumulator known as the Gel-cel. Its capacity is 29 ampere-hours. (Stand 54)

Mains Units for Portables

One of the outstanding developments in mains units has been for portable sets. It is well known that many owners of battery-operated portables have an electric-light supply. For these listeners a 120-volt 20-milliampere unit has been designed, notably by Regent Radio Supply Co., E. K. Cole, Ltd., and Tannoy Products.

These units also contain a trickle charger, so that the electric light can be used to keep the accumulator in its maximum state of charge. The portable mains units can be housed wherever a standard-capacity high-tension battery has been previously installed.

The Regent Radio Supply Co. announce a wide range of



Several new metal rectifiers at reduced prices are announced by the Westinghouse Brake and Saxby Signal Co., Ltd. This is Model HT7. (Stand 239)

mains units for A.C. and D.C. supplies. Prices are very reasonable; as an example, the De-Luxe unit for direct-current mains provides 160 volts at 50 milliamperes and is only £3 10s.

Another model at £4 19s. 6d. is very good value for those who, with A.C. mains, require an output of 120 volts at 20 milliamperes. This



Siemens's popular Full o'Power high-tension battery—100 volts for 13s. (Stand 70)

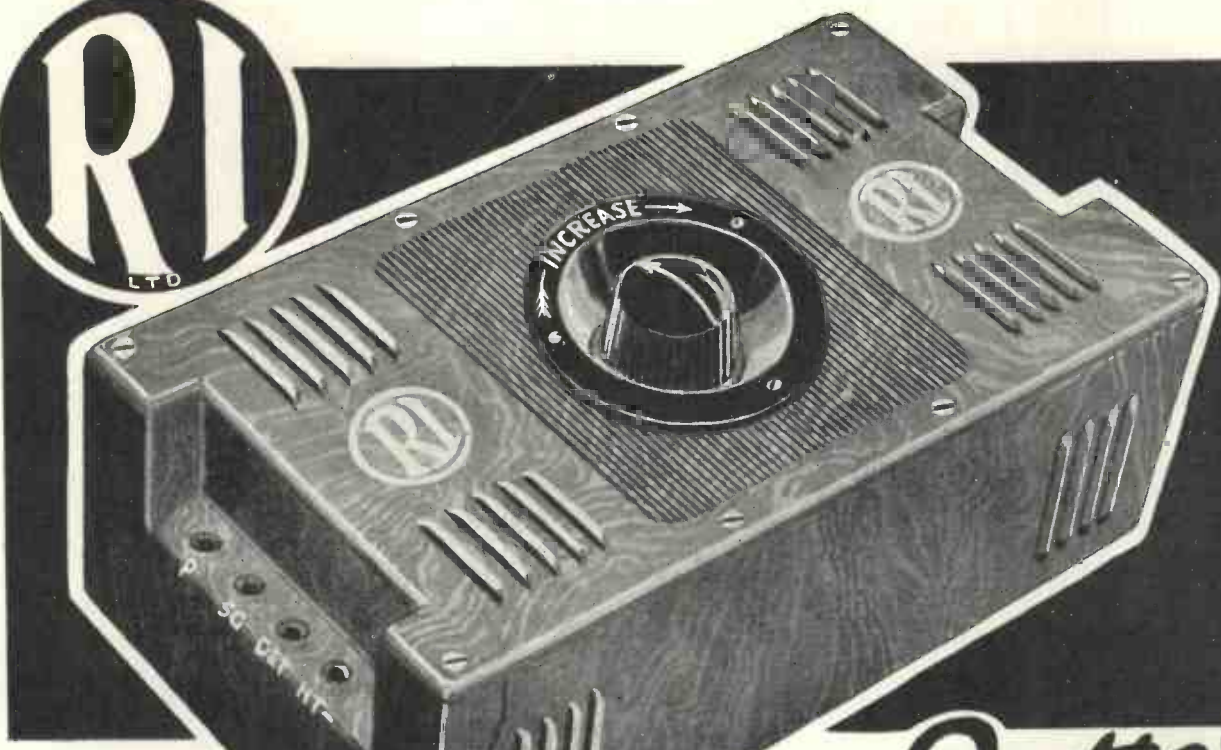
particular unit can be used with great success in sets embodying screened-grid valves.

Many Regentone models have a special high-low power switch, whereby a constant voltage output can be maintained on widely differing loads.

The Ekco units of E. K. Cole, Ltd., are grouped in 10-, 20-, 30-, and 60-milliampere outputs. Good performance at low cost is evident throughout the range. A portable unit for A.C. mains is listed at £4 12s. 6d.



One of the new Lively O series of accumulators made by Oldham and Son, Ltd. It has a capacity of 75 ampere-hours. (Stand 6)



Safer, Cheaper Better Radio with the-

THE R.I. H.T. UNIT FOR A.C. AND D.C.

*Cuts out the costly H.T. Battery.
Gives immunity from all danger
of live contact because it is All-
Insulated.*

*Gives safe H.T. current from any
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*FITS PORTABLES and suits all
sets up to five valves—output 20
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Improves reception amazingly.

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SEE OUR STAND No. 61

RADIO EXHIBITION,

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NEW ALL-INSULATED H.T. UNIT

Nikalloy—the Marvellous New Metallurgical Discovery—has been applied by R.I. Research Workers and Engineers to a new H.T. Unit.

Absolutely Revolutionary in Safety, Efficiency and Economy, this "Nikalloy" H.T. Unit attains a new achievement for British Radio and R.I. Reputation, equalled only by the performance of the Big 3—the "Hypermu" and "Hypermite" Transformers and the "Hypercore" Choke.

Write or ask your dealer for illustrated descriptive leaflet.

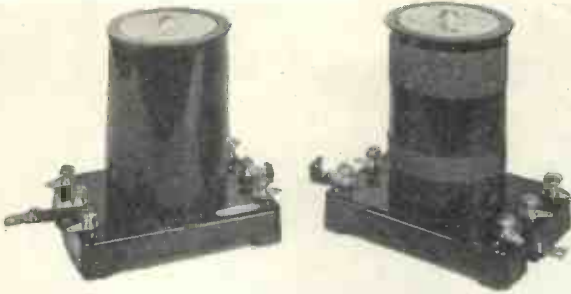
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WHAT IS NEW IN TUNING COILS



A new type of Lewcos dual-range coil made by the London Electric Wire Co. & Smiths, Ltd. On the left is the DWG for screened-grid anode circuits and on the right the DWA aerial coil (Stand 41)

THIS year we find many more manufacturers devoting their attention to the growing need for dual-range coils. The increase in the number of high-power long-wave stations has meant that few listeners are prepared to put up with a set having a wavelength range restricted to the medium waveband. To save the tedium of changing coils many dual-range coils covering the wavelength range of 200 to 600 metres and 1,000 to 2,000 metres are on the market.

New types of dual-range coils are announced by Lew-

cos and Watmel; and a new tuner, price 14s. 6d., is marketed by British General.

The famous Binowave coils for medium and long waves are still made by Wright and Weaire, Ltd. Readers should note that these coils are made to the specification of W James, as published in WIRELESS MAGAZINE.

As so many inexpensive coils are made by firms specialising in the job, home-constructed coils are not so popular. But for those who still take pride in making their own coils the reduction in the price of Becol ebonite formers will be of interest.

In spite of the considerable number of dual-wave coils, we find that two-pin plug-in coils are still very popular. Little reduction in price can be recorded, but many of these coils have been improved in their mechanical construction. They are not nearly so fragile as formerly.

Of particular interest to those dwelling in flats or other restricted locations is the announcement of Lewcos regarding the introduction of a dual-range frame aerial.

Although short-wave reception is, if anything, growing in popularity, there seems to be nothing new in short-

Particulars of new products mentioned in these pages are necessarily brief. For fuller information get in touch with the manufacturers. They will be glad to send you catalogues if you say you are a "Wireless Magazine" reader.

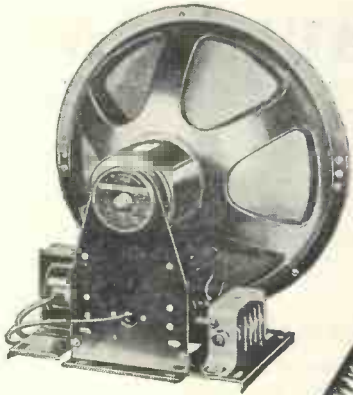
wave coils. The present wide range of two-pin plug-in short-wave coils, such as the Atlas, is being continued. For those with more cash there are several excellent makes marketed by the Rothermel Corporation.



Substantial reductions in the prices of Becol six-contact ebonite coil formers are announced by the British Ebonite Co., Ltd. (Stand 253)

and NOW the **MAGNAVOX** SENIOR AND JUNIOR

PERFORMANCE MODELS COUNTS



The moving-coil type of loud-speaker was originated by the Magnavox Company—and we have to thank their engineers for maintaining proved world leadership for the last fifteen years.

The Magnavox Dynamic Speaker is the only unit capable of giving a perfectly natural reproduction which cannot be distinguished from the original. There are positively no other loud-speakers, irrespective of cost, which can possibly compare with a Magnavox in design, construction, and quality of reproduction.

Write for the new Dynamic Booklet and special folder.



SENIOR MODELS

No.	Field Voltage	Price £ s. d.
117	110-190 D.C.	6 10 0
119	180-190 D.C.	6 10 0
211	6-12 D.C.	6 10 0
411	105-120 v. 50 cy. A.C.	9 15 0
415	220-240 v. 50 cy. A.C.	9 15 0

THE ROTHERMEL CORPORATION, LTD.
24 MADDOX STREET, LONDON, W.1

Phone: Mayfair 0578/9.

Continental Sales Office - 27 Quai du Commerce, Brussels, Belgium.

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No.	Field Voltage	Price £ s. d.
116	110-190 D.C.	5 7 6
118	180-190 D.C.	5 7 6
210	6-12 D.C.	5 7 6
410	105-120 v. 50 cy. A.C.	8 5 0
414	220-240 v. 50 cy. A.C.	8 5 0

GRAHAM FARISH
PROVED COMPONENTS

STAND 76
MAIN HALL
108
GALLERY



THIS MONTH'S SETS IN PILOT RADIO KITS

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1. Every Component, approved by the Editor, required to build the receiver.
 2. "Red Triangle" guaranteed ebonite panel, highly polished and drilled to specification.
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 4. The specified valves.
 5. All nuts, screws, plugs, connecting wire and flexible leads contained in neat partitioned carton.
 6. Every Pilot Radio Kit contains a written guarantee of service.
 7. The Pilot two-range Test Meter.
- * PILOT "B" KITS as above but less Valves and Cabinet.

	KIT "A"	KIT "B"
	Cash Or 12 monthly payments of	Cash Or 12 monthly payments of
MERLIN TWO (including Voxkit Console Cabinet in "A" Kit ..	£10-1-0 18/5	£4-4-6 7/9
REGIONAL BAND-PASS FOUR ..	£13-4-0 24/2	£9-15-6 17/11
FIVE-POINT THREE	£8-6-10 15/4	£5-5-4 9/8
A.C. UNIT (No valves)	£6-15-3 12/5	£6-2-9 11/3

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 SEND 10/- ONLY Don't delay, order this splendid 8-v. S.G. Kit now. Better value than ever. Balance in 11 monthly payments of **12/9**
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 SEND 10/9 ONLY Model W.5 Portable H.T. Eliminator for A.C. Mains. Output 120 volts at 15 m.a. 2 variable and 1 power tapings. Balance in 11 monthly payments of **10/9**
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 SEND 8/6 ONLY 120 volt W.H. Type H.T. Accumulator, complete with crates, dry charged. Balance in 11 monthly payments of **8/6**

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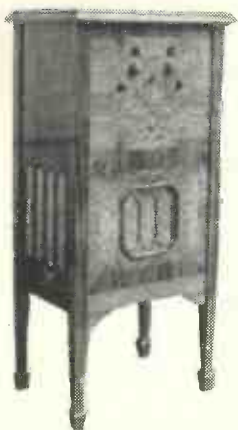
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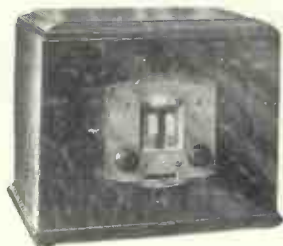
WHAT IS NEW IN RADIO SETS



Ferranti, Ltd., have a number of new sets. This is the console receiver (Stand 47)

ALL-ROUND improvements, but no definite innovations, mark this year's radio sets. It is clear that many makers have now entered in earnest into the market of factory-built sets. The amateurism that characterised many of the factory-built sets of previous years is notably absent.

This improvement is reflected in the very noticeably enhanced appearance of the new sets. Clever imitations of expensive woods in bakelite mouldings have been



This is a new model Columbia screened-grid "three," type 307, price 20 guineas (Stand 71)

noted; they are highly effective.

Some sets with metal cabinets have an exterior covering of fabric. In this way any advantage of a metal case is achieved without sacrificing appearance. Whilst speaking of the appearance of the latest sets, we must note the general tendency to fix as many controls as possible behind the control panel.

Marked Controls

More controls are clearly marked in this year's sets, so that there should be less confusion as to the exact function of the different knobs, dials and switches. There seems to be more than a suspicion of larger controls; but the tendency to hide essential

controls as though they were something to be ashamed of is still pronounced.

Fewer controls are now the rule in the more expensive sets. Although there are more tuning circuits in the big sets, better "ganging" of tuning condensers has produced many sets having a single-tuning control. Where the sets are driven from the electric-light supply, we note the dial is frequently illuminated by means of a small pilot light mounted immediately behind it.

Calibrations

We are glad to see that several of the new sets have dials with wavelength calibrations instead of degree divisions. This long overdue development will be welcomed by many set buyers, who should appreciate the convenience of being able to set the dial to the exact position determined by the wavelength of the station required.

Gramo-Radios

In the various divisions of sets we see little falling off. There is little evidence of the obsolescence of any existing type. Thus radio gramophones are still much in evidence, particularly the more ornate models costing upwards of £80. An effort has been made to provide medium-priced gramophones at a figure around £50.

In table-cabinet sets we find great improvements, especially in all-electric models, together with a small but welcome reduction in prices. Better cabinet work is exhibited, and more character is entering the shape of the cabinets.

Table-sets for battery operation still, in general, lack enough room for the storage of treble-capacity batteries. As against this, more sets are including the loud-speaker.

Probably the biggest development in factory-built sets is the all-electric transportable. Here we find completely self-contained three- or four-valve sets, including



A Kolster-Brandes five-valve A.C. mains set for 100-120 and 200-250 volt mains (Stand 55)

a cone loud-speaker, frame aerial and all the equipment for deriving power from the electric-light supply. Because this type of set can be worked only where there is a suitable electric-light socket, it has a more restricted function than the battery-operated portable.

Self-contained Sets

In self-contained sets working from batteries, most makers have given up the hopeless and rather futile attempt to restrict space and weight. Without these unnecessary sacrifices, the latest portables, although more bulky and heavier, are capable of fine results; and their self-contained nature still exerts a tremendous appeal.

It is rather curious that, at a time when a craze for short-wave reception is sweeping America, practically no development in short-wave sets can be re-



Note the handsome appearance of this new Philips all-electric two-valver, type 2523

corded in this country, in spite of the fact that here also there is a growing demand for transatlantic or even antipodean reception. The big market overseas for short-wave sets is still unexplored, save for one or two outstanding makes already referred to in previous issues of this magazine.

To give some indication of present-day sets, we quote brief details of a selection of the products announced by leading makers. During the next few months we shall go more fully into all the sets mentioned.

From Pye Radio we learn of new portables likely to create much interest. The Pye twin-triple battery portable is 22 guineas, and the all-electric version for A.C. mains is 28 guineas. A D.C. mains model will also be marketed at about the same price. These new Pye portables are extremely handsome in appearance and shape. They have two screened-grid stages providing amplification up to 1,500. Three tuning circuits are simultaneously op-

erated by a single tuning control. There is a volume control at the input. Power grid detection is employed in the all-electric models. The weight of the battery model is 34 pounds and of the all-electric model 37 pounds.



Climax all-electric three-valve set in an attractive cabinet (Stand 27)

The battery model takes only 7.5 milliamperes.

We learn from Ferranti, Ltd., that their famous three-valve A.C. mains set will be continued with slight alterations. The price is £28 in walnut and mahogany but an additional model is now available, with a metal cabinet finished in leather, at a price of £25. Two new two-valve sets are added to the Ferranti range. Both are in



This is the Lissen two-valve regional portable set (Stand 40)

leather-finished metal cabinets. One is designed to tune in the two regional programmes and Daventry. The other two-valve set of Ferranti, Ltd., is permanently adjusted to two regional stations; the price of both models of the Ferranti two-valver is £16 inclusive.

Models Retained

So great was the success of last year's Marconiphone products that most of the range is being retained this year. Undoubtedly, the Marconiphone sets introduced last season were of such advanced design that they merit a continuance for at least another year. Probably the most popular amongst Marconiphone sets is Model 39, which

(Contd. on page 312.)

The BEST SHOW IN TOWN!

—AND THE BEST VIEW IS ON STAND NO 69



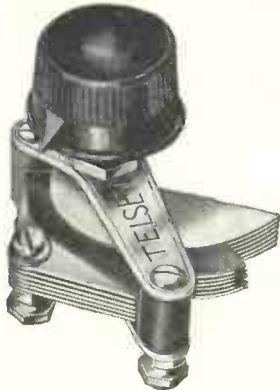
TELSEN "ACE" TRANSFORMER.

The ideal model for all portable sets and where space is limited, gives perfect reproduction throughout the musical range. Shrouded in genuine bakelite, with new windings and core. Fitted with earth terminal. Made in ratios 3-1 and 5-1. Price 8/6 each.



TELSEN "RADIOGRAND" TRANSFORMER.

New model, shrouded in genuine bakelite, with new windings and core. Fitted with earth terminal. Made in ratios 3-1 and 5-1. Price 12/6 each.



TELSEN VARIABLE CONDENSERS

(bakelite dielectric). Particularly designed for use as a reaction condenser. May also be used as a neutralising condenser where large capacity is necessary. All vanes are insulated with bakelite. Made in three capacities: .0005, .0003, and .00015. Supplied complete with pointer knob, with one-hole fixing for panel mounting. Price 3/- each.



TELSEN VALVE HOLDERS

Pro. Pat. No. 20286/30. An entirely new design in Valve Holders, embodying patent metal spring contacts, which are designed to provide the most efficient contact with the valve legs. Low capacity, self-locating, supplied with patent soldering tags and hexagonal terminal nuts. Price 1/- each.



Look out for the new range of Telsens Components at Olympia—new types, new prices—better and cheaper radio!

These models embody many new features, which at their remarkably low prices now place first-class radio components within the reach of all.

The new models of Telsens Transformers have been entirely redesigned, each one having new windings and core, in addition to which they are now fitted with earth terminals, a very desirable feature in these days of high-efficiency two-transformer sets, and finally they are shrouded in Genuine Bakelite Mouldings.

The complete range of Telsens Components includes Variable Condensers, Fixed (Mica) Condensers, H.F. Chokes, Valve holders, etc. The range is of such technical perfection and beauty of finish that no real radio enthusiast will buy other than Telsens: "Radio's Choice" for "Better Radio Reception."

VISIT THE TELSEN STAND FIRST

Only Telsens could produce Components of such technical perfection and beauty of finish—components that are worthy of any circuit—components that you can place the utmost confidence in, to do their job and do it well—components that are up to the standard expected in present-day radio engineering—components that have been designed by engineers, for the real radio enthusiast—components that once you have tried them will make you want to tell your friends what a wonderful difference they have made to your set.

TELSEN

COMPONENTS

Advt. of Telsens Electric Co., Ltd., Birmingham

WHAT IS NEW IN RADIO SETS—Continued



The new *Cossor Empire* screened-grid three-valve kit set which is certain to be very popular. (Stand 52)

for working from A.C. mains costs £21. For D.C. mains it costs £17 15s., and for battery operation, £15 15s. Then there is model 47, a four-valve set for A.C. mains, price £24, model 55, a portable, model 34, a short-wave set, and model 56, a five-valver for A.C. mains, price £35.

E. K. Cole, Ltd.

This year, E. K. Cole, Ltd., have enhanced their reputation with two interesting models, a three-valver and a two-valver, both for A.C. and D.C. mains. Model 313, the three-valver, employs the latest A.C. valves in a cabinet of exquisite bakelite moulding. No aerial is necessary, because signals are picked up on a flexible lead.

The price of this set is £22 10s. complete. For 25-cycle mains the set costs £25. The two-valver, type 312, is similar in external appearance and employs a steep-slope detector and a pentode valve. The price of the two-valve set is £14 10s., or £16 for 25-cycle A.C. mains.

Improvements in the R.I. three-valve all-electric sets for A.C. and D.C. mains are announced by Radio Instruments, Ltd. The A.C. set uses the new A.C. pentode in the last stage. Provision is made for the use of a gramophone pick-up. The control dial, which is marked in metres, is illuminated by a pilot light. This firm has designed a pedestal type of moving-coil loud-speaker for use with the R.I. set, the price of which is £30. Intro-



A new *Ferranti* A.C. mains set, the *Regional* model 22. (Stand 47)

duced for the first time is the *Madrigal* four-valve set, consisting of two screened-grid valves, detector and power valve. The cabinet work is of the same high-class workmanship as the three-valver.

Climax radio are responsible for an all-electric two-valve set and an all-electric three-valve set. The two-valver is intended for local reception within a radius of 50 miles from a medium-power station or of 100 miles from a regional station. Sockets are provided so that a gramophone pick-up may be used. The set is housed in a cabinet of modern design, finished in figured walnut. The three-valve set has a considerable range, since it employs a screened-grid high-frequency valve and a pentode power valve. Only two controls are involved in the tuning process and both are marked in wavelengths. A selectivity control is included.

Burndept Wireless, Ltd., continue their excellent range of radio sets. Among them we single out the *Burndept* *Universal* *Screened* *Five*, which, as a battery set,



Another new *Ferranti* set with fabric-covered cabinet, type 32. (Stand 47)

is listed at 30 guineas, while for mains operation the price is 39 guineas. This set is really a "sports" model, incorporating every conceivable refinement. Designed for use with a normal outside aerial, the *Universal* *Five* covers three distinct wavelength ranges: from 16 to 38 metres, from 220 to 560 metres, and from 900 to 2100 metres.

New Mains Set.

To the very successful range of sets marketed by L. McMichael, Ltd., is now added an entirely new product, the *McMichael* *Mains* *Three*. In producing this set the makers have achieved exceptional dignity in appearance. The price of 20 (Contd. on page 314.)

THE GAM-BRELL 1930-1931 ALL - ELECTRIC RECEIVERS

These wonderful sets include many new features not possessed by other receivers:

VARIABLE SELECTIVITY CIRCUITS GIVING HAIR-LINE TO BROAD TUNING AT WILL.

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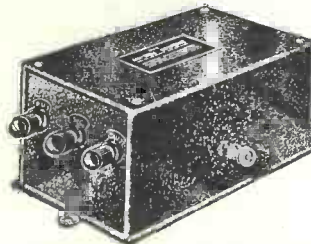
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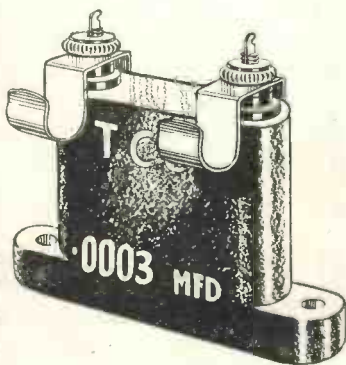
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In the Time of Wren...

Westminster Abbey was rebuilt. It had then stood through seven centuries. It is still standing the test of time, though another 200 years have passed.

A quarter of a century ago the first T.C.C. Condenser was made. And, like Westminster Abbey, T.C.C. has stood the test of time. To-day, as ever, it is the standard of condenser reliability and accuracy. That is why the leading Radio technicians choose T.C.C. And that is why you, too, will use T.C.C. Condensers in your set.



Illustrated above is a .0003 mfd. T.C.C. Upright Type Mica Condenser. Price 1/6 each. Other capacities in this type are made from .0001 mfd. to .25 mfd. Prices 1/6 to 18/6.

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Four, complete
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Chassis are incorporated
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THE MIRACLE OF RADIO rediscovered in amazing simplicity of operation

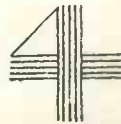
The four valves give power that thrills to handle. First the screened grid valve. Then the detector followed by the first low frequency valve. And finally a super power valve, ensuring a surge of pure volume that is amazing in its vivid, exact realism. Enough to fill a hall, yet it can be controlled to a whisper.

Wavelength range covers all Europe—200 to 2,000 metres. And no coil changing. Merely fit a Wates Star Pick-up, price 21/6, to your existing gramophone and you have a powerful Radio-Gramophone combination. Hear it demonstrated at our showrooms—then your local dealer can supply.



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M.B.

WHAT IS NEW IN RADIO SETS—Continued

guineas is moderate. Even without an aerial a number of stations are claimed to be within range. The calibrated tuning scale is illuminated and a travelling pointer is operated by a single tuning control. The selection of long or short waves, the introduction of a gramophone pick-up, and the complete control of volume is effected by the rotation of one control knob.

Gnome Portable

One of the most successful makers of portables, the Rees Mace Manufacturing Co. Ltd., have told us their new season's programme. The Gnome portable, weighing 20 pounds, has been revised



The Kolster-Brandes four-valve transportable set for operation from A.C. mains (Stand 55)

and is listed at 19 guineas. Instead of the suitcase of the standard 1931 Gnome portable, one can have an upright mahogany case at the same price. Then there is a four-valve screened-grid portable at 22 guineas, called the Welbeck Major. A still more expensive portable, finished in brown and blue crocodile, is the Tourist Seven, price 39 guineas. This is a seven-valve super-heterodyne.

Kolster-Brandes, Ltd., are marketing some very fine new sets. Pride of place must be given to the new K.B. 239, a de-luxe radio gramophone with two turntables. But the K.B. 237, which includes a frame aerial and is housed in a simple yet pleasing walnut bureau cabinet, is likely to have a more popular appeal. The new K.B. transportable shows a new trend, for it is an all-electric four-valver with frame aerial, electro-dynamic loud-speaker



A Selector four-valve attache-case portable (Stand 114)

and mains power unit housed in a bureau type cabinet. A new four-valve battery-operated table model requiring an external aerial is also announced. Then there is the new Kolster Brandes two-valve all-electric set.

The Halcyon Wireless Co., Ltd., are very successful makers of portables. The new Halcyon super-screened four-valve set finished in brown crocodile hide takes the suitcase form. It has an Ultra linen-diaphragm loud-speaker and a very powerful four-valve circuit. The price complete is 28 guineas. Designed to give the most perfect results on radio and gramophone, the Halcyon Grandola radio gramophone is housed in a beautifully figured solid walnut cabinet with illuminated panel. The price is 85 guineas.

Junior and senior all-electric sets are announced by Varley, Ltd., who entered



A good four-valve A.C. set with two screened-grid stages—the new Regentone model (Stand 51)

very successfully into the set market last year. There is a two-valve A.C. model at 15 guineas and a three-valve D.C. model at 16 guineas.



The Climax two-valve A.C. set is distinctive in appearance (Stand 27)

Both are housed in very handsome cabinets of burr walnut. Varley all-electric radio gramophones have been entirely re-designed. The price of the A.C. model is 85 guineas. It employs a moving-coil loud-speaker, an electric gramophone motor and a very powerful output stage capable of giving a large volume of undistorted sound.

Adding to the ever-growing range of good radio gramophones is the Gambrell Novogram. The general features of this instrument include a tone-brilliance control, a variable selectivity device, and accessories calculated to provide trouble-free service. Prices are quite reasonable. For D.C. mains the Novogram is 62 guineas and for A.C. mains 70 guineas. We are glad to see a Gambrell four-valve console, which includes a good four-valve set and a moving-coil loud-speaker. The price for D.C. mains is £37 and for A.C. mains £45.

Selectors, Ltd., are making a bid for the popular market with their Selector Attaché Twenty-two, which is an en-

tirely self-contained portable, finished in Rexine. The four-valve screened-grid circuit has plenty of power and is capable of giving good reproduction. The Selector Attaché Thirty-two is a four-valve portable with every



The new Murphy transportable set, priced at 17 guineas (Stand 252)

possible refinement, including a device for showing when the low-tension accumulator requires recharging. The Selector Vox is a radio gramophone having a veneered walnut cabinet of distinction. This instrument is completely self-contained and operated from A.C. mains.

Do you want to know more about radio?

As a newcomer to radio there must be many things that are still a mystery to you—even after reading this bumper issue of WIRELESS MAGAZINE.

For this reason we are preparing for insertion in the next issue—to be published on Wednesday, October 22, at the usual price of 1s.—a special "Easy Steps in Radio" Supplement that will be of particular value to beginners.

And even if you are not a beginner, there are doubtless a number of points in radio practice and theory about which your memory could be profitably jogged!

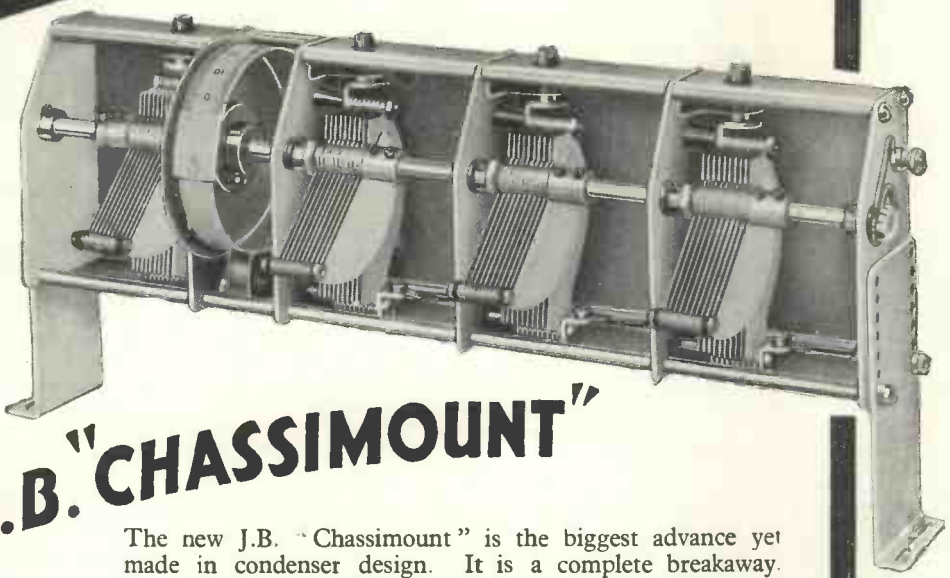
The demand for this issue will be great, and although many thousands of extra copies will be printed, it will be as well to order in advance from your newsagent to avoid disappointment.

Tell your friends about the "Easy Steps in Radio" Supplement—many of them will be interested and wish to read it themselves.

Wireless Magazine

for November on Sale Wed., October 22

RADIO'S NEWEST TUNING DEVICE



The NEW J.B. "CHASSIMOUNT"

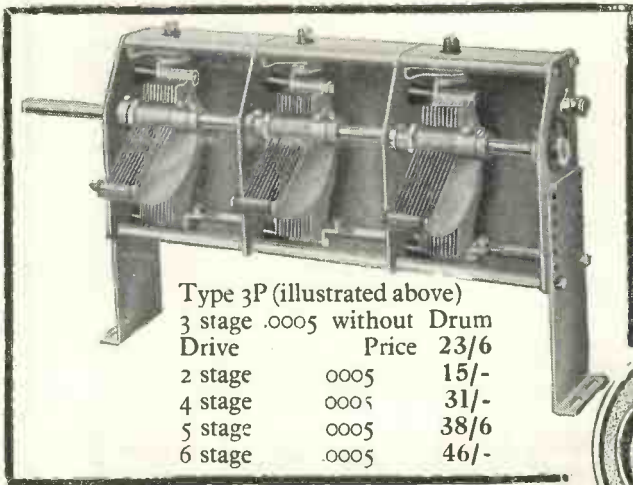
The new J.B. "Chassimount" is the biggest advance yet made in condenser design. It is a complete breakaway, throws open new fields and will be the basis of this year's popular circuits.

Two, three, even six tuned circuits—one knob controls them all, keeps them perfectly in tune, and brings in station after station.

Once again J.B. lead the way. J.B. precision has made the "Chassimount" possible and ensured the various condenser units matching over the whole range.

The J.B. "Chassimount" is built and designed as a unit. Each stage is adequately screened and has a special device which balances out all stray capacities. **AND IT COSTS LESS THAN SEPARATE CONDENSERS.**

See it at Olympia—Stand No. 63.



Type 3P (illustrated above)
 3 stage .0005 without Drum Drive Price 23/6
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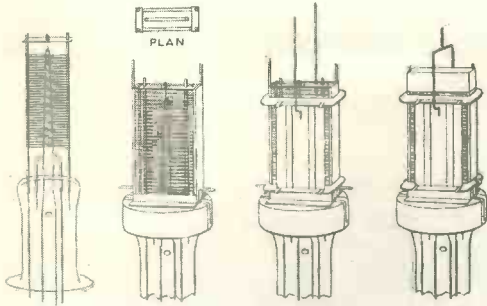
2 stage	.0005	26/6
3 stage	.0005	35/-
5 stage	.0005	50/-
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Advertisement of Jackson Brothers, 72, St. Thomas' Street, London, S.E.1. Telephone: Hop 1837.

Mention of the "Wireless Magazine" will ensure prompt attention

WHAT IS NEW IN VALVES



Details of electrode construction of the new Cossor screened-grid valve, which has the amazingly low inter-electrode capacity of .001 micro-microfarad (Stand 52)

ALTHOUGH there is nothing radically new in valves this year, detailed improvements are marked. These apply especially to A.C.-heated valves for all-electric sets. Some of the new A.C. valves have tremendous amplification factors, and provided they are used with suitable apparatus, a great increase in receiver sensitivity will result.

S.G. Valves

Screened-grid valves have definitely taken the place of three-electrode valves for high-frequency amplification. These valves have all been

improved, in order that the theoretical amplification denoted by the published figures may more nearly be approached in practice.

A lowering of the self-capacity between the electrodes of screened-grid valves has been aimed at by more than one manufacturer. A. C. Cossor, Ltd., claim the lowest inter-electrode capacity for a screened-grid valve; the Cossor SG 215 having a stated capacity of .001 micro-microfarad.

Among A.C. valves, the developments of the four-volt last-stage power valve must be noted. By using

these directly-heated four-volt valves in the last stage of an all-electric set, a standardised four-volt transformer winding is possible, instead of a separate six-volt winding as previously required when using a normal large power valve.

Two-volt Valves

Not only A.C. valves have been improved and modified, for we find small battery-heated valves giving much more all-round efficiency this year. As an example, the .2-ampere power valve can be quoted. This comes in between the very small .15-ampere power valve and the rather greedy .4-ampere power valve. The .2-ampere power valve will give good-quality reproduction and ample volume with quite moderate running costs of the high-tension battery.

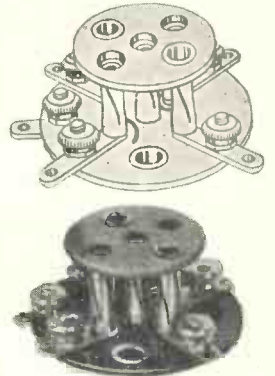
The new .2-ampere power valve is specially applicable to portables, wherein we expect to see it widely utilised this season.

Pentode valves are here to stay; they have been added to by the introduction of the first A.C. pentode, a power

valve having a really extraordinary performance. With the production and lowering in price of large high-tension

Details of more than 150 battery-operated valves will be found on page 188 of this issue. Next month this list will be extended to include A.C. mains valves as well

batteries, pentodes will now have a much greater application.



Two illustrations of a new Clix valve holder, made by Lectro Linx, Ltd. (Stand 131)

NOW THE AF7 TRANSFORMER

Many constructors requiring greater L.F. amplification than is practicable with one stage find that two stages with transformers of the old standard ratio give excessive amplification.

As an instance, take first the case of a single L.F. stage employing the standard transformer ratio of 1-3½.



The amplification factor of the modern detector valve is about 16, and that of an output valve of the P625 class is 6. This gives the total L.F. amplification as

$$16 \times 3.5 \times 6 = 336$$

This may be increased by using a transformer such as the AF6, which with its higher ratio of 1-7 would give

$$16 \times 7 \times 6 = 672$$

Compare the above with two stages, employing the same valves and transformers of the standard ratio. The figures become

$$16 \times 3.5 \times 16 \times 3.5 \times 6 = 18,816$$

What is required is some combination capable of giving appreciably more amplification than the single stage, but appreciably less than that obtained from two.

Several methods offered a solution, but after investigation of all the possibilities we decided that a transformer with a ratio of 1-1½ had, amongst others, one great advantage: the reduction in the secondary allowed us to increase the primary, thereby securing a primary inductance of 210 henries when carrying 1 milliamp. This transformer is therefore clearly the most suitable transformer to follow an anode-bend detector.

Compared with the figures given above, the total amplification using this transformer would be

$$16 \times 1.75 \times 16 \times 1.75 \times 6 = 4,704$$

This new transformer is the AF7. Price 30/-. It is available for push-out—AF7c, price 34/-.

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(20v., 5,000 m.a.)
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NEW BLUE SPOT 66R UNIT

with large cone chassis.
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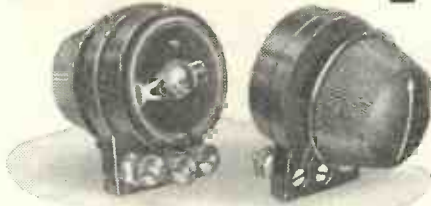
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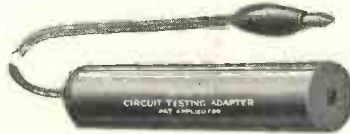
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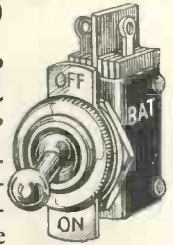


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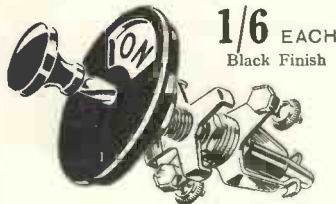
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Complete Kit of Parts including: Handsome Frosted Metal Cover, Drilled and Engraved Panel, Power Unit, Baseboard, Resistances, Condensers, terminals, etc. Guaranteed one year—A.C. Mains 200/250 volts. Other Kits to Choose from: Super Power All Mains Unit. Power 190 volts at 30 m.a., with Det., SG, GB and LT tappings. Complete Kit of parts £4 10 0 High Tension Units: 20 m.a. at 120 volts with SG and Det. tappings. Complete Kit of parts £2 7 6 35 m.a. at 200 volts with SG and D t. tappings. Complete Kit of parts £3 0 0

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1/6 EACH
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Per doz.	No. 1.	No. 2.
Jars (waxed) ..	1 3 1 6	s. d.
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LONG LIFE : SILENT : ECONOMICAL
 Sample doz. (18 volts), complete with bands and electrolyte. No. 1, 4/1; No. 2, 5/-; post 9d., terminals extra. No. 3, with terminals, 7/6 (10,000 milliamperes). Sample unit, 6d. Orders 10/- carr. paid. New illustrated catalogue post free.
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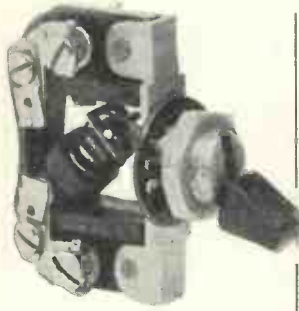


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Those who cannot get there will receive full details of their new season's products on request.

It helps us if you mention "Wireless Magazine"

WHAT IS NEW IN COMPONENTS



A new Atlas quick make-and-break switch, made by H. Clarke & Co. (Stand 211)

In every respect components have improved this year. Looking through forthcoming products we note lower prices and better quality. Moreover, most of the components so far announced are of pleasing appearance.



Two Red Diamond components. On the left is a lead-in tube and on the right a turned ebony knob. Made by the Jewel Pen Co., Ltd. (Stand 138)

We should like to see control components, such as condenser dials, wavelength switches and other panel components, marked or engraved to indicate their function. Gripso filament switches are a fine example of what can be done in this direction.

Learning from last year's constructional work, we find component makers paying more attention to wire-wound resistances, such as the Regentone.

Reliability

Reliability is a strong point of the wire-wound resistance. They are now being made in a much cheaper form than formerly. Instead of winding the resistance wire on to an expensive former it is enclosed as a single length inside Systoflex sleeving.

They are being made by two firms—A. F. Bulgin and Co., and Burne Jones & Co., Ltd.

Condensed news of this season's components will be found in the following paragraphs:—

Complete new ranges of components will be produced by Igranic and Telsen. Prices of Dubilier condensers have been reduced. These famous

components will find a ready application in all constructor's sets.

Six-sixty adaptors have been produced so that the new A.C. valves can be fitted to standard sets.

Specially valuable for mains working are the quick make-and-break switches introduced. A very good switch has been produced by A. F. Bulgin, Ltd., having "on" and "off" markings.

Harlie Bros. announce new electric gramophone motors. There is model 32, with a special speed control for the turntable. It is for alternating current only, and the price is £3 17s. 6d.

Graham Farish, Ltd., are bringing within the reach of the constructor their postage stamp type of fixed condenser. All the usual capa-

spaghetti wire-wound anode resistances, made in values from 1,000 to 40,000 ohms, to carry 10 milliamperes and 50,000 ohms to carry 5 milliamperes, are priced at 1s. 6d. each.

As usual with Wingrove and Rogers, Ltd., the Polar condensers are again the main component. Prices have been reduced in several types as from September 1. New condensers in the Polar range include the universal for two-, three- or four-gang circuits, and the short-wave condenser.

Two new Igranic products are important to constructors. The Igranic Minor slow-motion dial, price 2s. 6d. each, and the Igranic Major slow-motion dial, price 4s. each. A considerable number of the existing Igranic components have been deleted.

A new audio transformer, to be known as the A.F.7, has been produced by Ferranti, Ltd., for use with anode-bend detectors.

Wearite components for the new season include quick make-and-break switches, a new low-frequency coupling unit, a new potentiometer with grid-leak clip, and a very



The Elite high-frequency choke, made by the Beaver Electrical Supply Co. (Stand 206)

useful little component called the by-pass unit.

Jackson Bros. are again doing their very wide range of variable condensers, in-

cluding a new model for short-wave reception. Price 8s., this condenser is made in three capacities suitable for all short-wave requirements.

One of the most interesting products of T.C.C. is the non-inductive condenser, made in capacities between .005



An on-off switch with a particularly good action, made by the Pioneer Manufacturing Co., price 1s. 3d. (Stand 226)

microfarad and 2 microfarads. This type of condenser is designed for use with screened-grid valves. Another interesting T.C.C. development is the electrolytic condenser with working voltages of 12, 40, and 100.

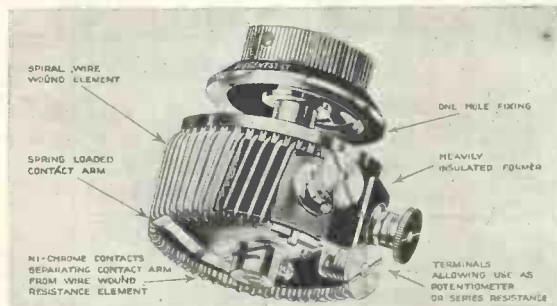
Lewcos developments include an improved low-frequency transformer, price 25s. for the 5-to-1 ratio, and 20s. for the 3-to-1 ratio. Lewcos anode resistances of the wire-wound type are listed at 5s. each. Then there is a Lewcos low-frequency choke price 17s. 6d. This has an inductance of 30 henries, a limiting current of 30 milliamperes and a D.C. resistance of 70 ohms.

Varley Products

Varley, Ltd., have a new impedance-matching output transformer of special value to constructors. The price is £1 2s. 6d. Another new Varley product is a push-pull pentode output choke, price 7s. 6d.

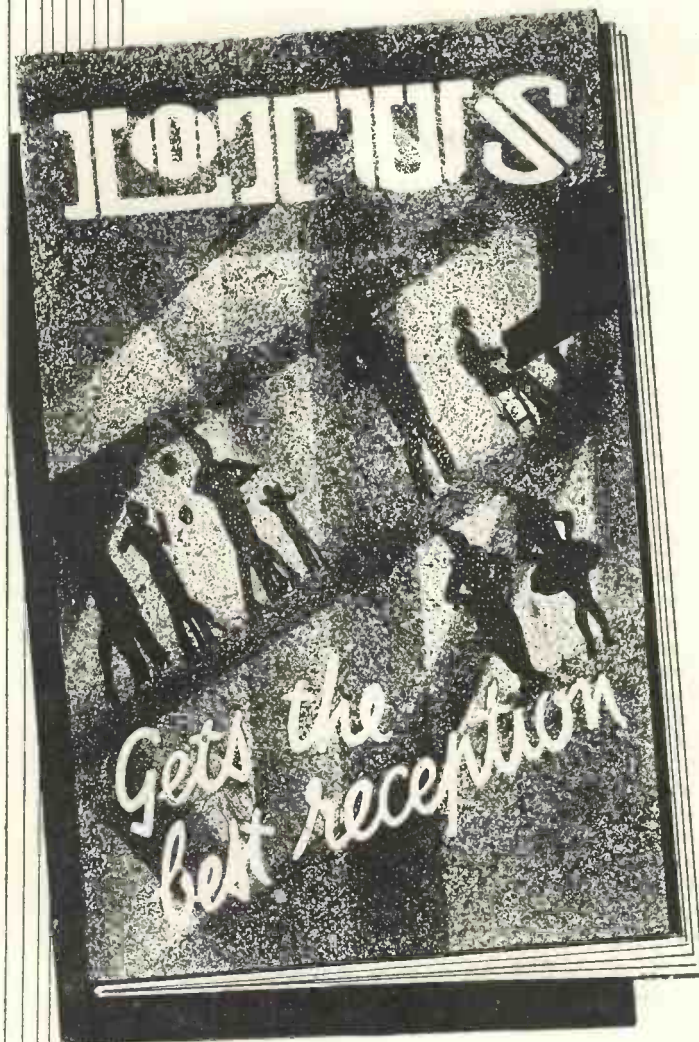
Radio Instruments, Ltd., have brought out several important additions to their famous range of low-frequency transformers. A variable-ratio push-pull output transformer, price 25s., should be of great interest.

Belling-Lee announce a multiple-purpose mounting for terminals as well as an extremely neat gadget called the Wanderfuse, price 1s. 6d. It is just the gadget to protect valves and batteries.



Schematic diagram of the new wire-wound Regentat (plain variable resistance or potentiometer). Various values are available (Stand 51)

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AN INTERESTING TWO-VALVE SET



This photograph shows the valve installation supplied by son and Webb (Stand 247) complete two-valve set itself is only £2 10s. with valves. It is known as the Double Two. The complete kit includes an Amplion guinea cone loud-speaker, a Sparta 100-volt battery and a Sparta 2-volt accumulator

AROUND AND ABOUT

READERS who use accumulators will be interested to learn of an arrangement concluded by Oldham and Son, Ltd., of Denton, and the U.S.L. Battery Corporation of Niagara Falls, U.S., by which the British company will have full benefit of the research carried out by the American concern, which is one of the biggest producers of batteries on the other side of the Atlantic.

In future all batteries will be sold under the name "Oldham U.S.L."

Constructors of the Music Monitor, the simple two-valve set described in the previous issue of WIRELESS MAGAZINE, should note a misprint that occurs at the top of page 136.

It is there stated that the reaction winding should be wound in a clockwise direction; this should be anti-clockwise. Those who have already made their coils with the winding clockwise should reverse the connections.

Those who prefer

to assemble their own loud-speakers will be interested in a double-cone chassis made by Frederick Squire, Ltd. This costs £1 19s. (plus 3s. royalty), and will take Blue Spot, Watmel, and Hegra units besides others.

Readers who intend to build for themselves any of the sets described in these pages will find it a great convenience to get a complete kit of parts from one of the firms that specialises in that business. Amongst such suppliers, who give a prompt and reliable service, are H. and B., London Radio Supplies, P.B. Radio, Peto-Scott Co., Ltd., Raymond's, Ready Radio, and S. Scott Sessions & Co.

If you think any friends of yours who are not already readers of WIRELESS MAGAZINE would like a specimen copy write to the Publisher, who will be glad of the opportunity to send them specimen copies free of all charge.

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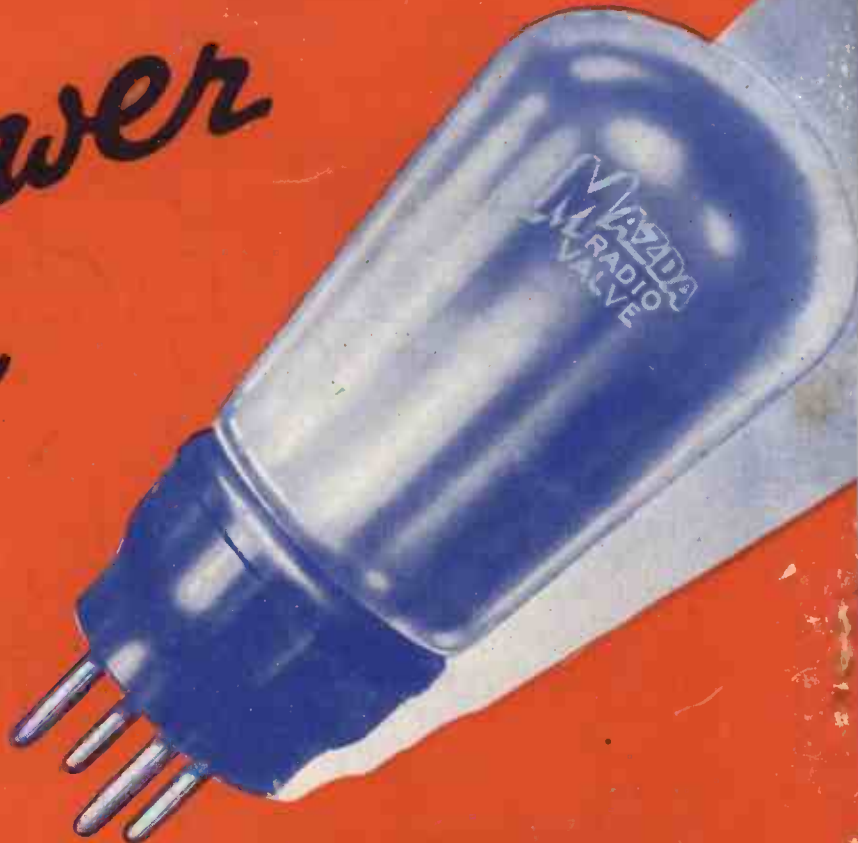
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