

35 LOUD-SPEAKERS to CHOOSE FROM COLOR SUPPLEMENT

Wireless Magazine

SPECIAL CHRISTMAS NUMBER

No. 71. DECEMBER, 1930.

All About
LOUD-SPEAKERS
AND 45 OTHER FEATURES

1
132 PAGES



★ LISTEN!

Hear Every Note and Syllable—

THE
"HYPERDYNE"
DEPENDS
UPON
THIS

AND

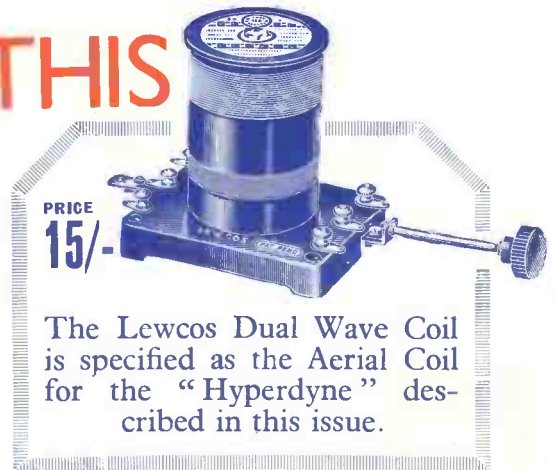
THIS



Fit Lewcos components and you will notice that a sonorous tone has replaced that hitherto indifferent reproduction.

Every Lewcos component lives up to its manufacturer's world-wide reputation for "perfection in every detail."

Fully descriptive leaflets of the Ultra Short Wave Coil (Ref. R64) and the D.W.A. (Ref. R65) will be sent on request. Please quote reference number.

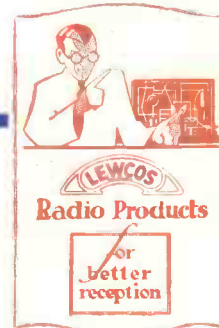


The Lewcos Dual Wave Coil is specified as the Aerial Coil for the "Hyperdyne" described in this issue.

★ LEWCOS

Lewcos Ultra Short Wave Coils (with magnetic reaction—references A.M.S.4 and 9)—are specified as the oscillation coils for the "Hyperdyne"—Price 6/- each

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LARGE STOCKS
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ALL BRANCHES

Editor:
BERNARD E. JONES

Technical Editor:
J. H. REYNER,
B.Sc. (Hons.), A.M.I.E.E.

Wireless Magazine

The Best Shillingsworth in Radio
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Research Consultant:
W. JAMES

Assistant Editor:
D. SISSON RELPH

IN yet another special supplement we are reviewing and illustrating no less than 135 different models of loud-speakers this month, and for easy reference are dividing them into eight groups.

More than sixty of these models have been personally tested by us, and for the reader who is never satisfied unless he is told how things work, we are presenting diagrams explaining the action of four different types.

In addition, W. James contributes an article on "Getting the Best Results." Altogether, this issue provides the most comprehensive data on modern loud-speakers ever put together in any one issue of a periodical.

For readers desirous of choosing a ready-made set, the article "Give Them Radio This Christmas!" is intended; in it are mentioned the many considerations that should weigh with anybody in making a choice, the article being followed by five full-page test reports of as many important sets, including two A.C. three-valvers, an A.C. four-valver, a battery two, and an A.C. radio gramophone.

"We Test Before You Buy," based upon our own personal tests and written on original, independent lines, has rapidly become a favourite feature with the reader and, in addition, a pronouncement of value to which manufacturers give their serious attention.

The gramophone must loom large in any Christmas number. As usual, we review the best of the new records (with a special eye to Christmas requirements), and Capt. H. T. Barnett—who lives with the gramophone by day and dreams of it by night—contributes the first of a special series of articles entitled "Secrets of Gramophone Success."

"Thermion," of Amateur Wireless—surely the "Thermion" pages in our weekly contemporary are the best-known "chat" feature of any radio journal in the world—offers a careful explanation of the Stenode circuit. He has had special facilities for studying Dr. James Robinson's already famous invention which makes possible in connection with a super-het a degree of selectivity of an order previously undreamed of.

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When "Thermion" wrote his article no set manufacturer had yet incorporated the principle, but, as we point out editorially, some firms are now on the point of production with sets that will embody the Robinson patent; we shall keep readers well informed on the subject as it develops.

J. L. Baird, through the mouthpiece of Sydney Moseley, replies in our pages to my article last month in which I asked whether television is at a standstill.

Mr. Moseley replies with an emphatic "No," and you will read his vigorous contribution with pleasure—mingled, I hope, with sorrow for me, at whom he makes his hits.

I am accepting Mr. Baird's invitation to pay another visit to his studio and laboratory.

Our sets this month embody some particularly interesting ideas. The Regional A.C. Four, W. James's successor to his Regional Band-pass Four, which was a battery set, is worth while; you will find it an ideal basis for a radio gramophone.

The Five-point Two is another edition to a famous range of sets.

The Hyperdyne is an up-to-date version of our old friend the super-het, a receiver de luxe which our Technical Editor, J. H. Reyner, guarantees to give a performance "which seems almost like a dream in these days of the over-crowded ether."

The Hyperdyne possesses all the advantages of the old super-het, but without the drawbacks that were responsible for its retirement into the background. In addition, it has some special advantages—only two operating controls; works on an indoor aerial; can be adapted to ultra-short-wave reception and, compared with the old super-het, the construction is economical.

My space is gone; I can only in conclusion allow myself the great pleasure and privilege of wishing you all a Happy Christmas and of reciprocating all those good wishes which during the past few months have reached me from so many of my readers at home and abroad.

THE EDITOR.



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120	"	...	15/6	PXG4	...	40 a.h.	13/6
60	Super	...	13/-	PXG5	...	50 a.h.	15/6
100	"	...	21/-	PXG6	...	60 a.h.	17/6
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VALVES TO USE IN YOUR SET

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Anode Current at 120 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
Two-volt Three-electrode Valves								
Dario ..	Resist.	60,000	30	.1	.5	5	1.5	3.0
Mazda ..	H210	59,000	47	.1	.8	1.1	—	1.0
Lissen ..	H210	58,000	35	.1	.6	1.1	—	1.5
Six-Sixty	210RC	55,500	39	.1	.7	1.6	1.0	1.5
Mullard	PM1A	51,000	36	.1	.72	1.5	1.5	1.5
Cossor ..	210RC	50,000	35	.1	.72	1.5	1.5	1.5
Marconi	H2	35,000	35	.1	1.0	1.0	—	1.5
Osram ..	H2	35,000	35	.1	1.0	1.0	—	1.5
Six-Sixty	210HF	25,000	19	.1	.75	2.75	—	—
Osram ..	HL210	23,000	20	.1	.87	1.5	2.0	4.0
Osram ..	HL210	23,000	20	.1	.87	1.5	1.5	4.0
Mullard	PM1HF	22,500	18	.1	.8	1.0	3.0	4.5
Dario ..	Super HF	21,000	25	.15	1.5	2.0	1.5	3.0
Lissen ..	HL210	21,000	18	.1	.85	2.2	1.5	4.5
Mazda ..	HL210	21,000	26	.1	1.25	3.0	1.5	3.0
Cossor ..	210HF	20,000	22	.1	1.2	1.2	1.5	3.0
Cossor ..	210D-t.	13,000	15	.1	1.15	—	—	—
Six-Sixty	210LF	12,500	10.6	.1	.85	5.4	4.5	7.5
Cossor ..	210LF	12,000	10	.1	1.1	3.5	3.0	4.5
Marconi	L210	12,000	11	.1	.92	2.0	3.0	7.5
Mullard	PM1LF	12,000	11	.1	.9	3.0	4.5	7.5
Osram ..	L210	12,000	11	.1	.92	3.5	3.0	7.5
Six-Sixty	217D	10,700	13.5	.17	1.25	7.0	—	4.0
Mullard	PM2DX	10,700	13.5	.2	1.25	3.0	3.0	6.0
Dario ..	Univ.	10,000	9	.1	.9	3.0	—	1.5
Lissen ..	L210	10,000	10	.1	1.0	3.5	3.0	7.5
Mazda ..	L210	10,000	15.5	.1	1.55	5.0	2.5	4.5
Dario ..	Super D-t.	7,500	15	.15	2.0	3.0	1.5	3.0
Marconi	P215	5,000	7	.15	1.4	5.5	7.5	12.0
Osram ..	P215	5,000	7	.15	1.4	5.5	7.5	12.0
Six-Sixty	220P	4,800	7.2	.2	1.5	17.0	10.0	16.0
Lissen ..	P220	4,700	7	.2	1.5	5.0	9.0	15.0
Dario ..	SP	4,500	9	.15	2.0	—	7.5	12.5
Mullard	PM2	4,400	7.5	.2	1.7	4.0	7.5	12.0
Cossor ..	220P	4,000	8	.2	2.0	7.5	4.5	9.6
Cossor ..	P215	4,000	9	.15	2.25	—	3.0	7.5
Mazda ..	P220	3,700	12.5	.2	3.4	11.0	3.0	6.0
Six-Sixty	230SP	2,750	5.5	.3	2.0	32.0	12.0	23.0
Dario ..	Hyper	2,700	5	.3	1.8	15.0	10.5	15.0
Mullard	PM25E	2,600	5.4	.3	2.1	14.0	9.0	15.0
Marconi	P240	2,500	4	.4	1.6	12.0	15.0	24.0
Osram ..	P240	2,500	4	.4	1.6	11.0	16.0	24.0
Marconi	P2	2,300	6.5	.2	2.8	12.0	7.5	12.0
Osram ..	P2	2,300	6.5	.2	2.8	12.0	7.5	10.5
Lissen ..	PX240	2,000	4	.4	2.0	14.0	12.5	22.5
Mazda ..	P240	1,900	7	.4	3.7	18.0	6.0	13.5
Cossor ..	230XP	1,500	4	.3	2.3	18.0	12.5	22.5
Two-volt Screened-grid Valves								
Mazda ..	215SG	400,000	450	.15	1.1	—	1.5	1.5
Cossor ..	215SG	300,000	330	.15	—	—	—	—
Marconi	S215	300,000	180	.6	.85	3.0	1.5	1.5
Osram ..	S215	300,000	180	.6	.85	1.8	—	1.5
Dario ..	SG	250,000	250	.15	1.0	—	—	1.5
Six-Sixty	215SG	220,000	190	.15	.87	2.0	—	—
Mullard	PM12G	212,000	320	.15	.94	1.75	—	—
Cossor ..	220SG	200,000	320	.2	1.6	—	—	1.5
Lissen ..	SG215	200,000	180	.15	.9	—	—	1.5
Two-volt Pentode Valves								
Lissen ..	PT225	64,000	90	.25	1.4	7.0	3.0	6.0
Six-Sixty	230PP	64,000	80	.3	1.25	17.0	6.0	10.5
Mullard	PM22	62,500	82	.3	1.3	10.0	6.0	12.0
Dario ..	Pent.	55,000	100	.3	1.8	6.0	6.0	15.0
Marconi	PT240	55,000	90	.4	1.65	9.0	6.0	9.0
Osram ..	PT240	55,000	90	.4	1.65	9.0	6.0	9.0
Lissen ..	PT240	22,500	45	.4	2.0	12.5	7.5	10.5
Cossor ..	230PT	20,000	40	.3	2.0	15.0	6.0	7.5
Mazda ..	230P	—	—	.3	1.8	13.0	9.0	9.0
Four-volt Three-electrode Valves								
Cossor ..	410RC	60,000	40	.1	.66	1.0	—	1.5
Dario ..	Resist.	60,000	30	.075	.5	5	—	1.5
Marconi	H410	60,000	40	.1	.67	.5	1.5	1.5
Osram ..	H410	60,000	40	.1	.66	.35	—	1.5
Lissen ..	H410	60,000	40	.1	.66	1.6	—	1.5
Six-Sixty	4075RC	58,000	37	.075	.64	1.35	1.0	1.5
Mullard	PM3A	55,000	38	.075	.66	3	1.5	1.5
Marconi	HL410	30,000	25	.15	.83	1.0	2.0	3.0
Osram ..	HL410	30,000	25	.1	.83	1.25	1.5	3.0
Lissen ..	HL410	21,000	25	.1	1.2	2.5	1.5	3.0
Dario ..	Super HF	21,000	25	.1	1.2	2.0	1.5	3.0
Cossor ..	410HF	20,000	20	.1	1.0	1.75	1.5	4.5
Mullard	PM3	13,000	14	.075	1.05	2.0	3.0	6.0
Six-Sixty	4075HF	12,500	13.5	.075	1.1	7.0	3.0	5.0
Dario ..	Univ.	10,000	10	.075	1.0	3.0	—	1.5
Cossor ..	410LF	8,500	15	.1	1.76	3.2	3.0	6.0
Lissen ..	L410	8,500	15	.1	1.8	3.5	1.5	4.5
Marconi	L410	8,500	15	.1	1.76	3.0	2.0	4.5
Osram ..	L410	8,500	15	.1	1.77	3.5	3.0	4.5
Mullard	PM4DX	7,500	15	.1	2.0	2.0	3.0	6.0
Dario ..	Super Det.	7,500	15	.075	—	3.0	3.0	4.5
Six-Sixty	410D	7,250	14.5	.1	2.0	8.0	—	3.5
Marconi	P410	5,000	7.5	.1	1.5	6.0	6.0	10.5
Osram ..	P410	5,000	7.5	.1	1.5	6.0	6.0	10.5
Dario ..	SP	4,500	9	.1	2.0	7.5	6.0	15.0

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Anode Current at 120 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
Four-volt Three-electrode Valves—Continued								
Lissen ..	P410	4,500	9	.1	2.0	5.0	6.0	12.5
Mullard	PM4	4,450	8	.1	1.8	6.0	7.5	12.0
Cossor ..	410P	4,200	7.7	.1	1.85	18.0	6.0	9.0
Marconi	410P	4,000	8	.1	2.0	17.5	4.5	9.0
Osram ..	Hyper P	2,700	5	.15	1.8	15.0	12.0	17.5
Marconi	P425	2,300	4.5	.25	1.95	14.0	9.0	16.5
Osram ..	P425	2,300	4.5	.25	1.95	4.0	9.0	16.5
Lissen ..	P425	2,250	4.5	.25	2.8	28.0	12.5	19.5
Cossor ..	415XP	2,000	4	.15	2.0	2.0	12.0	22.5
Cossor ..	425XP	2,000	7	.25	3.5	—	6.0	13.5
Mullard	PM4A	2,000	4.2	.18	2.1	10.0	13.5	22.5
Six-Sixty	420SP	2,000	4	.2	2.0	41.0	12.0	22.0
Mazda ..	P475	1,950	3.5	.25	1.8	26.0	1.40	26.0
Marconi	FX4	1,050	3.5	.6	3.3	30.0	13.0	23.0
Osram ..	FX4	1,050	3.5	.6	3.3	30.0	13.0	23.0
Four-volt Screened-grid Valves								
Dario ..	SG	250,000	250	.075	1.0	2.0	—	1.5
Mullard	PM14	230,000	200	.075	.87	—	—	—
Six-Sixty	4075SG	220,000	190	.075	.87	3.0	—	—
Cossor ..	410SG	200,000	200	.1	1.0	—	—	1.5
Marconi	S410	200,000	180	.1	.9	3.5	1.5	1.5
Osram ..	S410	200,000	180	.1	.9	3.5	—	—
Lissen ..	SG410	200,000	180	.1	.9	—	—	1.5
Four-volt Pentode Valves								
Dario ..	Pent.	55,000	100	.15	1.8	—	6.0	15.0
Six-Sixty	SS4 Pent.	53,000	83	.275	1.55	17.0	10.0	14.0
Marconi	PT425	50,000	100	.25	2.0	8.0	4.7	7.5
Osram ..	PT425	50,000	100	.25	2.0	8.0	4.0	7.5
Mullard	PM24	28,000	62	.15	1.75	16.0	6.0	12.0
Six-Sixty	415PP	27,000	60	.15	2.2	—	6.0	10.5
Mullard	PM24A	25,000	50	.275	2.0	15.0	6.0	21.0
Lissen ..	PT425	22,500	180	.25	2.0	14.0	7.5	10.5
Cossor ..	415PT	20,000	40	.15	2.0	14.0	6.0	9.0
Mazda ..	475P	—	—	.75	7.0	14.0	14.0	14.0
Six-volt Three-electrode Valves								
Mazda ..	H60/	90,000	40	.07	.45	1.0	.8	1.5
Cossor ..	610RC	60,000	50	.1	.3	1.0	—	1.5
Lissen ..	H610	60,000	40	.1	.66	1.0	—	1.5
Marconi	H610	60,000	40	.1	.7	.5	1.5	1.5
Osram ..	H610	60,000	40	.1	.7	.35	—	3.0
Six-Sixty	6075RC	58,000	42	.075	.7	1.1	1.0	1.5
Mullard	PM5B	53,000	40	.075	.75	2.5	1.5	1.5
Marconi	HL610	30,000	30	.1	1.0	1.0	1.5	1.5
Osram ..	HL610	30,000	30	.1	1.0	.9	1.5	3.0
Mullard	HLD610	21,000	25	.1	1.2	2.5	1.5	3.0
Cossor ..	610HF	20,000	20	.1	1.0	1.75	1.5	3.0
Marconi	HL61J	20,000						

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A.B.41.O. The same model but in an Oak Cabinet £5.15.0

A.B.45. A larger version of the A.B.41, with greater baffle board. In Oak, £6.15.0. In Mahogany, £7.7.0.

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WITH ELECTRICAL
GRAMOPHONE PICK-UPS

SCRATCH FILTER AND VOLUME CONTROL

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CATALOGUE



I 5/6

Scratch and surface noise which so often mar record reproduction may be totally eliminated where electrical pick-ups are employed, by connecting an Edison Bell Scratch Filter and Volume Control Unit.

This unique device permits smooth control of volume and the special filter circuit incorporated in no way depreciates the quality or volume obtained from the pick-up.

Connection is simple, two twin flexible wires are supplied ready connected to the unit and these are clearly marked, one pair connecting to the pick-up and the other to input terminals of amplifier or receiving instrument.

The case is of metal with a brown leatherette finish, with a felt base, and may be accommodated on the gramophone itself or permanently fixed at a convenient point.

The provision of a volume control is recommended with all types of pick-ups as without this there is a danger of overloading the input valve with consequent distortion.

EDISON BELL LIMITED, LONDON S.F.15
and HUNTINGDON

Speedy replies result from mentioning "Wireless Magazine"

VALVES TO USE IN YOUR SET—Continued

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Anode Current at 120 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
Six-volt Pentode Valves								
Marconi	PT625	43,000	80	.25	1.85	10.0	6.0	15.0
Osram	PT625	43,000	80	.25	1.85	—	—	(at 250v.)
Six-Sixty	SS617PP	28,500	54	.17	1.9	35.0	8.0	14.0
Mullard	PM26	25,000	50	.17	2.0	—	9.0	15.0
Lissen	PT625	24,000	60	.25	2.5	14.0	7.5	15.0
Cossor	615PT	20,000	40	.15	.15	14.0	—	—
A.C. Mains Valves								
Mullard	S4V	1,330,000	1,000	1.0	.75	1.4	—	—
Six-Sixty	SS4SGAC	1,330,000	1,000	1.0	.75	1.5	—	—
Mazda	AC/SG	800,000	1,200	1.0	3.0	5.0	.5	.5
Marconi	MS4	500,000	550	1.0	1.1	2.2	1.5	3.0
Osram	MS4	500,000	550	1.0	1.1	2.2	—	(at 200v.)
Mullard	S4VA	430,000	1,500	1.0	3.5	1.7	—	—
Cossor	4IMSG	400,000	1,000	1.0	2.5	2.0	—	1.5
Marconi	MH4	35,000	16	1.0	2.19	3.0	1.5	3.0
Osram	MH4	35,000	16	1.0	2.19	3.0	1.5	(at 200v.) 3.0

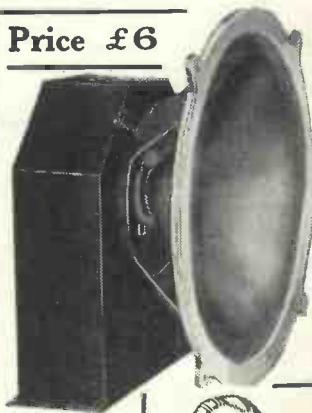
Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Anode Current at 120 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
A.C. Mains Valves—Continued								
Cossor	M41RC	20,000	35	1.0	1.75	2.4	1.5	3.0
Six-Sixty	SS4CPAC	14,500	35	1.0	2.4	3.0	—	3.0
Cossor	M41HF	14,000	32	1.0	2.3	2.5	1.5	3.0
Mullard	354V	14,000	25	1.0	2.5	3.5	1.5	3.0
Mazda	AC/HL	13,500	35	1.0	3.0	4.5	1.5	3.0
Marconi	MHL/4	8,000	20	1.0	2.5	5.0	3.0	6.0
Osram	MHL/4	8,000	20	1.0	2.5	5.0	3.0	(at 200v.) 6.0
Cossor	M41LF	7,900	15	1.0	1.9	4.5	4.5	6.0
Mullard	154V	7,500	15	1.0	2.0	5.0	4.5	10.5
Six-Sixty	SS4D t.	7,000	16	1.0	2.3	7.5	3.5	8.0
Cossor	M41P	5,000	10	1.0	2.0	6.5	4.5	7.5
Marconi	ML4	3,000	9	1.0	2.0	9.0	10.0	22.0
Osram	ML4	3,000	9	1.0	2.0	9.0	10.0	(at 200v.) 16.0
Six-Sixty	SS4PAC	3,000	10	1.0	3.3	10.0	5.0	8.0
Mazda	AC/P	2,650	10	1.0	3.75	14.0	6.0	12.0
Cossor	M41XP	2,000	4	1.0	2.0	15.0	12.0	19.5
Mazda	AC/PI	2,000	5	1.0	2.5	25.0	15.0	25.0
Mullard	AS064	2,000	6	1.0	3.0	15.0	9.0	14.0

**WIRELESS
MAGAZINE**
for
JANUARY

All the regular features will be retained, but in addition there will be a special section of full-page test reports of many of the new season's sets. These will interest prospective buyers and all who are concerned with recent developments. Make sure of a copy by ordering from your newsagent to-day.

PUBLISHED
on
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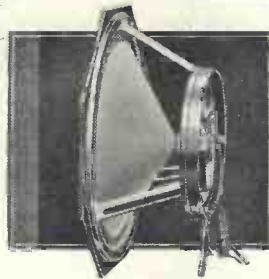
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The Squire 101 (illustrated), a double diaphragm model with double floating suspension. Chassis assembly (excluding unit) **39/-** (plus 3/- royalty)

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All Squire Cradles will take standard units—Blue Spot, Hegra, Bullphone, Ormond, etc.

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VALVE EFFICIENCY

MARCONI ML-4

SCIENTIFIC FACT

EXPERT APPRECIATION

PUBLIC APPRECIATION

FOR THE FINAL STAGE OF THE A.C. ALL-ELECTRIC RECEIVER—**MARCONI ML-4**, an indirectly heated output valve of exceptional efficiency, combining an amplification factor of 9 with an impedance of only 3,000 ohms—mutual conductance 3.0 M.A/VOLT. ML-4 provides a stage magnification which hitherto has only been possible with valves of much higher impedance; at the same time its undistorted output is ample for most requirements. In construction it retains the essential features of all Marconi A.C. valves—lasting emission, permanency of characteristics, special mesh anode and exceptional vacuum. ML-4 is the ideal output valve for most A.C. Receivers. ITS DEPENDABLE EFFICIENCY HAS BEEN PROVED BEYOND DOUBT—MARCONI ML-4 IS ALL BRITISH—AND COSTS ONLY 17/6.

CHARACTERISTICS.

Amp. factor—9	Fil. volts.—4.0
Impedance—3,000 Ohms	Fil. amps.—1.0
Mut. Conductance—3.0 MA/V.	Anode Volts—200 max.

MARCONI ML-4—THE FOREMOST INDIRECTLY HEATED OUTPUT VALVE FOR A.C. RECEIVERS—PRICE 17/6

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, &c., &c., because of their longer life—clearer tone—greater range and volume.

A letter typical of many received regarding the splendid service given by Marconi Valves:—

"On May 1st, 1924, I purchased two of your valves—2-volt General Purpose Type, costing at that time 21/- each.

These valves have been in daily use ever since, and to-day are giving me fine results. I have also another one bought three years ago, and these three are working on a P.W. Magic 3 set which I constructed a few weeks ago Your notice re long life attracted my attention, and I thought how true it was, as I have found it out myself. The volume and selectivity are wonderful, considering I have no Power Valve in my set."

W. S. R., Swansea.

USE A

MARCONI

THE VALVE THE EXPERT USES



Speedy replies result from mentioning "Wireless Magazine"

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MOVING COIL LOUD-SPEAKERS



READ REPORTS ON THESE SPEAKERS IN THIS ISSUE

Grassmann moving coil Loud-speakers are spoken of by the Technical Press as being definitely superior to nearly every other make. Confirm this yourself by asking your dealer to demonstrate. You will immediately appreciate its sensitivity, even response, ability to handle volume, richness of tone and absolute fidelity. Its price and performance sets a world standard of sound reproduction.

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GRASSMANN

INDUCTOR DYNAMIC SPEAKER

They say this model is amazing. We claim the usual Grassmann standard quality. The outstanding features of this speaker are PRICE AND PERFORMANCE.

This model consists of an improved "inductor dynamic" unit coupled with cone, chassis and stand. The movement of the armature and cone is very free and thus the reproduction of the bass is exceedingly good.

The D.C. resistance is 1,000 ohms, making this speaker suitable for practically every type of output valve using choke output only, no step-down transformer being required.

59/6

ASK YOUR DEALER TO LET YOU HEAR IT!

ROTOR ELECTRIC LTD.

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P3

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Have you ever built a set that wouldn't work? Has a mysterious fault in wiring or component eluded your most thorough search? How many hours have you wasted and how many valves have you burnt out when you have

had trouble—how many times have you given up in disgust?

Well, from now on you can say goodbye to all that! The All-in-One Radiometer will test valves components, circuits, batteries, everything—quickly, safely and with absolute certainty.

For 12/6 you can have a wireless expert at your beck and call. You may be a radio fan or the veriest amateur, it matters not a scrap—the All-in-One will help you out. You can be sure of everything before you turn on the juice! The steady readings given on the dial are as easy to follow as the hands on your watch, and the instrument gives perfect accuracy—it has a beautifully finished calibrated mechanism that cannot let you down.

Ask your dealer for our Booklet or write direct to Pifco Ltd., Pifco House, High St., Manchester.

12/6

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**GREATER SELECTIVITY
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Pat. No. 284571. An ADMIRALTY PATTERN AERIAL Made of special Rubber-covered Flexible wire being weather proof and non-corrosive. Suitable for erecting indoors, under eaves, or any outside position. Size 14 ft. long, 4 in. dia. Rapid shortening device for smaller span. A permanent Aerial giving high conductivity, selectivity and maximum volume. Price 6/6

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MAKE UP YOUR MIND TO GET THE "R.C." AERIAL AND ENSURE UNINTERRUPTED RECEPTION

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Can be mounted on bracket or through panel. Once set always ready. Not affected by vibration. Each one is tested on broadcast before despatch.
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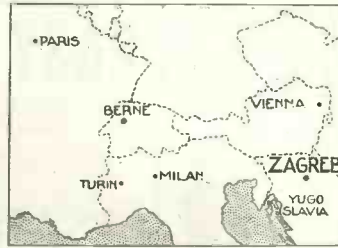
Broadcast Identification Sheets

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

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.



822 miles from London

308m.
(973 kc.)

Power: 700 watts

ZAGREB
(Yugoslavia)

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

Announcer: Woman.

Call: *Radio Zagreb.*

Opening Signal: Metronome (100 beats per minute), rather low in tone, as of a hammer striking wood, followed by a short "toot." Announcements are made in Serbian, Croatian, French, and German. An automatic signal relayed from the Geographical Institute is broadcast throughout the day, viz., three musical notes (morse letter U), the dash lasting three seconds, the end indicating full hour.

Main Daily Programme: G.M.T. 11.30, gramophone records; 19.30, concert or relay of outside broadcast (opera, etc.); 21.30, news bulletin; 21.40, relay of foreign stations (Monday, Friday); dance music (Tuesday, Saturday).

Frequently exchanges programmes with Belgrade and Ljubljana.



730 miles from London.

335m.
(896 kc.)

Power: 1.9 kw.

POZNAN
(Poland)

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

Announcer: Woman.

Opening Signal: Short carillon melody as under.

Call: *Rhalo! Rhalo! Radjo Poznanskie* (in French, *Ici Radio Pozran*, pronounced *Pause-ran*).

Interval Signal: Metronome.

Main Daily Programme: G.M.T. 09.15, Cathedral service (Sunday); 16.15, gramophone records; 18.00, concert, 19.30, main evening entertainment, relay of Wilno or Warsaw programme; 21.00, news in Polish and French; 22.00, dance music (Tuesday, Wednesday, Friday, Saturday).

Closes down as other Polish stations (e.g., Warsaw).

NOTE.—On pre-war maps the name of the city is given as Posen.



648 miles from London

364m.
(824 kc.)

Power: 1 kw.

BERGEN
(Norway)

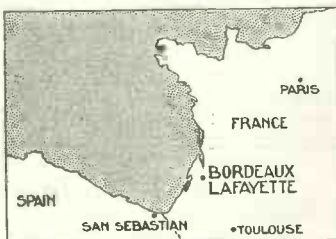
Standard Time: Central European (G.M.T. plus one hour).

Announcer: Man.

Call: *Dette er Bergen Kringcaster* and, between items, *Bergen Her.*

Main Daily Programme: G.M.T. 09.30, relay of Cathedral service (Sunday); 19.00 or 20.00, main evening entertainment; 21.30, dance music (Sunday, Wednesday); relay of foreign stations (Tuesday, Friday, Saturday), if practicable.

Usually closes down with one stroke on a gong followed by the words, *Godnatt, Godnatt* (good night).



463 miles from London

304m.
(986 kc.)

Power: 32 kw.

BORDEAUX-LAFAYETTE
(France)

Standard Time: Greenwich Mean Time.

Announcer: Man.

Call: *Allo! Allo! Ici le poste de radiodiffusion de Bordeaux-Lafayette.*

Main Daily Programme: G.M.T. 19.30 or 20.00, own concert, local outside broadcast or relay of PTT Paris (Ecole Supérieure).

Closes down with usual French good-night greetings, followed at times by *La Marseillaise*.

Relays Ecole Supérieure (PTT Paris) and takes part in all the French State "net" broadcasts.



455 miles from London

360m.
(833 kc.)

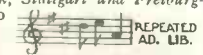
Power: 1.7 kw.

STUTT-GART
(Germany)

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

Announcer: Man.

Opening Call: *Achtung! Hier Suedfunk, Stuttgart und Freiburg-in-Breisgau*, abbreviated during intervals to *Achtung* or *Hier Suedfunk*.

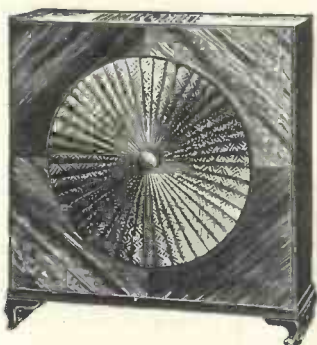
Interval Signal: Three musical notes.  REPEATED AD. LIB.

Main Daily Programme: G.M.T. 06.00, concert (Sunday); 07.00, physical exercises; 09.00, 11.15, gramophone records; 15.00 and 18.30, concert; 19.30, main evening entertainment; 21.45, dance music (Saturday, Sunday).

Frequently exchanges programmes with Frankfurt-on-Main and also carries out relays of U.S.A. stations.

Closes down with the usual German formula (*Gute Nacht, meine Damen und Herren*), followed by the National Anthem (*Deutschland Ueber Alles*).

Relay Freiburg-in-Breisgau, 574.7 m., 522 kc. (0.3 kw.).



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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.

Read the test report in this issue and write for full details.

**LOEWE RADIO
CONE SPEAKER**

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Phone: Tottenham 3911/2.



**The New
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WITH THE TONE OF A
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It is no exaggeration to claim that the new radio Chromogram is the finest reproducer of music and speech yet devised. It combines a 4-Valve all-mains three-stage screen-grid Radio Set with a perfectly balanced gramophone with electrical amplification.

Cased in a magnificent cabinet of finest quality Oak, it is also a piece of furniture of which you will be proud. The price complete, ready to switch on, is 35 guineas. In Period Italian Walnut or Mahogany 3 guineas extra.

**35
GUINEAS**

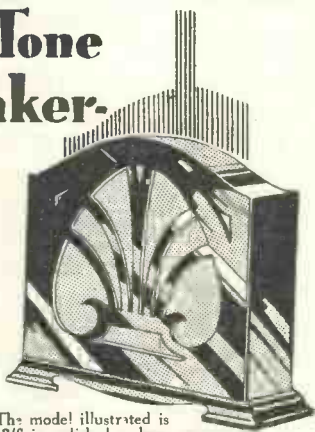
CHROMOGRAM

Write for full specification and illustrated leaflet, sent free on request. 76 CITY ROAD, LONDON, E.C.1



**The True-to-Tone
Loud Speaker.**

The Puravox embodies distinctive changes in Loud-Speaker construction. Its patent spider diaphragm and piston motion drive abolish distortion and bring within hearing the beauty of low organ notes and distinguish each instrument in orchestral music. The Puravox can be used with any wireless set. Every wireless set will be improved by it. Every wireless owner can afford it.



The model illustrated is £2/8 in polished mahogany cabinet. Other models available from 35/- to 90/-

PURAVOX

CONE SPEAKERS

FALK STADELMANN & Co. Ltd.
91, FARRINGDON RD., LONDON, E.C.1

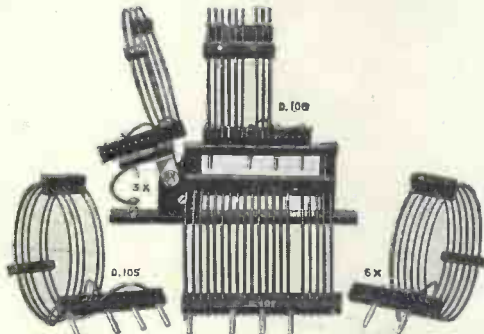
NOTE: If you are contemplating the purchase of a receiving set do not fail to get particulars of the Efescaphone. Catalogue post free.

Write for
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Booklet
P.1448

When replying to advertisements, please mention "Wireless Magazine"

EDDYSTONE

SHORT-WAVE APPARATUS



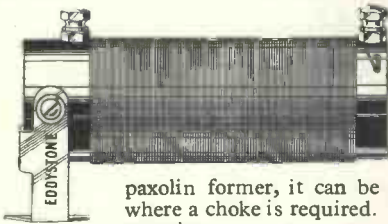
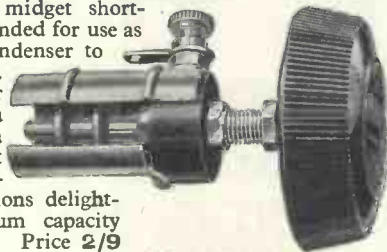
SHORT-WAVE INDUCTANCE UNIT

This unit forms the complete inductance portion for a short-wave receiver, providing variable aperiodic aerial coil, grid coil and reaction winding. Complete with stand and 5 coils, it covers efficiently the whole short waveband from 15-95 metres.

Price 22/6 complete with full circuit details. (Extra coils for B.B.C. wavebands can be obtained.)

MIDGET SHORT-WAVE CONDENSER

The EDDYSTONE midget short-wave condenser is intended for use as an aerial coupling condenser to the grid coil of a S.W. receiver or as a vernier control across the main tuning condenser. In the latter capacity it makes the final tuning-in of short-wave stations delightfully easy. Maximum capacity 00005 mfd. Price 2/9

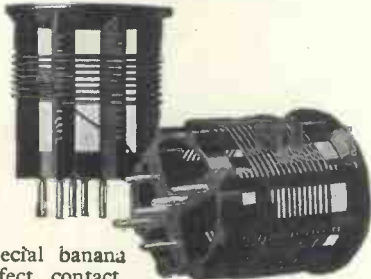


SHORT-WAVE H.F. CHOKE

This special choke is for use on short wavelengths between 10-80 metres. Wound on hollow Woodon former, it can be used for all purposes where a choke is required. Very low minimum capacity. Price 2/6

6-PIN SHORT-WAVE COILS

Designed for use in high-frequency screened-grid short-wave circuits, these coils are obtainable for all wavebands from 12.5 to 2,000 metres. Air wound on a skeleton bakelite former, we claim they are the most efficient 6-pin S.W. coils obtainable. Special banana type pins ensure perfect contact. Price 4/6 to 5/6 per coil. Former only, 2/6.



SEND FOR NEW LIST No. 30 of SHORT-WAVE APPARATUS

Sole Manufacturers:
STRATON & CO., LTD
BROMSGROVE ST.,
BIRMINGHAM.



London Service Depot:
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W.C.2
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IT'S NOT A MOVING COIL!



Farrand Patent

This is a statement that is hard to believe when you hear the original N & K Inductor Dynamic Speaker. It not only equals a moving-coil but improves on its sensitiveness, clarity and beauty of tone.

There are no running costs as no energising current is required. It is simple to operate and the price £3 10 brings this remarkable speaker within the reach of everybody. It is by far the greatest advancement ever made in loud-speaker design. The original N & K speaker can only be obtained from us.

Call for a demonstration or ask your dealer. Full details will be sent free on request on receipt of a P.C.

The new N & K electric pick up is an example of the latest development in pick-ups. As a result of its extreme light weight, record wear is reduced to a minimum: The pick-up is supplied with or without tone arm. Considering the excellence of reproduction, the price of 3 guineas is a most reasonable one. Full details of this new pick-up will be sent you on request.



PICK-UP ONLY
£1 : 17 : 6
PICK-UP WITH
TONE ARM AND
VOLUME CON-
TROL £3 : 3 : 0

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1928—1929—1930—1931
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ATLAS "CHALLENGE" COILS & INSULATION
TRADERS, MANUFACTURERS & EXPORT. CASH, EX-
CHANGES & HIRE PURCHASE. Provincial Traders Appointed.

SPECIFIED FOR THE "REGIONAL A.C. FOUR"



PRICE :
30,000 ohms,
1/6
80,000 ohms,
2/.

When building the "Regional A.C. Four" receiver described in this issue, make certain that the Magnum Spaghetti wire-wound resistances are used. These have been specified as they are the most convenient form of resistance, are considerably cheaper than the cartridge type, economical in space and simple to use.

Obtainable from all radio shops. If any difficulty in obtaining write direct to the makers. Full range of Lists FREE on application.

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THE "MEMBRA"

INDUCTOR DYNAMIC LOUD - SPEAKER

Manufactured under FARRAND LICENCE

The greatest advance made in design and construction of loud-speakers is embodied in the "Membra."

Its astounding beauty of reproduction and extraordinary sensitivity surpasses that of the Moving Coil types.

A most important point about the "Membra" is that Two sets of Terminals are provided so that it can be used for either High or Low impedance valves.



Chassis diam. 12"
Depth, 8 1/2". Cone
Diam. 9 1/2"

THE "MEMBRA"

Inductor Dynamic LOUD - SPEAKER

Can be obtained promptly through your Dealer as we can supply from stock.

PRICES

CHASSIS complete (as illustrated) - - £3 10

SPEAKER complete in "CAMCO" Oak Cabinet - - £5 10

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The "Membra" is permanently adjusted and perfect reproduction is secured over the entire frequency scale.

NOTICE TO TRADERS

We can supply promptly from good stocks held.
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BEAM LTD.

35 Farringdon Road, London, E.C.1.

The beauty is missed . . .

The full beauty of the bass notes and the brilliance of reproduction when using electrically recorded records, can only be obtained by placing a Novotone in your amplifying circuit.

Even in present-day recording there are still serious losses which must be compensated for if realistic reproduction is to be obtained.

The NOVOTONE imparts to your records :

Full-bodied and true reproduction of the bass notes.

Appreciable brilliance of the higher notes.

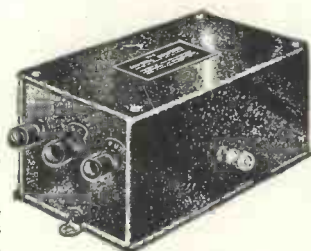
An increase in general amplification.

There are three models of the Novotone :

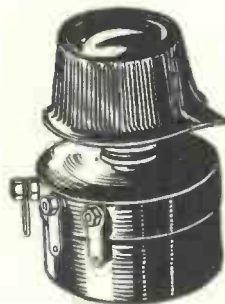
Type S for Standard pick-ups ... £ 1

Type H for High Resistance pick-ups £5

Type J exactly as Type S, but having less amplification £3 3



The Gam-brell VOLUVERNIA



A scientifically designed volume control which *does* give perfect control from zero to maximum volume with one turn of the knob. No moving metal parts in contact with the resistance, movement therefore being silent, firm and smooth. The perfect volume control for Radio or Radio-Gramophone. May be fitted to any panel.

6s. 9d.

The Gam-brell MULTITEST



Seven Ranges in One Meter.

This instrument can be used as Milliammeter, Ammeter, and Voltmeter. Ranges covered are 5 m/a., 50 m/a., .5 a., 5 a., 5 v., 50 v., 250 v. No external shunts or resistances required, simply plug into range required. Accurate readings easily taken. Robustly constructed, but with light movement. Supplied with flex leads with special spring test clips.

£3 0 0

ILLUSTRATED LEAFLETS OF FULL GAMBRELL RANGE OF COMPONENTS, COILS, AND ALL-ELECTRIC RECEIVERS ON REQUEST

GAMBRELL RADIO LTD., 6, BUCKINGHAM STREET, LONDON W.C.2

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

IN TUNE WITH THE TRADE

FETTER LANE'S Review of Catalogues and Pamphlets

GOOD SWITCHES

IF there is one thing I hate more than another about a cheap set it is the on-off switch which is usually frail and not at all likely to inspire confidence.

I, personally, prefer switches with a nice clicking reassuring action—switches answering to this description are fully described in a booklet just sent me by Claude Lyons, Ltd.

Do not go into the local wireless stores and ask for a switch without first acquiring some knowledge of switches. Write for this Claude Lyons booklet and see just how good switches can be.

153

FOR GRAMO-RADIO ENTHUSIASTS

FROM time to time I hear complaints from friends who have grammo-radio outfits fitted with electrically driven turntables. They say that the turntable must cause a ripple to be induced in the pick-up windings. Only too often have I heard electric gramophones in which this fault is painfully obvious.

To those experiencing such troubles I recommend a fine electric induction motor marketed by the Appollo Gramophone Co., Ltd., and known as the Paillard.

Induction motors have neither brushes

nor commutators, and the Paillard motor in particular has no belt in indirect drive to the turntable. I have used one for some time, and can vouch for its efficiency. An informative folder is available.

154

THAT MIDGET TENDENCY

IF you notice, set designers are showing a distinct trend towards the use of smaller and yet smaller parts. Condensers, for instance, are not so bulky as they were, and the midget bakelite insulated condensers are coming back into favour even for ordinary circuit tuning.

I like the appearance and the specifications of the new Snap parts which are being marketed by Graham Farish, Ltd., in conjunction with Snap Switches, Ltd. Before you build that new set you should get the latest Snap booklet.

155

UTILITY PARTS

SETS with a crowd of knobs are démodé nowadays, for ganged tuning of high-frequency and aerial circuits is all the rage. For this purpose you must have good ganged condensers, preferably with a balancing adjustment—just the sort of thing that is marketed

by Wilkins & Wright, Ltd., the Utility people.

The balancing adjustment on the new Mite double condensers is very neat, as also is the efficient and positive drum control. These condensers are described in a handy folder which also gives a number of useful circuits in which the Mite double condensers may be used.

156

FOR YOUR FILES

ALL keen radio people like to have somewhere near the work-bench an up-to-date file of radio literature. The Igranic Electric Co., Ltd., with characteristic Igranic thoroughness, appreciate this and make a neat file folder with a metal binder which holds the latest Igranic leaflets as they are issued.

The Igranic people have just sent me a current folder of leaflets filed up to date, and I certainly intend to keep this on hand for reference. A copy may be obtained free through my catalogue service.

157

FOR SET BUILDERS

THE Benjamin Electric, Ltd., are making a wonderful name with the new Benjamin valve holders and rotary switches.

(Continued on page 458)

To render music faithfully

Is the Aim and Achievement of the

"UNDY"

8 POLE DYNAMIC SPEAKER



No. 402



No. 410/8

CHOOSE FROM THESE FOUR TYPES

<p>No. 402 Complete 8-pole Unit with Chassis ready for building into Cabinet or Baffle Board. 50/-</p>	<p>No. 410/8 Undy 8-pole Dynamic Loud-speaker in polished Walnut Cabinet. The loud-speaker for the most exacting requirements at a reasonable price. 55/-</p>
<p>No. 404A Undy 8-pole Dynamic Loud-speaker in attractive Oak Cabinet. 70/-</p>	<p>No. 404 Undy 8-pole Dynamic Loud-speaker in highly polished Walnut Cabinet De Luxe. 90/-</p>



No. 404A



No. 404

Obtainable from your usual dealer.

Ask for Demonstration.

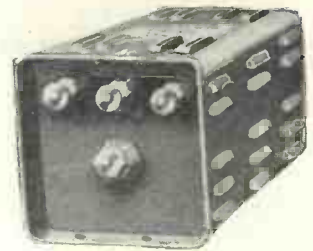
The Regional A.C. Four

described in this issue
gets its high tension
from a Style H.T.7



METAL RECTIFIER

The Regional A.C. Four is therefore equipped with the simplest and most reliable system of rectification available, using apparatus which has no chemical action, no filaments or moving parts, in other words—nothing needing periodical replacement.



Style H.T.7 21/-


The Westinghouse Brake & Saxby Signal Co., Ltd.,
82 York Road, King's Cross, London, N.1.

Full details of this, and all other types are given in our new book, "THE ALL METAL WAY, 1931."

40 pages of valuable information on A.C. mains operation.

Send 3d. stamp for a copy.

FOR FINE TUNING



The Lotus reaction Condenser has the moving and fixed vanes interleaved with bakelite discs of the highest possible dielectric qualities. This Condenser may also be used for other purposes, such as series aerial condenser, etc.
Price from 4/9
From all Radio Dealers.

LOTUS

REACTION CONDENSERS

Write for illustrated Catalogue to
GARNETT, WHITELEY & CO., LTD., LIVERPOOL.

FRANKLIN

FULLY GUARANTEED CONDENSERS

Specified for the Regional A.C. Four — ensure its proper working by using them. They are obtainable from your dealer or direct from us.

PRICES		
1 mfd. 500 v. D.C.	test	2/-
2 mfd. 500 v. D.C.		2/8
4 mfd. 500 v. D.C.		4/8
1 mfd. 500 v. A.C.		2/6
2 mfd. 500 v. A.C.		3/3
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1 mfd. 1,000 v. D.C.		3/-
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Our handbook "Engineering Opportunities," has pointed the way to better things to over 40,000 of your fellows. It contains details of A.M.I. Mech.E., B.Sc., A.M.I.E.E., A.M.I.C.E., A.M.I.A.E., A.M.I. Struct.E., London Matric., C. & G., G.P.O., etc., Exams., outlines home study courses in all branches of Electrical, Mechanical, Motor and Wireless Engineering, and explains our unique guarantee of

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When replying to advertisements, please mention "Wireless Magazine"

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 1/4d. for postage.

Here we review the newest booklets and folders issued by nine 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 1/4d. stamp, to "Catalogue Service," WIRELESS MAGAZINE, 58/61 Fetter Lane, E.C.4. Valid till Dec. 31

I confess that a year ago I found fault with a number of these small parts of all makes, but now manufacturers appear to have realised the need for making thoroughly reliable parts at a low price; and they have found a way to do so.

The valve holders (either four- or five-pin, depending on whether you have battery or mains valves) show clear signs of deep thought on the part of the

IN TUNE WITH THE TRADE

(Continued from page 456)

designer. If you think there cannot be much design in the production of a valve holder, then buy one of the cheap and nasty brand and learn by experience!

But if you are wise, get a new Benjamin booklet which describes these parts in detail. **158**

SPLENDOUR IN SOUND

THAT is the attractive title given to a neat little folder which describes the Faraday radio gramophone. The Faraday appears to be a very neat instrument, and in these days of 100-per-cent. service it is interesting to see that all owners of Faraday radio gramophones may make use of the network of Ediswan service stations throughout the country.

This folder gives the specification both of the radio and gramophone sides, and the instrument really does appear to be good value for 49 guineas. **159**

A CHEAP PORTABLE

THERE is a clear sign that portables and transportables will be cheaper in the new season. I have at hand a folder describing the Harmony Three, a production of P.B. Radio Co., which sells, complete with battery valves and accumulator, for £7 10s.—a striking figure when the specification is taken

into account. This set is housed in a cabinet which makes it equally suitable for indoor or outdoor use.

If you are on the lookout for a modest-priced transportable receiver for the home or a good set for the car then you should get this P.B. leaflet and consider the details of the Harmony Three. **160**

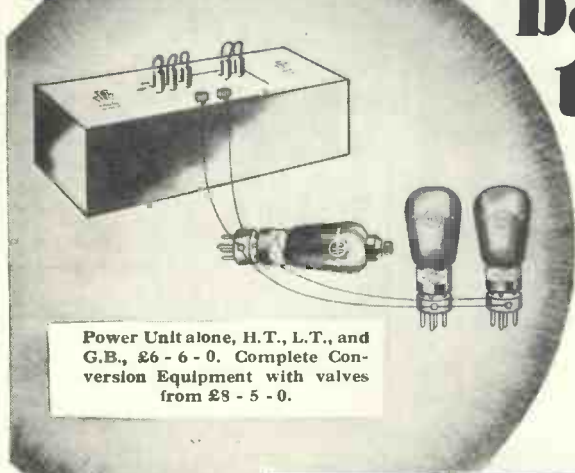
THOSE BIG SETS

IT is very fashionable to have a radio gramophone these days. The high cost of some of the big instruments probably prevents many people from being fashionable. I like the specification of the modest priced Clarith Reproducers radio gramophones, which are described in a leaflet sent me by Clarith Reproducers, Ltd. These are really high-class jobs and will work from A.C. or D.C. mains as required. A novel S.G. circuit is incorporated on the radio side.

The receiver unit can be supplied apart from the gramophone side, if necessary, and this makes a very efficient mains-driven four-valver at a low price. You should get this Clarith folder. **161**

Other catalogues received from manufacturers are noted on page 462. Only those reviewed above can be obtained through the special catalogue service

Convert your



Power Unit alone, H.T., L.T., and G.B., £6 - 6 - 0. Complete Conversion Equipment with valves from £8 - 5 - 0.

★ Made by the Makers of the famous Six-Sixty Valves.

battery operated set to "A.C. Mains"...

Think of the added power and range! The scope—convenience—economy of running! It is all so simply effected with the SIX-SIXTY ALL-MAINS CONVERSION EQUIPMENT. No internal wiring alterations. Specially selected Six-Sixty A.C. Valves and Six-Sixty 5/4 pin valve-holder adaptors are included. Dimensions only 13" x 5 1/2" x 4". Made for every A.C. supply.

L.T. 4 v. up to 5 amp. H.T. Tappings 60, 75, 100, 120, 150 and 200 v. "Automatic" G.B.—1.5 to 20 v. Any three H.T. or two G.B. simultaneously.

GET THIS FREE—

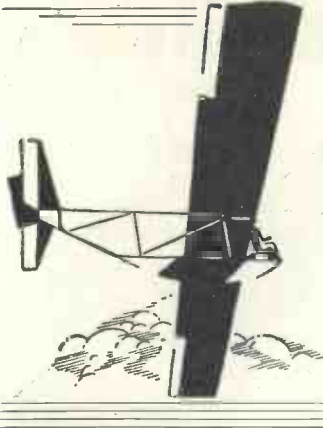
The Six-Sixty Booklet which tells how any set can be a much better set and up-to-date. And all about the famous SIX-SIXTY range of valves and equipment. Write for it NOW.

SIX-SIXTY

(B.V.A. RADIO VALVES AND EQUIPMENT)

Six-Sixty Radio Co., Ltd., Six-Sixty House, 17/18 Rathbone Place, Oxford St., London, W.1.

Tel.: Museum 6116/7



The ACME of Smooth Performance

Catapulted silently into the air, the glider taking advantage of every tiny air current, soars noiselessly and gracefully up and down the air valleys at the touch of the control stick. It is the acme of smooth performance.

The modern radio receiver, if it is CENTRALAB equipped, figuratively speaking, rides the ether waves smoothly and noiselessly. For real adventure in radio reception insist on CENTRALAB volume-control equipment. Write for complete Centralab catalogue—it's FREE.

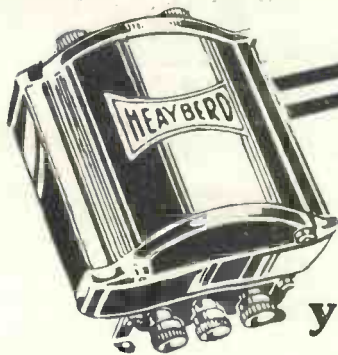
Centralab

THE ROTHERMEL CORPORATION LTD.,
24 Maddox Street, London, W.1.

Phone: MAYFAIR 0578/9.

Continental Sales Office:—

27, QUAI DU COMMERCE, BRUSSELS, BELGIUM.



Steady— Constant Power for your Valves

through an eliminator with a Heyberd Low Tension Transformer

Accumulators have been proved inconsistent in their output, but the mains will not vary and this is the ideal source of power for modern types of valves. The Heyberd low-tension transformer is designed for use with Westinghouse metal rectifiers for supplying steady, constant, hum-free power for the filaments of the modern radio valve. Make an eliminator, but specify Heyberd Low-tension Power Transformers.

Price 9/-.

Write for lists.

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F. C. HEYBERD & CO.,

10 Finsbury Street, E.C.

Telephone

Metropolitan 7510

ANOTHER PROBLEM SOLVED



When one L.F. Transformer is not enough, and two give EXCESSIVE amplification, two of the new

FERRANTI AF7 TRANSFORMERS

will solve the problem

Designed specially for those cases where considerably more amplification is required than is afforded by one stage, and considerably less than that usually obtained from two. Learn how a ratio of 1 to 1 $\frac{3}{4}$ makes possible a transformer giving an amplification curve that even Ferranti have never before achieved.

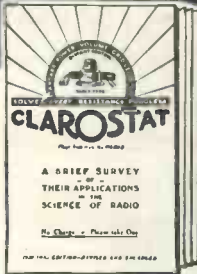
AF7, Price 30/- AF7c for Push-Pull, 34/-

FERRANTI LTD.

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LONDON: BUSH HOUSE, ALDWYCH, W.C.2

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The 1930 CLAROSTAT BOOK



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IT'S FREE
BRIEF SUMMARY

A "Foreword" of considerable importance to you. —Standard Clarostat, including Manufacturing Types.—Power Clarostat, 35 Watt.: How to build a Super-Eliminator.—The Volume Cont. of: How to use it: 12 Circuits.—The Table-Type Clarostat: Distant control of volume.—The Super-Power Clarostats (250 Watts): How to use them — "HUM-DINGER" Clarostats and their functions: 3 Circuits.—(The "Hum-Dinger" is essential in all mains-operated radios).—The New Clarostat Type "F.W." Grid-Bias, Decoupling and Grid-Suppressor Wire-wound Resistances: How to use them (Circuits).—The New CLAROSTAT GENUINE CONTINUOUS WIRE HIGH-RESISTANCE POTENTIOMETERS: How to use them: 24 Valuable Schematic Circuits.—The New Clarostat Type "F.R." Flexible Resistors and Type "F.C."—Fixed Tap genuine wire resistors.—"G.R." Type 365 Rectifier Transformers and Type 366 Double-Choke "B.A.T." D.C., H.T. ELIMINATORS.—How to make an entirely satisfactory D.C. Mains Unit at home.—"B.A.T." A.C., H.T. ELIMINATORS.—"KIT-SETS" for the home-construction of satisfactory A.C. Mains Units.—Scale wiring plan and instructions for A.C. ELIMINATORS.—The "C.R.A." New Filamentless, long-life, Rectifier Tube. "G.R." Type U.X. Socket for American Tubes. "B.A.T." "Q.M.B." Switches. "B.A.T." "L.T." SUPPLY UNITS: How to build 1.0 or 2.0 Ampere Models satisfactorily at home. BATTERY CHARGERS (1 and 2 Amp.)—High Voltage Smoothing and By-pass Condensers and Condenser Packs.—The "WESTINGHOUSE" METAL RECTIFIERS.—Five selected and recommended METAL RECTIFIER Circuits.—The New and Interesting "B.A.T." "UNIVERSAL" MAINS TRANSFORMER.—"B.A.T." Power Transformers for all Circuits.—"B.A.T." Power Chokes for all Circuits.—Recommended D.C. Eliminator Circuit: "Raytheon" A.C., H.T. Unit Circuit: Adding Variable Tapping to an Eliminator: Adding Variable Grid-Bias to an Eliminator.—Recommended Gramophone Pick-ups and Turn-Tables.—"B.A.T." De-Luxe Push-Pull Output Battery-Operated and "PAM" (Reg'd. Trade Mark) A.C.-OPERATED AMPLIFIERS.—Four exceptionally useful "Gadgets": Wall-Insulator: American to European Voltage Adapter: "G.R." No. 446, 4-Terminal Voltage Divider.—"B.A.T." Gramophone Pick-up "Scratch-Filter."

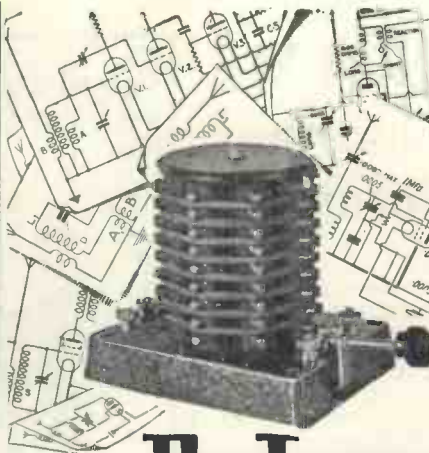
Previous Editions of the "CLAROSTAT" BOOK:

1925—1st Edition	10,000 copies,	12 pp.
1926—2nd	15,000	16 pp.
1928—3rd	25,000	24 pp.
1929—4th	50,000	32 pp.
1930—5th	50,000	48 pp.

TO BE RIGHT "UP TO DATE" IN RADIO YOU MUST HAVE THIS VALUABLE BOOK. SEND NOW, IT IS FREE, AND POST FREE

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76 Oldhall Street, Liverpool
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The Tuner for ALL circuits

This tuner is practically indispensable for all circuits now that the new broadcasting arrangements are being developed.

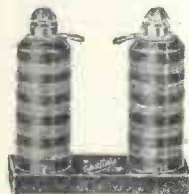
The Watmel Tuner selects—it gives absolute separation. It is efficient—volume and tone do not suffer. Its special winding and loose aperiodic coupling make it a Universal Dual-range Tuner and a wavetrap as well. It is specified for many successful circuits, including the SUNDAY PICTORIAL "FAMILY TWO."

It is beautifully finished in Walnut-bakelite, and the robust positive push-pull switch is concealed in the base.

PRICE COMPLETE
17/6

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/-

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D.C. Resistance, 450 ohms
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If you cannot get these Watmel products at your dealers, send remittance and order direct to us, and the article will be dispatched by return.



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

Telephone: EDGWARE 0323 M.C.14

THE MOST ECONOMICAL BATTERY YOU CAN BUY



COLUMBIA 4780, 60 volts, Triple Capacity

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Measure Columbia 4780 by its long life as well as its cost—you will find it to be the world's most economical battery. Now costing only 17/6, Columbia 4780 (60 volts, triple capacity) gives you better radio, clear undistorted and entirely trouble free. Buy Columbia 4780 from your dealer.

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GREATER VOLUME FEWER VALVES

BRINGS true tone and wonderful volume from the full compass of recorded frequencies. A delicately adjusted stylus operates a 4-pole balanced-armature movement in Bakelite casing. Counter-balanced to give a 5-oz. weight on the needle, the tracking alignment is 99% accurate; ball-bearing base; and copper-bronze finish. A super-sensitive pick-up giving more brilliant performance than any other. Complete with leads 42/-

ULTRA ELECTRIC LIMITED
661/3 HARROW RD., LONDON, N.W.10

When you send your order don't forget to say you "saw it in the 'W.M.'"



IDEAL FOR RADIOGRAMS
NO INTERFERENCE
if you fit a
PAILLARD
ELECTRIC INDUCTION MOTOR

No brushes or commutator to cause interference. No belt. The motor runs smoothly and silently, without variation in the revolution speed even with largely fluctuating mains current. 12" velvet-covered turntable, automatic brake and cut-out. For 100-130 and 200-250 v. A.C. 7 3/4" x 5 1/2" x 5 7/8"

£4/17/6 (without Unit Plate, £4/10/0).

Super Pick-up and Arm, £2/2/6.
 Portable Gramophone Cabinet fitted with Paillard Motor, Super Pick-up and volume control, £8/15/0 complete.

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ROTARY TRANSFORMER

provides the best means of running a Standard A.C. All Electric Receiver on D.C. Circuits

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Easy reading. Smooth action.

Metallic Continuity No crackle

Cap. .00015

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FORMO CONDENSER

A great little variable compression type Condenser.

F .0001 }
 J .0003 } 1/6
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A truly phenomenal drum dial (illustrated type) with trimmer control.

The lightest, lowest loss, and most efficient Condenser extant.

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A thirty-six-page catalogue from Baker's Selhurst Radio, of 89 Selhurst Road, South Norwood, S.E.25, dealing with all types of moving-coil loud-speakers.

Burton's radio products are detailed in a 20-page booklet sent us by C. F. and H. Burton, of Bernard Street, Walsall.

A forty-four-page publication (No. 5) and a four-page price list from Colvern Ltd., of Mawney's Road, Romford, Essex, describing their latest ranges of coils and components.

Two publications from Concerton Radio and Electrical Co., Ltd., of 256/7 Bank Chambers, 329 High Holborn, W.C.1—a 6-page folder about Fotos valves and a leaflet on Fotos low-frequency transformers.

A six-page leaflet from Dunham's Ltd., of 7 New Wharf Road, N.1, describing their 1931 range of portable and transportable receivers.

From J. Dyson & Co., Ltd., a sixteen-page booklet describing their range of Goodwinex eliminators and radio gramophones.

Two catalogues from Edison Swan Electric Co., Ltd., of 1A Newman Street, W.C.1, entitled "The Amazing Mazda Radio Valves" (sixty pages), describing the entire range of Mazda valves and "Ediswan Sound Reproducing Installations" (twenty pages) giving particulars of apparatus suitable for large institutions.

Eelex standardised plugs and terminals are the subject of a 12-page folder sent us by Eelex Products, of 118B Bunhill Row, E.C.1.

"Microphones for All Purposes" is the title of an interesting leaflet which has been sent to us by Electradix Radio, of 218 Upper Thames Street, E.C.4.

A 4-page leaflet from the Electrical Device Co., of 12 St. James Street, W.C.1, describing Eldeco terminals and connections.

"The Dawn of Better Radio" is the title of an eight-page booklet, sent by Electrical and Radio Products, Ltd.; of Horley, Surrey, dealing with their latest range of receivers and radio gramophones.

Gent & Co., Ltd., of Faraday Works, Leicester, have sent us a leaflet describing their new electric turntable and pick-up.

A leaflet from the Gripso Co., of 32 Victoria Street, S.W.1, describing their latest switches and accessories.

Igranic Electric Co., Ltd., of 149 Queen Victoria Street, E.C.4, have sent us two booklets—"The Link Between" (twenty-four pages) and one (fifty-two

pages) describing their full range of components.

"Valve Costs Cut in Half" is the title of a six-page leaflet received from Impex Electrical, Ltd., of 538 High Road, Leytonstone, E.11, describing Dario indirectly- and directly-heated A.C. valves.

From the Jewel Pen Co., Ltd., of 21/22 Great Sutton Street, E.C.1, a 4-page leaflet describing Red Diamond components.

The Rapid pole finder is described in a leaflet issued by the Ridged Cone Co., of York House, Southampton Row, W.C.1.

A 6-page folder describing Beethoven portables from the Montague Radio Inventions and Development Co., Ltd., of Great College Street, N.W.1.

Four catalogues from the Mullard Wireless Service Co., Ltd., of Mullard House, Charing Cross Road, W.C.2—a forty-eight-page booklet (G5) giving characteristics of Mullard valves, eight-page folder (G4) describing loud-speakers and components, sixteen-page booklet (G1) dealing with two-volt valves, and a twenty-page catalogue (G2) on mains valves.

The Nivex Pocket Detectoscope is explained in a 4-page folder sent by Nivex Gauge, Ltd., of Tipping Street, Ardwick, Manchester.

Peto-Scott Co., Ltd., of 77 City Road, E.C.1, have sent us a forty-four-page catalogue entitled "Making Way—While You Pay," dealing with all makes of radio receivers and components, and particulars of how to obtain them on easy terms.

From Sovereign Products, Ltd., of 52/54 Rosebery Avenue, E.C.1, a six-page leaflet describing their range of radio components.

"Polar Products, 1930/31" is the title of a 28-page catalogue received from Wingrove and Rogers, Ltd., of 188/9 Strand, W.C.2.

From Voltron Electric, Ltd., of Queensway, Ponders End, Middlesex, a 6-page catalogue of sets and a radio gramophone.

From the Young Accumulator Co. (1929), Ltd., of Burlington Works, Arterial Road, New Malden, Surrey, a four-page leaflet (No. R3).

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 listeners that is not dealt with.

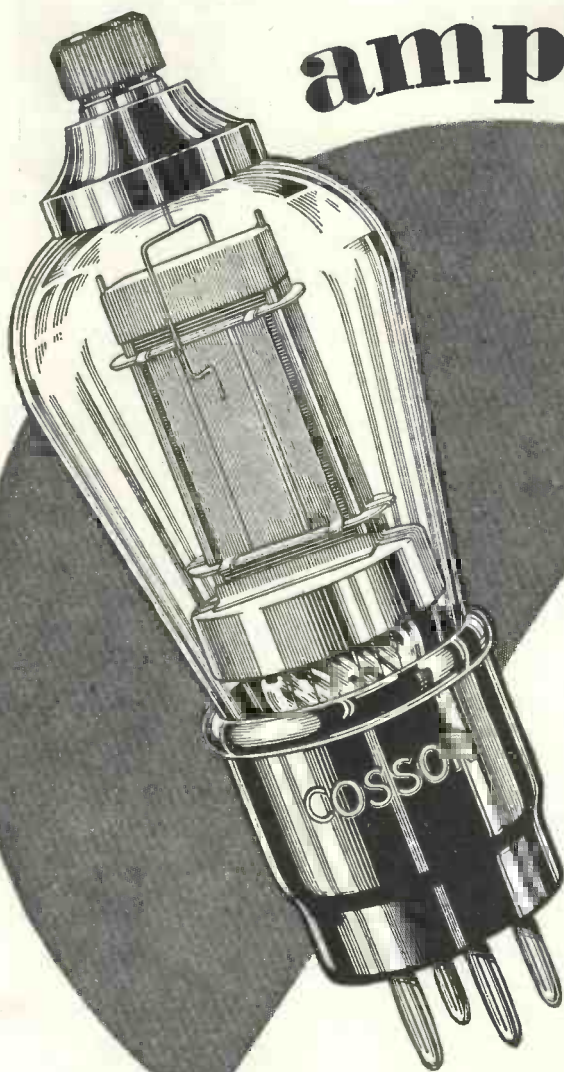
Then jot your idea down on a postcard and send it to "Suggestions No. 5," WIRELESS MAGAZINE, 58/61 Fetter Lane, E.C.4.

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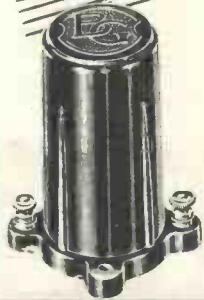


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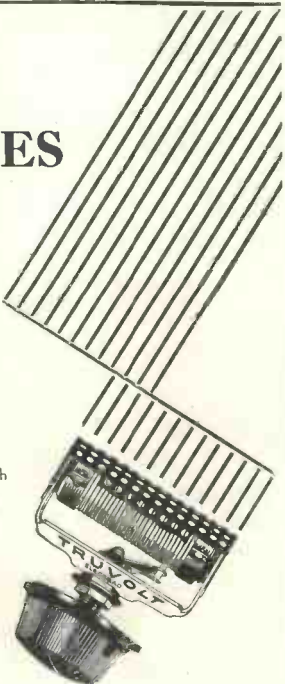
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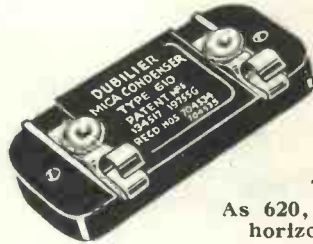
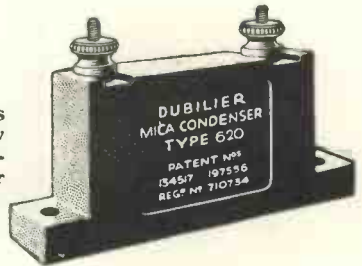
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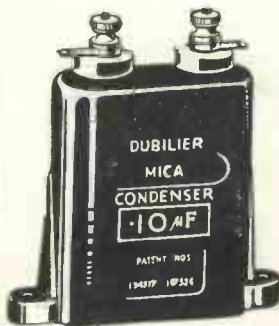
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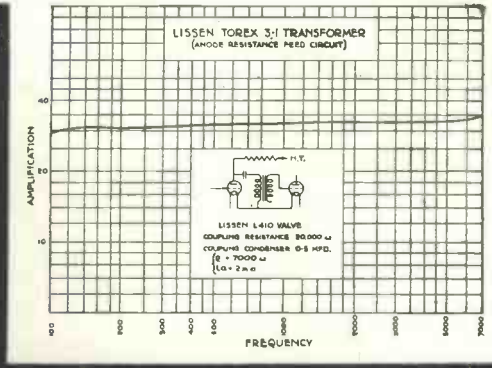
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An Editorial Word

“BOTTLED MUSIC”

MY thoughts go back to 1922 when broadcasting came suddenly into existence as the greatest scientific rage the world had ever known. British, and to a still greater extent, American amateurs had been playing with wireless telegraphy for more than ten years, from which must be subtracted the war period.

But, frankly, their joy was rather in their apparatus than what they could hear by its means. There was indeed little to hear. Until 1921 or 1922 ships' messages provided 99 per cent. of the programme.

There had been developed during the War, and almost entirely as a result of the terrible impetus of War conditions, a really practicable thermionic valve, and it was this which for all practical purposes converted wireless telegraphy into wireless telephony. By the end of 1922, the British Broadcasting Company had come into existence, and to-day radio broadcasting is the commonplace of this very modern world.

You will remember that music publishers and gramophone-record manufacturers looked askance at broadcasting in its infancy. They were afraid it would kill their sales. Even powerful newspaper interests, who ought to have known better, were jealous of the new arrival, and some of the restrictions under which the B.B.C. did its early work were the direct product of the fears and apprehensions entertained by what were then regarded as rival interests.

But history was merely repeating itself. Just as electricity did not hurt gas but rather assisted it to success, and just as the gramophone record did not kill but rather encouraged the manufacture of musical instruments, so the coming of broadcasting gave a remarkable flip to the production and sale of records and led to vast financial developments in the gramophone world.

But how was it that broadcasting had this beneficial result? Surely all those thousands of homes to which music had suddenly come were satisfied with the many hours of entertainment broadcasting gave them? Why to the possession of a wireless receiver had there to be added a gramophone?

Before the coming of radio the record was wholly a mechanical product. It had great limitations, much ingenuity being required in arranging the musical instruments, the singers and the recording apparatus to give reasonably natural results, and it followed that many subjects now common to gramophone reproduction were entirely beyond practical possibilities, inasmuch as control was almost a minus quantity.

The coming of radio altered all that. The gramophone technician saw in a moment that radio was his godsend; indeed, he appreciated that the gramophone record was necessary to the completion of the broadcast scheme. The electrical microphone with its comparatively high sensitivity; the thermionic valve with its magic amplifying powers; the ease with which recording could be done at a reasonable distance from the scene, and, still further, the amazing control made possible by valve modulation—all these were the gift of broadcasting to the gramophone interest, which realised that by adopting radio methods of production the record would become actually “bottled music” far superior in quality to the old-type record and enabling it to compete with radio broadcasting in presenting to the public fascinating subjects which previously had been outside gramophone possibilities.

The stride forward in technique would not in itself have caused the amazing success which the last few years have brought the gramophone industry. There was another factor: broadcasting in itself, far from proving a rival, was actually creating an almost insatiable demand for records.

I am not thinking in particular of the arrangement made by the broadcasting authorities with the gramophone interests to reproduce gramophone records and announce their catalogue numbers. I am thinking rather of the bigger fact, that broadcasting took music into countless homes to which it was more or less a stranger. It took good music into homes that before had only an elementary idea of what good music was. It took there the indifferent music also and considerably extended the public familiar with cheap and catchy tunes.

Where the theatre, music hall, concert room and dance hall had taught their tunes to tens of thousands of people in the course of a whole season, broadcasting took those tunes to hundreds of thousands in an hour. It has been a common experience for individuals who had not known they were musically inclined—for lack of opportunity in a great number of cases—gradually to find that the broadcasting of fine music was a delight and a rare mental and emotional stimulant.

There has come into existence since 1922 a new musical public, people who eight years ago did not know the works or the names of more than two or three composers, but who now are not only on intimate terms with a wide range of musical compositions, but are able, although possessing no executive ability, to appreciate the best that can possibly be offered them and even to criticise on a sure basis most of what they hear.

The new technique of production has led to a new technique of use. All that is in the up-to-date record cannot be called out of it again by a mechanical soundbox. For example, a certain record played recently in our test room on a mechanical gramophone gave me the effect of a mouth organ, but burst forth with the quality of a cathedral organ when played with an electrical pick-up, amplifier and loud-speaker.

The increasing efficiency of the pick-up; the greater elimination of distortion from the amplifier; and the progress in the design and manufacture of loud-speakers has made possible a beauty of gramophonic reproduction which constantly leads in its turn to a still greater demand for records.

Which is the more desirable, radio or the record? Who can say? It is better not to compare, but to regard one as the complement of the other. Broadcasting brings freshness; the authentic atmosphere of great occasions; the voice of the notability; the constantly varying entertainment; the news of the everyday world. The record gives some or most of these things, but it gives them, as it were, in due course, at times of your own choosing.

Certainly radio and the gramophone go hand in hand and some day will be one amalgamated interest.

Bernard Jones

A SCORE OF



1.—Edison Bell scratch filter and volume control, 15s. 6d. 2.—This Fluxite soldering set is 7s. 6d. 3.—M-L converters change D.C. to A.C., prices from £13. 4.—Exide Gel-cel accumulators are unspillable; all sizes and prices. 7.—A Pickett grammo-radio chassis for £3, with motor.



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 Why not give a kit of parts for making a WIRELESS MAGAZINE receiver? All types of sets are available at all prices. Complete kits of specified parts are supplied by H. & B. Radio, Peto-Scott, Ltd., G. Scott Sessions & Co., and the London Radio Supply Co.



6.—A Limit pick-up (£1 1s.), mounted on a Limit spring arm (15s. 6d.)

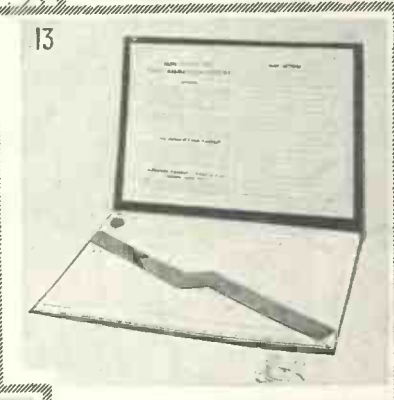
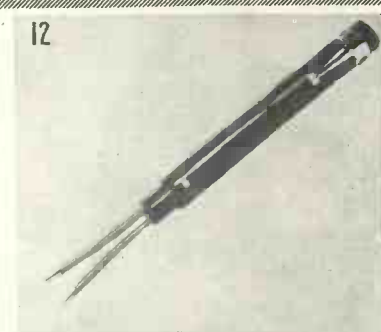


8.—This Brown pick-up, with swivelling head, is £3 3s. 9.—Belling-Lee Radio Legs for supporting a set (15s. 6d.). 10.—A two-range Lewcos wavetrap for 13s. 6d.



XMAS GIFTS!

11.—Chassis of a Junit mains unit for high tension from A.C. mains. 12.—This useful Nivex testing device is 8s. 6d. 13.—A British Games wavelength finder for 1s. 9d. 14.—A Borst loud-speaker baffle can be obtained for 9s. 6d. 15.—A useful Ever Ready torch for 6s. 6d.

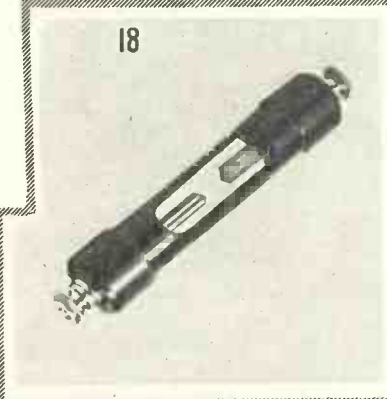


16.—A Paillard electric gramophone motor for £4 17s. 6d.



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18.—The Rapid pole finder costs only 4s. 19.—A Tannoy trickle charger for those with A.C. mains. 20.—Loud-speaker extension leads on a reel. (A. Brodersen).



Listening with a Marconi-phone set and loud-speaker

Oh, That Alternative Programme!

By
W. HADFIELD CRAVEN

You may or may not agree with the views expressed here, but in either case the Editor invites you to let him know YOUR opinion of the programmes

THE battle has raged, pens have been unsheathed and wielded in combat, typewriters have fired volley after volley. And now there comes the calm, when we glance about to count the casualties and review the results.

For this battle has had no decisive outcome—at any rate at first sight. And what battle fought on the correspondence fields of a popular journal has a right to have, for is it not the essence of accomplished editorship to strike the balance between right and left, to show favour to none but fairness to all?

Going Over the Causes

Let us, then, go over the causes leading up to the interesting discussion on programmes that has taken place in succeeding numbers of WIRELESS MAGAZINE since August last.

To the issue for that month I contributed an article bearing the title: "Found—An Alternative Pro-

gramme," the purpose of which was to illustrate what is, in my opinion, the British Broadcasting Corporation's chief difficulty in reaching a truly contrasted transmission—namely, its policy of giving a number of short, diversified items of from twenty to a hundred minutes duration rather than devote the main programme time of each evening to the full treatment of one definite subject as is done in the theatre or the concert hall.

The British Broadcasting Corporation's heterogeneous programme, it is my argument, does not permit of a definite alternative. Any reader who has not already considered the pros and cons of my original article is invited to refer to the August number.

Mr. St. John David (WIRELESS MAGAZINE, September) is the first to take up the cudgels on behalf of the existing programme scheme, and in answering some of the points he raises I must first of all concede that present arrangements of the

National and Regional transmitters do, as he says, provide an alternative during the evening dinner-time period.

The reason for this not being taken fully into account was simply that my article was written before the working of the two programmes became definitely established.

In effect, however, it makes no difference to my general argument, for I rather gather that people have a habit of eating at the same time, and I cannot see even the most studious music-lover forgoing his evening meal so as to devote his attention exclusively to the intellectual fare the B.B.C. is providing.

Normal Hours

Indeed, the more fond of music he is, the less will be the value of the B.B.C. transmission at that time. He, like any other, will wish (and has a perfect right) to have his chosen fare between the normal entertainment hours of 7.30 and 10.30 p.m.

It is as unreasonable to fob off the music-lover with dinner time as it would be to put over a Gilbert and Sullivan opera to the clanking accompaniment of the midday restaurant atmosphere.

My chief dispute with Mr. St. John David is, however, that in a misguided attempt to trip me up he commits the unpardonable sin of asking the B.B.C. for "jam on it."

Fourteen Types

In my original argument I formulated fourteen primary types of programmes, which may be repeated for the sake of clearness: (1) Drama, (2) Comedy, (3) Revue, (4) Variety, (5) Symphony Concert, (6) Light Orchestral Concert, (7) Ballads, (8) Period Music, (9) Celebrity Concert, (10) Military Band, (11) Organ, (12) Talks, (13) Dance, (14) Outside Broadcast.

My suggestion was, baldly, that if any one of these items was transmitted between the main programme hours of 7.30 and 10.30 p.m., a true alternative could be provided by sending out from the other station between these hours any of the other items on the list.

The remainder of the day's programme, with the exception of certain well-defined types that were indicated at certain hours (chiefly meal times), I left to take care of itself and as a playground for the ingenuity of the B.B.C.

This is what Mr. David says: "There is, I think, a big fallacy here, and one that the B.B.C. has tried hard to explode. Suppose they select drama for one station and dance music for the other; if you do not care for the drama, you will presumably care for dance music."

More Stations Necessary

"But will you? Is it not entirely reasonable to dislike both dance music and drama on that particular evening? The plan would, I suggest, only be workable if there were as many stations as there are types of broadcast entertainment."

As many as there are primary types of programme, Mr. David expects to be able to hear any one on any night that he chooses (and perhaps at any time that he chooses)!

What is wrong with Mr. David is that he is gramophone-minded. He is used to being able to select any

record he wants and put it on whenever it pleases him. Leaving apart pictures, which do not concern us, if one's entertainment is catered for as thoroughly as in London, it is not always possible to see any one of the primary types on a given night—opera, for instance, cannot always be had; neither can a symphony concert.

In the provinces the choice is almost always of the scantiest—in medium-size boroughs it is hardly ever possible even to see comedy and drama at the same time, for there is rarely more than one theatre.

What wonders, then, does Mr. David expect of the B.B.C. when he makes out that the only way of working my scheme would be to have all fourteen primary types blaring forth at once?

Such a thing, I venture to assert, unless it be by unreasonable beings, is not wanted. Such an idea certainly was not intended and is

Considerable interest has been taken by readers in the comments on broadcast programmes that have been published in these pages during the past few months.

Here W. HADFIELD CRAVEN, who began the discussion, reviews all the arguments put forward by other contributors.

All listeners will read with interest the views expressed in this article.

merely a quibbling misinterpretation of the facts that come out of a deep and considerate review of the whole of the broadcasting scheme.

I say here definitely that I, in company I know with thousands of listeners, would rather hear one good, full-time programme a week (or even a fortnight) of the kind I like than half a dozen barely intelligible, disjointed and disconcerting scraps occurring at all hours and by no means distinctly contrasted with the alternative transmission.

Mr. Oliver's article on "The Truth about the Programmes," in the November issue, treats of the problem from an intelligent angle.

A very interesting fact stands out from his analysis. Variety, the spice of life, the entertainment for which we have all cried out for years, occupies only 105 minutes of

the week's programme. It is fourth from the bottom of his list, and it comes after such items as School Transmissions, Children's Hours, Football Commentaries, Operatic Relays and (lo and behold!) *Television*.

A Tough Nut

That last seems hard to believe, but really it is no more remarkable than the others. Fancy vaudeville, of which the microphone—by virtue of its lack of visual representation—should be the stronghold now that talkies oust it from the music halls, coming beneath Children's Hours and Football Commentaries! Truly the B.B.C. is a tough nut from the entertainment point of view.

For better or worse, Mr. Oliver's analysis shows it as an ethereal newspaper with half a column on drama and vaudeville on a par with the average newspaper's dramatic criticism.

"The Truth about the Programmes," of course, takes no account of distribution of items—that is as bearing upon the question of diversified transmissions. Music, which takes first place in the week's output, is admittedly made up of the whole gamut of vocal and instrumental sounds.

Undoubtedly the most illuminating contribution to the discussion is that of the nineteen well-known personages whose opinions from the symposium in the October number on the question of Sunday programmes.

Here, at all events, the results of the battle are clear-cut. Four gentlemen are in favour of the programmes remaining as they are; nine are definitely against the continuance of the present Sunday type; while six are more or less neutral in a more or less facetious degree.

Generous Assumption

It is significant that of those for the present Sunday programmes two (or half) are divines; also that it is by being excessively generous that one assumes six neutrals, for four obviously infer their distaste for the existing order of things.

Roughly, then, twice as many people plump for the "brighter Sunday" as wish to retain the present dirge. And these figures are instructive and not a little authoritative, for they cover celebrities in

Oh, That Alternative Programme!

Continued

all walks of life whose opinions cannot be treated lightly.

With the alternative programme scheme outlined in my original article the Sunday contrast is at once available, for while one station takes the existing arrangement the other broadcasts a concert or play of the types inaugurated by the National Sunday Leagues and the various play-producing societies.

The utter inanity and unfairness of devoting both transmissions to a

radio conception of the Victorian Sunday would pass belief if it were not all too painfully true. It is an insult to those who are living through an age that is broader and fuller than any there has ever been.

Let me close with a final battle cry to those who would continue the fray. Get together—write, speak, fight for one Sunday programme that is what the 100 per cent. majority want. The minority shall not rule!

Another standard book that has recently been revised and enlarged is H. M. Dowsett's "Handbook of Technical Instruction for Wireless Telegraphists" (Iliffe & Sons, Ltd., 25s.).

This is the fourth edition and contains 488 pages. Its aim is to provide a complete theoretical course for the P.M.G.'s certificate and much of it will prove heavy going.

The first part, however, will appeal to those who want a theoretical insight into the art, sprinkled with a little mathematics. The latter chapters deal with special types of commercial apparatus and are only of value to operators.

For Your Wireless Library

AT this time of the year, when radio interest is at its height, many listeners will be wondering if there are not some good books that would augment the fare provided by a wireless periodical.

One of the most interesting of the recent publications is "Testing Radio Sets," by J. H. Reyner, B.Sc., (Chapman & Hall, 10s. 6d.).

This is divided into two parts, the first dealing with tests for general faults, such as may be encountered in a home-constructed set. There is a chapter on general testing methods, and special sections on tests of high- and low-frequency apparatus, tuning gear and mains apparatus.

The second part of the book deals with laboratory tests and is intended particularly for the commercial set designer and works testers. Tests for a number of special components are dealt with in an appendix.

To many listeners this book will prove an eye-opener; one realises suddenly how many things can go wrong! This book will prove useful to experimenters and manufacturers. It contains 178 pages.

R. D. Bangay's "Elementary Principles of Wireless Telegraphy and Telephony" will be remembered by many old-timers. A third edition has just been published (Iliffe & Sons, Ltd., 10s. 6d.), revised by O. F. Brown, M.A., B.Sc.

This book is theoretical rather than practical. Indeed, for many years it was one of the only standard works on the subject. It is commendably free from mathematics.

There is much in the preliminary chapters that will not interest the average listener, but anybody reading the later chapters thoroughly will glean useful information about some of the more recent developments.

The eighth edition of the "Chronicle Wireless Annual" has been considerably enlarged in scope and is this year of more general interest than formerly.

The Annual contains nearly two-hundred pages and is intended primarily for the home-constructor. There are many constructional and practical articles. A special sheet of wiring layouts and diagrams is given with each copy, but these are not full size.

Although published some months ago, "Radio Data Charts" has not been previously reviewed in these pages. This is a collection of abacs compiled by R. T. Beatty, M.A., B.E., D.Sc., (Iliffe and Sons, Ltd., 4s. 6d.) which will prove of great utility



A SPANISH CONTRALTO
Conchita Surpervia, the well-known Spanish contralto, who has broadcast on several occasions



A POPULAR COMEDIAN
One of the most popular broadcast comedians is Gillie Porter, who has been heard recently

to those who desire to design their own sets on a properly scientific basis.

These abacs give instantly many values that otherwise could only be worked out laboriously from involved formulæ in many cases. The subjects covered vary from the coupling efficiency of a grid leak and condenser to the stage gain of a tuned-anode circuit.

To the serious constructor this collection of data sheets will prove a great time-saver. D. S. R.



We believe that this is the most complete guide to loud-speakers ever presented to listeners by a wireless periodical. No pains have been spared in its preparation and every precaution has been taken to check the accuracy of the information given. More than sixty loud-speakers have actually been tested in the Wireless Magazine Laboratories.

135 LOUD-SPEAKERS TO CHOOSE FROM

The loud-speaker illustrated above is the Grosvenor moving-coil model made by S. G. Brown, Ltd. A special pitch control is fitted and three models are available; 1) with 6-volt field coil, £17 17s.; (2) permanent magnet type, £20; and "3" for A.C. mains, £21.

EVERYBODY who has a modern radio set is interested in loud-speakers. That is why the WIRELESS MAGAZINE is presenting this special 16-page supplement. In these pages are reviewed no less than 135 models made by forty-nine different manufacturers; over sixty models have actually been tested in the "W.M." laboratories.

A very large number of the loud-speakers at present in use by listeners are out of date and give poor reproduction. Many an old set can be given a new lease of life—and may sometimes be completely transformed—by providing it with a new loud-speaker.

But buying a new loud-speaker does not necessarily mean that the existing instrument need be scrapped or relegated to the junk box. In many homes there is need for an additional reproducer, and it is a simple matter to arrange an extension lead.

Why not put the old instrument in the kitchen for the use of the servant?

By the aid of this guide, the choice of a loud-speaker is a simple matter, although details of 135 different models are given. For convenience in use, these have been divided into eight different classes, as follows:—

1.—First we have permanent-magnet moving-coil instruments, which need no special field excitation. These loud-speakers should only be used with sets giving good volume; many three-valvers will be powerful enough to work them satisfactorily. See reviews Nos. 1 to 9.

2.—Electromagnetic moving-coil loud-speakers need a supply of current to produce the magnetic field. They are run from A.C. or D.C. mains, or in some cases from an accumulator. See reviews Nos. 10 to 38.

3.—Inductor loud-speakers, made under Farrand patents, are a new development and show great promise.

They are suitable for any good set provided with a transformer or choke-filter output circuit, but need careful matching with the last valve to give the best results. These instruments are serious competitors to ordinary moving-coil models. See reviews Nos. 39 to 42.

4.—Cabinet cone models form the bulk of the loud-speakers on the market and are undoubtedly the most popular type. Over fifty such instruments are illustrated in these pages and there are prices to suit every purse. See reviews Nos. 43 to 94.

5.—Plaques and "open" cone loud-speakers without cabinets form the fifth classification. Plaques are the cheapest complete loud-speakers that can be obtained and are especially suitable for use with small two-valve sets. See reviews Nos. 95 to 110.

6.—Linen-diaphragm and double-cone instruments have been classified on their own. Linen loud-speakers were introduced to British constructors by WIRELESS MAGAZINE and "Amateur Wireless," and have proved to be very popular. See reviews Nos. 111 to 118.

7.—Chassis combined with driving units will interest those who want a loud-speaker to put in a radio gramophone cabinet or to mount on a baffle board. See reviews Nos. 119 to 128.

8.—A selection of driving units is here dealt with for the benefit of constructors who wish to build up their own instruments. See reviews Nos. 129 to 135.

A glance through the following pages will reveal that each loud-speaker has been given a number (see bottom right-hand corner of each review). It is suggested that, if further details are required, the reader should get in touch with the maker and mention "loud-speaker No. So-and-so in the WIRELESS MAGAZINE Loud-speaker Supplement."

BUY A NEW LOUD-SPEAKER IN TIME FOR CHRISTMAS!

PERMANENT-MAGNET MOVING-COIL MODELS

(Nos. 1 to 9)

Great strides have been made in the design of this type of instrument during the last few months. These loud-speakers need no energising current and can be connected straight to a three- or four-valve set through a suitable output transformer. Baffles are needed for the best results.

BAKER

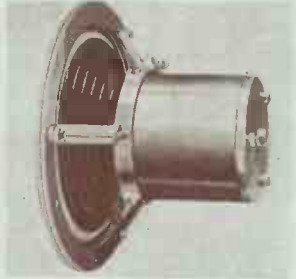
Perm. Mag. ... £6



In spite of its very reasonable price, this loud-speaker is claimed to give outstanding results. No field current is necessary to operate it and it is supplied correctly matched to suit the output of any receiver. It is a good loud-speaker at the price. The diameter of the cone is 9½ in. and the weight is 13 lb. 1

CELESTION

Type D100 ... £9



This permanent-magnet moving-coil chassis is reputed to give remarkable quality of reproduction with even response between 25-8,000 cycles. No energising current is required. The chassis can be connected direct to the output terminals of the set without any external output transformer. The construction is very robust. 2

EDISWAN*

B.T.H. R.K. ... £6 15s.



An excellent moving-coil chassis with a permanent magnet. We very much liked the overall response. The top notes were extremely good for the type and, with a baffle, the bass was very well reproduced. The sensitivity, in view of the type, is considerable. This model has a special corrugated diaphragm of 8 in. diameter. 3

EPOCH

Type B4 ... £4 9s.



A permanent-magnet moving-coil loud-speaker equal in sensitivity to those of energised type. No field current is necessary and the permanency of the magnets is guaranteed for two years. This may be obtained mounted in an oak cabinet for £1 15s. extra. Without enclosed construction, the price is 5s. 4

EPOCH

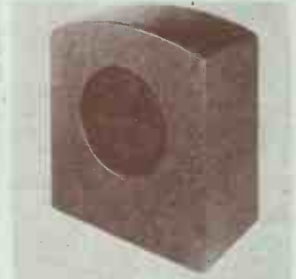
Type A1 ... £3 7s. 6d.



This miniature permanent-magnet model has just been redesigned and the price of the instrument has now been reduced. Although weighing only 4 lb., it is claimed to give as good results as many instruments of the energised type. If desired a cabinet can be obtained at the extra price of £1 15s. (oak). 5

FERRANTI*

Type MR ... £12 10s.



We have been greatly pleased with our tests of this magnodynamic model, which is a moving coil with a permanent magnet. The case of the model tested is in rexine. The quality was as good as we have yet heard. The magnet is made of 35 per cent. cobalt steel and is electro-plated to prevent rusting in the gap. 6

K. B.*

Type 208 ... £10 10s.



Most distinguished in appearance, this cabinet permanent-magnet moving-coil model produced fine quality at large and small volumes. A triple-ratio output transformer is included to suit various output valves. The chassis can be bought separately for £5 5s. The dimensions are: depth, 8½ in.; height, 17¼ in.; width, 15 in. 7

LISSEN

Type LN564/5 ... £7 10s.



This unit does not require any energising current and can be used with receivers taking their high-tension supply from standard batteries or the mains. It is supplied with an 8-1 ratio transformer for use with standard valves or 23-1 transformer for pentode valves. Of course, for the best results a baffle is essential. 8

LONDONA*

Type 52 ... £7 10s.



Very sensitive and has a pleasing tone, reproducing both top and bottom notes without any individual emphasis. D.C. resistance of coil is about 2,300 ohms. Weight is approximately 14 lb. Cabinet can be obtained for £3 3s. extra. It is to be recommended. A special constructor's kit can be obtained for £3 10s. 9

ELECTRO-MAGNETIC MOVING-COIL MODELS

(Nos. 10 to 38)

These loud-speakers require an energising current to produce the magnetic field; the current is obtained from A.C. or D.C. mains, or from an accumulator. These instruments also need a baffle. They are ideal for powerful sets, but must be used with a special output transformer.

BAKER

Type S.P.D. ... £6



Many improvements have been introduced in this electro-magnetic moving-coil loud-speaker. The polepieces have been re-designed and increased sensitivity is claimed. Besides the model illustrated, which works from D.C. mains, it can also be supplied (type S.P.6) to work from 6-volt batteries at the same price. 10

BAKER

Standard ... £4 15s.



This loud-speaker is mounted in a well-finished screening box and incorporates many improvements over the previous model. An important feature is that this instrument is fitted with a matched high-resistance coil ready to connect to any set containing a choke-filter output. For A.C. mains operation, the price is £8 complete. **11**

BAKER

Type S.P.A.C. ... £9 10s.



This 1931 super-power moving-coil model has an entirely new method of energising the pot from A.C. mains. The method adopted makes use of a Westinghouse rectifier and is claimed to eliminate the hum usually obtained from this type. Obtainable for 100/120 volts or 200/250 volts A.C. Cone diameter is 9½ in. **12**

BAKER

S.P. Cinema ... £16 10s.



This is primarily intended for use in cinemas and is a great improvement over previous models. Together with all Baker A.C. 1931 loud-speakers, it can be used with D.C. mains without special equipment. Remarkable results are claimed when used with a radio gramophone. The price for D.C. mains or battery operation is £10 10s. **13**

COLUMBIA*

Type 326MB ... £21



An exceptionally handsome pedestal moving-coil loud-speaker, this model incorporates a Rice Kellogg movement and can be worked from A.C. or D.C. mains. We were greatly impressed with the output, as regards both quality and volume. A loud-speaker for the connoisseur. The size is 34 in. high, 19 in. wide and 15 in. deep. **14**

EPOCH*

Type 101H ... £11 5s.



Although marketed for domestic use, this moving coil gives sufficient output to fill a large hall. It needs a really good amplifier to do it full justice. The reproduction was almost perfect. We applied full output of the standard amplifier without causing overloading. This model is for A.C. mains. The D.C. model is £7 15s. **15**

EPOCH

Type 99½F ... £5 5s.



A most powerful model. Reproduction is sharp and clear-cut. The weight of this model is approximately 15 lb. and is for operation from D.C. mains. An A.C. model can be obtained for £7 5s. (9 watts) or £9 5s. (30 watts). If desired an oak cabinet can be obtained for £2 2s. extra; mahogany or walnut, £1 10s. **16**

EPOCH

Type AF ... £9 15s.



Known as the Auditorium model, this loud-speaker is claimed to give an enormous volume. It is specially built and intended for all kinds of public-address, speech and music transmissions. Obtainable in "standard" or "sub-normal" tonal characteristics. An A.C. model is priced at £13 5s.; for 4- or 12-volt battery, £8 15s. **17**

EPOCH

Type 66G ... £8 15s.



This loud-speaker, housed in an attractive mahogany cabinet, will handle an input up to 9 watts. It is very sensitive and will give good results with a small input. Smoothing condenser is only necessary on noisy A.C. mains and can be had for 15s. ex. This model is supplied complete for operation from A.C. mains; D.C. mains, £6 15s. **18**

GECOPHONE

Type BC1810 ... £7



Designed for use with 200/260 volts D.C., this speaker is claimed to give brilliant results. It is of robust design and is fitted with input transformer, giving alternative impedances. May be obtained for use with 100/130 volts D.C. at the same price. For A.C. mains (including an Osram U5 rectifier) the price is £10 10s. **19**

GECOPHONE

Type BC 1814 ... £10 10s.



This loud-speaker is not of box type, being mounted on an attractive baffle taking the form of a screen. The model illustrated works from D.C. mains, but can be obtained for A.C. mains at £14. Claimed to be very sensitive. The chassis is type BC1810. The height is 32 in., width 23 in., and depth 9½ in. **20**

GRASSMAN*

Type PG ... £4 17s. 6d.



One of the best D.C.-mains moving-coil chassis yet tried. We were very pleased with the top-note response—often weak in this type. The low notes were also very satisfying. Sensitivity was well above the average. A good all-round chassis. Can be obtained for A.C. mains (110, 125 or 220 volts) at £8 5s., complete with metal rectifier. **21**

HEGRA*

Type A5 ... £11 10s.



Suitable for large power outputs, this moving coil for D.C. mains has an extremely strong magnetic field. The reproduction at volume is very satisfying. We were impressed with the balance of the tone. With a D.C. mains supply of 220 volts, the consumption is 170 milliamperes. Obtainable for 110 or 220 volts. **22**

*An Article for All Listeners***GETTING THE BEST RESULTS**

THERE are so many models of loud-speakers, having individual characteristics, that one may well sympathise with those who attempt to compare the more likely ones with the object of choosing the best for their sets.

The point is that most loud-speakers and sets have peculiarities, and so have the users, too. Some prefer a low-toned reproduction. Others demand clarity before all else, while others, again, strive to obtain as nearly as possible a uniform output of sound over a wide range of frequencies.

Pleasing Reproduction

It is, of course, not for me to say that one general class of reproduction is better than another. I could, as a matter of fact, agree with the listener who pushes up the lower and higher notes, as the reproduction seems more pleasing in certain circumstances; in a small or moderate room, for instance. The truth is, that given a loud-speaker without too bad faults, we can regulate the set itself for the purpose of obtaining the most pleasing results.

Maybe, the adjustment of the set which best suits speech is not the best for different classes of music. A tone control is, therefore, a useful feature and will, no doubt, one day be found on the best sets.

Little can be accomplished when either the set or loud-speaker has a fault in the form of strong resonances. The set can, of course, be taken in hand and be cured, but the loud-speaker is a more difficult and attractive problem.

Outside the Range

We cannot, naturally, make sounds outside the range of the loud-speaker. The first point to be attended to, therefore, is the range of frequencies covered by the reproducer. If the instrument does not respond to low notes or high ones the quality is bound to be poor and the characteristics of the set do not matter very much. When we want good bass response the instrument must be one capable of dealing with the lower frequencies. There is

In these notes W. JAMES explains some simple loud-speaker tests and gives some advice on the choice of a suitable instrument for particular needs.

not much sense in so arranging the set that it sends plenty of bass into the loud-speaker if this is unable to respond. We merely uselessly add to the cost of the set.

Other loud-speakers cannot reproduce high notes, very well and cut off too early, that is, do not reproduce the highest notes which occur in music at all. Here, again, a very good set or amplifier is not needed, for the reproducer is incapable of making sounds outside a certain range of frequencies. When some sound is produced there is hope, for the characteristics of the set can always be altered in order to make the general quality of the reproduction good.

Pronounced Resonances

What we particularly have to avoid, after a restricted frequency range, is pronounced resonances. With some instruments it is easy enough for any of us to note the defect, but some loud-speakers are not so easily found out and all that we know is that the general reproduction is below what it should be.

For general testing a good amplifier and pick-up with varying frequency records are valuable. The loud-speaker to be tested is connected to the amplifier fitted with a power valve of the type which normally would be used with the particular loud-speaker. Then the record is played, the volume being adjusted to avoid overloading the last valve.

It is surprising how quickly you can spot the defects of an instrument by this simple test. Sometimes pronounced resonances are found or a mechanical fault producing a buzz or a chattering at about a certain frequency. Sometimes feeling the diaphragm of the loud-speaker whilst the record is being played will disclose a fault,

and so on. With a little care quite an amount can be discovered about loud-speakers by testing them this way.

It is important not to put too much power into the loud-speakers and they should, if possible, be used with valves of the type which would normally be employed with them in ordinary reception.

Special Oscillator

I have used with great interest a low-frequency oscillator of the valve beat-note type. The output from this apparatus is adjusted to a suitable value and the frequency is varied from below 50 cycles up to 10,000 or more by turning a condenser knob. With such an apparatus delivering as nearly as possible a pure note and having a uniform output, quite an amount of useful information can quickly be obtained. Pronounced resonances are easily spotted; so are the top and bottom limits of the reproducer, and, in fact, its general characteristics are soon noted.

When we come to consider loud-speakers for various sets we realise that some are bound to be more suitable than others. A good moving-coil type would be wasted with a distorting set; the resulting sounds would, in fact, not be quite so bearable as when an ordinary loud-speaker, having a restricted frequency range, was used.

Question of Sensitivity

Some sets, too, are much more powerful than others. Sensitivity may, therefore, be an important factor, or perhaps, power handling capacity.

For use with small sets we generally want a sensitive loud-speaker, capable of dealing with signals of only fair strength, and we want to hear them as loudly as possible. With large sets, sensitivity is not so important, but the loud-speaker must be capable of delivering a good volume of sound without being shaken to pieces.

With a given loud-speaker, the best reproduction will probably not be obtained until the set is

(Turn to Page Twelve)

HEGRA*

Type A3 ... £6



Worked from 220-volt A.C. mains, this moving-coil chassis, with a 2-ft. baffle, gave a fine all-round response. The bass was especially good, although top notes were also notably well handled. The unit has average sensitivity. An output transformer is fitted as standard, but can be disconnected if desired. **23**

HEGRA*

Type A1 ... £4 10s.



An inexpensive moving-coil chassis for D.C. mains, or a 6-volt accumulator, which produced quite good quality on test. We noted that sensitivity was fair, while the overall response could fairly be described as satisfactory. At 220 volts the consumption is 70 milliamperes; at 6 volts, 1 ampere. **24**

HEGRA*

Type A6 ... £8



A low-resistance moving-coil chassis working from D.C. mains. It works extremely well from a low-resistance output. The top notes are strong, without any sign of dither. Low notes were also well in evidence. We were also impressed with the sensitivity. This instrument appears to be very well made. **25**

IGRANIC*

Type B ... £7 15s.



An A.C.-mains moving coil of great merit, this Igranic model was found to be sensitive above the average for its type. The low notes were remarkable. Top notes had a pleasing timbre. With a baffle the reproduction was excellent. A metal rectifier is included. The diameter of the cone is 9 in.; it is of the corrugated type. **26**

LISSEN

Type LN589-90 ... £3 15s.



This moving-coil instrument is designed for use with 200/250 volts D.C. mains. It is claimed to give powerful undistorted volume from very large amplifiers and, in addition, to be more sensitive to weak inputs than the smaller types of loud-speaker. A model for operation from a 6-volt battery is available at the same price. **27**

LISSEN

LN706-7 ... £5 15s.



This instrument requires a 6-volt energising current and is supplied with an output transformer for use with pentode or standard power valves. It is mounted on a baffle board and housed in an oak or mahogany cabinet. It is claimed to have good quality and to be very sensitive. With 8:1 or 23:1 output transformer. **28**

MARCONIPHONE

Type 80 ... £4 10s.



This chassis model, including a step-down input transformer, may be used on a 6- to 10-volt battery supply. It is claimed to be very sensitive and capable of handling exceptional volume. Model 90 has a 3,000-ohm field for D.C. mains (or A.C. mains with a rectifier). The price of this excellent instrument is £5. **29**

MARCONIPHONE

Model 130 ... £12 12s.



Quality of reproduction is the outstanding feature of this loud-speaker, which is designed to operate from A.C. mains (200/250 volts). Very sensitive and handles large volume. Contains a special diaphragm to ensure equal balance of tone. Finished in solid mahogany cabinet of handsome design. For D.C. mains, £7 10s. **30**

PHILIPS*

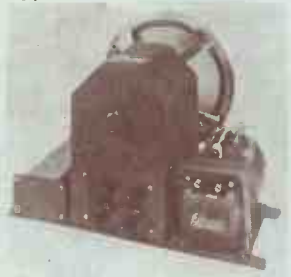
Type 2063 ... £12 10s.



This A.C.-mains-operated moving-coil loud-speaker is a new Philips product giving pleasing reproduction. The amount of volume that can be handled is very considerable. Overall response is good. Top notes are well handled and the bass is natural. It is fitted with a special tone control and interference eliminator. **31**

PORTER*

Type P.A.11 ... £7



This moving-coil chassis is an inexpensive assembly, well made and extremely robust. It is complete with output transformer, mains transformer, Westinghouse metal rectifier, and smoothing condenser. The quality was quite good. The overall reproduction was inclined to be high-pitched. For 100/125 volts or 200/250 volts. **32**

PORTER*

Type P.D.12 ... £4



Designed to operate from a 6-volt accumulator, this model is claimed to be very sensitive and have natural tone with even response over all frequencies. It is strongly made and gave efficient results on test. Quality was fair, with good volume. Type P.D.10, for 200/250 volts D.C., £4 5s.; for 100/125 volts, same price. **33**

R.I.

Type A.Y.23 ... £18 18s.



This instrument is for working from 100/120 volts A.C. or 200/250 volts A.C., and is supplied complete with rectifying equipment and smoothing circuit. It is housed in a handsome cabinet, with castors. It is claimed to be sensitive and free from hum. A table cabinet is obtainable at £14, in walnut or mahogany. **34**

R.I.

Type AY20 ... £11



This instrument is contained in a handsome table cabinet with an exceptionally fine finish. It is supplied to work from 100/120 volts or 200/250 volts D.C., and is claimed to be very sensitive and capable of handling heavy loads without distortion. It can be obtained as a cabinet model, in walnut or mahogany with castors, for £15 15s. **35**

ROTHERMEL*

Midget Type ... £3



This moving-coil loud-speaker gives remarkable results for its size and price. It is designed to operate from a 6-volt field excitation, but can be supplied to work from A.C. mains at £5 10s. The size is approximately 7 in. in diameter by 4 in. deep. At £3, this instrument can be obtained for D.C. mains at 110 or 220 volts. **36**

ROTHERMEL*

Senior 415 ... £9 15s.



With 220-volt A.C. mains, this moving-coil chassis was found to give satisfactory reproduction of all musical frequencies. If anything, the bass notes were better than the top notes. The sensitivity was average for a moving-coil model. No sign of distress with maximum volume. Available for D.C. or battery operation at £6 10s. **37**

SQUIRE

Sylphone Model 21 £8 15s.



This can be adapted for any type of attachment, for example, baffle board, shelf, walls, etc., and is in this way unique. It is very sensitive and will work from an ordinary two-valve amplifier. A 6-volt type can be obtained at the same price and an A.C. model at £12 12s. Type illustrated is for operation from D.C. mains. **38**

**FARRAND
INDUCTOR
DYNAMIC
MODELS**

(Nos. 39 to 42)

This is the latest type of loud-speaker and is similar to a moving coil, with an armature in place of the coil. It is essential to use these instruments with an output choke or transformer. They are suitable for most three- or four-valve sets, and can be recommended.

GECOPHONE

Type BC1850 ... £3 10s.



This chassis makes use of the new Farrand dynamic principle. No energising current is necessary, and the results are comparable with many moving-coil speakers. It is claimed to be sensitive and suitable for all receivers using a super-power valve in the last stage. This instrument is also available in cabinet form. **39**

LAMPLUGH*

Chassis ... £3 10s.



Employing the well-known Farrand patent, this is a good chassis, producing a well defined and balanced tone. Both high and low notes are very natural. No pronounced resonance on the audible scale. Four terminals—rather small—for different value impedances. Housed in standard cabinet, £5 10s.; de luxe cabinet, £6 10s. **40**

MEMBRA*

Chassis ... £3 10s.



With the Farrand inductor-dynamic principle embodied, we naturally expected to hear good quality from this cone chassis. On a large baffle we were not disappointed. Both high and low notes are reproduced in a well-balanced output. Bass was exceptionally good. An output transformer or choke is essential. **41**

N. AND K.*

Chassis ... £3 10s.



An excellent chassis; an improvement on the original which was the first inductor-dynamic type of loud-speaker to be sold here. We were very pleased with the overall reproduction. Bass had a rare naturalness. The top notes were also strongly in evidence. The unit is very sensitive and handles full volume. **42**

**CABINET
CONE
LOUD-
SPEAKERS**

(Nos. 43 to 94)

This type comprises the bulk of the loud-speakers on the market. Most are suitable for any set with two to six valves. The majority incorporate a balanced-armature unit, but a few employ simple reed drives. Many will work satisfactorily without any special output circuit. There are types to suit all pockets.

AMPLION

Type AC8 ... £2 2s.



This is one of Amplion's latest editions. The cabinet is of standard shaded finish and is quite imposing in appearance. For its price it is good value for money and should give satisfactory results with any moderate-powered set. Dimensions are: height, 13½ in.; base, 13½ in.; and depth, 6½ in. Cone is 12 in. in diameter. **43**

AMPLION*

Type AB6 (oak) ... £4 10s.



This handsome loud-speaker incorporates a balanced-armature unit and alternative impedance values are obtainable. Quality of reproduction is inclined to be rather boomy but nevertheless is of a pleasing natural tone. It can be obtained in mahogany or walnut at an extra cost of 7s. 6d. Height, 14½ in.; base, 15½ in.; depth, 7½ in. **44**

AMPLION*

Type AB41 ... £5 15s.



A large cabinet cone, with a new Amplion balanced-armature unit. It handled considerable power without overloading. On the standard input we noticed the sensitivity was above the average. Top notes are reproduced without screech. Low notes well in evidence, but not overdone. Model illustrated is oak; supplied in mahogany at £6 6s. **45**

AMPLION

Type AB450 (oak) £6 15s.



A new 1931 model embodying all the latest improvements in design. It incorporates a new power-type unit and is claimed to handle large volume. Two alternative impedances are available to match either power or pentode valves. Obtainable in mahogany or walnut at 12s. extra. Dimensions are:—height, 29½ in.; width 26 in.; depth, 11½ in. **46**

AMPLION

Type LC500 (oak) ... £15



Incorporates the 18-in. power chassis and is particularly suitable when large undistorted volume is required. Great claims made for this instrument make it good value for money. Although the photograph shows the oak model, it may be purchased in mahogany for £1 extra. Dimensions are:—height, 40 in.; width, 28 in.; depth, 16 in. **47**

AMPLION*

Lion Chassis ... £4 10s.



This well-known reproducer is supplied in a plain wooden box all ready for connection to the receiver. It gives remarkably good results for its type. The model illustrated has a 14-in. cone. With an 18-in. cone the price is £6 (type L18P). Dimensions of the 14-in. model are:—height, 17½ in.; width, 17½ in., depth, 8½ in. **48**

BEL-CANTO*

Standard Model £5 10s.



Driven by a Bel-Canto balanced-armature unit, this cabinet loud-speaker takes a lot of power and without overloading. Well-balanced tone. Top notes better than low, which are inclined to be "boxy." We were pleased with the overall performance. It is sensitive. Available at the same price in oak, walnut or mahogany. **49**

BLUE SPOT*

Type 99K ... £3 15s.



Driven by the well-known 66K unit, this inexpensive cone loud-speaker, finished in mahogany gives brilliant reproduction of top notes, but is not very strong in the bass. The unit can handle a good deal of power and is sensitive to weak inputs. The dimensions of the cabinet are:—height, 11½ in.; width, 16½ in.; depth, 5½ in. **50**

BLUE SPOT*

Type 71R ... £4 15s.



Sensitive above the average, this Blue Spot model gave characteristically brilliant high-note reproduction. Bass was also well handled, making a very pleasing overall response. The amount of power that can be handled is great. An adjustment knob is at the back. Finished in walnut and incorporating a 66R unit. Width is 18½ in. **51**

BLUE SPOT*

Type 29K ... £5 5s.



In either light or dark walnut finish, this large Blue Spot cone loud-speaker gives a majestic output. As usual with this make, the brilliance of the top notes is the outstanding feature. Sensitivity is remarkable. A speaker for every good set. Dimensions of the cabinet are 18½ in. high, 17½ in. wide and 9½ in. deep. Thoroughly recommended. **52**

BLUE SPOT*

Type 51R ... £4 4s.



Quite a pleasant-sounding model in the large Blue Spot range. The sensitivity of the model tested was very good. The adjustment at the back worked the balanced-armature unit with precision. Top notes were brilliant; bass notes good. Finished in polished walnut wood. Dimensions:—15½ in. high; 14½ in. wide; and 9½ in. deep. **53**

BLUE SPOT*

Type 101K ... £3 15s.



A floating-edge cone mounted in a very handsome-looking Trolite case, this Blue Spot model gave typical Blue Spot results—brilliant top notes, adequate bass notes, sensitivity above the average, good unit adjustment. This unit can take a lot of power without overloading. The dimensions are 19 in. high and 16½ in. wide. **54**

BURNDEPT

Type 1676 ... £2 10s.



This loud-speaker has a handsome appearance, being finished in either oak or mahogany hand-polished cabinet. The unit is robust and claimed to handle considerable power without rattle, and to give a clear but well-balanced tone. Overall dimensions: 14 in. high, 15 in. wide, and 5 in. deep. This model has a 12-in. cone. **55**

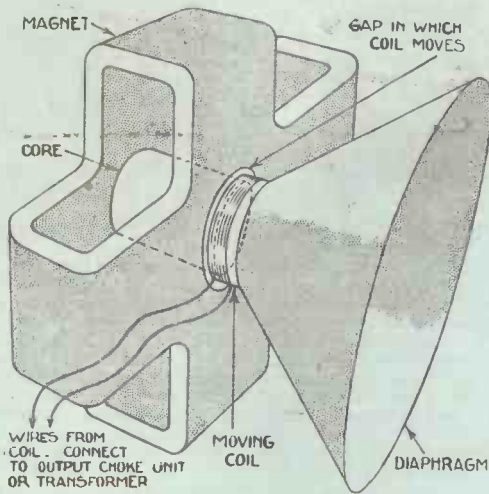
CELESTION

Type C24 (oak) ... £20



This, without a doubt, is one of the most handsome of loud-speakers. It has a sturdy balanced-armature unit, with a D.C. resistance of 750 ohms. It is claimed to be outstanding in performance and very sensitive. The dimensions are 29½ in. wide, 44½ in. high, and 12½ in. deep. Price in mahogany, £21. **56**

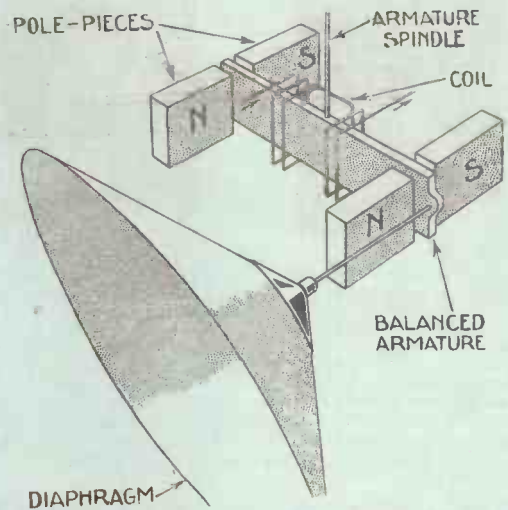
HOW YOUR LOUD-SPEAKER WORKS



MOVING-COIL INSTRUMENT

In this type of loud-speaker a small coil connected to the output terminals of the set is placed in a strong magnetic field. When signals are received, current variations occur and the coil moves backwards and forwards; this movement of the coil displaces the cone diaphragm, and sounds are produced.

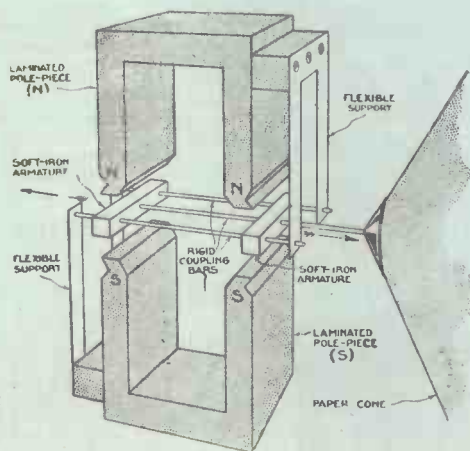
The magnetic field is obtained by means of a powerful permanent magnet (as shown here) or by means of an electro-magnet.



BALANCED-ARMATURE UNIT

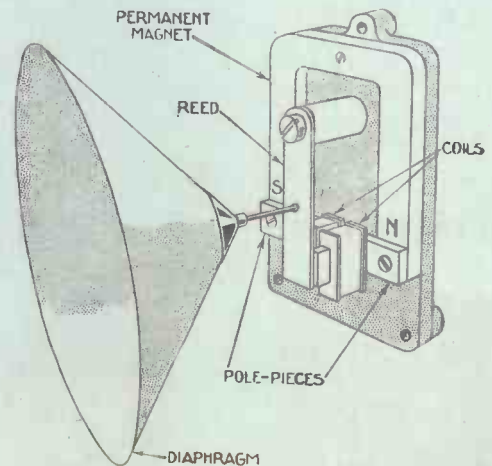
This is one of the most popular types of loud-speaker drive. A centrally-pivoted armature bar has each of its two ends between a pair of magnetic poles. Current flowing through the coils causes the armature to rock backwards and forwards, and this movement is communicated to a coupling rod fixed at one end of the bar.

As can be seen, the cone diaphragm is fixed to this coupling rod and causes a movement of the air.



FARRAND INDUCTOR PRINCIPLE

One of the latest developments, the Farrand inductor principle is attracting considerable attention. This type of instrument is somewhat similar to a moving-coil drive, but the coil is replaced by a special armature system. By means of thin metal supports, the armature is suspended in a magnetic field and, when current variations take place, moves backwards and forwards horizontally in the gap, the motion being parallel to the pole faces.



SIMPLE REED MOVEMENT

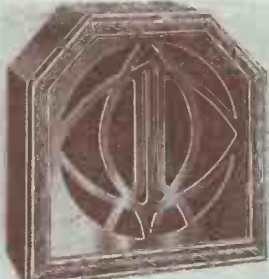
The cheapest loud-speakers only have this type of drive which, however, has a number of variations. The armature is pivoted at one end and the other end is free to move to and fro in front of an electro-magnet. The movement is obviously restricted, because of the close proximity of the armature to the pole face in order to get a strong magnetic field. Sometimes a second magnet is provided so that the armature actually moves in a gap.

CELESTION
Type D10 (oak) ... £3



This is the lowest-priced instrument in the Celestion range. It incorporates every Celestion feature to be found in the larger models. Claimed to be very sensitive and capable of handling good volume. D.C. resistance, 2,000 ohms. A good instrument at a moderate price. Available in mahogany cabinet for 10s. extra. **57**

CELESTION
Type D12 (oak) ... £5



A new instrument based on the design of the C12. It is claimed to be very sensitive, capable of handling great power, and giving even response over a wide frequency range. D.C. resistance, 2,000 ohms. It is housed in an attractive cabinet. Price in mahogany is £5 7s. 6d. Dimensions are 14 in. high, 14 in. wide, and 5½ in. deep. **58**

CELESTION*
Type C14 (oak) ... £11



A handsome loud-speaker of large dimensions claimed to be extremely sensitive and with a wide frequency response. Contains a large diaphragm, with a special electro-magnetic system. D.C. resistance of 750 ohms. Can be obtained in mahogany at £11 7s. 6d. One of these instruments is in constant use in the "W.M." laboratories. **59**

CELESTION
Type Z20 (oak) ... £7 15s.



Incorporating a sensitive electro-magnetic reed movement working in conjunction with a reinforced diaphragm of special size and shape. D.C. resistance is 750 ohms. It is housed in an attractive oak cabinet; can be obtained in mahogany at 10s. extra. Dimensions are 19½ in. high, 17½ in. wide, and 8½ in. deep. A very popular instrument. **60**

CELESTION
Type D50 (oak) ... £8



A recently-developed model working on an entirely new principle. Its movement incorporates many special features and is claimed to give good response over all frequencies. Supplied with three tappings to suit valves of 1,500, 2,000, and 3,000 ohms impedance. Dimensions are 19½ in. wide, 21 in. high, and 8½ in. deep. **61**

COLASSION
Standard ... £5



Great claims are made by the makers of this popular-priced loud-speaker. They claim it to be superior than any loud-speaker of its price on the market. It is housed in an attractive oak cabinet and is fitted with a special electro-magnet capable of taking an input up to 18 watts. This instrument has a D.C. resistance of 1,600 ohms. **62**

COLASSION
Super Type ... £10



An outstanding feature is that it is reputed to take an output from any size amplifier without any vestige of chatter. All frequencies from 100 to 6,000 cycles are reproduced with equal fidelity, it is claimed. Finished in solid oak, this instrument has a resistance of 2,000 ohms. Dimensions: 19½ in. high, 19½ in. wide, and 10½ in. deep. **63**

COLUMBIA*
Model 325M ... £4 15s.



Housed in the usual attractive Columbia cabinet, this balanced-armature cone loud-speaker gave a very pleasing response. The bass had a natural timbre and top notes were precise. We liked the overall tone very much. The unit has high-, medium-, and low-resistance tappings. Model illus. is mahogany; walnut same price. Oak, £3 17s. 6d. **64**

DONOTONE*
Type Ideal ... £6 6s.



Incorporating twenty-four tuned gongs, this novel loud-speaker has an unusual shape. It was very sensitive on the standard input. Top notes were extremely pleasing, but bass notes were not very strong. The overall effect was quite good. Handles power without overloading. Other models at £8 8s., £10 10s., etc., up to £78 15s. **65**

EDISON BELL
Type 364 ... £5 5s.



This is built into a solid mahogany cabinet of outstanding design. It embodies a specially-designed unit; claimed to be very sensitive and to give equal response over the whole musical scale. It is to be recommended for incorporation in mahogany furnishing schemes. The drive has a torque reed movement. **66**

GECOPHONE
Type BC 1790 ... £3 5s.



Sensitive and capable of giving good standard of reproduction. The front of the loud-speaker slopes and the fret is decorated with a stork design. Controlled by a balanced-armature unit, this speaker is claimed to be very sensitive. Model illustrated is mahogany; can be obtained in oak at same price (Type BC1792). **67**

It will be seen that in the bottom right-hand corner of each review there is a number.

If you write to any manufacturer for further details of his instruments, it will be only necessary to quote the number and mention the WIRELESS MAGAZINE Loud-speaker Supplement.

Full names and addresses of the makers whose instruments are reviewed will be found on Page Twelve. On that page any difference between the maker's name and the brand name is noted.

A star (★) indicates that the loud-speaker has actually been tested in the "W.M." laboratories

GRAHAM-FARISH

Cabinet Cone ... £2 2s. ★



For such an inexpensive model, this gives fine results. The sensitivity is above the average. Driven by a balanced-armature movement that handles power without distress. The top notes were exceptionally good. Bass notes were quite satisfactory. The cabinet, of walnut, is handsome and well shaped. A model to be recommended. 69

HEGRA★

Type S ... £3 5s.



Strikingly handsome in its walnut cabinet, this loud-speaker delivers fine quality, both high and low notes being reproduced. The high notes were better than the low. Sensitivity was good. A triple-resistance tapping is provided for different valve impedances. The instrument is particularly attractive, having a gilded cone protector. 70

HEGRA★

Type V ... £3 5s.



Driven by the Hegra four-pole balanced-armature unit, this is similar to type S at the same price. Very handsome appearance. Triple resistances for different valves. Good overall quality, with a slight "boxy" effect—not unpleasant. Sensitive and handles power well. A loud-speaker specially suitable for general use. 71

K.B.

Type 177 (oak) £1 19s. 6d.



An inexpensive cone loud-speaker, which is stated to give pleasing results. It has a knob for adjusting the unit on the back of the cabinet. It is claimed to handle a large volume without rattle and give a good response over a wide range of audible frequencies. The dimensions are 12½ in. high, 12½ in. wide, and 6½ in. deep. 72

K.B.

Type 232 ... £3



For its modest price, this model is stated to give remarkable results. It is claimed to be very sensitive and reproduce all frequencies throughout the musical scale. No output transformer is provided, but is recommended. The unit is housed in a cabinet of distinctive design. The dimensions are 14 in. high, 14½ in. wide and 6½ in. deep. 73

K.B.

Type 72 (oak) ... £5 5s.



This is similar to model 135. An output transformer is provided which keeps the plate current from the windings of the speaker. It is claimed to give excellent results and can be obtained in mahogany or walnut at £1 1s. extra. A chassis only can be obtained for £2 10s. The dimensions are 17½ in. high and 15½ in. wide. 74

K.B.

Type 135 (oak) ... £7 7s.



This model is driven by a unit of balanced-armature type and introduces new principles in winding and armature mounting. It is claimed to give results nearly equal to that of a moving-coil loud-speaker. It is housed in an attractive oak cabinet. Mahogany or walnut £8 8s. Dimensions: height, 18½ in.; width, 23½ in.; depth, 11½ in. 75

LISSEN

Type LN345 ... £3 3s.



Fitted with a novel type of cone movement, this loud-speaker is claimed to reproduce both upper and lower frequencies with equal fidelity. The model illustrated is finished in mahogany, but can be obtained in oak at the price of £2 17s. 6d. The cabinet acts as a baffle as well as a cone for the specially-prepared diaphragm. 76

LISSEN

Type LN732 (oak) £2 15s.



Driven by a Lissen four-pole balanced-armature unit, this loud-speaker is claimed to give good reproduction. It is of very pleasing appearance, being housed in an oak cabinet with a bow-fronted design. The movement is controlled by a knob fitted on the back of the cabinet. It is called: "The cone speaker with moving-coil quality." 77

LOEWE★

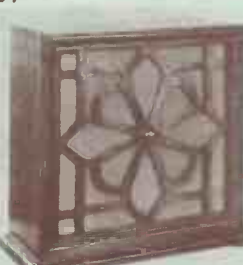
Type EB85 ... £2 2s.



Driven by a four-pole unit, this is contained in an effective Caucasian walnut cabinet, with a pleated silk centre. Quality was on the high-pitched side, with a rather peculiar but not unpleasing characteristic timbre. Fairly sensitive. Handles volume well, and is good value for money. Dimensions: 15 in. wide, 16 in. high, and 4½ in. deep. 78

MARCONIPHONE

Type 63 ... £4 ★



Cabinet looks well and has an adjustment knob mounted on the grille at the front. The volume from our standard input was moderate, as is sensitivity. Quality is average, and good for general purposes. Satisfactory for small sets. This model is obtainable only in mahogany. Dimensions:—15 in. high, 15 in. wide, and 8 in. deep. 79

MARCONIPHONE

Model 60 ... £3



Very pleasing in appearance, this loud-speaker should give clear reproduction and full volume. It is claimed to be sensitive enough to operate at good strength from a simple two-valve set. It is housed in an attractive mahogany cabinet with adjustment knob fitted on the back. Dimensions: 13½ in. wide, 12½ in. high, and 6½ in. deep. 80

MINSTREL

Type 1760 ... £4 4s.



This Burndept model is of the double-linen-diaphragm type and is finished in oak or mahogany. It has an adjustable balanced-armature drive. The overall dimensions of the cabinet are 16½ in. high, 17 in. wide, and 7½ in. deep. This loud-speaker should give excellent reproduction, like all others of its type. **81**

MULLARD*

Type K ... £6 15s.



Polished oak cabinet contains balanced-armature movement driving 13-in. diameter cone. Winding will carry 25 milliamperes. Three terminals provide resistances of 500, 1,100, and 1,600 ohms. On the high-pitched side, but very pleasant. Sensitive, and it delivers plenty of volume. **82**

ORMOND

Type R/459 ... £3 19s. 6d.



This pleasing loud-speaker is so shaped that it will fit into the corner of a room, taking the minimum of space. It is driven by a four-pole adjustable unit with a large-size cone. It is stated to be unusually sensitive. The cabinet is made of solid oak and the dimensions are 39 in. high, 21½ in. wide, and 13 in. deep. **83**

ORMOND*

Type R/455 ... £2 10s.



This model gives excellent quality of reproduction and is very good value. It is fitted with a new-type cone and baffle, driven by the Ormond four-pole adjustable unit. Available in oak or mahogany. Dimensions; height, 13½ in.; width, 13½ in.; depth, 6½ in. It is claimed to be sensitive and capable of giving good response. **84**

PHILIPS*

Type 2032 ... £3 10s.



A handsome-looking loud-speaker, giving a pleasing output that tends to be high-pitched. There is no adjustment, but considerable power was handled without rattling. Specially designed for the well-known Philips sets, but suitable for all sets. In mahogany-colour moulded case, measuring 15½ in. high, 14 in. wide, and 5 in. deep. **85**

PHILIPS*

Type 2024 ... £4 10s.



Unusual appearance—the fret at the front is fashioned after organ pipes. Cabinet in solid weathered oak. We liked the crisp, high notes—more accentuated than the low notes, also well heard. Non-adjustable movement, but handles plenty of power. Quite sensitive. Cabinet is on the small side. **86**

PHILIPS*

Type 2019 ... £5 10s.



Extremely handsome in its polished philite, with antique metal grille. Large balanced-armature unit without adjustment. Three-way tone switch. In oak or mahogany finish. Pleasing tone, somewhat high-pitched. Bass notes not emphasised. Average sensitivity. Specially suitable for use with Philips sets. **87**

PURAVOX

Type W91551 ... £3 2s. 6d.



This instrument is housed in a mahogany cabinet of distinctive design. It is driven by a balanced armature unit and is claimed to be very sensitive. No output transformer is necessary. Guaranteed for twelve months. The D.C. resistance is 2,000 ohms. The cabinet measures 14 in. high and 14½ in. wide. Unbaffed free-edge cone. **88**

PURAVOX

Type W91552 ... £3 2s. 6d.



A loud-speaker that has many distinctive features. It has a spider diaphragm instead of a reed and is claimed to obviate distortion through reed resonance. No output transformer is necessary. It is housed in an oak cabinet of pleasing design, which measures 15 in. high by 15 in. wide. The D.C. resistance is 2,000 ohms. **89**

PYE*

Type 1040 J ... £3 3s.



An extremely sensitive little cabinet cone loud-speaker, giving an output that compares well with many models twice its size. The high and low notes were well balanced, no pronounced resonance being detected. There is no adjustment on the back, but great volume can be handled without rattling. Obtainable in oak, walnut or mahogany. **90**

RADIO L.S.*

Model S16 (oak) ... £7



A high-class cone loud-speaker, the R.L.S. was one of the best tested. It gave excellent results on a piano record. High and low notes well reproduced in correct proportions. The cabinet did not greatly affect the bass. Price in mahogany is £7 10s. The dimensions are—18½ in. high; 18 in. wide; and 10½ in. deep. **91**

REVOLIAN*

Type W/5330 (mah.) £2 15s.



Medium sensitivity with tendency towards "boxy" bass notes—due to small cabinet. Good looking, in mahogany or oak. Good adjustment at the back. Takes plenty of volume and needs a good signal current to work at full strength. Quite fair for the money. Price in oak is £2 12s. 6d. **92**

GETTING THE BEST RESULTS—*Continued from Page Four*

adjusted to suit it. The loud-speaker might, for example, have a relatively great bass response. Speech might, therefore, sound unnaturally low-toned and not clear. This fault may be removed by altering the set, making it emphasise the higher frequencies. Lowering the grid leak or grid condenser will help here, and perhaps a valve of lower impedance will raise the tone a little.

Correcting Output

In the output stage we may correct by fitting a transformer having a tapped secondary coil, or by using a valve of higher impedance. A pentode would probably help.

You will see, therefore, that there are various ways of altering the tone

with the object of making the reproduction more pleasing. Other loud-speakers, being inclined, perhaps, to sound too high pitched, may be used with sets giving relatively too much bass. The result will be pleasing provided a little care is taken in adjusting the values.

It is hardly fair to connect a loud-speaker to a set and to decide at once whether the reproduction is good or bad. So much might be effected by a few adjustments to the set that it is always worth while to endeavour to discover the best combination.

The power output is, of course, affected by the arrangement of the last stage as a whole. Sometimes a transformer is needed to adapt the

loud-speaker to the valve. With valves in push-pull or in parallel, and different types of valves used singly, the impedance of the circuit is likely to be very different from the average value of that of the loud-speaker. A transformer of the right ratio used to couple valve and loud-speaker will ensure that the best use, from the points of view of both quality of reproduction and volume, is made of the stage.

Output Circuits

With moving coils a transformer or output filter must be used. These components are also useful with ordinary loud-speakers as the anode-current feed is kept out of the winding.

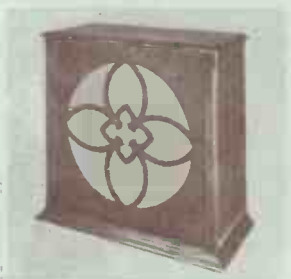
A DIRECTORY OF MANUFACTURERS

Following we give the names and addresses of the forty-nine loud-speaker manufacturers whose instruments are reviewed in this supplement. When writing to the makers for further details just quote the number in the bottom right-hand corner of each review.

- Amplion—see Graham Amplion, Ltd.
 Baker's Selhurst Radio, 89 Selhurst Road, S.E.25.
 Beam, Ltd., 35 Farringdon Road, E.C.4
 Becker, George, Ltd., 39 Grafton Street, W.1.
 Bel-Canto Radio, Ltd., 87 Regent Street, W.1.
 Blue Spot—see British Blue Spot Co., Ltd.
 British Blue Spot Co., Ltd., 94-96 Rosoman Street, E.C.1.
 Brodersen, A., 11 Northampton Square, E.C.1.
 Brown, S. G., Ltd., Western Avenue, North Acton, W.3.
 Burndept Wireless (1928), Ltd., Eastnor House, Blackheath, S.E.3.
 Celestion, Ltd., London Road, Kingston-on-Thames, Surrey.
 Colassi, W., Mark Lane Station Buildings, E.C.3.
 Colassion—see Colassi, W.
 Columbia Graphophone Co., Ltd., 108 Clerkenwell Road, E.C.1.
 Donotone Loud-speaker, 40 Furnival Street, E.C.4.
 Edison Bell, Ltd., Glengall Road, S.E.15.
 Edison Swan Electric Co., Ltd., 12 Newman Street, W.1.
 Epoch Radio Manufacturing Co., 3 Farringdon Avenue, E.C.4.
 Falk, Stadelmann & Co., Ltd., 83-93 Farringdon Road, E.C.1.
 Ferranti, Ltd., Hollinwood, Lancs.
 Gecophone—see General Electric Co., Ltd.
 General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.
 Graham Amplion, Ltd., St. Andrew's Works, Slough, Bucks.
 Graham-Farish, Ltd., 17 Mason's Hill, Bromley, Kent.
 Grawor—see Joseph, Henry.
 Grassmann—see Rotor Electric, Ltd.
 Green & Faulconbridge, Ltd., 11 Queens Road, Coventry.
 Hegra—see Becker, George.
 Igranic Electric Co., Ltd., 149 Queen Victoria Street, E.C.4.
 Joseph, H., 11 Red Lion Square, W.C.1.
 Kolster-Brandes, Ltd., Cray Works, Sidcup, Kent.
 Kone Dope, 43 Idmiston Road, Stratford, E.
 Lamplugh, S. A., Ltd., King's Road, Tyseley, Birmingham.
 Lichtenburg & Jones, Ltd., 12 Emerald Street, Theobald's Road, W.C.1.
 Lissen, Ltd., Worple Road, Isleworth, Middlesex.
 Loewe Radio Co., Ltd., 4 Fountayne Road, N.15.
 Lowne Electric, Boones St., Lee, S.E.13.
 Londona—see Sherwood, A.M.E.
 Marconiphone Co., Ltd., 210-212 Tottenham Court Road, W.1.
 Membra—see Beam, Ltd.
 Mullard Wireless Service Co., Ltd., 111 Charing Cross Road, W.C.2.
 N. & K.—see Brodersen, A.
 Ormond Engineering Co., Ltd., Rosebery Avenue, E.C.1.
 Philips Lamps, Ltd., 145 Charing Cross Road, W.C.2.
 Porter, C. J., Wellsgate, Grimsby.
 Puravox—see Falk, Stadelmann & Co., Ltd.
 Pye Radio, Ltd., Paris House, Oxford Circus, W.1.
 Radio Instruments, Ltd., Purley Way, Croydon.
 Radio Loud Speakers, Ltd., Cranmer Court, High Street, Clapham, S.W.4.
 Revo Electric Co., Ltd., Britannia Works, Tividale, Tipton, Staffs.
 Revolian—see Revo Electric Co., Ltd.
 R.I.—see Radio Instruments, Ltd.
 Rothermel Corporation, 24-26 Maddox Street, W.1.
 Rotor Electric, Ltd., 2-3 Upper Rathbone Place, W.1.
 Sherwood, A.M.E., 150 King's Cross Road, W.C.1.
 Squire, Frederick, Ltd., Leswin Place, Stoke Newington, N.16.
 Standard Battery Co., 184-188 Shaftesbury Avenue, W.C.2.
 Tekade Radio & Electric, Ltd., 29 Farringdon Street, E.C.4.
 Triotron Radio Co., Ltd., 91 Great Russell Street, W.C.1.
 Tunewell—see Turner & Co.
 Turner & Co., 54 Station Road, Southgate, N.11.
 Twin Cone—see Green & Faulconbridge, Ltd.
 Ultra Electric Co., Ltd., 661-663 Harrow Road, N.W.10.
 Wates—see Standard Battery Co.
 Watmel Wireless Co., Ltd., High Street, Edgware, Middlesex.
 Wufa—see Lichtenburg & Jones, Ltd.

TUNEWELL*

Cabinet Cone ... £3 3s.



Excellent appearance, in a mahogany cabinet. Terminals at back not very accessible. Sensitivity was average. The top notes were well handled, but bass is weak. The power-handling ability is good. This instrument has a free-edge cone. The dimensions of the cabinet are 16 in. high, 15½ in. wide, 7½ in. deep. In walnut to order. **93**

WATES*

22-in. Type ... £4 10s.



A very large cabinet cone loud-speaker, incorporating the Wates double-cone chassis. Unusually sensitive. The quality was found to be excellent. Bass notes and top notes were equally well reproduced. On the maximum power output of the amplifier there was no sign of distress. One of the best cones tested for this Supplement. **94**

PLAQUES AND OPEN CONES

(Nos. 95 to 110)

These loud-speakers are the cheapest types available in a complete form and will, therefore, interest those in need of low-priced yet efficient instruments. It should be noted that the prices are low because the loud-speakers have no cabinets, not because the electrical efficiency has been reduced in any way.

AMPLION

Type AC2 ... £1 1s.



In spite of its very low cost, this speaker is stated to uphold the Amplion standard of giving good results. It is of neat appearance, being of a pleasing brown shade with bakelite surround. It is supplied with brown silk cord for hanging on a wall. The cone diaphragm has a diameter of 10 in., and the overall diameter is 13½ in. **95**

AMPLION

Type AC21 ... £1 19s. 6d.



This is a larger model and gives better results than the AC2. It is fitted with a self-supporting stand or can be hung on a wall. The overall diameter is 16½ in., and the instrument is claimed to give very excellent results. This instrument is known as the Standard model and has a 12-in. diameter cone diaphragm. **96**

EDISON BELL

Type 410 ... £1 17s. 6d.



This plaque loud-speaker is driven by a balanced-armature unit and is claimed to be very sensitive and capable of handling great volume. An oxidised chain, hanger, and hook are provided to enable its suspension to be made from a picture rail or on a wall. This type of loud-speaker is useful for moderate-power receivers. **97**

GECOPHONE

Type BC1770 ... £2 2s.



An exceptionally imposing plaque which can be used either as a wall or table model. Employs a balanced-armature unit and is sensitive. It has a heptagonal frame of mottled brown bakelite. The cone is coloured brown. The dimensions are 17 in. high and 17½ in. wide. This model is called the Stork plaque. **98**

GECOPHONE

Type BC 1720 ... £1 12s. 6d.



This is attractively finished to represent antique copper and is a good speaker at the price. The unit employed is of the balanced-armature type and is controlled by a knob fitted on the back. It is mounted on a light frame for wall suspension. The diameter of this loud-speaker is 15 in.; it is known as the Junior plaque. **99**

LISSEN

Type LN187 ... 19s. 6d.



This model has been produced in order to provide an efficient cone speaker at a reasonable figure. It is a plaque design and can be obtained either in oak or mahogany. It is controlled by a knob fitted to the centre of the fret. This type of loud-speaker is particularly suitable for use with small receivers that do not give great volume. **100**

MARCONIPHONE

Model 30 ... £1 10s.



The attractive octagonal design incorporates an ingenious mounting which allows the speaker to be placed in two positions and enables it to be hung on the wall of a room. Is quite sensitive and will give a fair volume for its size. This instrument has a mahogany mount and measures 14 in. high by 14 in. wide. **101**

MARCONIPHONE

Model 62 ... £1 15s. *



Rather a restricted output, but quite suitable for small two-valvers. Bass notes are not much in evidence, nor are the very top notes. Sensitivity is moderate, as is the volume-handling ability of the unit. The adjustment is quite positive. This loud-speaker also has a mahogany mount and is of the same dimensions as model 32. **102**

MULLARD*

Type H ... £4 7s. 6d.



Driven by a balanced-armature movement, this open cone loud-speaker delivers an extremely pleasing output. The tone is crisp, with sufficient bass to give "warmth," but boominess is entirely absent. Attractive looks. 600, 1,200, and 1,800 ohms alternative resistances provided. The maximum height is 17½ in., and width 17 in. **103**

MULLARD*

Type C ... £2 10s.



A remarkable little plaque model, sensitive and capable of handling a good volume. A tone filter can be brought into operation by a switch. Quality was notable for its balance. Both high and low notes well produced. This is one of the Pure Music range of loud-speakers and is supplied in black and maroon or brown and black. **104**

PHILIPS*

Type 2007 ... £5 5s.



A robust balanced-armature movement with three alternative tone values. The appearance is unusual, but strikingly attractive. Orange, violet, or brown, in combination with black and gold finish, can be obtained. Quality was pleasing, top notes being better than low notes. A special reflector is placed in front of the cone. **105**

PURAVOX

Type 91549 ... £1 15s.



This open-cone loud-speaker is mounted on a cast stand finished bronze colour, and has a quite pleasing appearance. D.C. resistance is 2,000 ohms. It is claimed to be sensitive and capable of handling considerable volume without rattle. It is provided with a 15-in. buckram cone and the overall height is 17½ in. Six-ft. cord provided. **106**

REVOLIAN*

Plaque ... £1 9s.



An inexpensive speaker finished in oak, giving very pleasing results. Adjustment is made by a knob fitted to the centre of the fret. Will take good volume without overloading, reproducing all frequencies with equal prominence. It is good value for its price. The dimensions of this instrument are 15½ in. high, 14 in. wide and 4½ in. deep. **107**

SQUIRE

Model 97B (cradle) ... 15s.



This is an ideal unit for those who wish to make their own speakers. It is strongly made, the cradle itself being a solid casting throughout, and will fit all well-known makes of balanced-armature unit. Good results are claimed for this chassis. Price indicated includes cone, already assembled. **108**

TUNEWELL*

Convex Plaque ... £2 2s.



We found this plaque model had average sensitivity. It reproduces without pronounced resonance. The top notes are better heard than low notes. The construction avoids boominess. Quite handsome in appearance. Driven by a balanced-armature unit capable of taking a full output. This model has a 14-in. cone and measures 19 in. overall. **109**

TUNEWELL*

Popular Plaque, £1 8s. 6d.



A pleasing model giving quite satisfactory results. Top notes were clearly reproduced, but as with most speakers of this type, the bass notes were not greatly in evidence. Specially suitable for receivers giving a moderate output, although it will handle fair signal strength if necessary. This model has a 14-in. cone. Finished bronze and gold. **110**

LINEN AND DOUBLE CONES

(Nos. 111 to 118)

The linen-diaphragm type of loud-speaker was introduced to British listeners by WIRELESS MAGAZINE and "Amateur Wireless"; it has proved to be most popular. A number of double-cone diaphragm instruments are also included in this group for convenience in classification.

KONE-DOPE*

Linen Diaphragm ... £1 5s.



Embodying the single linen-diaphragm principle, this assembly was driven by a new Blue Spot unit. One of the very best loud-speakers we have tested for sensitivity and overall evenness of response. The bass notes were indeed natural. The outstanding characteristic was brilliance. Price does not include unit. **111**

LOWNE*

Linen Chord ... £2 10s.



In an oak or metal cabinet is a single linen diaphragm. This produced fine quality on bass and treble. The balanced-armature unit has a large adjustable knob. Handles very great volume without rattling. Three terminals provide loud and soft reproduction. Inexpensive and good. Price indicated includes driving unit. **112**

SQUIRE*

Model 101 ... £2 2s.



Driven by a Blue Spot unit, this aluminium cradle frame has two floating vellum cones and an ebonised octagonal front. Quite sensitive on the standard input. Good top notes and adequate bass—especially with large baffle. Handles power with ease. A good chassis. The price indicated does not include a driving unit, which is extra. **113**

SQUIRE

Model 100 ... £1 8s. 6d.



This cradle is supplied completely fitted with cones and is packed in a box. The larger cone is 12 in. in diameter and the smaller, 7½ in. The ebonised octagonal front has a width of 15½ in. Suitable for Blue Spot, Ormond, Wamel, Hegra, Amphion. Brown and Wates units. **114**

TWIN CONE*

Linen (no unit) ... £1 1s.



Driven by a Gecophone Stork unit, this double-cone assembly was found to give fair volume and a satisfactory all-round quality of reproduction. We could detect no pronounced resonance throughout the audible range. There is entire absence of "boominess." This model is supplied as a kit of parts for home construction. **115**

ULTRA*

Type U99 ... £4 10s.



The commercial version of the famous linen-diaphragm principle, this Ultra loud-speaker produced a generally pleasing result. The overall response was remarkably even, top and low notes being handled equally well. Sensitivity is good. Almost impossible to overload. The cabinet measures 14 in. square and is of solid oak. **116**

ULTRA*

Popular Fifty ... £2 10s.



With brilliant top-note reproduction, this small linen-diaphragm gave a generally pleasing response. Bass was not much in evidence, but sensitivity was above the normal. The results are exceedingly good for such an inexpensive model. There is an adjustable unit. In oak or mahogany, the cabinet measures 12 in. by 10 in. **117**

WATES*

Double Cone ... 17s. 6d.



Driven by a Wates Star unit, or by any of the well-known makes, this chassis proved to be very sensitive. The quality was quite pleasing, top notes being better than low notes. The double adjustment on the Wates unit enabled great power to be handled with ease. Price indicated is without unit. A Wates Star unit is £1 5s. extra. **118**

CONE CHASSIS AND UNITS

(Nos. 119 to 128)

These combined cone chassis and units will appeal to those listeners who need an instrument for mounting inside a radio-gramophone cabinet. Many chassis or cradles are made so that they will accommodate driving units of other makes. Good results can be obtained with a simple chassis mounted on some kind of baffle.

GRASSMAN*

Chassis PD7 ... £1 10s.



A neat chassis construction driven by a robust balanced-armature movement. It responds well to all but the very low notes. Top notes came through very satisfactory. The unit is capable of handling ample volume for ordinary use. The Grassman balanced-armature unit can be obtained separately for 19s. 6d. (see review No. 130). **119**

GRAWOR*

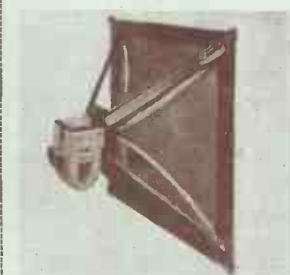
Goliath Chassis ... £1 15s.



This chassis gave very powerful results on test. Tone was pleasing and the frequency response was very even over the whole musical scale. Bass notes were exceptionally prominent. It incorporates the new Goliath adjustable balanced-armature unit. This unit can be obtained separately for £1 1s. if desired. **120**

GRAWOR*

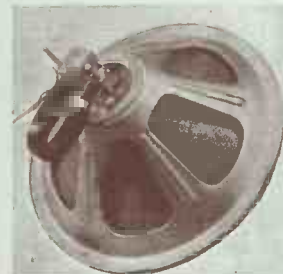
Sektor Chassis ... £3 8s.



This chassis gave good results on test. It is very sensitive, and reproduces both treble and bass notes without any undue emphasis; the quality of tone being excellent. It is fitted with an eight-pole unit and the cone is made of a special damp-proof material. One of the best chassis tested. The Unit cannot be obtained separately from the chassis. **121**

HEGRA*

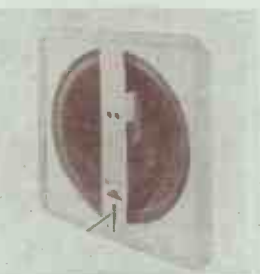
Type F ... £1 10s. 3d.



Driven by the Hegra balanced-armature four-pole unit, this chassis, behind a 2-ft. baffle board, gave fine quality at good volume. The unit adjustment is easy and can be altered to handle considerable power. The price indicated includes a type C Hegra unit, which can be obtained separately for 19s. if desired. **122**

HEGRA*

Chassis ... £1 9s. 3d.



This instrument is ready for mounting in a cabinet. It gives good volume and pleasing tone. Includes a four-pole balanced-armature unit provided with three alternative tapplings, ensuring correct matching with the output valve of the set. A good chassis. In this case the cone is mounted on a wooden board which acts as a baffle. **123**

LISSEN

Type LN632 ... £1 2s. 6d.



Great claims are made for this chassis and unit. It is stated to be very sensitive and, owing to the large size of the cone employed, to reproduce very low notes without the use of a baffle board. The unit is of the balanced-armature type. The cone has a diameter of 13 in., and is made of a specially-treated fabric. **124**

MULLARD*

Speaker Unit £1 18s. 6d.



This incorporates a balanced-armature unit designed to carry a current of 25 milliampers. It is provided with three tapplings, providing D.C. resistances of 1,800, 1,200, and 600 ohms. The cone is made from special parchment material and can be mounted on any type of baffle board. The diameter of the chassis ring is 8 in. **125**

ORMOND

Chassis and Unit ... £1



The unit used is the Ormond four-pole balanced-armature model. Chassis is of aluminium, 11 1/2 in. in diameter, and is provided with two brass pillars to ensure easy assembly of the unit. Reproduction is claimed to be of the very highest quality. A 16-in. chassis is sold at 11s. 6d. **126**

TEKADE*

Chassis ... £2 7s. 6d.



An outstanding feature is the exceptional sensitivity. This assembly handled great power without overloading. The top notes were very brilliant, and bass notes came through strongly. Adjustment at back enables the sensitivity to be varied over wide limits. A fine combination. This chassis includes the Motor unit (see review No. 132). **127**

WUFA*

Sixty Pole ... £2



Very sensitive unit has sixty separate pole laminations. Adjusted by means of a large lever. Even response, both very high notes and all low notes being well handled. Three alternative resistances are provided: 1,750, 1,200 and 500 ohms. This assembly is very substantially made and can be thoroughly recommended; excellent value for money. **128**

Should you wish to write to any manufacturer for further details of the models reviewed in this supplement, the full name and address will be found on Page Twelve.

It will only be necessary to refer to the number to be found in the bottom right-hand corner of each review and mention the WIRELESS MAGAZINE Loud-speaker Supplement.

A post card or letter addressed to any loud-speaker manufacturer about his products and mentioning WIRELESS MAGAZINE will bring a prompt reply.

LOUD-SPEAKER UNITS FOR CONSTRUCTORS

(Nos. 129 to 135)

The units reviewed here will be of particular interest to constructors who wish to build up their own reproducers. For instance, most of them will be satisfactory for the operation of linen-diaphragm loud-speakers.

AMPLION*

Type B.A.2 ... £1 1s.



The very thing for the home-constructor. Has three alternative impedances and has a remarkable frequency response. The unit is strongly made and has a polished black finish. It is supplied with an extension for use with linen diaphragms. This unit can be thoroughly recommended for general use. **129**

GRASSMAN*

Unit ... 19s. 6d.



This unit is of the balanced-armature type and gave good results on test. Reproduction was very clear cut, with a good definition of the lower frequencies. Very sensitive and strongly made, this is very suitable for the use of the home constructor. Has been used with success for "W. M." linen-diaphragm models. **130**

HEGRA*

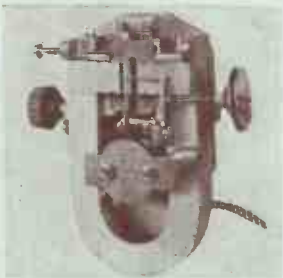
Type E ... 15s. 9d.



An ideal unit, giving plenty of power with clear-cut reproduction. It is of the four-pole balanced-armature type and is provided with three tappings, providing D.C. resistances to suit all types of output valves. It is well finished in a gilt dust-proof case. The permanent magnet is made of tungsten steel and is of ample size. **131**

TEKADE*

Type S4 ... £1 7s. 6d.



A new unit that embodies many entirely new features. The field magnet is very strong, having a pull of 10 lb., which makes it very sensitive. It is claimed to handle an output up to 5 watts. A double-tapped winding provides two alternative resistances of 250 and 500 ohms. This unit is known as the Motor Isophon. **132**

TRIOTRON*

Type P ... £1 7s. 6d.



This is a new adjustable balanced-armature unit, capable of giving very large volume. Quality of reproduction is good and with a large-size cone the bass notes are well emphasised. It is provided with alternative resistances to suit various output valves. This can be obtained with a cone and chassis, completely assembled, for £2 10s. **133**

TUNEWELL*

Unit ... £1 2s. 6d.



Good reproduction was the outstanding feature of this unit. Both high and low frequencies were well defined, with no emphasis of either. Of the four-pole balanced-armature type, this is recommended for those desiring good results at a moderate price. Metal brackets for mounting 10, 12 and 14-in. cones are 2s. 6d. each. **134**

WATMEL*

Unit ... 18s. 6d.



This balanced-armature unit is very sensitive, attractive in appearance, and gave very good results on test. The permanent magnet, of cobalt steel, is very powerful. Reproduction was pleasing, with a good quantity of bass. D.C. resistance is 2,000 ohms. A.C. impedance at 1,000 cycles is 13,700 ohms. **135**



A Happy Christmas!

I MUST wish you a very happy Christmas and a prosperous New Year. We must also remember with gratification that radio is bringing goodwill towards all men.

This is the Christmas number of WIRELESS MAGAZINE and, judging by the last two issues, I have no doubt that we shall find in it plenty to interest us.

By the way, I believe that all existing records have been broken by producing two successive 140-page issues, such as we were able to enjoy in October and November.

Those Gifts

One cannot mention Christmas without at once thinking of the gift problem. Don't you agree that radio is a fine thing from this point of view—and that a loud-speaker is the ideal Christmas present?

Everybody who has a valve set will appreciate an extra loud-speaker; they can be had at prices to suit all pockets and in types to suit all tastes.

When at the WIRELESS MAGAZINE offices the other day, I found the laboratory littered with loud-speakers of all kinds which were undergoing tests. No doubt you will be as interested in the reviews as I shall.

Television Progress

Did you read the Editor's comments on the progress of television in the previous issue?

When I wrote my own notes I had not, of course, seen that editorial and I was gratified that Mr. Bernard

Jones's impressions coincided with my own.

It will be a great day when we can have really satisfactory television reproduction by our firesides.

A Good Joke

What is the best wireless joke you have ever seen in a newspaper—the unintentional kind, I mean?

Not long ago a so-called "national" daily printed an article on how to tune a set. If you saw it you must have laughed as much as I did.

Although there were a number of bad mistakes, the cream of the whole thing was a statement to the effect that the dial readings for a particular station would vary as the distance from the transmitter increased. The idea was that if the readings were 45 and 47 (on a two-dial set) at ten miles from the London Regional, for instance, the readings would be increased to something like 53 and 56 at twenty miles.

The way in which some newspaper editors get their legs pulled passes belief!

Medium or Short?

A great deal of confusion arises, I think, by radio people labelling what are really "medium" waves as "short" waves.

I remember the Editor telling me some time ago of receiving an angry letter from a Dominions reader because it was stated in an article that a set would receive long and short waves, when "medium" was intended.

My own practice is to call wavelengths over 1,000 metres "long,"

between 1,000 and 200 metres "medium," and only those wavelengths below 200 metres "short." The term "ultra-short" can then be reserved for wavelengths below 20 metres or so.

This seems to be the most logical method.

One in Six Thousand

You could not talk very long with Mr. Boyd, who presides over the research activities of the Lewcos works, without learning many interesting things about tuning coils and transformers that would be new to you.

At lunch the other day, for instance, he told me that by their special methods of testing transformer primaries they can spot at once one short-circuited turn in six thousand!

A 1,000-volt Test

Another thing new to me was the method of testing enamelled wire for pin-holes in the insulation. Mr. Boyd explained that the wire is run vertically through a bath of mercury, a source of potential being applied between the mercury and the wire.

I expressed surprise that the mercury would penetrate a pin-hole, and learnt that water is placed on top of the mercury and that the wire passes through this first. In this way a conducting film spreads all over the wire.

The voltage applied may be as much as 1,000 volts and good wire will show only three pin-holes in a length of fifty feet. Rather surprising, isn't it?

Radio Medley—Continued

A CAUTIONARY TALE

John Jenkins was extremely nice,
Thoughtful and kind in every way,
Except for one appalling vice—
He oscillated night and day!

This was a fiendish trick he had;
And listeners for miles around
Were driven very nearly mad
By this incessant howling sound.

He oscillated one fine night
When "You shut up!" a rough voice said.
Loud-speaker speaking on your right!
Headphones, just bash him on the head!

They did, to his intense surpris; ;
His three-valve set joined in the fray
By promptly blacking both his eyes;
John tried in vain to break away!

An amplifier roared "You cad!
You oscillate!" Its tone was grim;
John's aerial was just as bad
It did its best to strangle him!

Then all the wireless parts surged round,
Led by a most ferocious choke,
Kicked him and threw him to the ground—
Till from his nightmare he awoke!

LESLIE M. OYLER.

Those Marked Components

Again I want to return to the subject of marked components. Last month I said that there were too few panel controls with indicators for the use of the home-constructor. Every knob on a panel should be clearly marked with an indication of its purpose.

I have been looking at a few manufacturers' catalogues and find that there are only three firms making filament switches with "on" and "off" indicators. The models made by Benjamin, Bulgin and Gripso are thus marked, but I can trace no others. I should like to know of any.

"Do Your Stuff!"

Now this is not good enough and here is chance of many manufacturers to show what they can do. The Gripso people have given a lead in the right direction, for their switches are actually self-indicating.

When you pull out the knob of the filament switch the word "On" appears clearly in a slot, and when you push the knob back again "Off" appears.

I am glad to see that other indications can also be obtained; for instance, "Gramo" and "Radio," and "Long" and "Short."

This is the sort of thing we want, Mr. Manufacturer, so do your stuff!

Terminals for Good Cheer

It is frequently my fortune (though occasionally a misfortune, let me whisper!) to meet some of our well-known manufacturers in person.

One I am always glad to see is Mr. E. M. Lee, who makes terminals that must be known to all of you. I think that without exception Mr. Lee is the most cheerful man in the radio business and a few minutes' chat with him acts like a tonic.

When I last saw him Mr. Lee was talking of the large number of people who wanted to buy terminals at the Radio Exhibition. He regards such inquiries as an omen of good business for the new season. Mr. Lee is a B.Sc., and one of his hobbies is reducing the petrol consumption of a Bentley motor-car. Long may his plugs wander!

South Coast Two-valvers

During a week's holiday spent on the south coast, touring towns such as Bognor, Worthing, Brighton, and Eastbourne, I was struck by the large number of two-valve sets stocked by radio dealers. There were also a large number of cheap three-valvers, but that was to be expected.

I could not help wondering, however, what sort of results could be obtained with a simple two-valve set at such a distance from Brookman's Park. One dealer told a friend of mine that the results were not up to much, but there was a market for such sets because of the low price.

A Small Portable

In one shop I even saw a two-valve portable set, with self-contained loud-speaker, of course. I wonder what satisfaction that would give anybody on the south coast. I should not care to have to use one myself.

Trying Out A New Pick-up

For the last few evenings I have been amusing myself (but not my wife!) trying out a new pick-up that may appear on the market soon.

By comparison with two well-known standards, I found that the new instrument did not give a very high output and I very quickly had to turn the volume control to the full-on position. The response seemed to be very even over the whole musical range, however, and that is what matters most.

It is great fun to experiment with new gadgets before they are available to the general public—which in this case means you.

Reaction Condensers

A thing that always annoys me is to work a set incorporating a reaction condenser that has no stop. You turn the knob back to what you imagine to be the zero setting and find that the plates are suddenly going into mesh again. Consequently it is extremely difficult to get a proper control of the receiver.

Surely there is no reason why stops cannot be fitted to all variable condensers? I should be glad if any manufacturer can explain to me why they are ever omitted. The cost must be infinitesimal.

A Radio Fan's Causerie

Fun at the Talkies

I heard a story the other day that throws an interesting light on the capabilities of some talkie operators, a number of whom have just gone on strike in the North as I write these notes.

A certain well-known company installed an outfit in a north-country cinema and tested it out. Having found everything satisfactory the installation engineers returned to London.

Urgent Telegram

The show was timed to open on a Monday afternoon and on the preceding Saturday evening the talkie people received a telegram demanding the immediate attendance of an engineer because the gear would not work. A member of the staff set off and arrived some time on the Sunday.

What do you suppose was the reason for all this fuss? Why, the operators had simply forgotten to insert the mains plug in its socket!

A Loud-speaker Problem

A couple of days ago I had a most interesting talk with a Mr. George L. Hutton, an Englishman who lives at Accra.

He is interested in short-wave sets, and is trying to find one that will give Chelmsford on the loud-speaker at Accra. They have tried two well-known commercial sets out there, but can get only headphone signals.

Another problem is cone loud-speakers. The diaphragms will not stand up to a shade temperature of 96 degrees during the day and a very heavy dew at night.

At Portsmouth

I liked Mr. W. James's sensible comments on connecting up several loud-speakers to the same set in the previous issue of WIRELESS MAGAZINE. I went to see Captain H. T. Barnett a few days ago (he lives in Old Portsmouth), and was interested to see that he uses four loud-speakers at once.

Two Amplion Lions are arranged in series, one being in its proper case and the other in the special type of resonance cabinet described in "W.M." some months ago. In parallel with the Lions were a Celestion Z20 cone cabinet and a Rola moving-

coil in a Dulcitone cabinet assembly.

When run from a special Edison Bell amplifier giving an output of about 35 watts (the output stage being two Mullard DO20's in parallel) the reproduction was most pleasing. I spent a most interesting afternoon listening to gramophone records reproduced through this combination.

When working at full blast the amplifier gives sufficient power to run eight moving-coils, if need be!

Combination Cabinets

I am always surprised that combination cabinets for a radio set and loud-speaker are not more popular amongst constructors, especially now that so many good loud-speaker chassis are available. The type of cabinet I have in mind would be large enough to accommodate the batteries and/or mains unit as well.

Such a combination seems to me to be ideal. I should like to know what you think of the idea, for I am sure many firms would make such cabinets as a standard model if there were any demand for them.

Detector Action

What did you think of the "Easy Steps in Radio" Supplement given with the last issue? I thought it very fine, and many people have told me how helpful they found it.

I was particularly interested in the section dealing with detector action, which, to me, is the most complex thing in radio.

Maybe you will not agree with me, but I think the explanation of simple rectification (such as is needed to convert alternating currents to direct currents) is not a very satisfactory way of dealing with detection.

Perhaps my trouble is that I do not know enough about the fundamentals of alternating-current theory. But I am not worrying; even the greatest experts are still arguing as to whether the Stenode really works in the way it is claimed to function by the inventor.

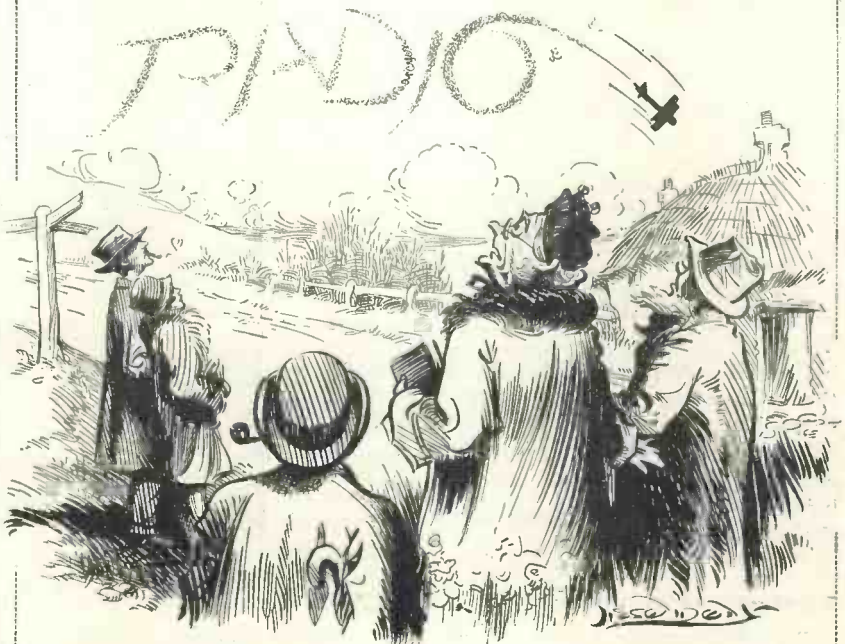
This Month's Teasers

When has a girl got wireless eyes?
When she has a broad cast.

And how long is a short-circuit?

BM/PRESS

MORE TROUBLE IN THE ETHER!



OLD LADY (watching sky-writing for the first time): "Good gracious!
That must be one of those wireless messages caught fire."

Build This Fine Set in Time for Christmas!



THE REGIONAL A.C. FOUR

WITH BAND-PASS TUNING
DESIGNED BY W. JAMES

This set has been built in answer to requests made by dozens of readers during the last few weeks. The set is similar to the Regional Band-pass Four described in October, but it takes all its power from A.C. Mains (including grid bias for the screened-grid and low-frequency valves). Terminals are provided for the use of a pick-up, without any alteration to the wiring

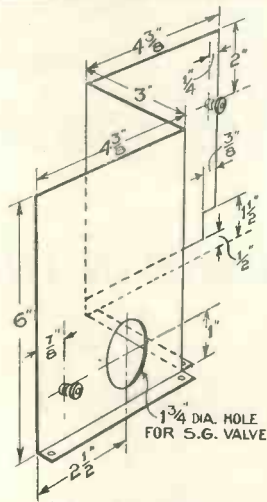
THIS receiver, with its aerial circuit filter, single screened-grid stage, detector and two low-frequency magnifiers, follows closely the Regional Band-pass Four, described in the October and November numbers.

Actually, the chief difference between the sets is that one is designed for battery operation, while the other is "all-electric," meaning that its filament, grid and anode circuits are supplied from an A.C. unit.

It is not necessary for me to describe in detail the tuning and amplifying circuits. We have as a filter between the aerial and the grid of the first valve, two tuned circuits with a coupling condenser, the whole being so proportioned that what is called a band-pass action is obtained.

Band-pass Advantages

This band-pass business is an interesting one. Properly carried out, we obtain sharp tuning without distortion. A broadcast station when transmitting sends out a carrier of



METAL SCREEN

Here are details of the simple metal screen, which is an important part of the design

METAL RECTIFIER USED FOR HIGH-TENSION SUPPLY

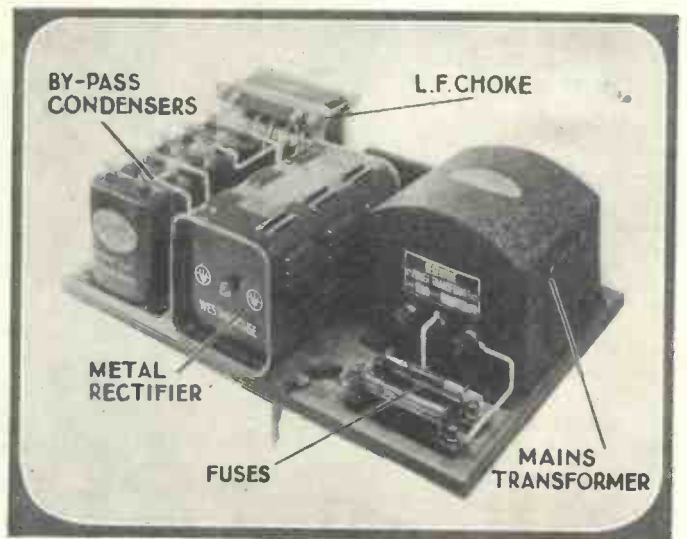
The rectifier in this set supplies 28 milliamperes at 200 volts, ensuring adequate power for the valves, which are of the indirectly-heated mains type (except the power valve, which is directly heated)

the frequency of the tuned circuits and modulation (speech or music) creates side bands extending 5,000 and more cycles on each side of the central frequency. At the receiver, therefore, we ought to use tuned circuits of such proportions that the detector valve

restricted band of frequencies is passed on. The band, in actual practice, may not be and, in fact, seldom is, with a single filter, only just so wide that all the frequencies from one station can pass through.

Further, the width of the band of the filter is liable to vary over the tuning range of the set. In spite of these points, however, the band-pass circuit is of real practical value.

The diagram shows the two sepa-



receives the complete signal. If the circuits are such that much more than the whole signal can pass to the detector, then interference may be experienced, owing to signals besides the wanted one arriving together at the detector.

With a good band-pass circuit, a

rate tuning coils and the .015-microfarad coupling condenser; also the two parts of the two-gang condenser. Band-pass action is obtained on the medium waves only, the long-wave circuit being a simple transformer.

Connected to the grid circuit of the screened-grid valve is an adjustable

grid-bias potentiometer. This part is included in the cathode circuits of the screened-grid and detector circuits. Thus the resistance is traversed by the anode current of both valves, and as the contact arm is turned, the grid bias of the screened-grid valve is altered

Safe Volume Control

This is a good method of adjusting volume, being safe to use. The valve in the screened-grid stage, a Mullard S₄VB or a Mazda AC/SG, cannot be overrun with a grid-bias control and the wide variation needed is obtained. For regulating the screen voltage to the most suitable value for the particular valve used, a high-resistance potentiometer is fitted across the high tension. The sliding contact of this goes to the screen and it is, therefore, possible to apply just that voltage which allows of the best results. Valves vary a good deal and the actual output from the mains unit also will vary, with the result that the adjustable screen voltage is a refinement much appreciated

Division of Apparatus

We have the necessary anode-leed resistances included in the set, with by-pass condensers, and the grid-bias circuits are also fitted in the set. In the mains unit itself, which is separate, we have the transformer, rectifier, choke and smoothing condensers only.

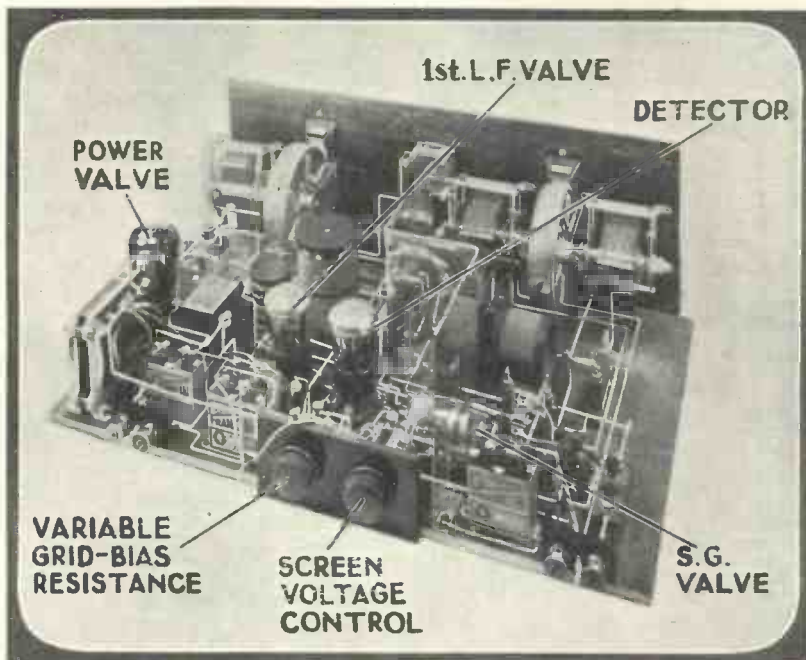
The rectifier is a Westinghouse type HT7. This is used in a voltage-doubler circuit, with an A.C. input of 135 volts. It will give an output up

to 200 volts at 28 milliamperes. For lower currents the voltage will be higher.

A pair of fuses is included in the primary circuit of the transformer. This part has a 135-volt secondary and two heater windings capable of

of allowing the grid bias to be conveniently provided. None is needed in the detector circuit, but the other valves are biased.

For the low-frequency stages we use a potentiometer, this being a convenient way of dealing with both



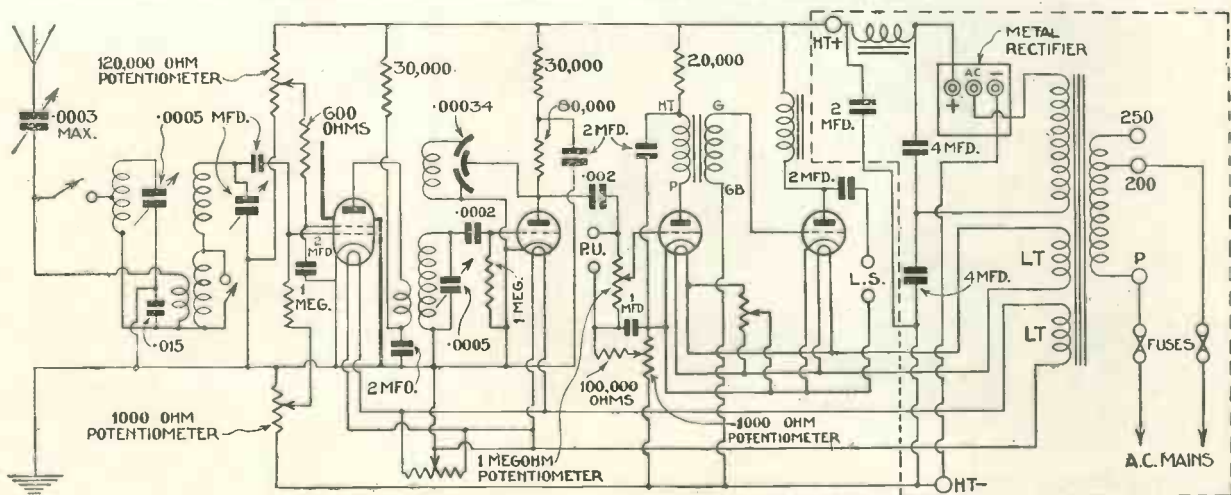
COMPACT BUT EFFICIENT DESIGN

It will be seen from this photograph that the design is particularly compact, although all the parts are easily accessible

providing 4 volts each at 2 amperes.

In the receiver the screened-grid and detector valves are heated from one winding, while the two low-frequency valves are connected to the second winding. This circuit arrangement was employed for the purpose

circuits. The value of the potentiometer (1,000 ohms) is such that a suitable bias is obtained for the power valve, a Mullard AC064. From the sliding contact we obtain the bias for the first low-frequency valve, this being adjustable. Flexible



FOUR-VALVE CIRCUIT WITH BAND-PASS AERIAL TUNING

The circuit is similar to that of the Regional Band-pass Four, described by W. James last October, but certain modifications have been made for A.C. mains working. All the power supply, including grid bias, is taken from the mains

The Regional A.C. Four—Continued

COMPONENTS REQUIRED FOR THE REGIONAL A.C. FOUR

CHOKES, LOW-FREQUENCY

- 1—Igranic, type C30, 15s. 6d. (output choke).
- 1—Parmeko, £1 7s. 6d. (smoothing choke).

COILS

- 1—Pair of 1930 Binowave coils, types C and E, with ganging device, £1 17s. (Wearite).

CONDENSERS, FIXED

- 1—T.C.C. .0002-microfarad, upright type, 1s. 6d. (or Dubilier, Lissen).
- 1—T.C.C. .0005-microfarad, upright type, 1s. 6d. (or Dubilier, Lissen).
- 1—T.C.C. .002-microfarad, upright type, 1s. 10d. (or Dubilier, Lissen).
- 1—T.C.C. .015-microfarad, upright type, 3s. 3d. (or Dubilier, Lissen).
- 1—Franklin 1-microfarad, 2s. (or T.C.C., Hydra).
- 5—Ferranti 2-microfarad, 15s. (or Mullard, T.C.C.).
- 5—Franklin 2-microfarad, 13s. 4d. (or T.C.C., Mullard).

CONDENSERS, VARIABLE

- 3—Polar .0005-microfarad Universal ganged condensers, £1 2s. 6d.
- 1—Lotus .00034-microfarad differential, 8s. 6d.
- 1—Formo pre-set, .0003-microfarad max. 1s. 6d. (or Sovereign, Lewcos).

DIALS

- 2—Polar, drum drive, 17s.

EBONITE

- 1—Trelleborg 18 in. by 7 in. panel, 10s. 6d. (or Becol, Lissen).
- 2—Belling-Lee terminal blocks, 2s. (or Lissen Junit).
- 1—Panel, 5 in. by 2½ in.
- 1—Panel, 4 in. by 2 in.

FUSES

- 2—Microfuses, 250-milliamper type. with holders, 5s.

HOLDERS, GRID-LEAK

- 3—Bulgin, 2s. 3d.

HOLDERS, VALVE

- 3—Telsen, 3s. (or W.B., Lotus).
- 1—Junit, SG type, 1s. 9d. (or Parex).

METAL RECTIFIER

- 1—Westinghouse, type HT7, £1 1s.

PLUGS

- 6—Belling-Lee, marked 'H.T.+ H.T.— L.T.—(4), 1s. 6d.
- 6—Belling-Lee sockets, 1s. 6d.

RESISTANCES, FIXED

- 1—Magnum 600-ohm, 1s. 6d. (or Bulgin).
- 1—Magnum 80,000-ohm, spaghetti type, 2s. (or Bulgin).
- 2—Magnum 30,000-ohm, spaghetti type, 3s. (or Bulgin).
- 1—Magnum 20,000-ohm, spaghetti type, 1s. 6d. (or Bulgin).
- 1—Lissen 100,000-ohm, grid-leak, 1s.
- 2—Lissen 1-megohm grid leaks, 2s. (or Watmel).

RESISTANCES, VARIABLE

- 2—Clarostat 30-ohm potentiometers, 5s. 6d.
- 2—Regentstat 1,000-ohm potentiometers, 19s.
- 1—Regentstat 120,000-ohm potentiometer, 11s. 6d.
- 1—Igranic 1-megohm potentiometer, type 2233/9, 6s.

SUNDRIES

- Glazite insulated wire for connecting.
- Rubber-covered flex for battery leads.
- 1—Peto-Scott screen to specification, 4s. 6d. Length of flex

TERMINALS

- 6—Belex, marked. Aerial, Earth, L.S.+ , L.S.—, Pick-up+, Pick-up—, 2s. 3d. (or Igranic, Burton).

TRANSFORMER, LOW-FREQUENCY

- 1—Varley Ni-core II., 17s. 6d. (or Telsen, Ferranti).

TRANSFORMER, MAINS

- 1—Regentone, type WRM, £1 7s. 6d.

ACCESSORIES

CABINET

- 1—Carrington, Waverley radio-gramophone model, £5 10s.

VALVES

- 1—Mullard S4VB, £1 5s.
- 1—Mullard 164V, 17s. 6d.
- 1—Mullard 354, 15s.
- 1—Mullard 064, 16s.

equivalent) condensers in series across the positive and negative terminals of the rectifier. The amount of the current which would flow in the event of a short-circuit across the high-tension terminals is, therefore, restricted, this being a valuable feature of the circuit. A further point is that the output, 200 volts at 28 milliamperes, is obtained with an A.C. input of 135 volts.

Good Strength Signals

With 200 volts and a good power valve we can obtain signals of a strength to suit most people. The actual power valve used is a thing of some importance, owing to the grid-bias arrangements. A Mullard AC064 is recommended, as it passes about 20 milliamperes with the suitable bias at 200 volts.

The set is arranged after the style of the Regional Band-pass Four, the panel layout being about the same. There is a difference, of course, a potentiometer being fitted in place of a filament resistance, as the high-frequency volume control.

Grid-bias Controls

At the back of the set are two further potentiometers. One of these is for the screened-grid circuit, and the other provides the grid bias for the L.F. and power valves. A pair of wires is taken from the set for the high-tension supply, and further leads are for the heater circuits.

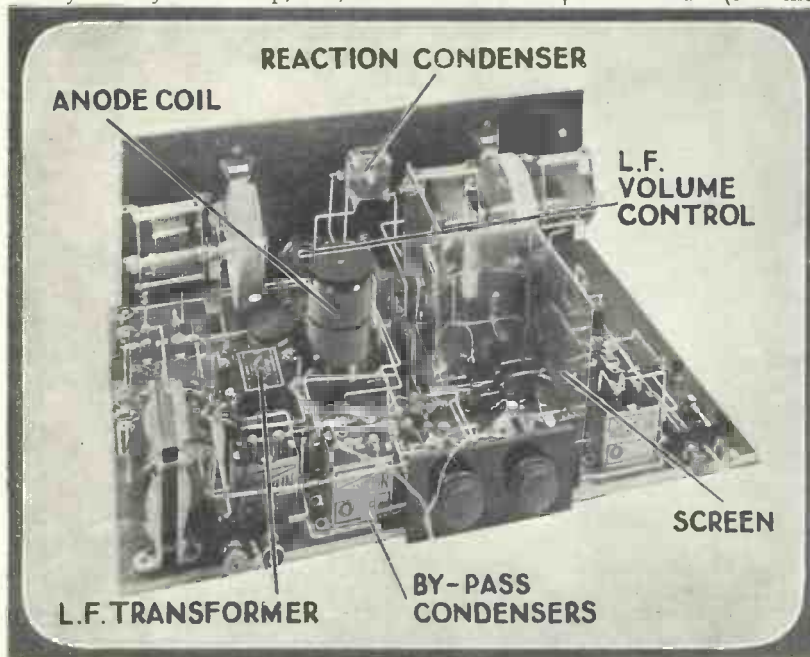
A centre-tapped heater circuit is not used. Small adjustable potentiometers are fitted across the two sets of heaters and may be set whilst receiving. They are, of course, adjusted to cut out hum. The parts are a little crowded, but not too tightly packed together, but it does not matter how closely the fixed condensers and resistances are placed together provided the wiring can be carried out.

Ease of Wiring Up

It may be necessary to move one or two parts when wiring, but if the work is carried out carefully, there will be no difficulty. The two potentiometers for the heaters are carried by the wiring; being light in weight this is satisfactory enough.

In an A.C. set, it is most important to pay attention to grid circuits. Good contacts must be made and the wires kept as short as possible,

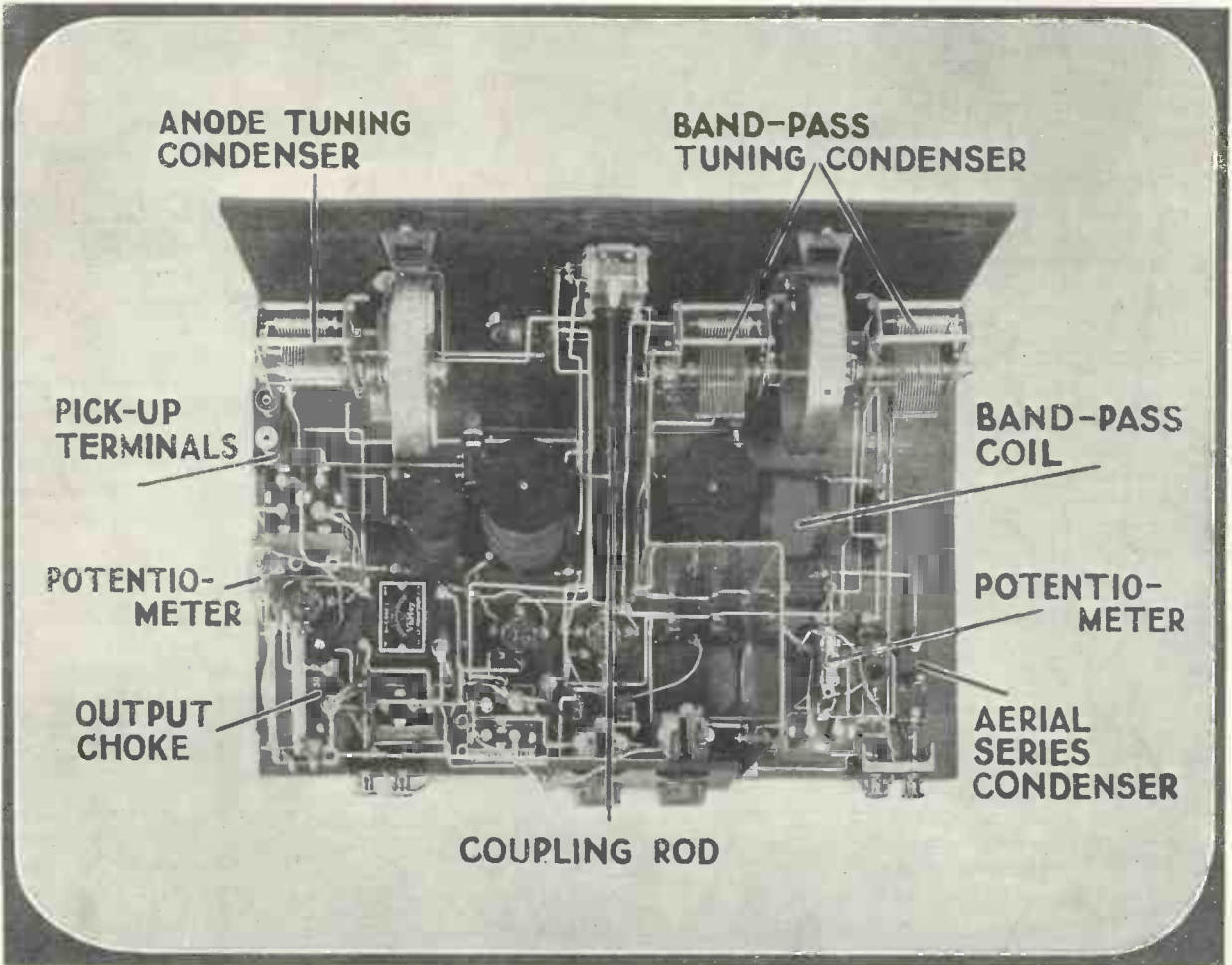
de-coupling anode resistances are used, the type having proved satisfactory. They are cheap, too, and very convenient to wire up. In the voltage doubler circuit, we use two 4-microfarad (or the



AN IDEAL FOUR-VALVE GRAMO-RADIO OUTFIT

Sufficient power for all ordinary needs can be obtained from this receiver, which will form the basis of a fine radio gramophone

W. James Describes a Fine Gramo-Radio Set



CONSTRUCTION WILL BE SIMPLE IF THIS PLAN PHOTOGRAPH IS FOLLOWED

The disposition of all the parts will be clear from this photographic plan view. There is a separate unit with the metal rectifier, illustrated on page 476. The set has been specially designed to fit a standard radio-gramophone cabinet

especially on the detector and first low-frequency valve. Any high resistance here is almost certain to produce hum. Even the valve contacts must be firm and good.

Adequate filtering is provided to take care of the anode circuits, the

resistances and condensers being of suitable sizes for a set of this type. The set is naturally capable of providing more volume than the battery model, owing to the bigger power valve and anode-circuit supply. This does not mean that the aerial

magnification is much greater, but simply that the last valve has a bigger capacity than ordinary battery-heated valves.

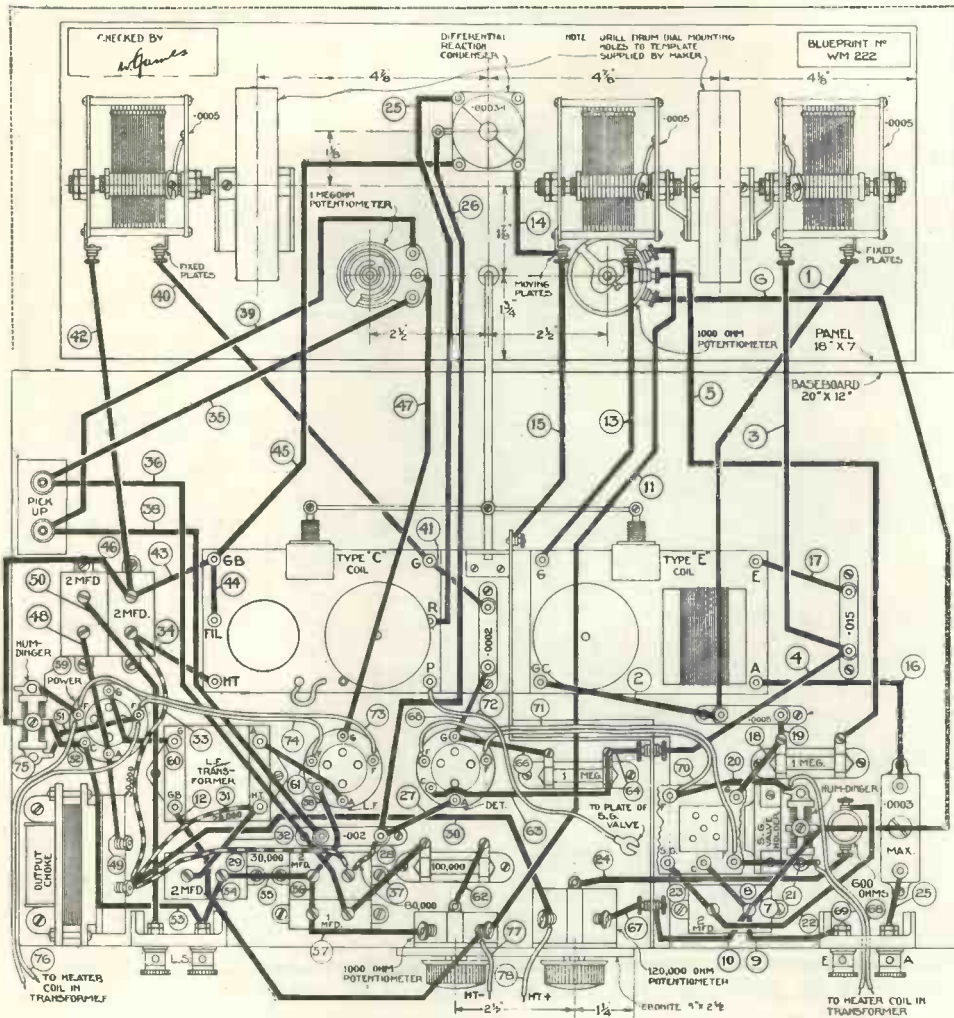
To adjust the tuned circuits you must first fix the aerial pre-set condenser in order to gang correctly the

ANOTHER FINE SET by W. JAMES NEXT MONTH

A recent announcement in these pages that W. James would describe in an early issue the construction of a set with three screened-grid stages has created considerable interest among readers, many of whom have written to WIRELESS MAGAZINE saying that they wish to build such a

receiver. Mr. James is at present completing his experiments and full details of the set will be published next month. The set will first be designed for operation from A.C. mains, but later a battery model will be produced. Look out for the next issue on December 19.

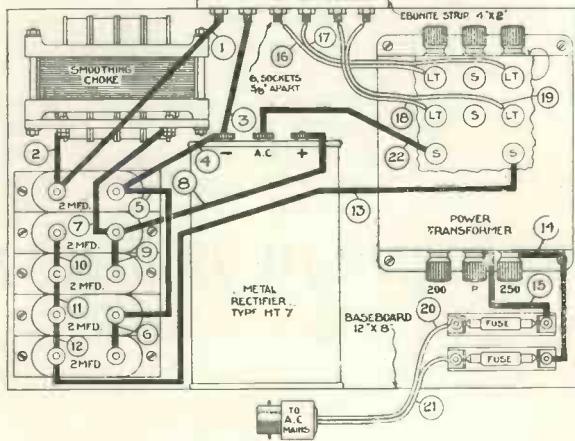
The Regional A.C. Four—Continued



QUARTER-SCALE LAYOUT AND WIRING DIAGRAM

A full-size blueprint layout, panel template and wiring guide can be obtained for half-price (that is, 9d., post free), if the coupon on the inside back cover is used by December 31. This price includes the four-valve set and the mains unit. Ask for No. WM222. When connecting up, wire the leads in numerical order for the quickest and best assembly.

If you need a battery set build the Regional Band-pass Four described in the October issue. Blueprint No. WM211 is obtainable for 1s. 6d., post free.



filter circuit; unless this circuit is accurately adjusted the band-pass action will not be the best. Full details were given in the last number and the reader is referred to page 350.

Do not overlook the fact that the

voltage of the circuit is, relatively, considerable; and if the power valve is pulled out the voltage will probably rise to nearly 300. Care is therefore necessary, as it is possible to damage the screened-grid and detector valves

church clock. On inquiry, I have learnt that it is purposely kept fast, as the announcers cannot always be found when they are required to announce something. They get two minutes' grace that way.

by the application of too great pressures. The high-tension supply from the mains should, therefore, be always cut off before making adjustments.

THE LEAKY GRID

QUESTIONS of a suitable nature, no matter how technical, may (or may not) be answered in this column. Correspondents should type their queries (preferably on machines that can spell), as I am not good at deciphering hieroglyphics.

Please mark your envelopes "The Leaky Grid" on the left side, and do not forget to put a stamp on the other side. Give your Christian or pet name.

I have a few letters to deal with:—

Amy, Bognor.—I cannot tell you why cinema organs tremble like that, except that there is a little device on most organs, called the *tremulant*, which causes certain stops to waver when it is put on. Real organists use the device for occasional effect; cinema organists put their *tremulants* on as soon as they arrive and take them off when they go home. Sorry I cannot be more explicit. Write to one and ask him.

Tottie, Tottenham.—Organists are of two kinds: real and cinema. (See answer to *Amy, Bognor*, given above.)

Herbert, Newport.—I am interested to learn that Big Ben is always two minutes fast by your

Wireless Magazine *Gramo-Radio Section*

A SPECIAL SECTION FOR THOSE INTERESTED IN ELECTRICAL REPRODUCTION

The Month's Notes and Jottings

"Cavalleria Rusticana"

TO their records of complete operas, H.M.V. now add Mascagni's "Cavalleria Rusticana." This worthy companion to "Rigoletto," "La Boheme," "La Tosca," "Pagliacci," and "Madame Butterfly," is an all-star production by the principals of La Scala Opera House, Milan, with full chorus and orchestra, giving the true Italian tone and quality.

In quite another sphere, yet equally acceptable, will be the vocal gems with orchestra from "Miss Hook of Holland."

Franz Lehar is again all the rage, largely through the successful London presentation of his operetta, *Frederica*. Most attractive are the renderings of "Nothing but Laughter," and "Thine is my Whole Heart," sung in German by Marcel Wittrisch with Marek Weber and his orchestra.

"Bolero" Is Most Exciting!

Serge Koussevitsky, one of the most renowned of conductors, makes his entry into H.M.V. supplements with the Boston Symphony Orchestra in Ravel's "Bolero," hailed by Compton Mackenzie as "the most exciting piece of music ever written." This Spanish dance rhythm was composed for the ballerina, Ida Rubenstein, and, with an amazing background of drums, the music works up to sheer exhilaration, which makes one understand why this work has so thrilled concert-goers.

Other Favourites on H.M.V.

From Fritz Kreisler we have two pieces clamoured for at his recitals, Dvorak's "Slavonic Dance in G Minor" and "Songs My Mother Taught me," both on H.M.V.

Reginald Foort, who has just

been appointed organist at the new Victoria Cinema, to play upon the great instrument he designed, contributes "Falling in Love Again," made famous by Marlene Dietrich, as the star in *Blue Angel*. He also plays another film hit, "The Love Waltz." Two other H.M.V. cinema organ numbers are "Thistledown" and "Exactly Like You," rendered by Edward O'Henry.

Keith Falkner possesses a perfect

records and leaflets were handed round and examined with interest by no less than fifteen eminent counsel who were at the time in attendance in Mr. Justice Bennett's Court.

At one time it looked as though the court would develop into an actual gramophone salon, so keen was the interest shown in the record and so numerous the inquiries as to where it could be purchased!

We hope to try these flexible, coloured records in the near future. The makers are Phonocord, Ltd., of 24 Denmark Street, W.C.2.

A FINE RADIO GRAMOPHONE

If you want to build a radio gramophone, you cannot do better than construct the Regional A.C. Four, described by W. James on page 476 of this issue.

This receiver has been designed to fit in a standard radio-gramophone cabinet and is the last word in modern design. It takes all its power from A.C. mains and two volume controls are provided. With this set you are certain of the best quality of reproduction.

recording voice of great power and charm, amply revealed in Bach's "How Jovial is My Laughter" and "Twas in the Cool of Eventide" (H.M.V.).

A Court Recital

During the hearing of an application by the manufacturers of the Phonocord record for an injunction to restrain another gramophone company from infringing certain copyrights claimed to be the property of the plaintiffs, Phonocord

"Say, Massa Dealer!"

This heading was the subject of much comment recently. It appeared on a folder issued by the Zonophone Company to all their dealers, announcing the release of two special records from their December list. These records are Nos. 5733 and 5734—exclusive recordings of the famous Blackpool "White Blackbirds" Minstrel Troupe.

"Rhapsody in Blue" on the Organ

From Quentin Maclean, playing George Gershwin's famous "Rhapsody in Blue" (Columbia mid-October list), comes a remarkable organ record. The "Rhapsody" is featured in a gigantic scene of its own in the Paul Whiteman super talkie, *King of Jazz*, just produced at the Regal and Alhambra Theatres in London. Maclean, by arranging it for the organ and by clever manipulation of stops and connections, has produced on one instrument, not only the whole of the orchestral colour, but the solo piano part also! This feat was made possible by having the piano

The Month's Notes and Jottings—Continued

connected to the console, from which the organist tackled and successfully overcame what is undoubtedly the most difficult of all organ interpretations.

Mr. Maclean played on the instrument of the London Regal Cinema, the largest cinema organ in Europe, and the recording has brought out every detail.

New Columbia Catalogue

The new Columbia record catalogue, just issued, is now a bulky work of 350 pages, and constitutes a monument to the musical enterprise of the gramophone industry. To browse in its pages is to get glimpses of the wide field of music now covered by gramophone records.

From dramatic plays and old-time music-hall songs, we may ascend to the heights where Beethoven and Wagner jostle shoulders with Sibelius and John Ireland; and, in the next breath, we are thrown into the realm of modern dance.

There can be few who will not find something worth while in this volume, whether it be among the pages of recommended records, or in the admirably arranged alphabetical catalogue itself. The book, which is complete to August last, can be obtained free from Columbia House, 102 Clerkenwell Road, E.C.1.

Wireless Favourite for Zono

Miss Megan Thomas has joined the ranks of Zono "stars," and a record issued this month (No. 5718) of the songs "She Wandered Down the Mountain Side," by Clay and "The Pipes of Pan" from the Arcadians, makes her a worthy recruit. Miss Thomas is an established broadcast favourite and her many "fans" will be glad to hear of these recordings.

Menin Gate Record

From Columbia has been issued a record that many gramophiles will treasure. It is "The Menin Gate," sung by Raymond Newell, baritone. The words are by Eric

Haydon and music by Lauri Bowen. The record is DB271, a 10-in. dark-blue label.

Cheaper Radio Gramophones

With the increase in popularity of radio gramophones, prices have appreciably dropped. Whereas a year ago the average price for a good-class instrument was in the region of £100, similar instruments are now generally available at prices as low as 50 guineas. The early radio gramophones were, for reasons best known to the designers, much too powerful for the average home.

It is probable, that, when radio gramophones were struggling for a place in the sun, the makers found that the most ready application was in restaurants and other public places where a large volume of sound was essential.

We can well remember how radio-gramophone makers used to stress the fact that greater volume could be obtained from an electrically driven machine than from even the best mechanical model. But as most users of modern mechanical gramophones will agree, the volume of reproduction from a modern record is more than enough for domestic requirements. So this advantage of the electrical machine can hardly be a selling point to-day.

Varying Volume

We do not see it stressed often enough that an electrical gramophone overcomes the greatest drawback that was associated with the mechanical gramophone, namely, the inability to vary the degree of volume. Opening and shutting the doors of the cabinet is a poor way of controlling volume compared with the nicety of adjustment associated with the amplification control of the electrical machine.

With a radio gramophone, or the electrical gramophone, volume can be varied from a whisper to the full output. And this can be done without altering the tonal quality. Many records sound quite different when reproduced loudly and softly, as several gramophone enthusiasts have recently remarked.

Lower Prices

One of the outstanding price-cut announcements comes from the Gramophone Company in connection with all H.M.V. machines, both electrical and mechanical. The famous model 520 H.M.V. radio gramophone, which, until recently, was £75 has now been reduced to £60. This is for the model in oak. The mahogany 520, which was £78, is now £65 and the walnut 520, which was £80, is now also £65.

This outstanding radio gramophone, which the Set Selection Bureau of WIRELESS MAGAZINE has heard and highly approved, works entirely from alternating-current electric-light mains. It is not generally known that for prospective purchasers who are unfortunate enough to be on a direct-current supply, model 520 can be driven by a converter at an extra cost of £18 10s.

The radio set in model 520 is particularly interesting. It covers the medium and long-wave broadcasting channels, from 220 to 550 metres and from 700 to 2,000 metres. There is one stage of high-frequency amplification, a detector, and two stages of low-frequency amplification. A special system of impedance coupling is provided on the low-frequency side, yielding an exceptionally good tone, as our auditions proved.

New Radio Gramophone

We are glad to note that another famous gramophone company has appreciated the need for moderate-priced radio gramophones. We are thinking of the new Columbia model 308. The price is 62 guineas in oak, 65 guineas in mahogany and 69 guineas in figured walnut. The last-named is a beautiful piece of work, which we much appreciated during a recent inspection.

The radio circuit works on medium and long wavelengths, and is designed for long-range reception with an external aerial. The gramophone reproduction is excellent, involving a Columbia moving-coil loud-speaker, an electrically driven turntable motor, Columbia pick-up, automatic stop and speed regulator.

A. S. H.

Secrets of GRAMO-RADIO SUCCESS

Good results can always be obtained from a grammo-radio outfit provided certain simple points are borne in mind. Here H. T. Barnett, M.I.E.E., who is an acknowledged authority on the subject, explains how success can be assured.

1930 has been a great year for detail improvements and for a recognition of the fundamentals essential to really good reproduction of disc-recorded sound.

The principles laid down in this journal during the last two years have now come to be recognised as sound by nearly every maker of grammo-radio apparatus, if not by the more old-fashioned makers of gramophones.

A résumé of the scattered matter on this subject, and embracing references to the latest improvements now available, may be useful not only to beginners but also to those who have carefully followed the subject.

If every reproducing engineer of a cinema will try to follow the advice herein to be given we shall certainly hear fewer complaints about "canned music" than are rife to-day.

TRACK ALIGNMENT

Quite the most important thing to be observed, if one's records are not to be ruined and if the sound of the records being ruined is not to drown all sweeter sounds, is that the reproducing needle during the whole of its swing across the record should dip straight down into the groove and not be skewed across it.

In many gramophones of recent production, even expensive ones, insufficient attention has been given to this point, but with makers of radio apparatus a far better state of things prevails and it is a rare thing to find a pick-up arm that does not permit its pick-up to be used with a needle track alignment error not exceeding 2 or 3 degrees.

Some of the makers give a chart for setting the arm so that good

alignment may be secured; I have checked these charts, some are very good but in other cases there are errors if not mistakes, and it would be well for every user of a gramophone or pick-up arm to check the alignment for himself and to see if it cannot be improved.

In the case of a gramophone, of course, the tonearm cannot be shifted, but it is often possible to refit the motor a little forward or backward and so to bring things a little nearer to ship-shape. With the pick-up arm, if one is not cramped for room on one's motor

board, it is usually quite easy to attain a maximum error not exceeding 3 degrees.

THE BEST ARMS

The kind of pick-up arm that will allow the best possible alignment to be obtained in any given space is that in which the principal member of the arm is telescopically extensible and the front end swivelling, so that the pick-up can be set at any desired angle to the arm axis.

The Limit arm and the arm of the new Edison-Bell combined pick-up and arm are the best examples I have seen.

THE TRACK

Of course, in order that the needle may dip straight down into the

THE LEGACY

My aged Aunt Belinda
Was reckoned well-to-do,
Yet when her will was read to us
We found it wasn't true.

For all she'd left behind her
(A nasty shock I own!)
Was just one piece of furniture—
A cabinet gramophone.

The thing was quite a good one
(When new it was quite dear)
Yet nothing more she left to us—
It seemed extremely queer.

We couldn't understand it,
It sadly shocked our pride!
We'd always thought her quite well off
Before she went and died.

But we've one consolation
To soften down the blow
And that, dear reader's specified
Within the verse below.

There's one good thing about it—
There will at any rate
Not be a deal of trouble when
We wind up her estate!

C. P. P.

Secrets of Gramo-Radio Success—Continued

groove, in view of the fact that it is not vertical but *slopes*, its fore and aft line must be a tangent of the groove circle from the point where the needle touches.

In other words the fore and aft line of the needle must be at a right angle to a radius line across the record passing through the position of needle contact.

A SIMPLE CHECK

Now if we take a half-sheet of notepaper (see Fig. 1) and make a hole for the motor spindle near one end and then with a rule and a pencil make a straight line along the middle of the paper and passing through the middle of the spindle hole we shall be provided with a marker that can be slipped on to the spindle over a record and which can be twisted round into any position, so that we can bring the radius line up to the needle point in every part of the swing of the arm.

WITH SOUND BOXES

With gramophones, by using this check sheet, it is easy to find out whether our alignment is good or not. Put a record on the turntable and then the check sheet over it.

Bring the radius line up to the needle point at the outer edge of the record and then, shifting the check paper so as to keep the radius line always under the needle point, swing the tone arm gradually inwards, noting all the time whether the face of the soundbox (the fore and aft line of needle) departs appreciably from a right angle to the radius line at any part of the swing.

If the tonearm is properly set, then at one or at two points during the swing the angle will be dead square and nowhere will it be more than 2 or 3 degrees with long tonearms, or 4 to 5 degrees with short tonearms, to the right or to the left out of square.

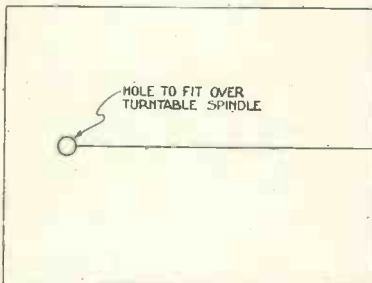
IMPROVING THE ALIGNMENT

Should this requirement not be filled and if you have room in the case to shift the motor, take the check paper off the spindle and try whether with the spindle hole a little more backward or forward a smaller average of error can be obtained, always endeavouring to get the error as small as possible at

the *inside* end of the record groove on a ten-inch record.

It will be found with ordinary tonearms in which the sound box is carried a couple of inches or so to the right of the tonearm axis and parallel with it, or on swivel arms is situated to the left of the arm axis and on a small angle deviating leftwardly, that in the case of a long tone arm, when the arm is swung inwardly, the point of the needle will come just to or a very little in front of the front edge of the spindle.

With a very short tonearm the needle might come to a point $\frac{3}{8}$ in. in front of the spindle. The longer the tonearm the nearer to the spindle the needle should come. Of course the longer the arm the better the average alignment.



TRACK ALIGNMENT

Fig. 1.—How to make a simple check of track alignment.

WITH PICK-UPS

Checking the alignment when using a pick-up may be somewhat less easy. Some pick-ups have their faces on a plane parallel with a plane embracing the fore and aft line of the needle; in such a case one would check on a right-angle to the radius line as with a sound box. The new Parlophone pick-up is a case in point.

But some other pick-ups, as for example the new B.T.H. and the new Edison-Bell on tonearm, have their faces at the right angle to the ordinary disposition and then one must see that the face of the pick-up is parallel with the radius line and not at right angles to it.

THE NEXT STEP

Having taken care that our record material cannot be gouged out of the groove by a needle skewed across it, there are other points to which attention must be

directed if we require our needles to *burnish and improve* our records, and not under any circumstances to wear them.

I invariably use steel needles myself and my most used records are the best I have. This result would not have been attained if my needles were used as a harrow rather than as burnishers.

NEEDLE ANGLE

The angle of the needle as it rests on the record must not be too steep. The electricians have beaten the gramophone makers completely in attention to this point; while many expensive gramophones are made for a needle angle of 60 degrees or even steeper, it is a rare thing to find a combined pick-up and arm set in this way.

It is much easier with a powerful electrical amplifier to *hear* a steeply set needle *harrowing* the groove, but such a setting on a gramophone (where one does not so easily hear the result) is just as damaging to the records and proportionately as injurious to the music as when one is dealing with a greater tone volume.

The kindest and most burnishing angle that one can use while still getting absolutely perfect definition is 50 degrees. To make the matter simple this is the angle made by the hour hand of a clock when the time is twenty minutes past seven.

Whether you have a gramophone or radio gramophone, look to it that your soundbox or pick-up can be and is set for this needle angle, and then as compared with a steeper angle you will instantly be rewarded.

A WARNING

Those who have unalterable bad track alignment cannot take advantage of a burnishing needle angle because the nearer vertical the needle is the less will bad alignment skew it across the groove; much, however, can be done by these unfortunate people to lessen record damage if they will pay attention to points to be mentioned in a later article.

Next month Capt. Barnett will continue his useful hints on gramoradio reproduction; look out for them and keep this month's notes for future reference.

Choosing Your Christmas



Here **WHITAKER-WILSON**, the "W.M." Music Critic, reviews the latest record releases. The reviews are divided into eleven sections to facilitate reference and the seven outstanding records are noted on page 487.

Records



Sacred Music

Lead, Kindly Light, Trevor Schofield, with organ, 3s. COL DB223

Not worth hearing. The boy's voice is nothing exceptional and the organ sounds like a cheap harmonium. I have not troubled to listen to the other side. If Columbia is to make a success of these kinds of records they must try somewhere else. The Central Hall organ is a failure on a record.

Rolling in Foaming Billows, Edward Halland, with orch., 2s. WIN 5155

From good old Father Haydn's "Creation." I consider it an exemplary rendering in many ways. It has the attractive *New Heaven in Fullest Glory Shone* on the other side. I cordially recommend the record, especially for male students with bass or baritone voices.

'Twas in the Cool of Eventide (Bach), Keith Falkner, bar., with orch., 3s. H.M.V. B3581

A beautiful rendering of one of Bach's most beautiful arias. Its pathetic solemnity is well set off against the rhythmic charm of *How jovial is my laughter* (Bach) on the other side. Both arias are sung in English—and good English at that.

Classical Orchestral Music

Bolero (Ravel), Boston Sym. Orch. (d.s.), 6s. 6d. H.M.V. D1859

Although I welcome this most heartily I doubt the wisdom of recording it, as the opening makes rather dull listening. If you buy it, use a pick-up, and if you have a portable, use a long lead and put the gramophone in another room; you must not hear the needle; if you do, you will spoil the whole effect. It is a very clever work and causes great amusement when it is played by a good orchestra.

Gymnopedie No. 1, Boston Sym. Orch., 6s. 6d. H.M.V. D1860

By Satie, and arranged by Claude Debussy, this makes beautiful orchestral music of not too

heavy a type. I am putting it in the classic column, rather than the light orchestral column, out of respect to its musical quality; but no one need fear that he is buying "highbrow stuff" when he acquires this.

Komarinskaya, London Sym. Orch. (d.s.), 6s. 6d. H.M.V. D1856

A London Symphony Orchestra record is always worth having. This work should appeal to all lovers of orchestral music which is not of a heavy or classical type. This is really admirable light music. The tone of the lower strings marks a development in orchestral recording. Congratulations to H.M.V. on a splendid production.

Naïla Waltz, Royal Opera Orch., Covent Garden, 4s. 6d. H.M.V. C1969

This is an attractive work by Delibes, but not a dancing waltz. It is, strangely enough, backed by *Judex* from Gounod's *Mors et Vita*, a work he originally wrote for a Birmingham Festival many years ago. It is well produced and the record is worth having.

Rakoczy March, Metropolitan Sym. Orch., 2s. BRDCST 5189

One of the most stirring marches in existence, and an excellent rendering of it. On the other side is Grieg's *Morning* (Peer Gynt Suite) played equally well. I have every admiration for the whole record.

Grand Opera

Doch Welch Ein Sehtsam Neues Lieben (Wagner), Kate Heidersbach and Max Lorenz, with Berlin State Opera Orch., 4s. 6d. H.M.V. C1987

In English the title is *But with what new unworldly feeling*, being a duet in "Tannhäuser." Both singers are fine; the whole record, which gives *O Princess* (another Tannhäuser duet) on the other side, is a worthy inclusion in any operatic library.

Faust, May Blyth, sop., Henry Wendon, ten., Richard Watson, bass, with orch. (d.s.), 3s. 6d. DEC K535

This is the best Decca record I have heard. Congratulations. A very presentable rendering of the famous Garden Scene in Gounod's "Faust." It is worth every farthing of 3s. 6d.

Il Trovatore (Verdi), Grand Opera Company, with full orch. Parts 1 to 4 (d.s.), 2s. BRDCST 5188

These are vocal excerpts and very well done they are. They cover two complete records of high merit. A word must be said for the recording, which is outstanding.

My Desert Flower, Foster Richardson, with orch., 2s. 6d. ZONO 5709

Also the *Cobbler's Song*, of which he makes the utmost. Those of you who cherish "Chu Chin Chow" in their memories will appreciate this. It is distinctly good.

Vous Qui Faites L'endormie, Theodore Chaliapine, bass, with orch., 8s. 6d. H.M.V. DB1437

This is the Serenade of Mephistopheles in Act 4 of Gounod's "Faust." Chaliapine seems as young as ever; if this has recently been recorded it is an amazing testimony to him. On the other side he takes his part with Cozette (tenor) in *Le Veau D'or* from the same opera. A fine record.

Chamber Music

Concerto No. 2 in E Major, Adagio (Bach), Leon Zegera, violin, with orch. (d.s.), 4s. 6d. DEC TF138

As a keen student of Bach I detect musical faults in this, but that need not deter anyone from buying the record, which is excellently produced, and which will give real pleasure to any lover of chamber music. The faults I hint at are those of personal opinion and have no weight in a review of the records. I recommend them both sincerely; there are, by the way, two complete records.

Slavonic Dance No. 1 in G, Minor, Fritz Kreisler, violin, with piano, 6s. H.M.V. DA1057

Very fine recording of him playing an attractive work by Dvorak. On the other side he does Dvorak's *Songs my Mother taught me*. Tonally this is one of the best things I have heard for a long time. It takes Kreisler to play Slavonic music.

Sonata for Violin and Piano in G Major, Adolph Busch and Rudolph Serkin (d.s.),

8s. 6d. H.M.V. DB1484

This is beautifully played and recorded. Bach lovers—indeed, all lovers of really beautiful music—should ask to hear this. It is one of the best Bach records I have ever heard.

Piano Solos

Dance from Enchanter, Joseph Holbrooke, 2s. PIC 5078

This is the first time I have heard Joseph Holbrooke play his own compositions. I like this very much, but in recommending it to you I must warn you that his music is modern. He plays his own *Rangoon Rice Carriers* on the other side. You had better ask to hear the record. It is a bit "ultra."

How It's Done, Don Bradman, 3s. COL DB270

Quite effective. Those who like light piano music should get this, which has *An old-fashioned locket* on the other side. I did not know the famous Australian cricketer was a pianist.

Popular Melodies on a Piano, Laddie Ray (d.s.), 2s. BRDCST 5192

Very well played and effective in every way. Although I am not fond of a piano played in this style I cannot but express admiration for the effect produced.

Organ Music

Father's Favourites, No 2, Terence Casey, organ (d.s.), 3s. COL DB249

It all sounds to me like a hurdy-gurdy, but perhaps that is what it is intended to sound like. I am more reconciled to cinema organ records than I was, but, candidly, I think this is a bad one. I have certainly heard better.

Toccata in D Minor (Bach), Marcel Dupre, organ, 6s. 6d. H.M.V. D1873

Very clear Bach playing, as one would expect from him; the organ is not suitable for recording and the effect is too reedy in many places. The same applies to a choral prelude on the other side. Students will, however, learn something by having this.

Choosing Your Christmas Records—Continued

Spoken Record

Story of David, E. R. Appleton and Company, with effects (d.s.), 3s. **COL DB237**

I think there is a distinct value in these kinds of records. The story of David is told in such a simple manner that any child would be thrilled. I hope Columbia will issue more of these records. The "effects" are in the best taste.

Light Opera & Songs

Bench in the Park, Norman Blair, bar., with orch., 2s. 6d. **ZONO 5664**

Quite a cheerful ditty; he sings it well also. He sings *The Song of the Dawn* on the other side, which I like very much. What a treat it is to hear these light songs sung by someone with a voice. It is also rare, but it should not be.

Cottage For Sale, Sonnie Daye, with orch. 2s. **WIN 5162**

Yes, quite good, with *I remember you from somewhere* on the other side. Both works are too well known to describe.

Dancing with the Devil, Douglas Graham, bar., with orch., 1s. 6d. **PIC 611**

The general build of the song is good dramatically and musically; the words are evidently intended to convey much; I think they convey surprisingly little, at least, on a record. With suitable scenery it might be different. *Great Day* is the companion, also sung by Douglas Graham, who makes a good job of both songs.

Fairings, Herbert Thorpe and Foster Richardson, with orch., 2s. 6d. **ZONO 5678**

I think the duet version of this and *Come to the Fair* an improvement on the originals. Ask to hear them.

I Know of Two Bright Eyes, Wilfrid Hudson, ten., with orch., 2s. **WIN 5153**

A pleasant rendering and good recording. He sings *Songs of Araby* on the other side, and his diction is such that you will not necessarily conclude that he is singing songs in *Arabic*. A pleasant voice.

I Wonder if Love Is a Dream, Megan Thomas, sop., with orch., 2s. 6d. **ZONO 5691**

This, of course, is a well-known ballad. Megan Thomas sings it well, but I like her better on the other side, singing the *Waltz Song* from "Tom Jones." A good record.

It Happened in Monterey, Maurice Elwin, bar., with orch., 2s. 6d. **ZONO 5693**

A very good version of it; so is *If I had a girl like you*, on the other side. Very good recording.

Jean, Jean, from Aber-Abdeen, Harry Fay, com., with orch., 1s. 3d. **BRDCST 614**

A very good tune, not particularly Scotch, though. Not particularly funny and his laugh has no real mirth in it; also he cannot speak Scottish English. I call this a failure, except from the tune point of view. Other side, *When Father Puffed the Parlour*, merely silly.

Leslie Stuart Memories, G. H. Elliott (d.s.), 2s. **WIN 5150**

I have admired Elliott all my life; he is really charming. This record delighted me, as in it I have heard most of the old favourites. Now I want gramophone television so that I can see him dance. That must be the next invention—gramophone television. Come on, somebody! Get on with it. A splendid record.

Let Me Sing—And I'm Happy, Billy Marlow, with acc., 1s. 3d. **BRDCST 613**

This is too well-known to need description; it is well produced here. *To my Mammy*, on the other side, is a silly sentimental ditty that ought not to be encouraged.

Lily of Laguna, G. H. Elliott and orch., 1s. 3d. **RAD 1386**

Here is a good record. *Little Dolly Daydream* is on the other side. I have come to the conclusion that these tunes take some beating. G. H. E. is in top form.

Little White Lies, Irving Kaufmann, with orch., 1s. 6d. **IMP 2328**

Of the shop ballad type, this may appeal to many people. The words are rather indistinct in places, but the voice is pleasing enough. On the other side, Chick Bullock sings *If I had a girl like you*, which is rather a sentimental effort; also he is a poor vocalist.

Merry England, Savoy Light Opera Singers and Players (d.s.), 2s. **WIN 5148**

Yes—very nice. May it never die! There is something really English about it. I recommend it sincerely.

Moon is Low, Norah Blaney and Gwen Farrar, 3s. **COL DB241**

Distinctly above the average and taking in every way. Their vocal imitation of steel guitars is exceedingly clever. A very entertaining record. On the other side they sing *What Angelina says, goes*, which I do not like so well. But the record is worth having for the other side.

Oh Maiden, My Maiden, Terence O'Brien, ten., with acc., 2s. **BRDCST 5191**

This and *Wayside Rose* are both from "Frederica." It is rather dramatic and certainly very appealing—in fact, the description applies to both items. Terence O'Brien sings splendidly. I thoroughly enjoyed both sides.

Old Rustic Bridge by the Mill, Zonophone Concert Quartet, with orch., 2s. 6d. **ZONO 5713**

The voices are good—better than the literature. Who wants to hear the *Old Folks at Home*? They are the sole occupants of the other side of this (otherwise) good record.

Rose Softly Blooming, Florence Austral, sop., with orch.

4s. 6d. **H.M.V. E561**

She gives mainly the accepted rendering of Spohr's beautiful song. This is the first time I have heard it outside opera; I admire her reserve. On the other side she sings Easthope Martin's *Everywhere I go*.

Say a Little Prayer for Me, Jack Gordon, with orch., 1s. 6d. **IMP 2331**

Not at all a bad song, it is of the ballad type, but there is some attempt at writing decently. On the other side is Horatio Nicholls' *Gipsy Melody*, sung by the same vocalist; it is not very gipsy or, indeed, interesting as music. Rather poor stuff, I think.

Three Ravens, John Goss, bar., and Male Voice Quartet, 3s. **H.M.V. B8548**

They do it splendidly; you know it, of course. Goss sings it very smoothly and with becoming reserve. On the other side he sings *The Boatmen*, which is very picturesque.

Violet Eyes and Cherry Lips, Austin Egen, ten., with orch., 3s. **H.M.V. B3529**

The song is of the song-dance type and would make a respectable fox-trot. The words are rubbish, of course, but the whole is not unpleasing. *Handsome Gigolo* is on the other side. The singer makes a mistake in speaking some of the words; he spoils what is not at all a bad tune.

Virgin's Slumber Song, Florence Brine, with piano, 2s. **PIC 5080**

This is followed by Max Regers' *The Quiet of the Woods*, sung in German, and has Leroux's *Le Nil* on the other side. A pleasant voice and good music. The recording by this firm has lately undergone considerable improvement. This is a good record.

Vocal Gems from "Miss Hook of Holland" (Rubens), Zonophone Light Opera Company, with orch. (d.s.), 2s. 6d. **ZONO 5668**

They are as follows: "Caecae Chorus," "House that Hook built," "Cream of the sky," "Flying Dutchman," "Soldiers of the Netherlands," "Sleepy Canal," "A pink petty from Peter," "Little Miss Wooden Shoes," etc. A very good selection excellently produced.

War Marching Songs, Debroy Somers Band, with male quartet (d.s.), 4s. 6d. **COL DX112**

I had better give you the list: "Tipperary," "Good-bye-ee," "Long Trail," "Who's your lady friend," "Pack up your troubles," "God send you back to me," "Home fires," "Blighty," "Soldiers never die." Well produced throughout.

Water Boy, Emory University Glee Club, 2s. **PIC 5084**

Rather pleasing. The humming effects are splendid. They do *Steal Away* (another Negro Spiritual) on the other side. They make the best records produced by Piccadilly in my opinion.

Why Did You Kiss My Heart Awake? Desiree Ellinger, sop., with orch., 2s. **DEC F1909**

I am no authority on cardiac troubles and so cannot answer the question. The song, though, has a little to recommend it—she

sings it well, for one thing, except that I cannot hear more than half her words. The accompaniment is played with understanding and sympathy. *Oh! Maiden, my Maiden*, sung by Norton Collyer, is on the other side; not a bad sort of song by any means. I think you should ask to hear it.

You Along o' Me, Richard Norton, with piano, 2s. **PIC 5088**

I am sick of Sanderson's ballads, but confess to liking the way this is sung. Schumann's *Two Grenadiers* lifts the record up a bit. Richard Norton's voice records splendidly and his diction is admirable.

Light Orchestral Music

Echo Des Bastions, Schottische Caprice, Black Dyke Mills Band (d.s.), 2s. **WIN 5154**

As light orchestral music, this has much to recommend it. It will stand electrical reproduction. I am now listening to it by that means. The Black Dyke Mills Band is very good; in fact, I have quite "cottoned" on to the record, so to speak.

Frederica, De Groot and his Orch., 4s. 6d. **H.M.V. C2011**

This bored me a little; also I thought the recording a little heavy. The other side is *Thine is my whole heart* from "The Land of Laughter." As light lunch-time music it has a place, but I do not feel disposed to place it amongst the classics.

Gaiety Echoes, Band of H.M. Welsh Guards (d.s.), 2s. **BRDCST 5190**

I recognised a good many of them; you will probably know all of them. On a big machine the bass of this record shows up very well.

Language of the Nightingale, Jean and Pierre Gennin with Bournemouth Municipal Orch., 3s. **COL DN178**

This and (*Jolly Whistlers*) are piccolo duets by the artistes named, accompanied by Dan Godfrey and the Bournemouth orchestra. The piccolos record well as one would expect with instruments of that kind. I doubt the musical-value of either composition, but both are pleasant to listen to.

Lollipops, Mario De Pietro, banjo, 2s. **DEC F1894**

I am not keen on banjo records, but the technique displayed here is interesting.

Lustige Bruder, International Novelty Quartet, 2s. 6d. **ZONO 5667**

"Merry Brothers," in other words. It is a halting waltz refrain and rather taking. On the other side is a sort of symphonic version of *Knocked 'em in the Old Kent Road*, which, I imagine, everyone knows. There are no vocal refrains.

Melody in F, Bram Martin, violoncello solo, with orch., 2s. 6d. **ZONO 5681**

The one tune by which Mr. Rubinstein is remembered to

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posterity. He plays it splendidly, but I have no patience with him when he wastes my time playing *Robin Adair* on the other side.

Musical Jig-Saw, Regal Cinema Orch. (d.s.), 4s. 6d.

COL DX105

As a light—even trivial—orchestral record this has much to recommend it. There must be many who like these medleys. Personally, I think they encourage mental inertia in people who might be trained to listen to good music intelligently. But the record itself is excellent.

Prelude in C Sharp Minor, Sir Henry J. Wood and his Sym. Orch., with organ, 4s. 6d. COL DX87

I am rather surprised at Sir Henry's speed in the first part of this; it is unusual to take it so fast. The playing is, of course, admirable. The *Volga Boat Song*, on the other side, is splendid. A thoroughly good piece of recording.

Raymond (Overture), Percy Pitt and his Sym. Orch. (d.s.), 4s. 6d. COL DX104

A splendid light orchestral record of the type that will appeal to many people. I suggest most emphatically that you ask to hear it. The recording is Columbia's very best.

Shepherd's Hey, Athenaeum Light Orch., 2s. PIC 5074

This is always entertaining; everyone loves it. It is played lightly and with understanding by the A. L. O. Voglein's Intermezzo, *Autumn Leaves* is on the other side. A very acceptable lunch-time music record.

Soldatenlieder (w.), Julius Kantrovitch and his band, 1s. 6d. PIC 606

This is by Gung'l. The waltz is well written, scored, and played. It is not suitable for the modern dances, however, but is an acceptable picture of the waltz as it used to be. *Over the Waves*, a waltz by Rosas, is a fitting companion in that it is of the same period in style.

Valencia, Band of H.M. Welsh Guards, 1s. 3d. BRDCST 618

A splendid Military Band record with *Parce* on its other side. The H.M. W.G.'s always produce something worth hearing.

Yeomen of the Guard, Band of H.M. Scots Guards (d.s.) 2s. WIN 5158

There is no singing in this. The Scotties play Sullivan's music excellently and seem to infuse a military band atmosphere into it.

Humorous Records

British Spelling Song, Mr. Flotsam and Mr. Jetsam, with piano, 3s. COL DB251

These two estimable comedians must be getting somewhat stale.

This is merely feeble; *Our War Book*, on the other side, is feebler still.

Clapham and Dwyer On Photography, Clapham and Dwyer, (d.s.), 3s. COL DB243

I have heard the first side and there have been so many customary diversions that nothing transpires about Photography. The second side brings us no nearer the point. This is quite the funniest record I have heard for months; C. and D. are inimitable. Of course, it will sell in thousands.

Clatter of the Clogs, Walter Miller, 1s. 3d. RAD 1391

A north-country effusion, spoken rather than sung, but rhythmical enough to dance to. *Harmonica Harry* is on the other side. It is not a good dance version and I am rather tired of Henry and all his harmonic works. It ends by a laughter scene, mostly at a saxophone, which is rather amusing. This is best in that doubtful column labelled humorous.

Daft Sandy, Will Fyffe, com., with orch. (d.s.), 3s. COL DX107

He is quite good, but there is

Our Clara's Clicked Again, Clarkson Rose, com., with orch., 2s. 6d. ZONO 5671

Quite amusing; the tune is very jolly. The record is spoilt by the low *Barmaid's Song*, which I personally detest.

Polar Bears Come Back, Tommy Handley, com., with orch., 1s. 6d. PIC 621

Mildly amusing, but I doubt if it is really worthy of our good Tommy; the refrain wants varying after each verse. On the other side is *The World snaps its fingers, Ha! Ha!* This comes much under the same heading. Look here, Tommy! You used to be a "scream," don't degenerate into a comedian who occasionally says something funny. It is hard, I know, but you must be funny in *everything* you say and sing.

Sandy, the Dirt-track Rider, Sandy Powell, com. (d.s.), 1s. 3d. BRDCST 615

The opening song is boring in the extreme. I am not keen on the dialogue.

Sir Harry Lauder Songs, Border Singers, with orch. (d.s.), 4s. 6d. COL DX113

THE MONTH'S BEST RECORDS.

A Broadcast record attracted my attention or, to be exact, two records; 5188 is the number and the subject is Il Trovatore from which vocal excerpts are given.

H.M.V. have produced something outstanding in Keith Falkener's singing Bach (B3581); and in a Chappian record (DB1437).

Decca has come well up to standard with the Garden Scene from Gounod's Faust (K535).

Imperial (2329) is only Blue in the Night and Swinging in a Hammock, but I include it as the recording is so good.

Lastly, Columbia has given us Clapham and Dwyer (arguing, as usual) on DB243; it is admirable. All these are reviewed in the general columns. WHITAKER-WILSON.

nothing humorous about him, so far as I can judge; it is a matter of opinion. You should ask to hear it.

Derby of 1930, Those Four Chaps (d.s.), 1s. 3d. BRDCST 616

The speaker has an irritating affectation in his speech which rather put me off the whole thing. Most of the dialogue is drivell. As a humorous sketch the record is a dead failure; as a description of the Derby it is worse than awful.

Fire! Fire! Fire! Jack Payne and his B.B.C. Dance Orch., 3s. COL CB129

Quite amusing and well produced; it is a sort of skit on *Jollity Farm*. *Harmonic Harry* is its companion; a good version, too.

Old Comrades Re-Union, Roosters Concert Party (d.s.), 4s. 6d. COL DX114

I do not want to appear to damp every effort at humour; but this misses me entirely. It may appeal to ex-soldiers; it certainly will appeal to no one else. Those interested should ask to hear it.

Includes "Roamin' in the Gloamin'," "Fou the Noo," "Tobermorg," "It's nice to get up in the morning," "She's ma Daisy," "I love a lassie," "Killiecrankie," and several other favourites. Well produced by the Border Singers, but not particularly Scotch in my opinion. Some of the songs sound a bit stodgy to me, despite the chorus.

So I Says to Him, Sydney Howard, humorous sketch, 3s. COL DB250

I cannot detect anything even approaching humour in this. It is merely a stupid, inconsequent scene in a tavern. *Really, Columbia!* *The Happiest Couple in Lancashire* is the title of another rather low-down effusion on the other side.

Their Golden Wedding Day, Rustic Players, with orch. (d.s.), 2s. WIN 5149

One of the most boring effusions I have ever heard. I say, Edison Bell, have a thought for some of us! Who on earth, do you suppose, has an intellect that can get down to "tripe" of this sort? Perhaps it will sell in the villages amongst those who are celebrating their G.W.D. Fancy two sides of it.

Dance Music

I have been asked by a Swedish teacher of dancing, writing from France, to say when a dance record is or is not good for dance purposes. On hearing a new work, in the future, I will certainly do so; but when reviewing one of twenty records of Springtime in the Rockies, or any other hackneyed effusion, I shall have only room to report from the point of rendition. W-W.

Absence Makes the Heart Grow Fonder (f.), Al Benny's Broadway Boys, 2s. BRDCST 2590

Conventional in design, this takes for its chief thought: Absence makes the heart grow fonder—of somebody else. Very effective and good for dancing. On the other side is *I remember you from somewhere*, which I consider one of the most outstanding tunes of 1930. A very good record.

All Alone Monday (f.), Jack Leon's Dance Band, 1s. 6d. PIC 619

This is a clearly defined melody; I liked it the first time I heard it. I think the words are tish, but they do not matter much. *Don't you see* is the title of a fox-trot on the other side. Rather taking. I do wish someone would write really smart lyrics; all this has been said before.

Bench in the Park (f.), Harry Hudson's Melody Men, 2s. WIN 5160

Happy Feet is the companion. Both are done to death, of course, but this version is by no means amiss.

Blow, Blow, South Wind (f.), G. H. Elliott, with orch., 1s. 3d. RAD 1390

G. H. Elliott infuses his charming personality into this admirable fox-trot; I wish all fox-trots were sung. The modern fox-trot voice is merely a series of adenooidal explosions, both on records and on the wireless. *Ten Little Nigger Boys* is on the other side. I thoroughly enjoyed it; there is a good rhythm and excellent singing. It beats most fox-trot vocalisation to a frazzle. *Get it*, not necessarily for dancing, though.

Blue Is the Night, Robert Gwynn, with orch., 1s. 6d. IMP 2329

This is quite effective and a well constructed tune. It ought to be very popular; I hope it will take the place of some of the less interesting tunes I have recently heard. *Swingin' in a hammock* is on the other side (see separate review); I recommend this record very strongly.

Blue Pacific Moonlight (w.), Jack Leon's Dance Band, 1s. 6d. PIC 617

This has *Falling in Love* again on the other side. Both are well known and, here, well played.

The Five-point Two[★]



THIS is the third "Five-point" set to be described in these pages for the benefit of home-constructors who want the cheapest and most efficient receivers that can be made with modern components. The first set of this range was the Five-point Three (October), and the second the Five-point Four (November). These sets have five features in common, namely:—

The Five Points

- 1.—Standard two-pin plug-in coils are used, but both wavebands are covered by the operation of a single switch.
- 2.—Self-indicating on-off and wave-change switches are used in all the sets.
- 3.—Each set uses standard components of good quality that can be obtained without difficulty from any radio dealer.
- 4.—Whilst using many components to be found in sets built three or four years ago, the circuits are the last word in modern practice, and can be relied upon to give the best results.
- 5.—All the sets are cheap to build for their type, but in no set has efficiency been sacrificed for cheapness.

Local-station Reception

Both the Five-point Three and Five-point Four utilised a screened-grid valve, but in the Five-point Two the combination is simply a leaky-grid detector and a transformer-coupled power stage. The set is therefore

particularly suitable for local-station reception and can be relied upon to give good loud-speaker results within fifty miles of a regional station.

Of course, under favourable circumstances a number of foreign stations can be picked up on the loud-speaker. During a test in south London such stations as Rome, Stockholm, Hamburg, Toulouse, and Turin were well received on the medium waves, while on the long waves we picked up Daventry and Radio Paris.

From the left-hand photograph in the heading of this article it will be seen how attractive is the appearance of the set in its cabinet, while the right-hand photograph shows the extreme simplicity of the layout.

The self-indicating switches are seen on the left and right of the panel, the switch on the left controlling the

wavelength range and the switch on the right putting the set on and off. When the left-hand switch is pushed in, the word "Long" appears in a slot; when it is pulled out the word "Short" appears and the set is adjusted for reception on the medium waves. Similarly the words "On" and "Off" appear when the filament switch is operated.

For Family Use

These self-indicating switches are obviously of very great convenience when the set is to be used by non-technical members of the family.

The main dial at the top of the panel adjusts the aerial-tuning condenser and controls the wavelength of the receiver. Immediately below this dial is the small knob of the reaction condenser, which is turned to the right to increase the strength of signals.

Although this set makes use of plug-in coils, there is no need to move them about once they have been set in their holders, owing to the special switching arrangement employed.

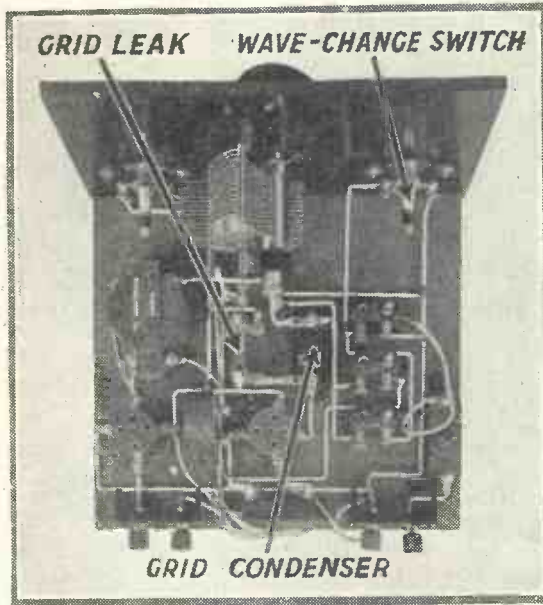
Circuit Arrangement

The arrangement of the circuit will be clear from the diagram on page 490. In series with the aerial is a semi-variable condenser with a capacity of .003 microfarad. This is used as a selectivity control and adapts the set for the best results under varying aerial conditions.

When this condenser is at its

Next Month : Look Out for a "Five-point" Short-waver

The Five-point Two—Continued



SIMPLICITY OF CONSTRUCTION

This plan photograph shows how simple is the layout and wiring of the set, which is ideal for local-station reception

minimum capacity (that is, when the knob at the top is unscrewed as far as possible), the set is adjusted for maximum selectivity, but only at the expense of volume, which will be decreased to some extent. It will be found that to get good selectivity on the long waves this condenser must be set somewhere near its minimum capacity, but for medium-wave reception on an average aerial the knob can be screwed down a fair amount without broadening the tuning too badly.

Tapped Coil

In the circuit diagram the medium-wave coil is indicated as being of the double- or X-tapped type. With many aerials a centre-tapped coil will give sufficient selectivity for all ordinary purposes. When the set is used for medium-wave reception the long-wave

coil is shorted right out of circuit by means of the wave-change switch.

Reaction is obtained by placing a third coil between the medium- and long-wave tuning coil. The amount of feed-back from the anode to the

grid of the valve is controlled by a .0002-microfarad variable condenser.

Usual values of grid condenser and leak are used for the detector valve, .0002 microfarad and 2 megohms. It should be noted that one end of the grid leak is connected to low-tension positive, to give a small positive bias to the grid of the detector valve and so improve its efficiency.

In the anode circuit of the detector is a high-frequency choke, which effectively prevents the passage of high-frequency currents into the low-frequency side of the circuit. These currents are by-passed to earth by means of a

.0001-microfarad fixed condenser connected between anode and low-tension negative.

The connections to the low-frequency transformer are quite standard, but it should be noted that

No difficulty will be found in the construction of the set, which can be tackled with every confidence even by the absolute beginner. All the essential details are reproduced in these pages, but those who desire one can obtain a full-size blueprint panel template, layout and wiring diagram for half-price (6d., post free) if the coupon at the foot of the inside back cover is used by December 31.

Where to Send

Ask for No. WM220, and address your inquiry to Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, E.C.4.

There are only four components to be mounted on the ebonite panel. These are the aerial-tuning condenser, reaction condenser, and the on-off and wave-change switches.

Looking from the back of the set it will be seen that the semi-variable aerial condenser is fixed in the front right-hand corner, while the holders for the three plug-in coils are fixed just to the left.

The long-wave coil is nearest the panel and the medium-wave coil nearest the edge of the baseboard, with the reaction coil immediately between them.

Along the back edge of the baseboard are two terminal blocks, and the .0001-microfarad fixed condenser.

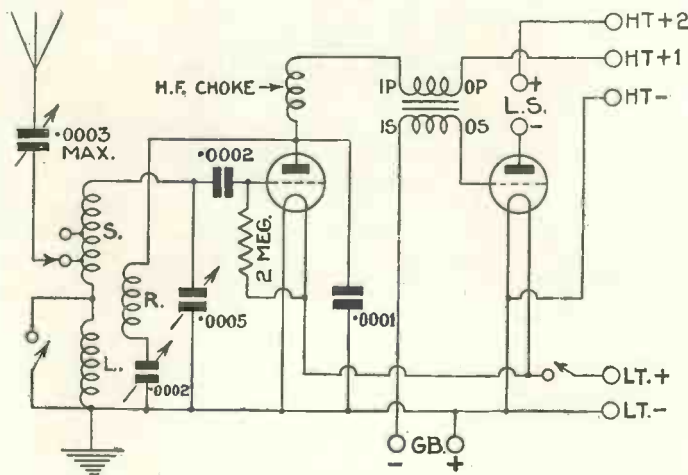
To the left of the baseboard are mounted the two valve holders, high-frequency choke, grid leak and low-frequency transformer.

Battery Leads

Only four terminals are provided, two at the right for the aerial and earth connections and two at the left for the loud-speaker. Flexible leads are provided for the connections to the high-tension, low-tension and grid-bias batteries, which can be put out of the way on a shelf

under the table on which the receiver is placed.

The wiring up of the receiver is probably the simplest part of the construction, if full use is made of the blueprint or the reduced reproduction



STRAIGHTFORWARD BUT POWERFUL CIRCUIT

The valve combination is a leaky-grid detector and a transformer-coupled power valve. Separate high-tension feeds are provided

separate anode feeds are provided for the detector and power valves. Almost any transformer can be used in this set, but of course for the best results only a good make should be employed.

Ideal for Local-station Reception

that appears on page 492. It will be seen that each wire is numbered separately; these numbers indicate the best and easiest order of assembling.

Start with the lead marked No. 1, and when this has been firmly fixed at each end proceed with wire No. 2, and so on in sequence. There are thirty-two connections in all.

No Soldering Needed

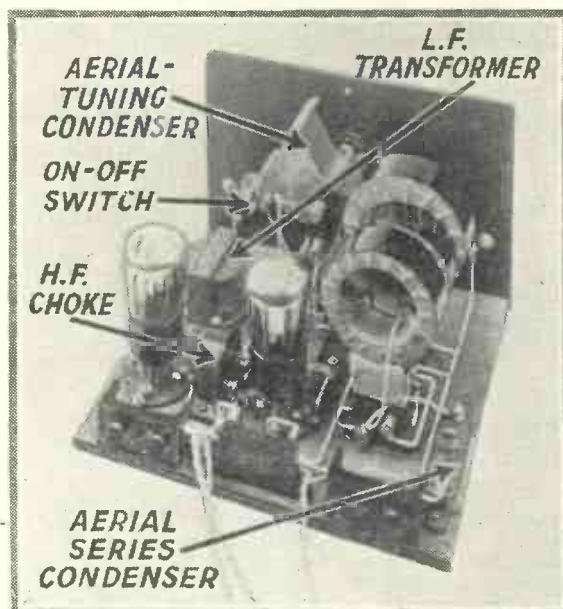
If desired, all the connections can be made with flexible rubber-covered wire and there is no need for any soldering at all. If desired, stiff wire can be used for the connections Nos. 1 to 24, but the connections Nos. 25 to 32, *must* be of flexible wire long enough to reach to the batteries.

Before the set can be used, suitable valves must be chosen. The detector valve should be of moderately high impedance with a magnification factor of the order of 30 to 35. For instance, a very good valve for this position would be one with an impedance of 50,000 ohms and an amplification factor of 35. The impedance should not exceed this figure and should not be lower than about 20,000 ohms.

The choice of a power valve

depends almost entirely on the source of high tension available. With a standard-capacity battery the total consumption for the two valves should not be more than 7 milliamperes. Assuming that the current for the detector valve will be 1 milliampere, we have 5 or 6 milliamperes left for the power valve.

The best procedure is to choose a valve of the lowest possible



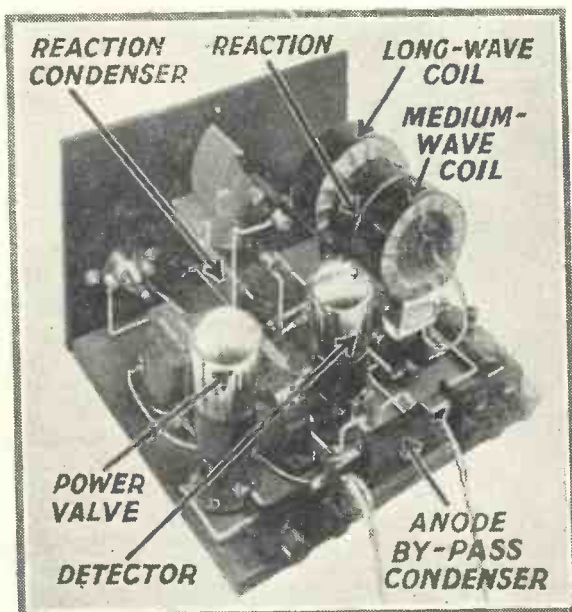
SHOULD YOU BE NEEDING A MORE POWERFUL RECEIVER—

You cannot do better than construct one of the other "Five-point" sets.

The Five-point Three comprises a screened-grid amplifier, detector, and transformer-coupled power valve. It was fully described on page 252 of the October issue and a full-size blueprint (No. WM212) can be obtained for 1s., post free.

The Five-point Four is a similar set with an extra low-frequency valve. It was described in detail on page 378 of the November issue and a blueprint (No. WM216) can be had for 1s. 6d., post free.

START BUILDING A "FIVE-POINT" SET TO-DAY—YOU CANNOT DO BETTER



EVERY PART IS ACCESSIBLE

There are no difficult connections in the set; all the parts are easily accessible and can be wired without difficulty

READY FOR USE

Here you see the Five-point. Two with the valves and coils in position all ready for use

ohms impedance that will give excellent results.

One point to be considered in this connection is that, whatever the consumption of the power valve, the whole of the anode current will pass through the loud-speaker windings. For this reason many readers will prefer to use a power valve with a moderate consumption in order to avoid the possibility of damage to the loud-

speaker windings. When the valves have been chosen, the battery connections should be made. The accumulator (which will be of 2, 4 or 6 volts, according to type of valves used), is connected to the flexes marked L.T. + and L.T. — on the blueprint. The lead marked H.T. — should be connected to the negative terminal of the high-tension battery, while H.T. + 1 should be plugged in at about 90 volts.

It is better to use a double-capacity battery, which will stand a discharge of 12 milliamperes, in which case the power valve can take 9 or 10 milliamperes. At this consumption there are several valves of about 2,000 to 3,000

ohms impedance that will give excellent results.

When the valves have been chosen, the battery connections should be made. The accumulator (which will be of 2, 4 or 6 volts, according to type of valves used), is connected to the flexes marked L.T. + and L.T. — on the blueprint. The lead marked H.T. — should be connected to the negative terminal of the high-tension battery, while H.T. + 1 should be plugged in at about 90 volts.

Power-valve Voltage

The voltage applied to H.T. + 2, which supplies the power valve, should be 120 to 150 volts, the latter figure being preferable if it can be obtained.

Finally, the grid-bias battery should be connected. The lead

The Five-point Two—Continued

COMPONENTS REQUIRED FOR THE FIVE-POINT TWO

CHOKE, HIGH-FREQUENCY

1—Telsen, 2s. 6d. (or Igranic, Lissen).

COILS

1—Atlas No. 40 plug-in, 2s. 6d. (or Lewcos, Tunewell).

1—Atlas No. 150 plug-in, 3s. 6d. (or Lewcos, Tunewell).

1—Atlas No. 60 double-tapped plug-in, 5s. 6d. (or Lewcos, Tunewell).

CONDENSERS, FIXED

1—Dubilier .0001-microfarad, upright type, 1s. 8d. (or Graham-Farish, Edison Bell).

1—Dubilier .0002-microfarad, 1s. 8d. (or Graham-Farish, Edison Bell).

CONDENSERS, VARIABLE

1—Ormond .0005-microfarad, type R/426 with slow-motion dial, 6s. (or Jackson, Lotus).

1—Burton .0002 reaction, 4s. (or Bulgin, Formo).

1—Polar preset, .0003-microfarad maximum, 2s. (or Igranic, Lewcodenser).

EBONITE

1—Becol 9 in. by 6 in. panel, 3s. 3d. (or Lissen, Red Triangle).

2—Belling-Lee terminal blocks, 1s. 4d. (or Junit, Lissen).

HOLDERS, COIL

3—Lissen, 3s. (or Lotus, Magnum).

HOLDER, GRID-LEAK

1—Burton, type G6, 9d. (or Lissen).

HOLDERS, VALVE

2—Chx 4/5 pin type, 1s. 8d. (or Benjamin, W.B.).

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

PLUGS

5—Belling-Lee marked; H.T.+2, H.T.+1, H.T.—, G.B.+ , G.B.—, 1s. 3d. (or Ealex, Clix).

2—Belling-Lee spades, marked; L.T.+ , L.T.—, 9d. (or Igranic, Burton).

RESISTANCE, FIXED

1—Dubilier 2 megohm, 1s. 9d. (or Watmel, Lissen).

SUNDRIES

Insulated wire for connecting (Glazite). Length of rubber-covered flex (Lewcoflex).

SWITCHES

1—Gripso single-pole, marked "On" and "Off," 1s. 9d.

1—Gripso three-point, marked "Long" and "Short," 2s.

TRANSFORMER, LOW-FREQUENCY

1—Igranic Midget, ratio 1 to 3, 10s. 6d. (or Telsen, Brownie).

ACCESSORIES

BATTERIES

1—Pertrix 120-volt, standard type, 15s. 6d. (or Ever Ready, Siemens).

1—Pertrix 9-volt grid bias, 1s. 8d. (or Ever Ready, Siemens).

1—CAV 2-volt accumulator, type 2AG7, 11s.

CABINET

1—Camco V.B., oak, 11s. 6d.

VALVES

1—Marconi H2, 8s. 6d. (or Osram H2).

1—Marconi P215, 10s. 6d. (or Osram P215, Mullard PM2).

will be necessary to make a slight readjustment of the reaction condenser each time the main tuning dial is turned.

In order to obtain adequate selectivity on the long waves, the capacity of the semi-variable condenser on the baseboard should be smaller than for medium-wave reception; in other words the knob should be screwed further out.

Varying Anode Voltage

After a few stations have been tuned in it is advisable to try altering the voltage supplied to the detector valve. To do this the lead marked H.T.+1 should be plugged into different sockets in the high-tension battery between the values of 60 and 120 volts.

We shall be very glad to have reports from readers on the results obtained with this receiver. Experiences of the set in various parts of the country are invaluable to other constructors and we shall be glad of the opportunity of publishing readers' letters about the Five-point Two.

marked G.B.+ should be put in the positive end of the battery, while the bias value recommended by the makers should be tapped off by the negative lead. It is most important, both for the sake of economy and quality of reproduction, that the grid bias recommended by the manufacturers should be applied.

Operation of the Set

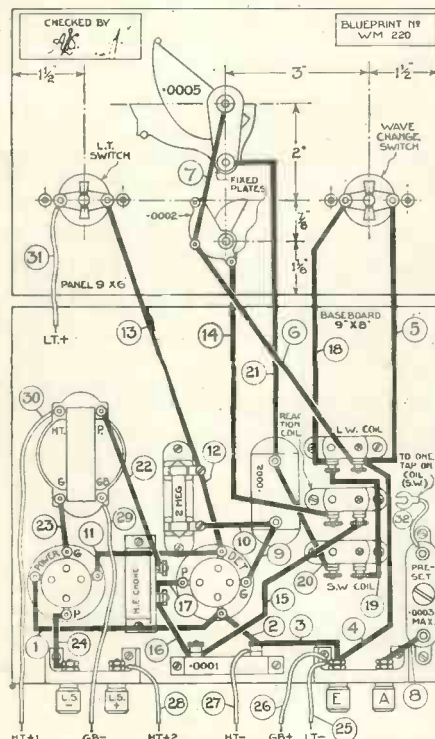
The operation of the set is not at all difficult, once the external accessories have been connected up. The procedure is as follows:—

Adjust the knob of the semi-variable condenser on the baseboard to its half-way position and set the knob of the wave-change switch on the panel for either long or medium waves, as desired; then pull out the right-hand knob to switch the set on.

Reaction Control

Slowly turn the small knob at the bottom of the panel to the right 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 state for reception.

Now turn the main tuning dial until a station is picked up. Then the reaction condenser should be readjusted for the best results. It



LAYOUT AND WIRING DIAGRAM

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 December 31. Ask for No. WM220

CHINA'S COMMUNICATIONS

ALL the agreements and contracts for telegraph communications in China with various companies will expire at the end of this year.

Extensive use of radio-telegraph will be made for international traffic, the Government having made contracts with the Radio Electric for the purchasing of short-wave radio transmitters and receivers. The two machines furnished by the Radio Corporation of America, with a capacity of 20 kilowatts, will operate between Shanghai and San Francisco, where connections are to be made with the American land lines.

Europe and Africa

A similar service to Berlin will be maintained so that transfers can be made to all European and African countries. Four German 2-kilowatt machines will give a rapid feeder and distribution service between Shanghai, Canton, Hankow, and Tientsin.

The two French 15-kilowatt transmitters will be put into service between Shanghai and Paris, where transfers, too, can be made to all European and African countries.

F. P.

UNDER MY AERIAL

HALYARD'S CHAT ON
THE MONTH'S TOPICS

SPECIALLY ILLUSTRATED
BY GLOSSOP

Aerial Life

NOW that we are once more well into the season of long nights, I expect you have seen to it that every part of your indoor wireless equipment has been put into the best possible condition, and that all the necessary renewals have been made.

Did you give any thought to your outdoor equipment, though, this autumn? Are you quite sure that your aerial is all right, and that your earth is efficient?

The reason I ask this question is because one of the painters who are working on the outside of my house at the present time asked me this afternoon if I knew that my aerial wire was badly corroded.

Now this aerial wire has only been up two or three years, and I am surprised that it has corroded. I shall have to take it down and put up a new wire, for I know from past experience that you cannot get the best results from an aerial which has become corroded through exposure.



Your outdoor equipment

My painter man turned out to be a wireless enthusiast and we had a great talk on wireless in general and aerials in particular. We finally came to the conclusion that, considering the varying atmospheric conditions we experience in this country, an outdoor aerial wire did jolly well to last three years.

Some Set

Do you happen to have a wireless booster amongst your circle of friends? You know the sort of fellow I mean. If you happen to have heard 5XX on a crystal set, he has heard Lahti on a chunk of Derby Brights and the poker. If you have the very best thing in five-valve receivers, he has something much better in a six-valve receiver of his own exclusive design.



A wireless booster

Well! should there be such a one in your little circle, I'll tell you how you might cure him, especially if he boasts as freely about his distortionless reception as about other things. Take him to see and hear the new broadcast receiver at the Science Museum, South Kensington.

A bit out of the way for some Londoners, and a bit out of the way for London visitors staying in the West End, perhaps, but all the same it would be well worth while taking your booster there. If that won't cure him, nothing else will.

This new Science Museum receiver is a little matter of ten valves, all worked from the mains; even the grid bias is obtained from the mains. The loud-speaker is of the moving-coil variety, with a specially-designed horn. The idea of the receiver is to obtain reception as free from distortion as possible.

Do go and hear this receiver, though, and, when you are in the Science Museum, take a look across the road at the university buildings where some of us have suffered torture in the past at the hands of examiners. Yes, I think so.

Another Giant

What do you think of the new transmitter which Marconi's have made for the Polish Broadcasting Company? Although I had read quite a lot about this latest giant of the European ether, it came as something of a shock to me when I saw the



This loud-voiced newcomer

hope expressed in one of our daily newspapers that this loud-voiced newcomer to European broadcasting would not interfere with our reception of Daventry 5XX.

The power of this new Polish giant is to be 120 kilowatts, which is much greater than the power of any existing European station. In spite of this, however, I do not see how the new station can interfere with the reception of 5XX in our own country.

NEXT MONTH!

Those who want to buy complete sets will find a special supplement dealing comprehensively with a large number of the new season's models in the next issue, which will be published

on
FRIDAY,
DECEMBER 19

Warsaw, where the new station is to be built, is about 900 miles from London and, although we shall undoubtedly hear the new station well, we cannot expect reception to be really strong at that distance. I know that a high wavelength will be used, but the wave of the new station will have to travel for more than half of its journey to us over land.

It looks to me as if Germany and Sweden will have the greatest cause for complaint against the new Polish giant, and I wonder how long it will be before Zeesen and Motala increase their power considerably.

Portables in Winter

"George, here is a problem for you," I said to my technical adviser last night. "Where do portables go to in the winter?"

"No idea," replied George with a yawn.

"What would your advice be regarding a portable in winter, George?"

"Use it, especially if it is the only one you possess."

Under My Aerial—Continued



Empty the acid out

"But suppose the owner possesses a big permanent set as well, what then?"

"Use the portable as an echo set, put it under the table, say, or inside the piano with a remote-control device."

"A good idea, George, but suppose the owner wishes to put his portable away for the winter, what would your advice then be?"

"Let him."

"I know, George, but what precautions ought he to take?"

"Oh! precautions. First he ought to take out the high-tension battery, if any. Then he ought to take out the grid-bias battery, if any. Such batteries should be used on some other set."

"Good advice, George, go on."

"He might take out the valves and use them also."

"Why, George?"

"Because there might be better valves on the market next spring."

"And the accumulator, George?"

"Certainly that should come out, too. If the owner desires to put it on one side for the winter, he had better empty the acid out, preferably on the cats at midnight."

"And the box itself, George?"

"That might be conveniently used as a store cupboard, or one might even keep gramophone records in it."

"Why not use the portable as a gramophone amplifier, George?"

"Certainly, that could be done, provided you could get direct on to the detector valve and cut out the high-frequency side of the set."

Continental Relays

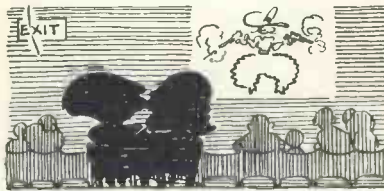
Do we want relays of Continental stations to form an important part of our broadcast programmes in the future? Our programme officials do not seem to be able to gauge our answer to this question, and they are deeply concerned over our wishes in the matter.

You see, a great deal has been done of late in improving Continental

landlines, and in the establishment of efficient repeater stations. A considerable amount of money has been spent in preparation for these Continental relays, and, when everything is practically ready, the B.B.C. officials cannot make out whether we want these relays or not.

What do you really think of these Continental relays? Do you want them, or are you quite indifferent to them? My own view is that these Continental relays serve a distinctly useful purpose. There are many listeners whose sets are incapable of direct reception of Continental stations.

There are also listeners who possess



Enjoying the programme

good long-distance receivers, but who do not reach out with them. A Continental relay presents such listeners with an opportunity they would otherwise not have, namely of enjoying the programme of a Continental station.

Now that the landlines are ready, and the apparatus has been installed, it seems to me a pity to talk of dropping these Continental relays. Let the B.B.C. go on with them, and perhaps some of us will write and tell them how much we like them.

Single-station Receivers

How many of your wireless friend's leave their wireless receivers tuned in to one particular station, and never alter the tuning month in, month out? According to an official view the vast majority of listeners content themselves with just the one station and never bother to tune in any other, no matter how tempting the programme.

Well! that official view is not cor-



Just the one station

rect as far as my wireless friends go. Indeed, I doubt if I have one friend or neighbour who sticks to one broadcasting station and never changes to another. Do you happen to have a one-station sticker amongst your friends? I doubt it.

Suppose this official view were correct, however, and suppose the majority of listeners did desire to listen to one station only, what would be the effect on the design of our sets?

If you happen to want a problem for one of the long evenings, why not try to design a one-station wireless receiver? You would not need to include a variable condenser for tuning, and you would want just the one coil. Try the problem and I think you will see that a one-station receiver would be very simple and inexpensive, but how deadly dull would such a receiver be in use!

Football Broadcasts

Don't you think we listeners ought to make the Arsenal our favourite football team this season, or at least one of our favourite teams? No, I do not suggest this because the Arsenal team happens to be doing well, but because the Arsenal Club seems to be the most willing of all our big League clubs to allow its home matches to be broadcast.

I am very fond of listening to a



Running commentaries

football broadcast and, as I very rarely get the chance of seeing a big football match these days, I think I shall know more about the Arsenal side than any other before the end of the season.

All the running commentaries on football matches that I have heard have been splendid. I have found it quite easy to follow the game, and I have been wonderfully excited at times.

Broadcasts must add to the great popularity of football, and I cannot understand the attitude of the big clubs which will not allow their home matches to be broadcast. The argu-

Halyard's Chat on the Month's Topics

ment that the broadcasting of an important football match tends to keep spectators away is about as sound as the argument that the broadcasting of gramophone records spoils the sale of those records.

The Nightingale

Surely no other living creature has received so much fame through broadcasting as has our beautiful



The fame of the nightingale

British songster, the nightingale. Many men and women have become famous through wireless or through broadcasting, but I doubt if the fame of any one of them, man or woman, is as great, or as world-wide, as the fame of the nightingale.

As instancing the broadcast fame of the British nightingale, there comes from Canada the news that so many requests have been received from Canadian listeners for the broadcasting of the British nightingale that the Canadian National Railways broadcasting officials have secured a special selection of nightingale records from England; these are to be broadcast all over the Dominion.

This is a very real compliment to our British nightingale, and to us, and I have been wondering how we can repay the compliment. One of my most vivid recollections of Canada is that the birds were silent, and I shall never forget how the silence of the "bush" in British Columbia seemed almost oppressive to me.

However, there are songsters amongst the Canadian birds. If we could repay Canada's compliment to us, I think we might do so by asking for the broadcasting in our country of the song of the Canadian mocking bird. Although I never heard the mocking bird in Canada, I am certain we should delight in hearing him broadcast over here, especially if he indulged in his wonderful powers of mimicry.

New Theories

Some of the world's most famous scientists seem to have had a good

time lately attacking the old and generally-accepted theories of wireless. For example, the great German scientist, Dr. Einstein, has propounded a new theory of space which compels the abandonment of what we call the ether.

A Canadian scientist, Dr. Eve, like several other scientists in North America before him, has recently thrown out a challenge against the Heavside layer theory.

Well! I suppose these efforts of the scientists to explode the old theories and to replace them with perfectly new theories of their own ingenious invention are very admirable in their way, and give those scientists a considerable amount of satisfaction.

To the layman, however, these contradictions of the old theories, and the setting up of new theories in their place, show very clearly that it is not



Explode the old theories

yet fully understood how a wireless wave, or wireless effect, call it what you will, travels from the transmitting aerial to the receiving aerial.

As George says, though, what does it matter whether there is a Heavside layer, or an ether either, so long as your accumulator is well up, and your high-tension battery isn't more than a year old.

Still, I suppose that in the long run these new theories will have some useful practical application and improve wireless for our benefit.

"Ask Me No More"

—Tennyson.

*Ask me no more. The wavelength may be wrong,
It may be atmospherics, also morse,
Or that the singer's voice is rather hoarse;
Good reasons why you cannot hear his song.*

Ask me no more.

*Ask me no more. What answer shall I give?
I love not chokes and coils and batteries
(I dare not say that I know naught of these,
In wireless lore my head is like a sieve!)*

Ask me no more.

*Ask not the meaning of magnetic field,
Of triode, grid condenser, tonic train;
I strove to mug them up, but all in vain . . .
I hope your licence soon will be repealed!*

Ask me no more.

Leslie M. Oyler.

"WAR" AGAINST

By
WHITAKER-
WILSON

In this article the "W.M." Music Critic discusses the position of the B.B.C. in modern musical matters and comments on the new symphony orchestra.

THE B. B. C.

LEAN days are upon us in the musical world; there seems not enough to do and far too many of us to do it, but there is some doubt in my mind as to whether we are justified in laying every ill condition at a certain door in Savoy Hill.

That broadcasting in general has been responsible for something approaching paralysis in the musical world at large is a fact, but there is no sense in blaming the B.B.C. for it. Broadcasting is the artistic outcome of an invention, of a commercial use of a system of communication; it was bound to come.

Furthermore, it has come to stay; I imagine no one will disagree with that platitude.

Musicians' Position

The situation being as it is, the musical profession has no other course open to it than to accept matters as they stand and regard itself as being part of the general public. There is nothing to be gained, that I can see, by writing vehement letters to the Director-General, or by accusing the B.B.C. of being the general enemy of musical mankind.

All this fuss at Manchester about the loss of two members of the Hallé Orchestra (who joined the B.B.C. Symphony Orchestra) merely worked itself up into a hot-air explosion. There was nothing in it worth reading when it was spread out in the newspapers.

At the time of writing I hear that the B.B.C. has declared privately that there is now no longer any ill-feeling between Savoy Hill and Manchester; in fact, Sir Hamilton's Harty laugh has once more been heard, if not actually broadcast. By the time these words appear in print the whole matter will have blown over.

All the same, the fact that there was trouble brings up the question of the B.B.C. Symphony Orchestra for review. The low-brows, famous for their sneering at anything that requires the use of an intellect, are

saying that the orchestra is not necessary.

We can well afford to ignore them. We live in 1930, not 1630, and it is time that Britannia ruled the sound waves even if naval disarmament looks like jeopardising their chances with the wet kind.

England is an unmusical country—at least, it *was*; owing entirely to the strength of mind at Savoy Hill, despite what the grumblers have had to say, music is becoming a household word in the Englishman's home. I repeat that this estimable state of affairs is entirely due to the B.B.C.

Speaking as a musician, I am certain I am right in saying that music is a force, a great power. I mean *serious* music. The Promenade Concerts have proved it as much as anything, though Queen's Hall is nothing to go by. Because a few hundred enthusiasts happen to turn up and yell themselves hoarse at the end of a Beethoven concert proves nothing; London's moving population is over eight millions.

But the fact that serious music has found its way over the ether into the Englishman's home means that he is becoming educated; that is why he is grumbling, of course.

Everyone grumbles *at* being educated, in the first place, and *while* he is being educated, in the second. It is the way of the world. Some people would rather have their teeth extracted than be asked to learn anything.

Orchestra Personnel

Now about this B.B.C. Orchestra. Let us look at its personnel: 19 or 20 first violins, 16 seconds, 14 violas, 12 'cellos, 10 double basses—a good three-score-and-ten string players. Of flutes, oboes, clarinets and bassoons there seem to be 15; of horns, trumpets, trombones and tubas, there are 16; there are two harps, two tympanists and three others for various percussion.

Altogether something like 114, and such leaders as Catterall, Woodhouse,

Kennedy, and other notable players are to be found amongst them.

Personally I should like to see many more strings; I think the B.B.C. Orchestra should not run the risk of having its string-tone cut in half by the power of the wood, brass, and percussion. I should like to see 30 firsts, 30 seconds, 30 violas, 20 'cellos, and 16 double-basses. That would make a more perfect balance.

I feel increasingly that nothing should be left to chance; the B.B.C. Orchestra should be the finest and the largest in the world.

Happier Low-brows

On the other hand, if people would only realise what is being done for them, and listen to what is given them with a more thankful heart, things would improve all round. If the low-brow would realise that great music was written by great men and is—here and there—performed by great men also, he would be much happier.

I have just been studying the symphony programmes. My only complaint is that there is but one a week; there ought to be three at least, even if two of them are given in the studio, but there has been some attempt to get the right people, presumably.

Amongst the conductors I see Boult, Coates, Wood and Ansermet. Amongst the pianists there are Backhaus, Cortot, Hess, Mosiewitsch, Samuel and Solomon. It is an impressive array.

There are some goodly fiddlers withal; Catterall, Busch, Sammons, and Szigeti are all worth hearing; Suggia and Casals are unrivalled as 'cellists; while amongst the singers we have Isobel Baillie, Elizabeth Schumann, Dorothy Silk, Stiles-Allen, Muriel Brunskill, Astra Desmond, Titterton, Widdop, Allin, Faulkener, and Roy Henderson.

As to the music itself, Bach, Beethoven and Wagner are well represented, Beethoven especially; his *Mass in D* is to be sung in December.

There is, thank heaven, very little modern English music. Those Thursday night Proms were a nightmare to many of us; it is sad to have to say it, but English composers of the younger school are forgetting one thing—*melody*.

They are bringing music into disrepute and are fast becoming no good to themselves or their Art.

Ban on Modern Music

If I had the control of the B.B.C. I should put a ban on all hyper-modern music. Men who forget what chords are really made of, and who simply put down anything for sounds, with little or no scholarship behind what they write, ought not, in my opinion, to be heard at all.

It is no argument to point out that, once on a time, the German critics howled Chopin down as a hopeless futurist. The chords that Chopin used were based on classic thought and were reasonable dissonances; the present-day chords are based on anything but classic thought.

The ordinary listener will stand any amount of classic music of the right kind, but he will stand precious little of ultra-modernity. On the other hand, looking at the programmes as a whole, there is not a great deal to complain of.

The average listener might do worse than realise that it is indeed a wonderful thing in this wonderful age that he can sit in his armchair, smoke his pipe, and balance a score on his knee to follow such a work as Handel's *Israel in Egypt*.

Of course, the low-brow says: "Who on earth wants to, anyhow?" but his opinion is worth nothing.

This age is progressive; we are supposed to be an intelligent race. It is a mistake to suppose it, really; but the time is coming when it may, at long last, be thought "the thing" to use one's brains. The day it becomes the fashion—everything here goes by fashion, you know—to have a brain and use it, will be a happy day for England.

Day of Progression

The day it becomes the cult of the Englishman to realise where he is in the history of the world, to be sensible to the fact that the world of Art is a world that has something to give him if he will only use his intellect, is the real day of progression.

Our masses are still but sheep; they have no private opinions and prefer the first opportunist to do their

thinking for them; but the day is coming when the average man may forsake his devotion to watching football matches or discussing the downfall of the opposite class, and turn his thoughts in a healthier direction.

He is slowly, but none the less surely, finding out that music indeed has charms, and is therefore becoming more peaceful in his soul. If we ever succeed in rousing the mentally inert to a sensibility of their own powers of reception it will be largely on account of broadcasting.

We all have our opinions of the programmes and we all experience disappointments during the week. It must be so. The unmusical person became incensed during August and September because a Promenade Con-

should have heard very little. The net result, to me, is that my home has been filled with music—and the very best music; personally I have nothing to complain of in the fact.

Nine-tenths of the weekly programmes bore me stiff; I am sick of dance music, hearing quite enough of it on the gramophone records; I am not very keen on broadcast plays; I hate military bands; I am rarely thrilled over light music.

No Sense in Complaining

But there is no sense in my writing to Savoy Hill and complaining about it; I get a tenth of the programmes and, really, ten shillings a year is cheap for what I do get.

It is quite time we all gave up this idea that the B.B.C. is out to damage



THE DIRECTOR-GENERAL ON HOLIDAY IN GERMANY

Here you see Sir John Reith, Director-General of the British Broadcasting Corporation, at an outdoor function in Germany. He is in the foreground, with his hands resting on a walking-stick

cert was relayed each night, and hundreds of letters poured into the offices at Savoy Hill to intimate the fact.

But the unmusical person also forgot that others enjoyed them and are feeling the loss of them now.

I speak from personal experience. I was far too occupied to attempt to go to Queen's Hall every night of the week. I did go to all the Bach concerts; as for the rest, I had to be content with hearing a work here and there which I wanted to hear.

Had it not been for the wireless I

every private enterprise; it is nothing of the kind. I thoroughly disapprove of much of the B.B.C.'s policy, but at least I realise that the intent behind it all is honest and sincere.

Hopeless Lives

Those responsible give their whole time to trying to please everybody; they are leading hopeless lives, it seems to me, for there is no man born who has ever succeeded in doing that.

Anybody who is popular has enemies; if you haven't any enemies you haven't any "guts."

Half-hours with Professor Megohm

SOLVING SOME MAINS MYSTERIES

Whether your house mains supply direct or alternating current you will learn some interesting things about them from this article. Young Amp thought he knew nearly everything about electric supplies, but came up against some knotty problems. Professor Megohm supplied the solutions and here the whole matter is set out for the benefit of other enquirers who want a simple explanation.

THE door opened very quietly. A head was poked round the corner, followed by the remainder of our young friend Amp, as he perceived the Professor seated at his desk, apparently engaged in wrestling with a circuit diagram.

The boy stood where he was, looking as if he were prepared to wait for some time before the Professor noticed him.

Perhaps, however, it was the very quietness of his entry which attracted the Professor's attention. He was used to Amp's usual bustling arrival, and the unusualness of this quiet

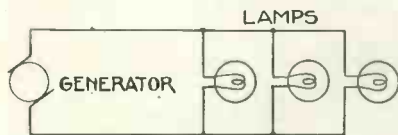


Fig. 1.—Connections to direct-current generator

opening of the door must have impressed his sub-conscious self, because he looked up almost at once and saw the lad standing there, cap in hand, looking somewhat self-conscious.

"Hello, my boy," said Megohm cheerfully, "what can I do for you?"

"I am not bothering you, I hope, Professor?" exclaimed Amp timidly.

"Not more than usual," was the gay reply.

In Cheerful Mood

Amp's spirits rose slightly. The Professor was obviously in one of his cheerful moods to-day, and perhaps—yet would not that make it almost worse?

He would be sure to laugh, in that superior manner of his, when the whole truth came out, for there it was, the naked and unpalatable truth, that Amp had found something he really did not know.

Megohm may have sensed something of this, for he immediately endeavoured to put the boy at his ease by inviting him to sit down. In the meantime, he drew his trusty pipe

from his pocket and slowly proceeded to fill it.

Finally, he said: "Yes, my boy, what's on your mind?"

"Well," was the reply, "I wondered if you would tell me something about mains. I asked a few questions at the wireless show, on some of the stands where they were showing mains units—"

"And found that the replies did not help you much," broke in Megohm, with a twinkle in his eye.

Amp nodded.

"Dear, oh dear," resumed the other, "what an extraordinary occurrence."

"Oh, heavens!" groaned Amp to himself. "I knew it. He is going to pull my leg right off now."

"What's the trouble, anyhow?" went on Megohm, still with a twinkle in his eye. "You know that electric-light mains supply electricity. You also know that you can use them to run your wireless set. You even know how it is done—or you ought to do."

"Yes," stammered Amp, "I thought I did, but this bloke started talking about neutrals, and earthed mains, and all sorts of funny words, and I had to pretend I understood when I didn't know what it was all about."

"In other words," nodded the Professor sagely, "you would like to know a little more how you get your electricity and the sort of bottles it is delivered in."

The boy grinned. What a funny way of putting it anyhow.

"Well," resumed the other, "let us take the case of D.C. The most obvious method of supply is to have a generator giving the voltage we

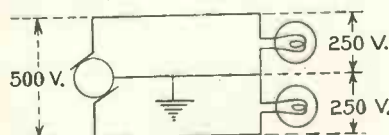


Fig. 2.—Simple form of three-wire system

require and to connect all the various lamps and other devices across the two wires like this (Fig. 1).

"The earliest forms of distribution were carried out like this, but it was soon found that this was not the most economical arrangement. You know that the power absorbed by any system is given by the product of the current and the voltage."

Amp nodded.

"So we can transmit the same power by having a current of 2 amperes at 200 volts or 1 ampere at 400 volts. When we try to transmit that power over a cable, however, we get losses due to the resistance of the wire, and you probably also know that the loss in any resistance is proportional to the square of the current."

Amp looked puzzled.

Increased Losses

Megohm, observing this, said: "Well, I won't stop now. If you ask me when I have shown you some of the various points about distribution systems, I'll show you just why this particular fact should be so. For the present take it for granted that as the current increases, loss increases much more rapidly. In the case we have just considered, the current of 2 amperes flowing through a cable would produce four times as much loss as a current of 1 ampere flowing through the same cable."

"Would it, really?" exclaimed the boy.

"It would," responded Megohm, his eyes twinkling again, "and in practice we should have to provide a larger cable having a smaller resistance in order to carry the heavier current without excessive loss. So that it pays us, if we can, to use higher voltages."

"But," objected Amp, "I thought that 400 volts were supposed to be dangerous."

"So it is, but as a matter of fact the maximum voltage which is allowed for any domestic supply is 250 volts."

"So you can't go as high as 400 volts?"

"I didn't say so. As a matter of fact, you can go as high as 500 volts."

Amp looked at the Professor in astonishment. In one breath he said that you were not allowed to have more than 250 volts and in the next breath he said you could have 500.

Megohm laughed.

Three-wire System

"We get over the difficulty," he explained, "by using what is called the three-wire system. Suppose we have a generator giving 500 volts, and we have two houses to supply, and we connect these two houses in series."

Amp's jaw dropped. "Well, I'm blessed!" he said. "Of course, I never thought of that."

He watched the Professor drawing the diagram shown in Fig. 2.

"Wait a minute, though," he thought to himself, "there's a snag here, Old Whiskers can't catch me as easily as this."

"That's all very well, Professor," he said out loud, "but supposing one house doesn't want any light and the other one does?"

"I was hoping you would spot that," responded the older man. "We must clearly take a lead back from the middle point to the generating station, and connect it some way to the centre point of the machine. Don't be hasty," he interrupted, as he saw Amp's mouth opening, "I'll explain how we do that in a minute. The point is that if we can do something of this sort, it will overcome your difficulty, won't it?"

"Yes," agreed the boy doubtfully.

Potential Difference

"And, further, if we connect this centre point to earth, we shall have a system in which neither house has more than 250 volts difference of potential above or below earth."

"Say that again, please," said Amp. "What do you mean by difference of potential, anyhow?"

"Let us say that the voltage in each house is only 250. In one case the negative lead of the mains is connected to earth, and the positive is 250 volts above earth, so that if anyone caught hold of the live lead, they would get a kick, but it would not ordinarily be a dangerous one."

Amp nodded in agreement.

"In the other house, we should have the positive lead connected to earth and the negative lead would be

250 volts different, so that again, if we caught hold of the live lead we should get a shock of not more than 250 volts."

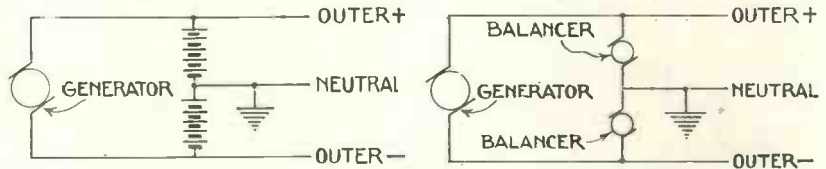
"Is that what they mean by a positive earth?"

"Exactly," agreed Megohm. "It means that you are on the negative side of a three-wire system."

Amp thought this over for some time. Finally he said: "That's all

"Is the loss so important, then?" asked Amp.

"Very," said the Professor. "The major cost of any distribution system is the cost of the copper in the cables, and if we can halve the amount of copper used, then we have saved a very considerable proportion of the total cost. As you see, the three-wire system goes a long way to solving this problem."



Figs. 3a and 3b.—Two methods of obtaining the neutral point

very nice, Professor, but I don't quite see what you have gained. If one house is not taking any current, then the other house's current has to come out and back to the generating station, and we still have 2 amperes at 250 volts, instead of 1 ampere at 500 volts. In fact, even if the other house switched on you wouldn't have 1 ampere, you'd have 2 amperes."

"Yes," agreed Megohm, "but you would be supplying twice the amount of power, for exactly the same loss. The 2 amperes going in and out from the generating station would cause no more loss whether it supplied one or two houses. As a matter of fact, in practice, where they are supplying a large number of houses, they arrange the load as far as possible equally on

Amp reflected, turning the matter over in his mind. Finally he said: "You haven't told me yet how you get this centre point on the generator."

"No," agreed the other. "Well, one very simple way is to put a battery across the whole generator and to connect the neutral to the centre point of this battery."

"What! A 500-volt battery?"

"Oh, yes. In some cases this is done because it enables one to shut down the generator and run entirely off the battery, during periods of light load. This, however, is only adopted in small undertakings.

"The more usual practice is to connect two small generators across the supply (Fig. 3). If the two motors are exactly similar and they are both running on the same shaft, the centre point between them must be exactly midway between the two outers, as we call them, and we can, therefore, connect the neutral to this point."

"That sounds ingenious," said the boy, "but it means three generators instead of one."

Balancing Generators

"These balancing generators have only to be quite small, however," said Megohm. "The only current they will ever be called on to supply is the slight difference in currents between the two paths of the system, and it is, therefore, quite an economical arrangement."

Wait a minute, though; the Professor had not explained this business of loss properly. So Amp said: "You were going to tell me, Professor, why the loss varies so much with the current."

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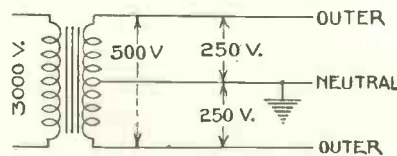


Fig. 4.—Three-wire scheme with alternating current supply

both sides so that the middle or neutral wire has to carry only a very small current.

"You can see, if you think it out, that it has to carry the difference between the currents taken on each side of the system, and as this is usually quite small, the neutral wire is of much smaller diameter than either of the two main cables."

"It sounds a jolly good scheme," said Amp thoughtfully. "Then you mean that by using this funny arrangement, you can transmit twice as much power with the same loss." Megohm nodded.

A WIRELESS ALPHABET

By Leslie M. Oyler



*for X-stoppers. These are trained
To be both solemn and restrained.
When interferences arise
From atmospherics each one tries
His very best to keep the peace,*

*They are the wireless-set police.
Though some accept excuses made
By atmospherics when afraid,
Others reject them on the spot.
They help receivers quite a lot.*



*Why on earth the letter Y
In wireless circles is passed by
I simply cannot fathom; still
I have to write, and so I will.
The river Wye we eulogise*

*Both for its beauty and its size,
And Wye in Kent, although 'tis small,
Is known to some, if not to all;
But once again I sadly sigh
"Why is Y ostracised? Why, Y?"*



*is for Zincite: with his friend
Bornite he makes a pleasant blend;
They are in partnership, these two,
And very useful work they do.
Their firm is one mechanics know,*

*The Perikon Detector Co.
My listeners begin to blink,
'Tis time that I closed down I think,
For now my Alphabet is done—
Good night, good night to everyone!*

Solving Some Mains Mysteries

(Continued from page 499)

"Oh, yes," agreed Megohm. "Let us suppose we have a cable which has a resistance R . Now you know, don't you, if a current flows through a resistance, the voltage across the resistance is IR ."

"Yes, that's Ohm's Law, isn't it?" broke in Amp excitedly, glad to find himself on solid ground once again.

"Exactly," said the Professor, "so we have a voltage across our cable of IR , and we have a current I . Therefore, the power consumed in that cable is the product of the voltage and the current; in other words, I^2R ."

"Oh, I see," ejaculated Amp, "the loss is proportional to the square of the current."

Amp picked up his hat and turned to go. Just as he reached the door, however, he was seized with a further idea: "I say, Professor," he said, turning back.

"Yes?"

"Can you have a three-wire system with alternating current?"

"Certainly. The principles involved are the same (Fig 4). It costs less to distribute 500 volts on a three-wire system in two sections of 250, rather than treat the whole area with a supply of 250 volts on a straight go-and-return arrangement. In fact, it is easier with A.C. because we do not require any balancers. Our neutral point can simply be taken to the centre point on the secondary of the transformer."

"What transformer?" objected Amp.

Megohm laughed. "Really, my lad, you're much too critical. For exactly the same reasons as we have already discussed, namely, the reduction of power loss, energy is transmitted from the generating stations with alternating current at a very high voltage, anything from 3,000 to 10,000 or more, and transformed down at the point where it is to be used to 500.

"This point is called the sub-station, and it acts as a small local generating station, drawing power from the mains supply at a very high voltage, and giving it out at a lower voltage. As you will see, the secondary supplies 500 volts, with a centre tap which is connected to earth, and so we have a 250-volt supply just as in the case of a D.C. system."

Dancing to Radio-at Christmas

I AM afraid that when the Christmas family party starts you will have to dance.

No doubt it is very trying for your patience. So it is for the youngsters. For a while they may put up with bridge, or even kissing games and after-supper stories, but before it gets too close to midnight some youngster is bound to say: "Let's have a hop."

I am a youngster, so I know!

Tables and settees are cleared away, and then the fun begins if there is any music. The thing is, will there be any music?

Easy Syncopation

People seem to be fed up with the domestic piano these days, and no doubt wireless is partly to blame, because Mr. Jack Payne and the efforts of the gentlemen at the Piccadilly Grill Room and other places have made it easier to get syncopation than by the labour-beset methods of Czerny.

Czerny meant hours of practising and thumping, and if the ultimate result was anything approaching Billy Mayer or Raie de Costa then the amateur performer was lucky!

He can now get Billy Mayer and Raie de Costa on very cheap records, and although this dearth of home talent may break Sir Walford Davies's heart, it is so much easier (isn't it?) to wind up the gramophone than it is to spend tedious hours with fourths, split basses and chromatic scales.

Plenty of Dance Music

And now we have wireless. At the time of writing I have not the B.B.C. advance Christmas programmes before me, but it seems fairly clear that there will be plenty of dance music for Christmas time—at least in the late evenings when the ordinary vaudeville items are over, and when the older folks are satisfied.

It is not my job to tell you how to prepare for Christmas reception. This issue is chock full of good technical advice on this subject, given by people better qualified to do so than am I. The only thing which from personal experience I would advise is to follow the Boy Scouts' motto and "Be Prepared."

Nothing falls flatter than a dance

By **KENNETH
ULLYETT**

without music (even if it is a twilight waltz!) and I have had the misfortune on various occasions to have batteries run down and valves give out at the crucial moment.

While the dancing party may be unanimous in applauding the provider of radio dance music, while it lasts, they are equally unanimous in their castigation if something goes wrong with the works and you have to suggest Postman's Knock or Beat-Your-Neighbour-Out-of-Doors, because there simply is no music to be had.

But don't let me frighten you. If you are running a radio gramophone outfit it is quite on the cards that it will be taking its high tension, if not its whole current supply, from the mains. That reduces the possibility of a complete breakdown to a small amount, depending on the age of the valves.

If yours is a battery set then you will be wise to take the usual precautions of having the low-tension freshly charged and of not putting too great a trust in a high-tension battery which has become sere and yellow with the passing years!

I have been following the writings of our friend Whitaker-Wilson very closely recently, and although he will probably snort when he finds that I have been paying particular attention to the new dance records he may feel gratified to note that I, personally, have followed his guidance and have bought some of the latest produced dance records for Christmas. Save me from carol records, no matter how good!

Although I am not being paid by any of the gramophone companies for saying so, I do recommend you to get one or two of the latest dance tunes, and to make arrangements for playing these through the wireless set by means of a pick-up.

Then, if the B.B.C. turns off its dance music at midnight and you feel like having a surfeit of syncopation, you can put on a few of these records and make your own dance band.

I have a shrewd suspicion that it is not only we ourselves who will be pleased with dance music this Christmas. Dance tunes are now so entertaining to listen to and although the "love-love" words are just as daft as they always were, the new comedy fox-trots are entertaining for listeners and dancers.

The impudent humour of some of the new dance-band effects is also easy to listen to, and I feel sure that our Christmas syncopation will be equally pleasing for those who are "twinkling," "hesitating," "gliding" and "dragging," and for the old folks.

Dancing at Home

Even the old folks will be induced to dance. I am not an expert dancer—being just sufficiently polished to feel the proverbial "pain in the neck" at seeing an elderly couple perform the stately contortions of the Edwardian waltz—but I am able to dance at home; and that is the case with thousands of other people who have not the leisure to be lounge lizards, but who like a dance occasionally so long as there are no critical observers.

Many friends of mine turn on the B.B.C. and Radio Paris dance music because they like to listen to it, but it never occurs to them to get up and dance to it—although I hope they will at Christmas. They go to a private dance only once in a blue moon and they do get so *horribly* out of form.

A Little Practice

If only they would take advantage of radio dance music in the home, and, during the "close" season, do a little practising in time with Jack Payne, then they would not be so beastly amateurish when they go out to dance.

I must keep a close eye on my visiting list and keep these people out of the bosom of my family at Christmas time, because they will be so much in the way during our Christmas dancing.

But there is yet time. Christmas will not be here for some weeks yet, and there is a brief but golden opportunity for you to brush up your dancing steps by means of broadcast dance music.



GIVE THEM RADIO

BATTERY PORTABLES :: MAINS-OPERATED TRANSPORTABLES :: MAINS

Why not solve your Christmas gift problem this year by giving radio? In this article ALAN HUNTER explains what types of sets make the best gifts and gives some representative prices.

Actual tests of five new receivers will be found in the pages that follow this article.

LET us start with portables. Their self-contained nature makes them particularly suitable as gifts. One can walk into a radio shop, or into one of the big stores in town, tell the salesman one has £20 to spend, and ask to hear a few portables at that price.

The difference between a portable and every other kind of set then manifests itself. For a portable can be played in the shop, just as a gramophone, whereas other sets need aerials, batteries, loud-speakers and parapher-

nalities not conducive to convenient demonstrations. Just now I mentioned £20, which happens to be a good average price for portables. Let us see what one gets for this outlay. A complete four- or five-valve set, a frame aerial, a loud-speaker and batteries or equivalent power equipment; altogether a fairly comprehensive installation.

Shapes of Portable Receivers

In choosing a portable as a gift, there is, firstly, the question of shape to be decided. Many portables are fashioned after the familiar suitcase, with the set and power supply in the main section of the container and the loud-speaker and frame aerial in the lid.

Probably the habits and environment of the recipient will decide whether radio in a suitcase is desirable. If he, or she, travels a lot, the suitcase portable might prove very acceptable. On the other hand, if the set is to be a stationary installation, a suitcase container might well strike a note of incongruity in the room it is destined to grace.

If so, there is another type of portable, having an upright cabinet construction, with the set controls mounted above the loud-speaker, the batteries behind the loud-speaker and the frame aerial completely encircling the whole interior construction. These upright portables are usually fitted with a turntable, so that they can be safely rested on a table without involving the ruination of the polished surface.

That is not the *raison d'être* of the turntable, which is really fitted so that the whole cabinet can be swung round bodily in the direction of the station required.

Shape is, perhaps, a superficial consideration compared with the results to be obtained. Without knowing much of

technicalities, the donor of a radio Christmas present should certainly become acquainted beforehand with certain distinctions. The chief is between four- and five-valve portables. Usually the five-valvers have only one tuning dial, whereas the four-valvers have two. To the non-technical reader this may sound paradoxical, but the explanation is simple. In a five-valve portable, there are two high-frequency amplifying valves. Ordinary three-electrode valves are used and their couplings are untuned. The only tuned part of the set is the frame aerial.

Tuning for Screened-grid Valve and Aerial

In most four-valve portables the two untuned three-electrode high-frequency valves are replaced by one screened-grid valve, which has a tuned coupling. As the frame is also tuned, this means two tuning adjustments.

If the recipient is living fairly close to a broadcasting centre, such as Brookman's Park, Daventry, or Manchester, the four-valve portable is preferable to the five. It's two tuning controls make the set more selective. That is to say, they enable the operator to separate a powerful station from a weaker one, or even two powerful stations one from the other.

As regards range, there is often little to choose between a four- and a five-valve portable. If anything, I should favour the four-valver. But we must not overlook the great ease in operating the one-dial five-valve portable. For a lady who refuses to be initiated into the mysteries of tuning, this sort of set is ideal as a gift.

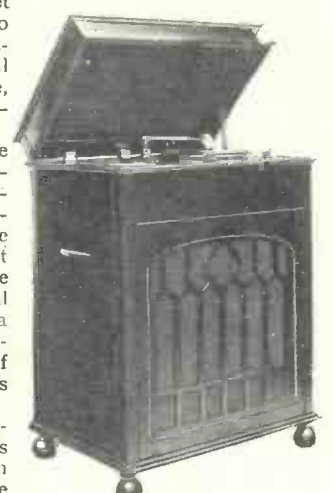
One can determine beforehand the dial settings for the stations within range, say, the local on the medium waves and Paris on the long waves. I am reminded of another great advantage of portables—the settings for a given station are the same wherever the set is situated. The self-contained frame aerial avoids the variation in tuning settings inevitable with a set having an external aerial.

Before I leave portables, which I consider ideal radio gifts, I ought to mention one of this season's big developments. I refer to the mains-driven portable, where the usual batteries are replaced by equipment enabling the set to be run from the electric-light supply, thereby avoiding all the troubles of maintenance.

Only a Few Models Available

This special type of portable is more costly than the battery-operated type. As far as I know there are only two or three models on the market, all priced within the region of 30 guineas.

Having devoted so much space to portables I must be careful what to suggest as alternatives. To my mind, any and every set is not ideal as a Christmas gift. Of course, much depends upon the price limit imposed by the donor. For someone without a set at all, on whom one wishes to



This radio gramophone is the Ethatropé home model; its price is 90 guineas



A typical portable set in an upright cabinet—the Selector Cabinet 32, price 32 guineas



THIS CHRISTMAS!

TABLE MODELS :: CONSOLE RECEIVERS :: RADIO GRAMOPHONES

spend £10 or £12, the new two-valve all-electric sets would probably prove very acceptable. At this price can be bought a highly-efficient little set working from the electric-light supply.

There is more in these sets than meets the eye. Of the two valves, the detector, with its A.C.-heated filament, is extraordinarily sensitive. And the second valve, the power valve, is usually supplied with sufficient voltage to enable it to give very fine quality of reproduction.

Compared with the two-valver of a few years ago, the A.C. "two" of to-day is a wonderful achievement. Such a set has no battery problem. And it will provide the local station or stations at good loud-speaker strength. Often an indoor aerial is quite sufficient to give this result.

When we come to consider really expensive gifts, costing up to £50, a wide vista of extremely satisfying instruments is opened up. The console readily comes to mind. In this type of radio is a three- or four-valve set deriving its power from the electric-light supply and housed in a really fine cabinet. Usually there is a self-contained loud-speaker, but not a self-contained aerial.

Destined to Become More Popular

Between 30 and 40 guineas, I could name several of these console sets, which are, I think, destined to become much more popular by the time Christmas 1931 arrives.

For a little more money, the radio gift de luxe can be considered—the radio gramophone. Several of these excellent combination instruments are now marketed at prices between £50 and £70. And for smaller purses I know of more than one good radio gramophone at £35.

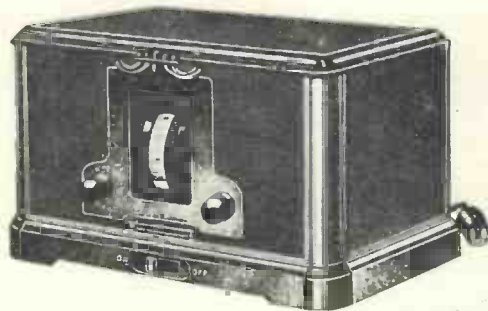
Let us briefly review the radio sets most suitable as Christmas gifts. In order of acceptability I place portables first, either for battery or mains operation, prices from 16 guineas to 30 guineas. Secondly, for leaner purses, self-contained two-valve all-electric sets; prices from

11 guineas to 15 guineas. Thirdly, consoles, from 35 guineas upwards. Fourthly, radio gramophones, from 35 guineas upwards.

To give radio for Christmas is a far more onerous task than giving club ties or Havana cigars. For one may discreetly ascertain beforehand which club the recipient prefers to represent, or which brand of cigars is least objectionable!

But with radio, apart from the danger of offending the æsthetic sense of the

recipient by presenting him with a shoddy varnished deal box, there is the need for preliminary spadework of a semi-technical nature.



An Ekco all-electric two-valver for A.C. or D.C. mains; price £14 10s.

The portable offers the least complication as a radio gift, because the question of aerial erection does not arise. But with the little A.C. two-valvers some sort of aerial is essential. One must find out whether the lady of the house has any prejudices against outdoor aerials or whether her furnishing sense will be outraged by the erection of an indoor aerial. The mere male usually

does not care one way or the other about these things.

Nature of the Electric-light Supply

Then the nature of the electric-light supply must be found out, because if it is direct current it will be quite useless for an A.C. set. This type of set also needs a loud-speaker; so one must either hear some representative models and present the most pleasing—hanging the expense!—or quietly hint to the recipient that the set

you are giving him will serve as an excellent start for a complete installation.

If the recipient is a family man who revels in his ignorance of technicalities, sets with six or more knobs should be shunned. For such a man one should select a set having only one tuning knob, one volume control, and one switch to put the set out of action when the programmes become annoying.

Some of the best sets are so designed that tuning is reduced to the last degree of simplicity. Instead of marking the dial in so many degree divisions, it is divided into wavelengths. Even a non-technical listener can then find out what is the wavelength of the station required and adjust the dial to the correct wavelength mark.

Sets without this form of calibration should not be summarily rejected, because the makers may have prepared a simple tuning chart to relate wavelengths to dial divisions.

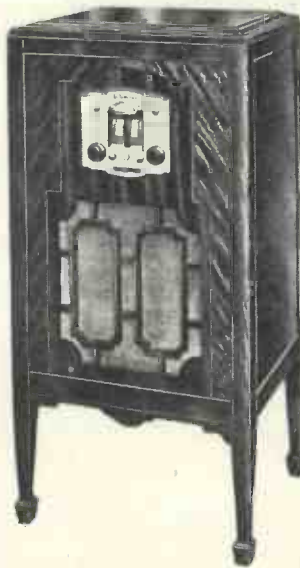
A console type of receiver—the Columbia Model 331 in mahogany case, price 30 guineas

In A.C.-mains sets the tuning dial should be brightly illuminated by a small bulb fitted behind.

From what I have said, the reader will appreciate the fact that radio can come to the rescue for Christmas gifts of all prices. They say it is better to give than to receive; but I think to-day we can surely say it is better to give in order to receive—broadcasting stations!



The Dunham suitcase portable costs 20 guineas and is particularly attractive



Chromogram Radio Gramophone

NOT long ago, in our preliminary chat on the month's work, we remarked upon the dearth of inexpensive radio gramophones; of instruments that would reproduce broadcasting or gramophone records with good quality but at a volume more in keeping with a living-room than with the Albert Hall. Well, here is just such an instrument, the Chromogram, moderately priced at 35 guineas.

Let us see what one gets for this outlay. For while it is comparatively modest, it is still a great deal of money to many people. Firstly, a high-class gramophone, the like of which, if bought separately, would cost £15. Secondly, a well-designed three-valve all-electric set, which would cost at least £20 as a separate instrument.

Thirdly, an inductor dynamic loud-speaker, giving moving-coil results, costing say £5. Add the cost of a good pick-up and you get a total of over £44. So the Chromogram at £35 is certainly value for money.

When it was delivered to a member of the Set Selection Bureau living in south-west London, the Chromogram created a favourable impression. Its solid oak cabinet houses the constituent parts in a sensible arrangement.

Loud-speaker Grilles

The loud-speaker takes up the bottom of the cabinet. Two loud-speaker grilles are provided, one at the front and one at the back of the cabinet, presumably to avoid boomy bass reproduction. Above the loud-speaker is the three-valve set and power unit, which can both be got at by lifting up the turntable platform. Only four screws have to be undone to expose the set and power point.

The turntable fitted to the

Maker: *Micro-Perophone and Chromogram, Ltd.*
Power Supply: A.C.
Price: 35 guineas.

Power Consumption:
30 to 45 watts.
Valve Combination:
S.G., D., P.

model tested is driven by a double-spring Garrard motor; very good for its type, but irritating to anyone accustomed to an electrically-



GOOD VALUE FOR MONEY

This set is interesting because it is the product of a gramophone manufacturer who has turned to radio for better reproduction

driven motor. For those who prefer it (who would not?) the makers say they can fit a Garrard electric motor at a cost of three guineas.

We think they might list the Chromogram at a little more than £35, so that an electric motor could be standardised. If the instrument tested is to be used at all it must be worked from A.C. mains. And if A.C. mains are available the nuisance of re-winding ought not to be given a chance to manifest itself. Still, that is entirely the makers' business

With an eye to possible ser-

vice needs, the makers have arranged the set and power unit in very convenient screened boxes.

The screened-grid high-frequency valve with its tuning coil is completely screened in one box from the detector and its tuning coil in another box. The two-gang tuning condenser is also completely screened in a third box, with a trimming knob at the top.

Only the power valve and one or two associated parts are exposed. Altogether a very clean interior layout, which is reflected in the simplicity of the panel controls.

A handy size of knob is on the left for reaction. Near it is the wave-range switch, clearly engraved to indicate which of the two wavebands is in circuit. On the right is a three-position switch; gramophone record reproduction to the left, mains off at the centre and radio to the right.

Nearby is the volume control, which, since it is connected to the low-frequency amplifier, operates for both radio and gramophone. There are no other controls on the panel, but inside is a small aerial switch, providing the alternative of an aerial from the mains or from an external wire. Then there is a variable adjustment on the aerial series condenser, mounted near the switch just mentioned.

Our first test was to try the Chromogram as a gramophone - record reproducer. Here we noted the inclusion of a B.T.H. pick-up.

As soon as the first record started we were satisfied that the Chromogram could deliver the goods. Such instantaneous approval implied a high standard of

performance, which further auditions served only to emphasise. The makers have hit upon, or perhaps it would be more just to say arrived at, a combination of power valve and loud-speaker producing a most pleasing effect.

The maximum distortionless volume within the powers of the valve was obtained with the volume control a third on. Further rotation towards maximum produced overloading.

Radio Results

We spent a pleasant evening with the radio side of the Chromogram. It is a good three-valver, making much of its screened-grid high-frequency amplifier. And the use of power grid detection does more than prevent overloading of the detector valve.

Selectivity is quite good for the circuit employed. London Regional, full loud-speaker strength at 90, had gone at 83 and 97, a 14-degrees spread. The National was full strength at 47 but silent again at 42 and 51, a spread of only 9 degrees.

Sensitivity

Sensitivity was well up to the standard expected. Twenty-four full loud-speaker signals were obtained on the medium waveband. These included Cologne at 29, Leipzig at 43, Turin 52, Bratislava 54, Cardiff 69, Toulouse 102, Frankfurt 104, Dublin 115, Stockholm 123, Rome 125, Lyons 135, Langenberg 137, Milan 147, Vienna 152 and Budapest 163.



WELL SCREENED RECEIVER

This photograph shows the screening boxes at the back of the cabinet and the well-screened radio section



Philips A.C. Three—Model 2531

CLOSELY resembling in its circuit arrangement the famous model 2514, the new Philips model 2531 all-electric three-valver is one of the outstanding sets of the season.

This three-valver is for electric-light supplies of the alternating-current variety. For direct-current supplies there is another three-valve model in the Philips range. As the voltage of A.C. mains differs considerably with each district, this set is provided with a tapped transformer, covering all supplies between 110 volts and 253 volts.

Compact Design

As with all Philips sets, the construction is extremely compact.

The valves form a powerful combination. The first is an A.C.-heated high-frequency amplifier of the screened-grid type. The A.C.-heated detector follows, and transformer-coupled to it is the last valve, a directly-heated pentode.

As there is a high-frequency valve, two stages of tuning are involved. Separate tuning condensers are provided so two knobs have to be turned to locate any given station.

The controls of the Philips set are conveniently arranged at each end of the cabinet. At the left-hand end we find a fairly large knob for volume control. Near by is a smaller knob operating one of the tuning condensers as well as rotating one of the two tuning scales arranged at the front of the set. Then there is the mains switch and the waveband switch.

A distinctive feature is the provision of three separate ranges of wavelengths. The waveband switch can be set to cover a wavelength range between 200 metres and 450

Maker : Philips Lamps, Ltd.
Power Supply : A.C. mains
Price : £23.

Power Consumption : 27 watts.
Valve Combination : S.G., D., Pen.

metres; or 400 metres and 950 metres; or 900 metres and 2,100 metres. This enables wavelengths to be explored very thoroughly. There is no wavelength gap between 200 and 2,100 metres.

At the right hand of the set is a large knob for reaction and a smaller knob operating the second tuning condenser, as well as the tuning scale on the right. We found all the controls worked smoothly and efficiently during our tests, details of which follow.

The volume control operates in front of the detector valve so that when only the detector valve and power valve are used for gramophone-record reproduction an external pick-up volume control is needed. The knob of the volume control rotates over 180 degrees, but its effective range is over 90 degrees, after which signals are inaudible.

Reaction was found to have a very pronounced

effect at full loud-speaker strength by turning the reaction knob towards the point of oscillation, which is produced very smoothly; there is no need to make the set oscillate when searching.

Selectivity in the London area was determined by the ability of the set to cut out the National and Regional programmes from Brookman's Park. The degree of selectivity of the Philips set can be gauged from the following dial readings taken.



A SHOCKPROOF DESIGN

When the lid of this Philips set is opened the mains are automatically switched off



HANDSOME AND COMPACT

This Philips set is built up into a handsome brown bakelite container that is most attractive

effect in building up the strength of distant stations. Many stations that would have been almost inaudible without reaction were re-

ceived at full loud-speaker strength by turning the reaction knob towards the point of oscillation, which is produced very smoothly; there is no need to make the set oscillate when searching.

The National station on 261 metres came in at 75 degrees on the left-hand dial. At 65, below, and 90, above, this station had completely disappeared, thereby indicating a total swamping effect of 25 degrees. Of course the right-hand dial was adjusted each time.

The Regional station on 356 metres came in at 110 degrees on the left-hand dial and disappeared at 100 degrees, below, and 120 degrees, above. This shows a reduction in the swamping effect, which was experienced over 20 degrees.

Sensitivity is indicated by

the fact that we were able to tune in 27 full loud-speaker signals on a 65-ft. indoor aerial. On the 450- to 900-metre range we got seven stations, starting with Budapest at 70 and 60 and coming down through Vienna, Midland Regional, Langenberg, Lyons, Rome, to Stockholm at 42 and 35.

Here we experienced some interference due to lack of selectivity, so the wavelength range was switched over to the 200- to 450-metre section, where Stockholm was clearly re-tuned at 158 and 132. We came down to Katowice, Glasgow, Frankfurt, Toulouse and Hamburg to the London Regional at 110 and 104. Below this we encountered a lot of heterodynes until we got to Göteborg at 98 and 88. So down through Cardiff, Bordeaux, Bratislava and Turin to the National 75 and 65 degrees. Below this Gleiwitz and Leipzig were received.

Long-wave Results

On the long waves we got the usual batch of six stations. Huizen 124 and 111 at the top end of the scale and Hilversum at 54 and 42 at the bottom end of the scale were very good. Radio Paris 110 and 104 was clear of Daventry 95 and 90; so was Eiffel Tower, 80 and 70. Kalundborg 60 and 50 was exceptionally strong.



Gambrell Four-valver—Model R4A.C.

THIS set for alternating-current mains has four valves, one amplifying at high frequency, another detecting and the third and fourth amplifying at low frequency. While sensitivity, or ability to pick up distant stations, is therefore on a par with the sensitivity of the average three-valver, the volume at which distant signals are heard is considerably greater. Such a set as the Gambrell four-valver under review would, we suggest, admirably suit listeners remote from a broadcasting centre, as in Devon and Cornwall. Or for more fortunately situated listeners this set offers powerful reception of a large number of stations on a small indoor aerial.

If no sort of aerial can be erected the Gambrell can be worked without. The electric-light wiring is utilised as a form of aerial in the set's mains aerial connection, which is provided as an alternative to the normal aerial connection.

With the mains aerial the range is naturally restricted. But such is the power of the set that, when tested in London, we got tremendous volume from the Midland Regional; and the strength of such stations as Langenberg, Rome and Katowice was more than enough.

Without An Aerial

It is evident that the entire elimination of the aerial does not limit the range of this powerful A.C. set to the local station. A good earth lead is wanted, whatever sort of aerial is used, otherwise the mains cause a hum background.

Whether all this power is needed under normal conditions we hesitate to say. What we do emphasise is that, with its great reserve of power, the Gambrell four-valver delivers extremely fine quality reproduction without the slightest trace of forcing.

To the technical man this quality will be understood

Maker : *Gambrell Radio, Ltd.*
Power Supply : *A.C. mains.*
Price : *£33.*

Power Consumption :
30 watts.
Valve Combination :
S.G., D., L.F., P.

when we state that the first of the low-frequency valves after the detector is a Mazda P1, coupled to the output power valve, which is a

lifetime of the set? The centre of things is an escutcheon plate carrying two drum dials mounted side by side, so that both can be simultaneously rotated. Each dial has a fast- and slow-motion control, a refinement that is appreciated when searching for weak distant stations.

Mounted at the left are two knobs, the top one for auxiliary aerial tuning and the bottom one for selectivity. Both these controls are absent in the average set.

On the right are two similar shaped knobs, the top for reaction and the bottom for volume control. Then underneath the tuning panel is a knob that has to be pulled for gramophone reproduction. Above the tuning is a similar

knob, pulled for low waves and pushed for long. Altogether eight different adjustments can be made—nine if one counts the mains

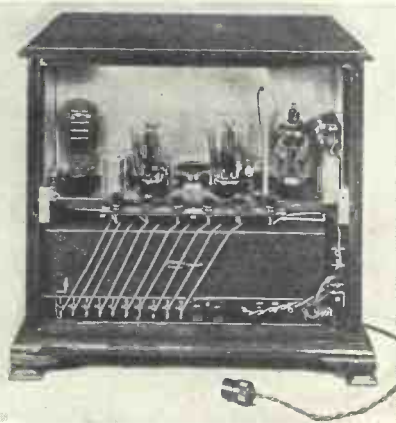
Mullard DO20. This set delivers good quality suitable for a moving-coil loud-speaker, which is likely to be overloaded before the output power valve.

The makers have in no way skimped the controls, which are notable for their number and variety of functions. The absolute novice might well take fright at the control panel, but more seasoned set operators will probably delight in the scope offered for expert manipulation.

It is only fair to say that most of the controls are necessary and that there is no trouble in tuning in the local stations. But for the more distant stations at least one evening's experience would be necessary. Still, what is one evening in the



FOR LONG-DISTANCE STATIONS
This set gives enormous power output because of the large amplifying valves employed. Many foreign stations were received on it



NEAT AND ACCESSIBLE DESIGN

The mains unit is built up in a separate metal case placed under the receiver, which occupies the top part of the cabinet

on-off switch at the bottom of the set. At the back we find terminals for loud-speaker, aerial and earth, and gramophone pick-up.

Perhaps the need for the two controls on the left is not fully appreciated. The selectivity control, which actually controls the coupling of the aerial coil, is highly effective, not only in cutting out the local in favour of more distant stations, but in separating one distant station from another.

Logging Stations

The aerial-tuning knob certainly makes three tuning controls altogether and the technique of operating them must be grasped. But with so much amplification after the detector, this triplication of tuning is essential in order to preserve adequate selectivity. During tests we ourselves had no difficulty in logging many stations. The following extracts from our log show the relative positions of the left- and right-hand tuning dials. All the following stations were definitely identified at full loud-speaker strength.

On Medium Waves

Kiel, 22 and 10; Nürnberg, 24 and 16; National, 29 and 20; Turin, 31 and 24; Regional, 46 and 41; Toulouse, 52 and 46; Katowice, 58 and 50; Dublin, 59 and 52; Berlin, 60 and 54; Rome, 65 and 59; Paris, 72 and 66; Langenberg, 74 and 68; Midland, 76 and 69; Milan, 80 and 76; Vienna, 84 and 79; Budapest, 88 and 88.

On the long waves we received Huizen at 83 and 80; Radio Paris, 71 and 64; Daventry, 60 and 55; Eiffel Tower, 51 and 42; Motala, 44 and 35; Kalundborg, 34 and 28.

These stations by no means exhaust the log, but they represent good signals received without interference and at good strength and quality. No more need be said.



Kolster Brandes Pup—Two-valver

FOR a two-valve set, the Kolster Brandes Pup gave an unexpectedly good show. During tests we were able to bring in many of the more powerful foreign stations at loud-speaker strength.

This is the sort of set listeners with a lean purse might well consider as a means of obtaining satisfactory broadcast reception at low cost. With the valves and batteries, the whole installation would cost just over £5. With the addition of an aerial and earth the K.B. Pup is complete.

Mass-produced

The set has several claims to distinction, apart from its low price. For one thing it is obviously mass-produced. Wherever possible economy of material has been effected. So compact is the two-valve set that it occupies only a small platform at the top of

Maker: Kolster Brandes, Ltd.

Power Supply: Batteries.

Valve Combination: D., P.

Price: £3 5s. without valves.

Power Consumption: 120 volts; 9 milliamperes.

smaller than the average loud-speaker cabinet, are mounted the variable controls. The two chief controls are for aerial tuning and reaction. Beyond these two dials is a small two-way switch for bringing the set into action or turning it off when not required.

Then there is an aerial and earth terminal board having five sockets mounted in a row. The first socket is aerial A2, which provides for selective tuning. The second socket is the aerial A1 or normal connection. The third socket is for the earth lead. The fifth socket is bridged to the fourth socket by means of a short flexible connection

when receiving medium waves. This shorting link is withdrawn when long wavelengths are required.

Even in this simple set the loud-speaker has an adjustable movement. By means of a screw in the middle of the loud-speaker grille at the front of the set the loud-speaker can be adjusted to give the best results.

The valves consist of a detector and

a transformer-coupled power stage. Recommended types are Mullard, Osram and Mazda. For our tests we used a Mullard PM1HF detector and a Mullard PM2 power valve. Starting on the medium waves, by inserting the shorting link, we were frankly surprised at the performance.

The London Regional came in at 56 degrees and the

Midland Regional at 134 degrees. These stations were received with the aerial lead plugged into the socket marked A1.

We could not get the National with this aerial connection, so A2 was used. Of course, this altered the tuning settings and the National came in at 28 degrees, the London Regional at 78 degrees, and the Midland Regional at 162 degrees.

From these preliminary readings one can see how well the three stations are separated on the tuning dial. There was absolutely no interference between the London Regional and National transmissions. Selectivity is really good.

So is the sensitivity, for the Midland Regional came in at full loud-speaker strength. Distant-station reception was carried out during two successive evenings. Rome, Langenberg and Bratislava were exceptionally good on the first night and next night the log of distant stations was brought up to 14, all at fair loud-speaker strength.

Whether this performance can be repeated depends entirely upon the operator. The K.B. Pup certainly makes things easy for the non-expert listener. The reaction control works so smoothly that the detector valve can readily be brought to its most sensitive position, which is just short of the oscillation point.

On the long wavelengths we did not expect to do much apart from receiving the Daventry 5XX transmission. This came in so loudly that we were encouraged to try for some of the Continental long-wave stations; we were delighted to find Radio Paris at 62 degrees and Eiffel Tower at 25 degrees. Both these transmissions were quite



SIMPLE IN CONCEPTION

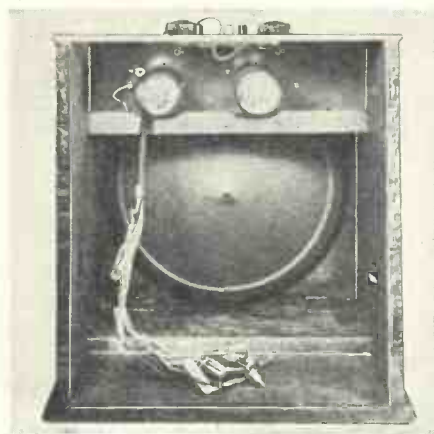
Although so small and simple, the Kolster Brandes Pup gives remarkable results for a set of its type. Just the set to install in your kitchen

strong on the loud-speaker.

In view of the makers' recommendation of a 100-volt high-tension supply the volume of distortionless sound is necessarily limited. But up to the point where the volume is within the handling powers of the power valve, worked at 100 volts, quality of reproduction on the self-contained cone loud-speaker is more than passing fair.

Good Sensitivity

Our tests in London of the sensitivity of the Kolster Brandes Pup can be taken as a guide to its probable range. As we got the Midland Regional station at such good strength, the loud-speaker range is certainly not less than fifty miles from a regional centre. And this range could be considerably extended if the set-buyer was prepared to erect an efficient aerial.



NO UNNECESSARY CONTROLS

Simple to tune, this set is quite self-contained with batteries and loud-speaker in the case. All the battery leads are provided with indicating tags that makes connecting an easy matter

the cabinet. Underneath is fitted a cone loud-speaker.

A multi-way cable coming from the set branches out into several battery leads. These are connected to the high-tension battery and the accumulator, which are also contained within the cabinet.

Apart from the aerial and earth the K.B. Pup is self-contained. On top of the cabinet, which is much



Gecophone A.C. Three—Model B.C. 3130

At £18 this new set from the General Electric Company probably stands alone in the three-valve all-electric class. In view of the fact that it is two or three pounds cheaper than the average set of its type, we were greatly interested to see how the cheapening had been effected. After a thor-

Maker: *General Electric Co., Ltd.*
Power Supply: *A.C. mains.*
Price: *£18.*

Power Consumption:
50 watts.
Valve Combination:
S.G., D., Pen.

This set has two knobs for tuning, arranged one on either side of an escutcheon plate carrying the two tuning dials. These are not calibrated in wavelengths, as in some other Gecophone sets. To offset this omission the makers have included in the instruction booklet a selection of dial calibrations for the guidance of the operator.



A WELL-DESIGNED RECEIVER

It is clear from this photograph that the Gecophone A.C. three-valver has been designed by experts. Note the screening of the tuned circuits

ough test we must admit that the only cheap thing about the set is its price. Appearance, performance and operation are awarded high marks.

By an ebonising process, the wood of the cabinet has a Chinese lacquer appearance, quite pleasing to those with oriental tastes. The shape of the cabinet, as the picture shows, is in keeping with the severity of modern styles.

Metal Chassis

Inside the cabinet is a neat metal chassis, carrying screened coils and all the parts for the three-valve set. Behind are the four valves, arranged in the order of screened-grid high-frequency amplifier, detector, pentode power valve and high-tension rectifying valve. Altogether an extremely powerful combination.

Our first test was to check these calibrations by tuning in one or two well-known stations. The book gives 55 and 54 degrees on left and right dials respectively to correspond with 1,800 metres. Radio Paris on 1,725 metres came in at 53 and 56.

Eiffel Tower came in at 35 and 38. As its wavelength is 1,445 metres this is a useful check for the book's calibration of 1,440 metres, which is given as 33 and 31. We think the readings given in the book should form a useful guide to listeners tuning in foreign stations for the first time.

Tuning is easy because both dials have to be set to the same readings for any given station. The wavelength ranges from medium to long waves are changed by means of a rod

running right along the under side of the set. There is no indication as to which way this rod must be pushed for a given wavelength range. Nor are the other controls engraved to show their different functions. But the book again comes to the rescue with very full explanations. And fixed inside the lid is a group of explanatory diagrams.

Apart from the tuning controls there is a knob on the left side of the set to vary the volume. This consists of a variable condenser in series with the aerial and the set. When it reduces volume it also increases selectivity.

At the right end of the set is a knob for reaction control. We found this made a great difference to the strength of all the foreign stations received. It was inclined to be fierce in action.

Two aerial terminal connections are provided. For normal conditions terminal A is used. With this, the two dial readings are almost the same, but with aerial terminal B, only needed under exceptionally bad aerial conditions, the aerial tuning is thrown out and the left-hand dial shows a much lower

reading compared with the right-hand dial.

Terminals for a gramophone pick-up are included, so we tested for quality of reproduction by playing a gramophone record through the set. Probably due to the use of a pentode power valve, quality was extremely clean-cut. The tone was crisp but ample bass-note reproduction was in evidence. This verdict was arrived at by using an inductor dynamic loud-speaker of the type marketed by the General Electric Company.

Selectivity

Now we come to the selectivity of the set. The London National station was tuned in at 10 and 10 on left and right dials. At 13 and 12 it had disappeared. Also at 7 and 7. This indicates very good selectivity. To do this we made some use of the selectivity knob.

The London Regional came in at 26 and 30. It had gone again at 32 and 35 one way and 20 and 22 the other way. The spreading effect was therefore greater, being 12 degrees on the left dial and 13 degrees on the right dial. Nevertheless, we consider this also is good selectivity.

Long-wave Results

On the long waves Daventry was received at 44 and 44 degrees. Quite clear of it was Radio Paris at 53 and 56.

So was Eiffel Tower at 37 and 36. Zeesen could not be received. Still on the long waves, we got Motala at good strength 29 and 32. Kalundborg 19 and 20 was fair. Hilversum at 15 and 12 was very good.

We have dealt with the quality of reproduction, which is good; with the selectivity which is also good, and with the ease of control which is satisfactory; finally the sensitivity is good. Fifteen full loud-speaker signals were definitely logged during our tests.



FINE APPEARANCE

The black and gold finish on this set is very attractive. Note the handsome escutcheon for the two dials



THE HYPERDYNE RECEIVER

HYPERDYNE
HYPERDYNE
HYPERDYNE

DESIGNED
BY **J. H. REYNER,**
B.Sc., A.M.I.E.E.



★
**ALL THE
ADVANTAGES
OF THE
SUPER-HET
PRINCIPLE
WITHOUT ITS
DRAWBACKS**
★

A MODERN SET FOR MODERN CONDITIONS

HERE is a receiver *de luxe*. It will give you a performance which seems almost like a dream in these days of the overcrowded ether.

The reader, casting his eye over this article generally, will immediately perceive that the system has the characteristics of a super-heterodyne. Now this type of receiver has been dead for some years in this country. What excuse can there be for reviving an out-of-date system?

Novel Interpretation

In the first place we are becoming more used to multi-valve receivers, and the conditions of radio to-day call for a number of tuned circuits. The super-heterodyne system, in theory, enables one to achieve the

selectivity and signal strength which one requires with less complication than a straight circuit. The practical form of the circuit, however, does not live up to the theoretical promise and the real success of this new system lies in the fact that the theory has been interpreted in a novel manner.

Instead of using an intermediate frequency of between 30 and 100 kilocycles, a frequency of the order of 2,000 kilocycles has been employed. This essential difference has produced results of such an excellent character, and yet so simple in the achievement, that I have felt that the system deserves a distinctive name, and have called it the Hyper-heterodyne or, for short, the Hyperdyne.

It will be as well to recapitulate

very briefly some of the advantages of the method. They are:—

1.—By amplifying at 2,000 kilocycles, selectivity is obtained without sacrificing the quality.

2.—The intermediate frequency amplifier is of an essentially simple character, and is inexpensive to construct.

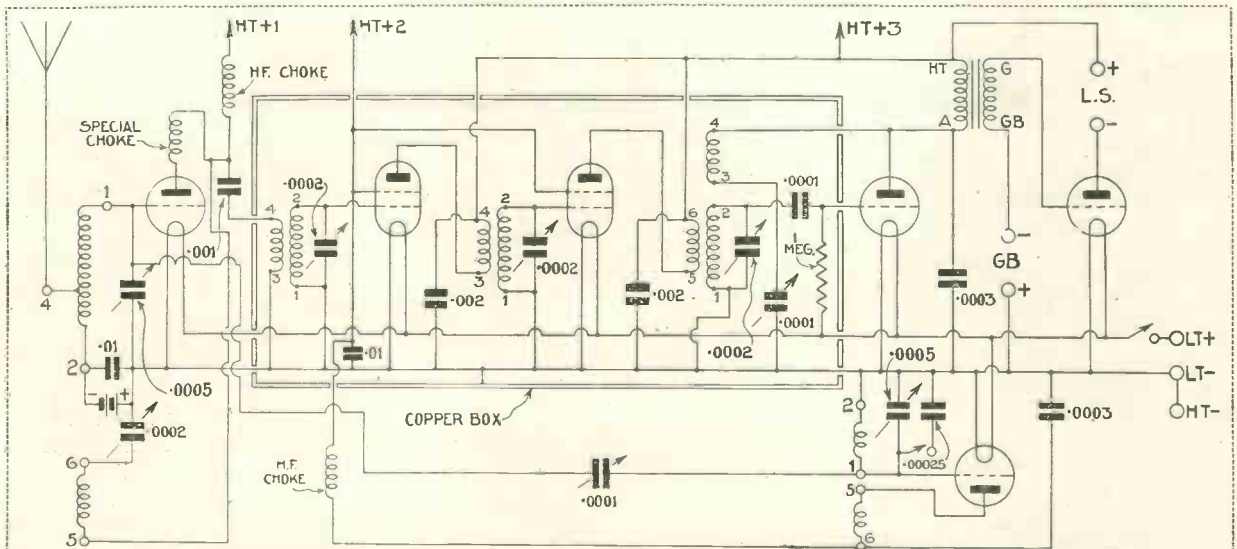
No Second Channel

3.—There is no "second channel interference." Each station tunes in at one point only.

4.—There are only two operating controls, one for the aerial circuit and one for the oscillator.

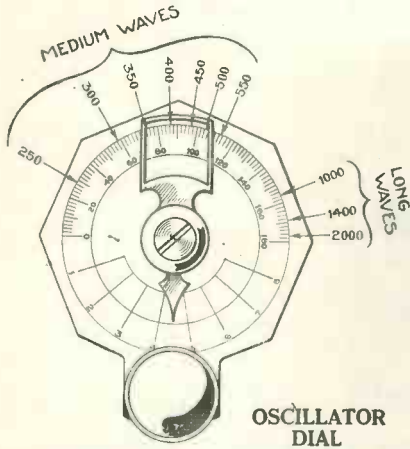
5.—The arrangement works on an indoor aerial; no frame is needed.

6.—The receiver can be adapted to



ALTHOUGH SIX VALVES ARE USED, THE CIRCUIT IS QUITE STRAIGHTFORWARD
In this receiver the intermediate-frequency screened-grid amplifiers work at a frequency of about 2,000 kilocycles

The Hyperdyne Receiver—Continued



This diagram shows the approximate dial settings for the long- and medium-wave stations

ultra short-wave reception, where it will give the same remarkable performance as on the broadcast band.

Details of its practical performance will be of interest. In gauging the capabilities of a receiver of this kind a daylight test is always preferable, because a distant station in daylight is consistently weak, whereas at night time the strength varies and may be misleading in its strength.

An Old Test

It is significant that with this receiver I was able to revive one of my old tests, that of receiving Cardiff in daylight whilst London was working. In the old days, when Cardiff was working on 353 metres, with London on 365, this could just be done on a really selective receiver. To-day Cardiff works on 310 metres and London on 361, but this is offset by the fact that Brookman's Park is only six miles from us at Elstree and that the power has been increased more than ten times.

In fact, no receiver which I have tested since the inauguration of the

regional scheme would do this, yet the new Hyperdyne receiver will put Cardiff on the loud-speaker consistently any afternoon.

The performance on the long waves is equally good, all the usual stations being obtained on an indoor aerial at good loud-speaker strength.

The most striking test here is that of obtaining Zeesen, the German station between 5XX and Radio Paris, when both these stations are working. As a matter of fact there is a slight interference from Daventry on this station, which is unavoidable unless one is prepared to cut too much of the sidebands, but this performance will indicate the capabilities of the receiver.

These special cases are quoted for the benefit of the critical reader. The

rotation of the dials, however, brings in station after station without any critical adjustment. The receiver, indeed, is essentially one in which a station is either obtained at good loud-speaker strength or not at all.

Short-wave Reception

The possibility of receiving ultra-short waves has already been referred to. Equipment for this purpose has not been included in this receiver, however, since the majority of readers only require broadcast reception. An adaptor will be described later which, in conjunction with the present receiver, will give loud-speaker short-wave reception.

The circuit of the receiver is shown on page 509, and we can follow through the sequence of operations in the following manner.

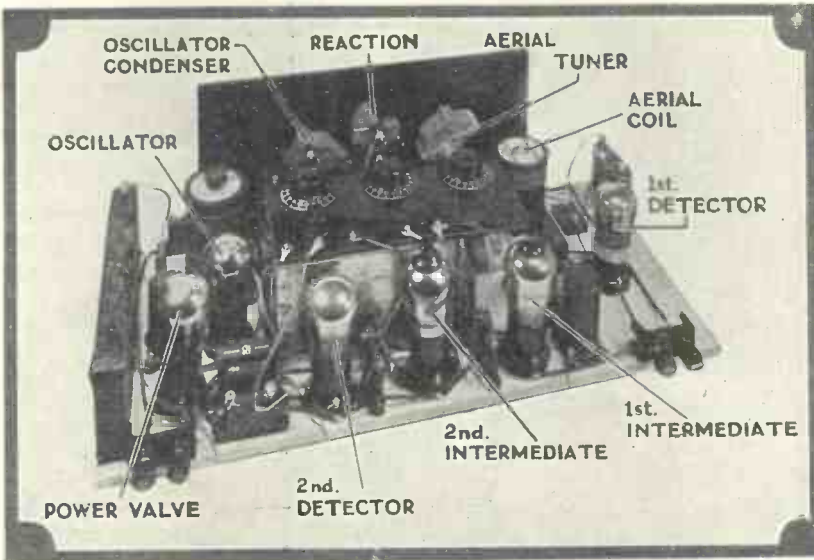
First of all there is a simple detector, which is tuned to the incoming signal, and for this purpose a standard dual-range coil has been adopted. Into this detector is introduced a high-frequency oscillation, in the neighbourhood of 100 metres.

An anode-bend arrangement is used for the detector, and this is slightly over-biased. This is so that the detector shall not operate effectively until the incoming signal is mixed with the high-frequency

oscillation, that is, until the station is properly tuned in on the oscillator dial. This arrangement contributes materially to the selectivity and reduces the "spread over" of local stations.

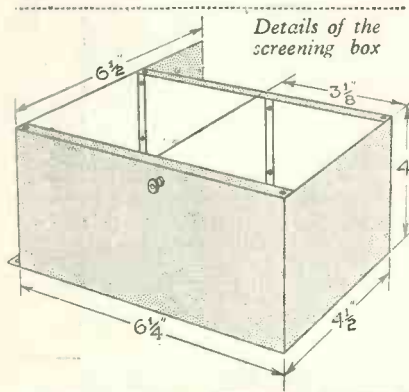
Intermediate Amplifier

The 100-metre oscillation and the incoming signal combine to give a mean wavelength which is of the order of 150 metres, and this signal is passed on to the two stage intermediate-frequency amplifier. It is here amplified, and any unwanted signals



COMPLETELY ASSEMBLED AND READY FOR USE

Here is the set complete with valves and all ready for connecting up



A Special Design by J. H. Reyner, B.Sc.

are rejected owing to the tuning properties of the system, after which the signals are again rectified and passed through a final stage of low-frequency amplification.

In practice, of course, the oscillator is not adjusted to 100 metres, the frequency being chosen so that, combined with the incoming signal, it gives the exact frequency to which the intermediate stages are tuned.

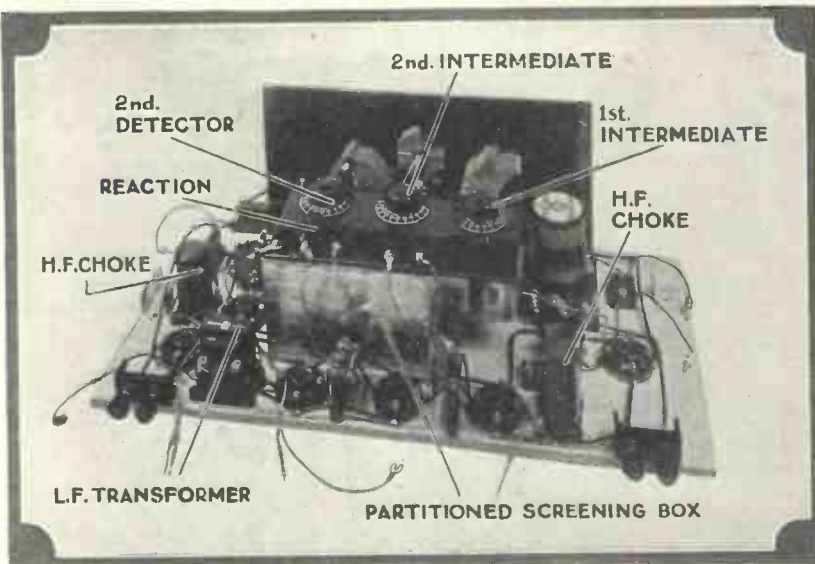
Simple Control

Although this sounds complex when written down on paper, the choice of the right frequency in practice is obtained simply by rotating the oscillator control. When the correct frequency is reached the signals are heard on the loud-speaker and the arrangement tunes exactly as if it were an ordinary set.

The intermediate-frequency amplifier is exceedingly simple, as will be seen. It consists of three tuning condensers, to each of which is attached a radio-frequency transformer consisting of a single-layer coil with a small primary winding over one end.

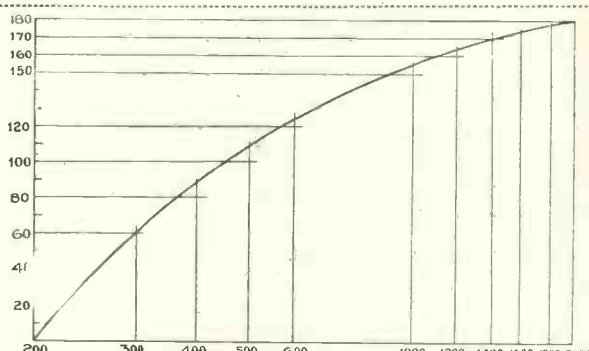
The whole of this assembly is mounted on a small ebonite panel and fitted to a screening box in order to shield one stage from the other.

In order to obtain correct



NOT AT ALL DIFFICULT TO CONSTRUCT

There is nothing really difficult about the construction of this receiver



Approximate dial readings of the oscillator, using a Lewcos AMS9 coil, with the 00025-microfarad condenser in circuit and the intermediates set at 60 degrees

separation of the frequencies after they have mixed in the first detector, a special high-frequency choke is required. This consists of only a few turns of wire on a 1-in. former, and will present no difficulties. Apart from this, no special parts are used.

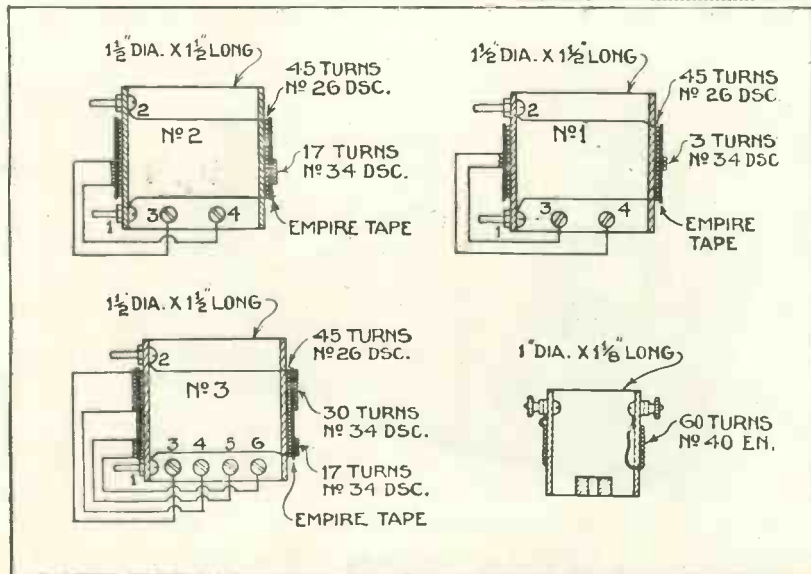
The method of changing from long to medium waves is a matter of interest. The initial tuning circuit is a standard dual-range coil, which is provided with a self-contained switch for changing over in the ordinary way.

The oscillator is, however, so chosen that the medium waves are tuned in over the first 120 degrees or so of the dial, while the long waves occupy the remaining 60 degrees.

No Oscillator Change

There is thus no change over required on the oscillator, and as this dial is the one which principally controls the tuning, it means that one can obtain a complete calibration of the whole broadcast band on one dial.

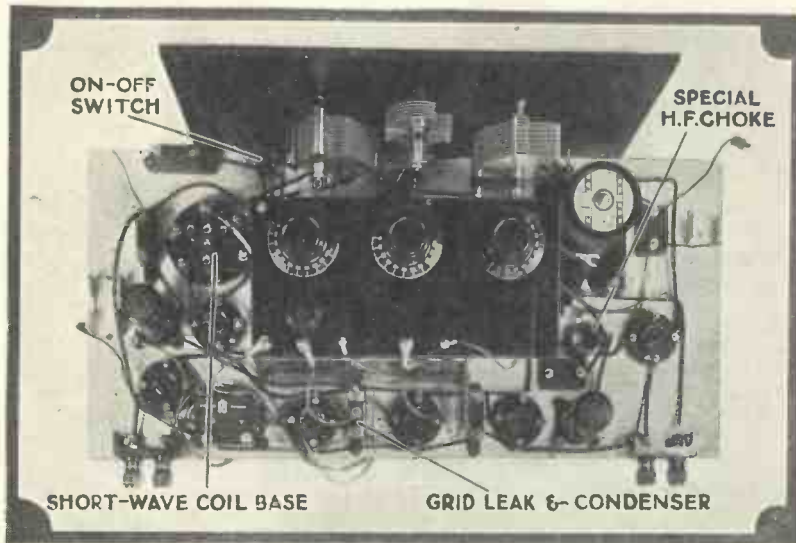
Although this is a little unusual, the distribution of stations so obtained is quite pleasant. There are some thirty or forty stations obtainable on the medium-wave band, and a further ten or so on the long-wave band. The stations are thus more or less uniformly distributed over the whole dial, which is a very convenient arrangement.



DETAILS OF THE INTERMEDIATE-AMPLIFIER COILS

Three different coils are needed, as well as a special high-frequency choke

The Hyperdyne Receiver—Continued



A FINE SET FOR GETTING DISTANT STATIONS

Excellent results have been obtained with this set at the Furzehill Laboratories, many stations being picked up with ease close to Brookman's Park

The tuning on the input circuit is not critical, and as long as the dial is somewhere in the correct position the station can usually be found by tuning the oscillator correctly. It can then be brought up to its best strength by tuning the left-hand dial, and perhaps adjusting the reaction control on the first detector, although in many cases this is not necessary.

Construction of the Set

So much for the system itself. Let us now turn to the construction. The first operation is the making of the first intermediate-frequency amplifier. This can, however, if desired, be obtained ready built, and those readers who wish to save themselves trouble can adopt this course. The three coils are all the same as regards the secondary, but have different primary windings on them, and full details are given in these pages.

Only a few turns are required on the first coil for coupling from the first detector. The second coil has a larger winding, while the third coil has a reaction winding in addition. The coils are so designed that they can be attached directly to the condensers by which they are tuned. A .002-microfarad condenser is taken from the high-tension point to earth, inside each unit, and the whole amplifier is thus built up on the ebonite panel as shown.

A sheet of copper foil is placed over the greater part of the panel, for

the purpose of completing the screening. This is cut away in certain portions to allow terminals to pass through the ebonite for subsequent connection to the remainder of the set.

This copper foil is used as the low-tension negative connection between the various condensers. It is, therefore, desirable to cut the holes for the variable condensers slightly smaller in the foil than in the panel.

The condensers may then be forced through, breaking the edge of the foil slightly, and in this way ensuring a

good contact between the moving plates of the four condensers and the metal foil. This is most important, and it is, indeed, advisable to check this point with a flashlamp and a dry cell when the amplifier has been assembled.

Simple Flashlamp Test

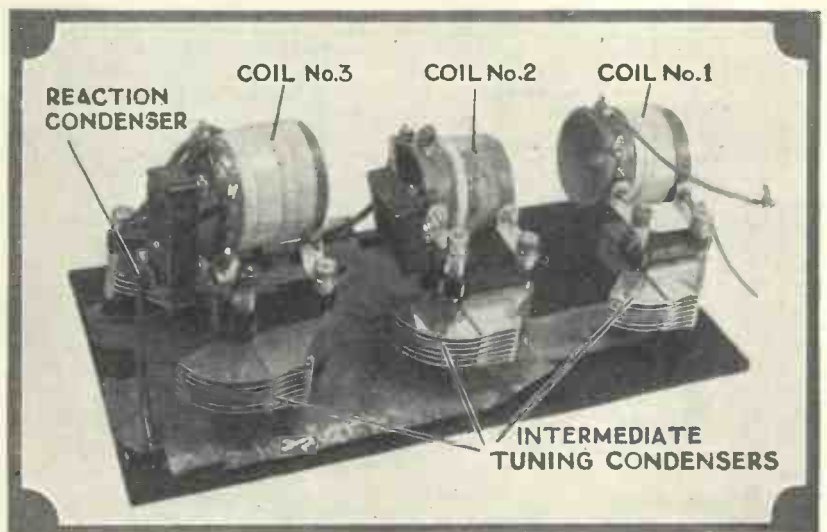
Connect one side of the battery to the copper foil and the other side to one side of the flashlamp; the other terminal of the flashlamp should then be touched on each of the moving-plate terminals in succession. If the flashlamp lights up on each occasion everything is all right.

The amplifier, when completed, is placed on the screening box, which serves to support it, and is held in position with four screws, which clamp it up tightly and make good contact between the copper foil and the metalwork of the case. This, again, is a point to which attention should be paid.

Baseboard Assembly

The next step is the laying out of the parts on the baseboard. The best plan here is to place the intermediate amplifier in its proper position and to mark out, with pencil, the position on the baseboard which will be occupied. The various components may then be grouped around the baseboard in the positions shown.

Starting with the dual-range coil on the left, we pass through the detector circuit, through the inter-



INTERMEDIATE-FREQUENCY AMPLIFIER WITH SCREENED-GRID VALVES

This photograph shows the coils and tuning condensers for the intermediate-frequency amplifier, which works at about 2,000 kilocycles

A Modern "Super-het" with S.G. Valves

mediate valves, and finally reach the low-frequency stage at the right-hand corner of the baseboard.

The oscillator valve and coil holder are placed at the right-hand end of the baseboard, a small strip being left at the extreme right-hand side for a grid-bias battery. The components may then be screwed down and wired up in this position, taking care that no wires run across the pencilled portion, which will ultimately be occupied by the intermediate-frequency amplifier.

Controls

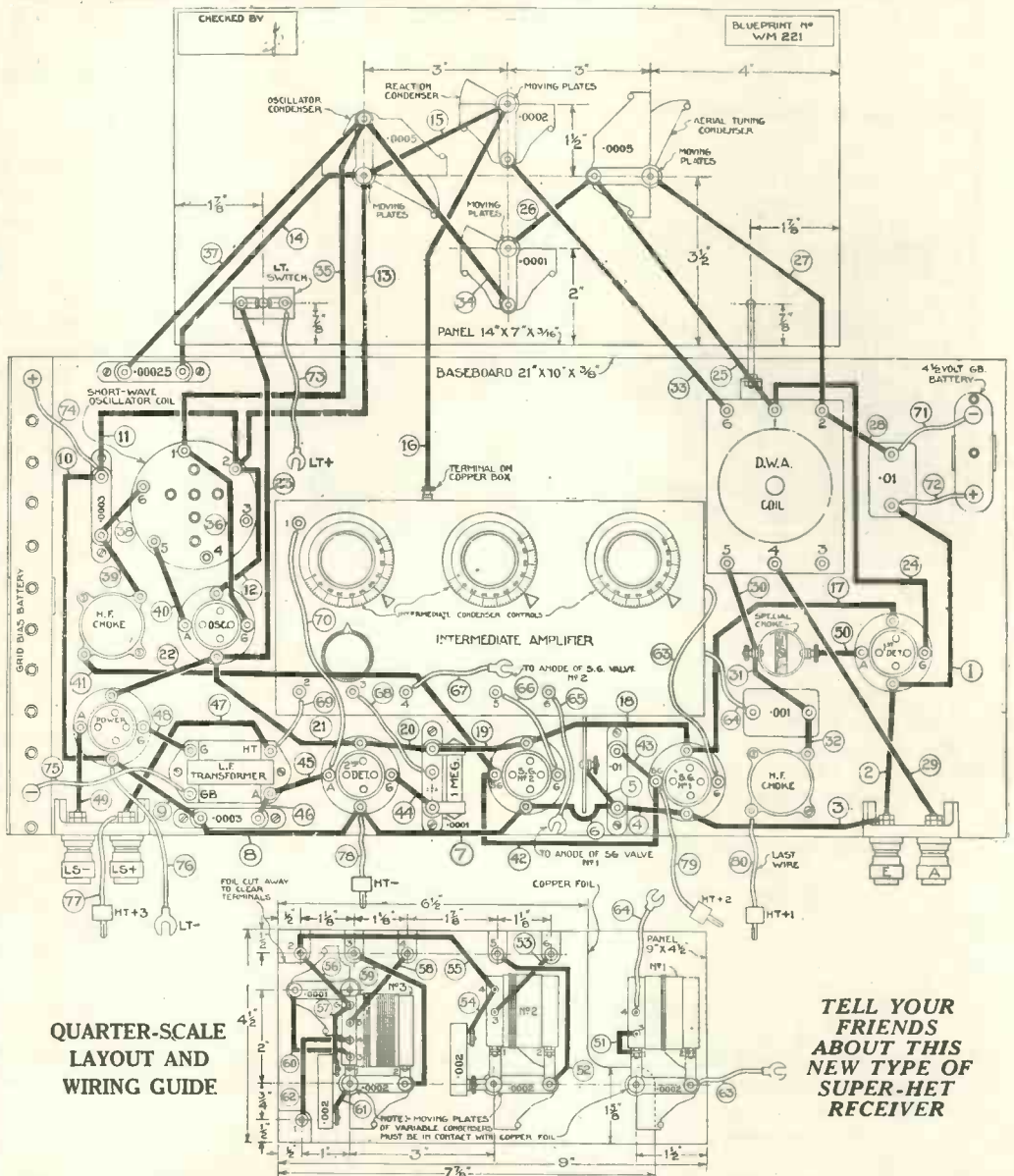
The controls may then be mounted on the panel. There are two main controls, both of which are .0005-microfarad slow-motion tuning condensers.

It is most essential to use a very smooth-acting condenser in this position. A condenser with any backlash whatever will be utterly useless, as one will pass over two or three stations in going to and fro, and it will be impossible to tune with any satisfaction.

Two subsidiary controls are provided, although they need not be used much. The bottom one is the coupling condenser between the oscillator and the first detector, and the top one is the reaction condenser on the first detector itself.

Wiring Up the Set

The operating rod for the dual-range coil projects through a hole at the left-hand corner of the panel, and the on-off switch is placed at the right-hand corner. When these controls are mounted the components may be placed in position and wired up.



QUARTER-SCALE LAYOUT AND WIRING GUIDE

TELL YOUR FRIENDS ABOUT THIS NEW TYPE OF SUPER-HET RECEIVER

This layout and wiring guide 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 December 31. Ask for No. WM221. Wire up in numerical order

By carrying out all the wiring in this manner before the intermediate-frequency amplifier is inserted, ready access will be obtainable to every part.

Now place the intermediate amplifier in position and screw it down to the baseboard. There are now a few connections to be made between this and the remainder of the set. Two connections come from the first circuit, one to the grid of the first screened-grid valve and the other to the .0001 microfarad condenser on the baseboard.

There are then the successive anodes and grids of the intermediate valves, a high-tension terminal and a reaction terminal.

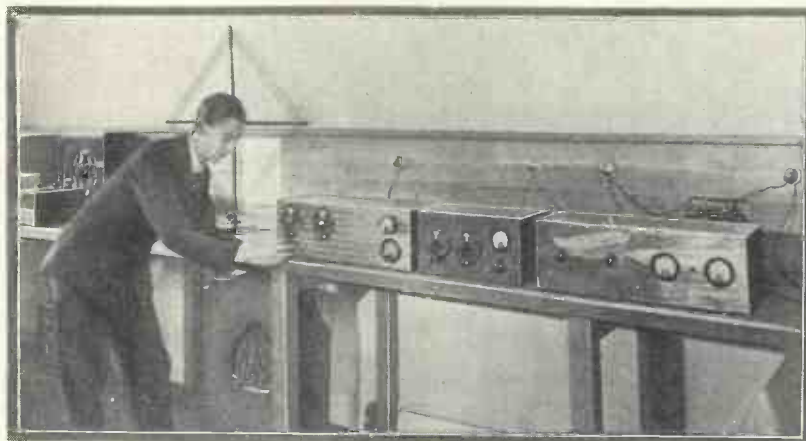
Two Screen Connections

Finally, there are two connections to the screen. It is important that both these connections are made, as otherwise curious effects result. The first of these is a connection from the low-tension negative terminal to a terminal at the right of the screen, and the second is a connection from the

(Continued on page 548)

THE STENODE CIRCUIT

By THERMION, the Well-known
Contributor to "Amateur Wireless"



NOT SO COMPLICATED TO WORK AS IT LOOKS

Although this experimental gear made by the British Radiostat Corporation, Ltd., looks very complex, the tuning controls are really very simple

DURING the last few months many manufacturers have applied to and have taken out licences from the British Radiostat Corporation, Ltd., to market sets including the Stenode patents. Some firms are already producing the sets and they hope to have them on the market before Christmas. One firm has put everything on one side to concentrate on Stenode sets.

The general impression gained by the WIRELESS MAGAZINE during a conversation with an official of the Corporation was that most of the firms interested are busily experimenting to see what they can produce in the quickest possible time. Something in the nature of a race is in progress.

Unfortunately, many firms had already planned their programmes before the Radiostat patents were available. The broadcast models of the Radiostat are designed to separate stations working as close together as 5 kilocycles. There is no crystal gate in these simple models.

In America the Radiostat has been demonstrated before the Army and Navy Departments in Washington, as well as at the Chicago Radio Exhibition. Over 100 separate demonstrations have been given. Chicago is extremely interested in the system.

AS the number of stations using the medium wavelengths continues to increase, many of us who go in for long-distance reception have tried to counteract the effects of greater and greater crowding on the band by increasing the selectivity of our receiving sets.

But the results produced by super-selective sets of ordinary type are distinctly disappointing; what you notice, in a word, with a set selective enough to bring in either of two transmissions working on wavelengths very close together is that reproduction becomes "woomfy"

You have plenty of rumbling and booming bass, but the higher treble notes simply are not there.

This was explained to our complete satisfaction by the sideband theory, which until a few months ago stood absolutely unassailed as one of the bedrock principles of wireless. The sideband theory says that if in a broadcasting studio you whack the C two octaves above the Middle, thus producing audio-frequency oscillations with a frequency of 1,024 a second, the net result is this:

Carrier Wave

Before you touched the note nothing was going out from the aerial, but a carrier wave whose frequency we will take at 1,000,000, which corresponds to a wavelength of 300 metres. When the note is given out the aerial

transmits, in addition to the carrier, two sidebands (we won't bother about harmonics), one of which has a frequency of 1,000,000 plus 1,024, whilst the other has a frequency of 1,000,000 minus 1,024.

To give anything like faithful reproduction of music frequencies up to at least 5,000 are required; this means, according to the sideband theory, that the station must transmit sidebands between 1,005,000 and 995,000, which the high-frequency part of the receiving equipment must be able to pass in their entirety.

Make your receiver so selective that it won't pass a band of this width and what happens?

Clearly, according to the theory, sideband cutting occurs, and the parts which suffer are what we may call the fringes corresponding to the higher notes. Therefore with a super-selective receiver there is a loss of treble notes, which makes reception "woomfy."—Q.E.D.

Everyone must admit that it is a fact that very high selectivity in an ordinary receiving set ruins quality because the treble does not come through. But Dr. James Robinson, the inventor of the Stenode system, worked out mathematically quite a different explanation of the phenomenon and then proceeded to make receiving apparatus which, if its claims could be substantiated, would blow the sideband theory sky high.

Saturation Point

The reason why Dr. Robinson set himself to tackle the problem was just this: We have in wireless the most remarkable means of communication that mankind has ever known; but unless something could be done the saturation point would very soon be reached when every available wavelength was occupied and no additions to either broadcasting or commercial stations could be made. This must be so if the sideband theory is correct.

He didn't believe that it was, and here is the way in which he explained the preponderance of the bass notes and the loss of the treble in a super-selective receiver.

Take, first of all, a circuit with

fairly high degree of damping, such as we use in normal broadcast receivers. An impulse entering such a circuit builds up rapidly to moderate strength, remains for a brief instant, and then dies away. Reduce the damping to about half the ordinary amount, and the impulse builds up to a higher value before starting to decline. Take away almost all the damping, and what will happen?

The impulse rises to a very high value, which it retains for an appreciable time. Then the decline sets in, but so long has been the period of maximum strength that a fresh impulse arrives before the dying away process is complete.

Effect of Damping

A glance at Fig. 1 will explain this. At A is seen what happens in a circuit of moderately heavy damping, while B shows what takes place when the damping is considerably reduced. At C are seen the results of reducing the damping to almost nothing. Owing to the fact that the impulse has not time to die away before it begins to develop again, it persists and builds up.

Now, clearly the impulse which is longest in a circuit will have the best chance of persisting by the build-up process. In other words, the effects of persistence will be most marked in the case of low notes.

What follows from this? If we use a highly efficient circuit with a minimum of damping to tune a valve the output from this valve will appear to contain far too much bass and far

too little treble. This is not due to the cutting of sidebands, but to the persistence of the lower notes. The higher notes have actually come through, but we can hear nothing of them, since they are drowned by those lower down the scale.

Fig. 2 shows diagrammatically

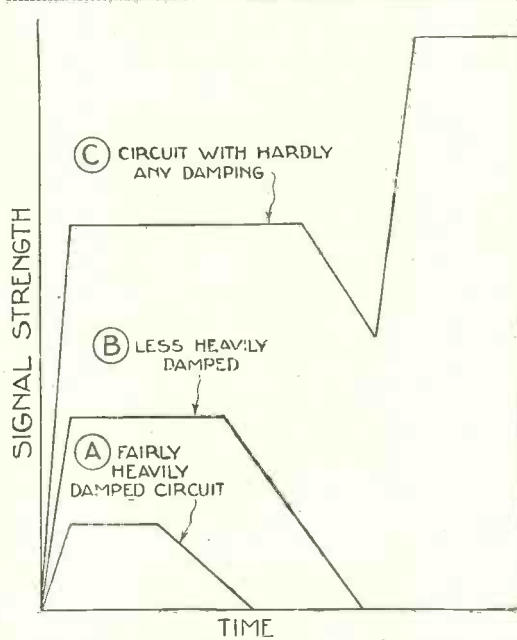


Fig. 1.—This diagram shows the effect of damping on the response of a tuning circuit. The lower the damping the greater is the persistence of low notes

(AB) the response of a highly selective receiving set to impulses of various frequencies. It will be seen that it brings out splendidly the deep notes and has virtually nothing at all to do with the higher ones. The ideal response should take the form of a perfectly straight line, such as CD, all frequencies being equally dealt with.

By the Stenode method persistence effects are allowed to take place to their hearts' content in the intermediate-frequency stages. The output from the second detector is not unlike that shown by the line AB. Still distorted, this output passes through the first low-frequency stage, and then things are made to happen to it.

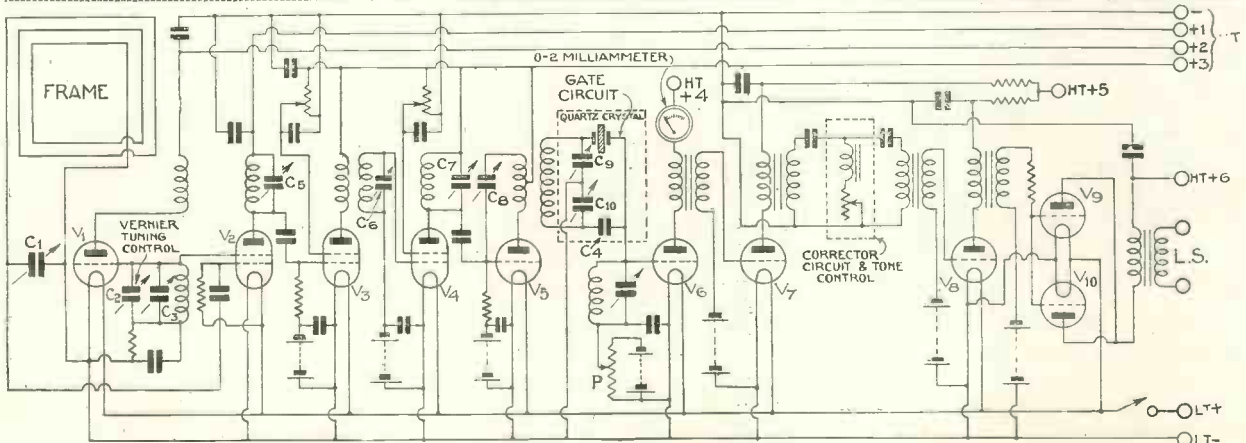
It is fed into a specially designed corrector circuit, whose response curve is something like that represented by the line EF. This circuit has a maximum response to treble notes and a minimum to bass. Its purpose is to even up the net response of the set and to produce the level response represented by the line CD.

That it does so is shown by the remarkably faithful reproduction of broadcast programmes on a moving-coil loud-speaker by the Stenode receiving sets now in use in the laboratory.

"Cutting Sidebands"

The Stenode is clearly "cutting sidebands" as no set before has ever cut them. Nothing can pass through the quartz gate but a band of frequencies a few cycles only in width. If the sideband theory were correct the loud-speaker, if it could produce anything at all, would bring out absolutely nothing but the deepest of deep notes. As it is, the treble is quite as brilliant as with a straight receiving set of the highest class.

Dr. Robinson maintains that even if the sidebands can be shown to



THEORETICAL CIRCUIT OF AN EXPERIMENTAL STENODE RECEIVER WITH TEN VALVES

From this diagram the reader will be able to follow out the arrangement of a typical circuit using the Stenode principle developed by Dr. James Robinson

The Stenode Circuit—Continued

exist, both by mathematical calculations and by actual experiments, they are entirely unnecessary for reception. He holds that the carrier wave is itself amplitude-modulated, and so long as you can receive the carrier you can, by means of a suitable corrector, make your set bring out every sound that goes into the studio microphone.

Stenode Principle

The principle of the Stenode set, whose circuit diagram accompanies this article, is just this: The intermediate-frequency stages are all tuned to the exact frequency—actually 107 kilocycles—to which the crystal is ground. Any transmission that is being received is "beaten up" by the oscillator to a frequency of 107 kilocycles, and this is passed on by stage after stage to the crystal gate, which adds the final touch to the selectivity.

The circuit used in the Stenode Radiostat receiving set is so ingenious and contains so many points of general interest that it is well worth while to look into it. Anything containing ten valves and apparently eleven tuning condensers looks naturally so formidable that not a few people may shy at it, as does that noble animal the horse at a piece of paper by the roadside.

But the circuit really contains nothing to be frightened of, and if you will run through it now with me you will find that it positively bristles with novel and absorbing points.

Super-het Receiver

The Stenode circuit incorporates a super-heterodyne receiver; I want to deal first of all with this. v_1 is the separate oscillator; v_2 is the first detector; v_3 and v_4 are screened-grid intermediate-frequency valves; v_5 , a triode, is also an intermediate-frequency valve, and v_6 is the second detector. Eliminate the "gate" with its quartz crystal from the Stenode circuit and you are left with a remarkable super-het, which is the result of a great deal of research and experimental work.

Since it was essential to the success of the Stenode that the super-het part should be beyond reproach, the

whole circuit was most carefully worked out to avoid any kind of overloading. Notice that v_3 , the first I.F. valve, has a useful negative grid bias and a fairly high plate voltage. The second I.F. valve, v_4 , has to deal with bigger grid swings; hence stronger negative grid biasing and a higher plate voltage.

The output of v_4 was found by experiment to mean such big grid swings that it was out of the question to use a screened-grid valve for the

this milliammeter presently.

And now I have some good news for the reader. Though they have arrows shot through them to show that they are variable, c_5 , c_6 , c_7 , c_8 , c_9 , c_{10} and c_{11} never need be touched in operating the receiving set. In fact, they cannot be touched for they and their knobs are all contained in the bowels of the set.

The purpose of these condensers is to tune the intermediate-frequency output and detector-input circuits to exactly the frequency of the quartz crystal.

Crystal Frequency

In the model under description the frequency for which the quartz is ground is 107 kilocycles, and once the circuits have been tuned to that frequency they are left alone. The actual controls which appear on the panels are few in number. Here they are: There is a slow-motion dial controlling c_1 , which tunes the frame aerial. The tuning of this is no sharper than that of any ordinary frame.

Another dial controls c_3 , which tunes the oscillator. The tuning here is so incredibly sharp that a tiny condenser, c_2 , is used in parallel. c_2 has only two midget plates, and the knob working it operates through a five-to-one reduction gearing.

One turn of this knob means a capacity change of one micro-microfarad; the capacity of this condenser is thus only one five-hundredth of that of the tuning condensers seen in the ordinary receiving set. Yet a five-degree movement of its control knob is quite sufficient to bring either Brookman's Park transmission in or to cut it clean out. Some selectivity!

Other Controls

The only other tuning control is the dial working c_4 , whose use I will explain in a moment. The panels also show the knob of the potentiometer P , the milliammeter, and a knob which controls the action of the corrector circuit between v_7 and v_8 .

Now for the action of c_4 . The piezo-electric properties of a quartz crystal are such that it makes no response to frequencies varying by more than a few cycles from that for which it is ground. The purpose of

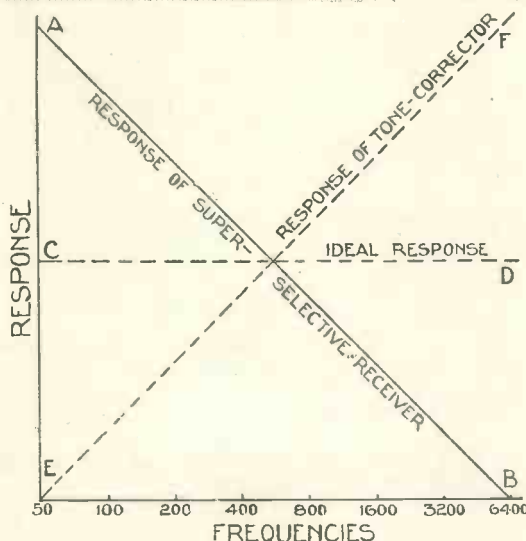


Fig. 2.—Response of a highly-selective receiver to various frequencies. It will be seen that the low frequencies are very greatly amplified, while the high notes produce hardly any effect

third intermediate-frequency stage, v_5 .

You will see by looking on page 515 that a triode is employed. It is not a medium-impedance valve, for experiment proved that 30-volt grid swings might well come its way. It is actually a super-power valve with a very heavy grid bias and heaps of plate volts.

The second detector, v_6 , also provided some pretty problems owing to the immense grid swings that it might be called upon to deal with. Here again a very low-impedance valve had to be used with a high anode potential. By means of the potentiometer P the grid biasing voltage can be varied to suit the strength of the incoming signal.

As a general rule, it is made so high that the current passed by the milliammeter in the plate circuit of the valve is of the order of one-tenth of a milliampere. We shall see more of

A New Receiver Development Explained

this crystal in the gate circuit is to ensure that nothing whatever, except the beaten-up carrier frequency, is passed on to the second detector.

In early experiments it was found that, though the circuit worked, selectivity was not quite so high as it should have been. Investigations disclosed a very interesting state of affairs.

The crystal had to be mounted in a holder, and this holder had, of course, a capacity of its own. The capacity was not big, but tests proved that there was quite enough of it to pass high frequencies. It thus to some extent short-circuited the crystal and prevented it from doing effectively its job as a strainer.

Balancing Capacity

The only way out of the difficulty was to balance out the capacity of the crystal holder. This was done by tuning the inductance of the gate circuit by a split variable condenser with a mid-point tapping, and then fitting c_4 to balance out the capacity of the holder. If this condenser is thrown slightly out of balance the selectivity of the Stenode receiver is at once enormously reduced, owing to the capacity leak which now exists across the holder of the quartz crystal.

Before we pass on to discuss the manner in which tuning is done, just notice the way in which a screened-grid valve is used as first detector. It is really fitted into the circuit as if it were two separate three-electrode valves. Detection is done on the ordinary leaky-grid condenser method by means of the control grid provided with a condenser and a leak connected to L.T. positive. The screening grid is used to receive the oscillations passed on by v_1 . Though the method is not original, this is one of the first practical applications to which it has been put.

Directional Properties

Just one more point before we come to the tuning. No use whatever is made of the directional properties of the frame. If you trace out its connections you will see that one "leg" of it is actually earthed by its connection to filament minus of v_1 . You can, in fact, rotate the frame to any angle when a station has been tuned in without making the slightest difference to the strength.

And now we will suppose that we sit down to handle the controls, as I have done on many thrilling occasions. If c_4 has already been balanced, c_3 with its vernier parallel condenser and c_1 are the only ones that we need bother about, for the potentiometer will already have been set suitably.

Let us imagine, first of all, that we are trying for Stuttgart, a station utterly unreceivable with the best and most selective of ordinary sets in London, owing to the huge wipe-out of the London Regional transmitter. We tune in Brookman's Park first of all by setting c_1 according to the calibration chart.

We don't find the kind of Brookman's Park that you and I are accustomed to on our own sets. There is absolutely no spread.

Having set c_1 , we move the slow-motion dial of c_3 , keeping an eye on the milliammeter. The only indication that we shall get of Brookman's Park in this way is a flick of the milliammeter needle, showing that

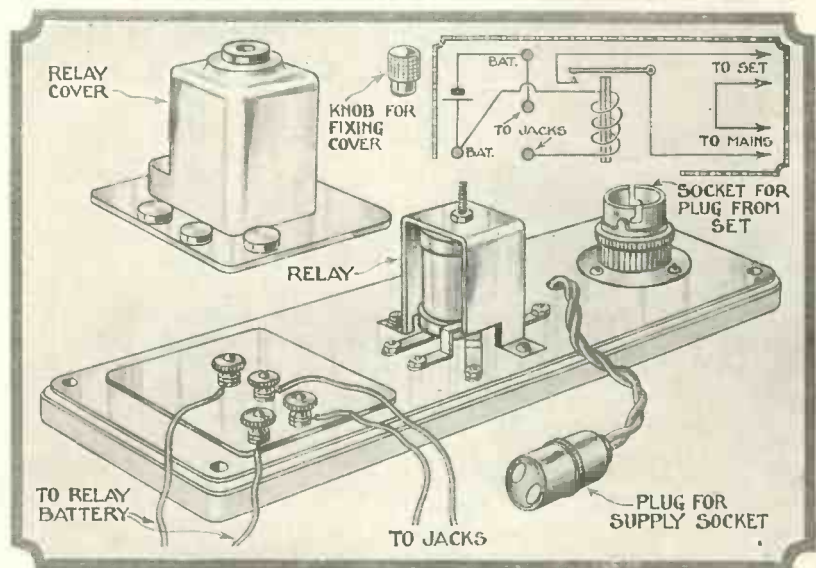
for the tell-tale flick with c_2 . In a few moments we find Stuttgart roaring in, and so far as the Stenode itself is concerned there would be no difficulty in getting him completely free from interference from B.P.

But there is one little trouble. Brookman's Park is not either crystal- or tuning-fork controlled and his carrier shows an appreciable wobble. The wobble is only a few cycles in extent, and on no ordinary set would it be appreciable. The Stenode, however, shows it up at once.

Appreciable Variation

If, for example, we tune in the London Regional and watch the milliammeter, we shall see that its reading slowly declines from the point indicating resonance and then comes back to it again.

If all European transmitters were controlled by crystal or tuning-fork there would not be one single station, except, of course, those working upon group wavelengths, which could not



REMOTE CONTROL FOR A RADIO SET

This schematic diagram shows the connections and operation of a Lotus remote-control system for an all-electric set. When a loud-speaker plug is inserted in the jack a relay operates and switches on the mains

we have passed right through it! With c_3 we get as near as we can to the point where the flick occurs and then use c_2 . Even here we have to tune by watching the milliammeter needle, for a tiny movement even of this knob is sufficient to put B.P. clean out.

Having got B.P., we slightly increase the reading of c_3 and search

be tuned in without the slightest interference from its neighbours, even though these were only two or three kilocycles away.

Even as things are, we can pick up with an ordinary receiver two stations which are heterodyning one another out of existence and then with the Stenode separate them so that each comes through to perfection.

When Wood Won't Work

I DISTRUST wood as an insulator. Yes, I know wooden formers are used for the coils of some transmitters, and that big wooden panels are used in electricity power supply stations; but that is wood properly chosen for the work, and generally treated to prevent the ingress of moisture.

It's a different job with a wireless set. For safety's sake, don't let bare wires touch the wooden cabinet, and never fix aerial and earth terminals direct to the cabinet itself. In dry weather it may be all right, but damp will affect results.

After all, it takes only five minutes or so to fit ebonite terminal strips or insulating bushes to the terminals themselves. L. K. F. T.

Screened-grid Bias

IT is the practice in many modern sets to bias screened-grid high-frequency valves with a small $1\frac{1}{2}$ -volt dry cell.

Generally, this makes a marked difference in the performance of the high-frequency stage, and the tip can be recommended to those who have not tried it.

Occasionally, though, one comes across a valve with an impedance slightly higher than normal, and with characteristics which result in even $1\frac{1}{2}$ volts negative bias sending the impedance figure up to too high a value for the circuit in use.

If you have doubts as to the efficient working of a screened-grid high-frequency stage, check the anode current before applying negative grid bias.

The converse is true, of course, and if your set now works nicely with a little dry cell tucked away behind the panel, take care that it is not overlooked and—owing to a drop in voltage after a few months—that any deterioration in the working of the high-frequency valve is not due to this simply traced fault. A.

A.C. or D.C.?

PEOPLE are always willing to argue about the respective advantages of alternating- and direct-current mains supply for driving a receiver. Both have good and bad points, but one thing in which the

A.C. supply definitely does score is in the working of an electric gramophone motor.

With the cheaper makes of motor there is always a tendency for temporary slowing down when the needle arrives at a loud, deeply-engraved passage on the record. Naturally, this causes a second's drop in tone, and the usual way of curing this is the fitting of a heavy-weight turntable

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with sufficient momentum to carry over the loud passages.

But the fact is that the trouble is usually more marked with a D.C. supply than with A.C. Gramophone motors for A.C. supply are usually of the inductor type in which the pulsations of the alternating current keep the rotor in motion. There is thus a master-control effect which is lacking in a D.C. motor, and this does maintain the rotor at a constant speed.

If there is any variation, therefore, it is the D.C. motor which is more likely to be at fault; but if the drop in speed is caused by any friction or slip in the drive from the motor to the turntable, then both A.C. and D.C. are on an equal footing. K.U.

A Resurrection!

IT must be five years ago that I last used a super-het. Probably 75 per cent. of present-day listeners hardly know what a super-het is.

Yet in the technical circles behind the manufacturing world there are signs of a return to the super-het principle for B.B.C.-band work.

Short-wave super-hets have always been in use.

There's one thing I know, and it is that if the super-het does come back it will have anode-bend detection in the second detector stage. Much of the distortion we used to get with super-hets on loud stations was due to overloading of the detector, and leaky-grid detectors were all the rule thenadays.

With modern valves, tuning arrangements and detector connections, the super-het should stand a good chance. Selectivity is "humdinger," as the Americans say! B. S.

Live Getting

THERE'S something funny about my screened-grid valve," said a puzzled listener. "When I touch the bulb, without putting my hand on any metal parts, the set whistles. It can't be capacity effect, because if I even touch the bulb with my little finger the same thing happens."

The fault? Well, really, there's no fault at all, provided the set works properly. The reason is that the "getting" of the valve—which is, of course, a film of metallic deposit—is on the bulb and close to the anode, and a stray capacity effect is produced.

Generally this doesn't do any harm. With a well-shielded set the stability will not be impaired. It doesn't indicate a faulty valve.

R. C.

Those Announcers

WHICH do you prefer, women or men announcers? Some men may prefer to hear the feminine tones, and some women may prefer the masculine boominess of Mr. Hiberd and his assistants at Savoy; and, of course, if sex attraction is going to enter into the business, then up goes the popularity of broadcasting!

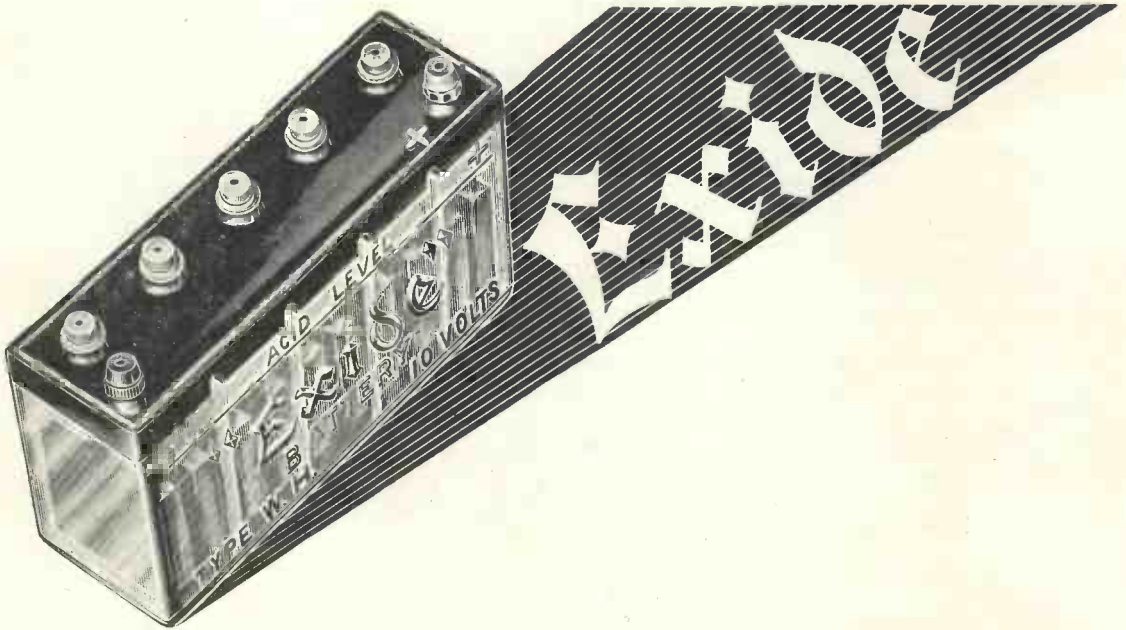
But all joking apart, the average listener prefers an occasional change, and it is a good idea to have women announcers at not-too-frequent intervals.

Generally speaking, a woman's voice is more distinct but has not such a wide range of tone, and is apt to become monotonous—unless one knows the lady, of course!

But I'm afraid I'm treading heavily on delicate ground. K. U.

The most economical H.T. The Exide Battery gives the cheapest form of H.T. Instead of replacing it, as you would a dry battery, you merely recharge it—and it costs much less than a mains unit.

Makes reception pure — an Exide adds no noise to your reception — no buzz, no crackle, no howl. It's silent right to the end of its charge—helps to eliminate harshness too—distant stations come in clearer. Aids selectivity — helps to cut out interfering stations because voltage does not fluctuate.



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There is news in the "Wireless Magazine" advertisements

ANODE VOLUME CONTROL

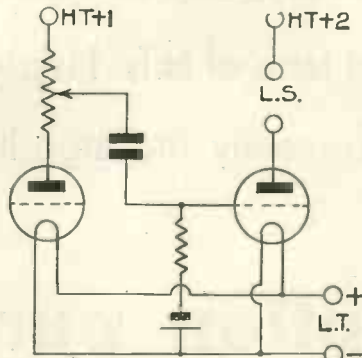
IN some circuits a low-frequency volume control is essential. One that I have tried and found satisfactory will be understood upon referring to the figure.

In the anode circuit of the valve is joined a high-resistance potentiometer. The resistance of this potentiometer, which must be wire wound, may be from 50,000 to 150,000 ohms, depending upon the valve to which it is connected.

Full Amplification

Its contact arm is taken to the grid coupling condenser. Now when the contact is at the bottom end of the resistance the full amplification of the valve is used. When the arm is half way, only half of the full amount is passed on—and so on.

As the arm is turned toward the end of the resistance connected to high-tension positive, so the signal



Arrangement of anode-circuit volume control

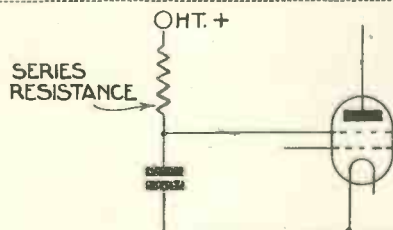
passed on to the next valve is reduced until finally, when the arm is right round to this end, the signals are reduced to zero. Here, then, is a fine volume control—no trouble and no snags.

W. JAMES.

ABOUT SCREENED-GRID VALVES

TO obtain the maximum degree of amplification from a triode (three electrode) valve and its associated circuits without the amplifier breaking into self-oscillation, it is essential that no coupling exists between input and output circuits.

Metal screening between circuits will accomplish much, but the anode-grid capacity of the valve is a



Resistance to drop voltage applied to screening grid

capacity coupling which cannot be removed, so that attempts must be made to render this capacity more or less ineffective, that is, neutralised.

The screened-grid valve is essentially an ordinary receiving valve with a meshed screen inserted between anode and grid to prevent the latter functioning as a capacity back-coupling (or reaction) between anode and grid circuits.

Now consider how to join up this screen :

(1) It must be fixed at filament potential (that is, zero or earth) as regards high frequencies. By so doing, no oscillatory electrostatic strain will exist between the anode and control grid, as the anode is now only able to exert that influence upon the screen, which is fixed at filament potential.

It should be observed that before the interposition of this "earthed" screen the anode and control grid

formed "two plates charged at opposite potentials and separated by a dielectric"; in other words, a condenser in operation.

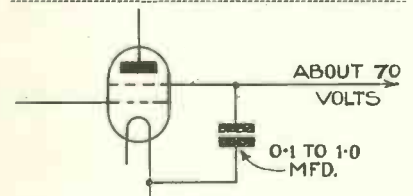
(2) The screen must have a direct-current potential of such a value that the screen does not adversely affect the normal flow of electrons across the valve. This direct-current potential is usually about .7 of the total anode voltage applied.

Need for D.C. Potential

If the screen were directly connected to filament the anode would attract few, if any, electrons, hence the direct-current potential referred to in (2) above.

Consequently the connections between screen and filament must insulate direct current, but be almost a short-circuit to high frequencies.

The comparatively large condenser provided for (1) and (2) may be



By-pass condenser for high frequencies

arranged for by either tapping the high-tension battery or by feeding from the positive high-tension terminal with the necessary series resistance to limit the voltage applied.

It is undesirable to tap the high-tension battery, as this would mean some cells being subjected to a greater discharge than the remainder.

In all other respects the grid and anode circuits are those common in triode practice.

C. P. O. T.

FAKE NEWS BULLETIN!

RECENTLY Berlin and Königswusterhausen interrupted their transmissions with a thrilling announcement to the effect that "the German Foreign Minister has just been murdered at the Friedrichstrasse Bahnhof (railway station) on his return from Geneva." A few minutes later telephone bells rang incessantly at most of the newspaper offices, government departments, broadcasting studio, houses of members of the Reichstag and general excitement ensued.

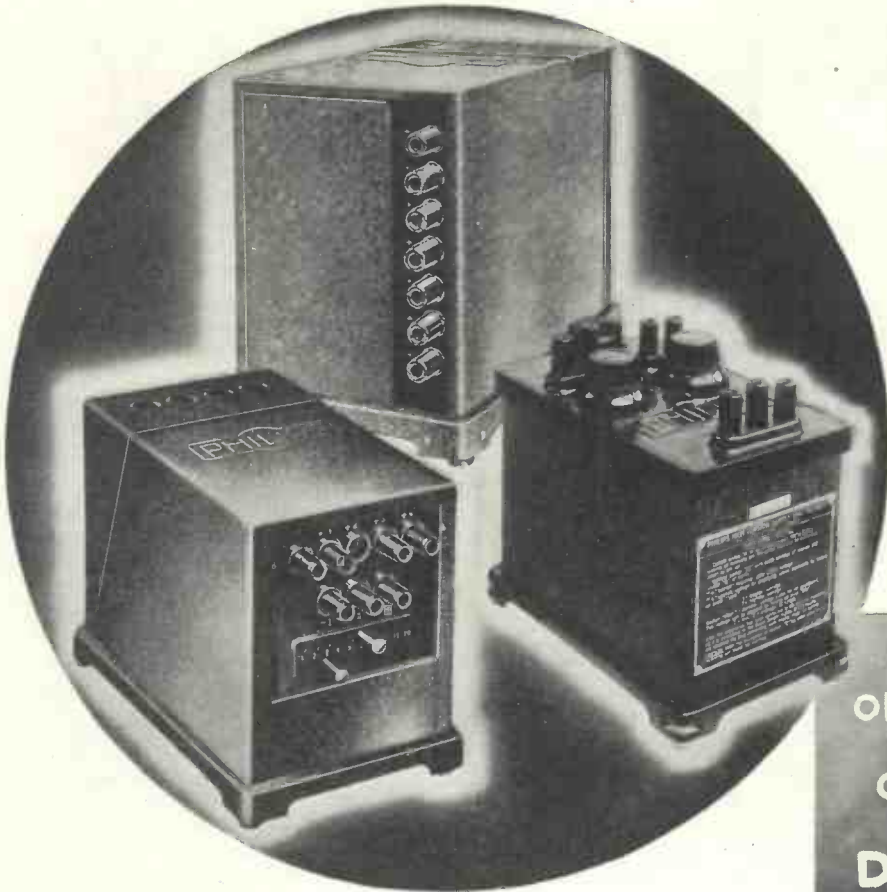
It was some time before listeners

who had not seen the daily programme realised that the aforesaid announcement was merely the opening scene of a new thriller entitled *The Minister Is Murdered*. To secure the right atmosphere the producer had hit upon what he considered was a novel effect.

"Got in Bad"

It was; it jarred Berlin to its marrow bones. The dramatic producer's shares have slumped and to use Americanese, he has "got in bad" with the studio authorities—and others.

JAY COOTE



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A LISTENER'S LOG

Here Jay Coote comments on the more important activities of Continental broadcasting organisations. His notes will be found invaluable to foreign-station listeners.

THE question whether the British public does or does not want grand opera is one which, for lack of space, I cannot discuss in these columns; opinions are very divided on the subject, but, no doubt, there must exist, shall we say, a minority, who will always enjoy such performances, whether they are in English or in a foreign language.

With the advent of high-power transmitters on the Continent, such tastes to-day are easily gratified, for we do not need a very expensive wireless receiver to capture such stations as Rome, or even Milan.

Fifty Operatic Relays

It is good news, therefore, to learn that the Italian broadcasting authorities have decided to develop that artistic side of their programmes and that during the winter months we may expect to be given from the Milano-Torino e Geneva group alone some fifty relays during the season.

As a matter of fact, the Scala Opera House at Milan will be called upon to supply thirty performances, ten broadcasts are to originate from the Teatro Regio at Turin and the Carlo Felice at Genoa will be tapped on another ten different evenings.

From the Scala Theatre the first relay will be carried out on December 7, commemorating the Feast of St. Ambrosius, the Patron Saint of Milan.

Seventy Performances

From the Teatro Reale (Rome) and the San Carlo (Naples) some seventy performances will be transmitted, including first nights, and in each instance the broadcast will be carried out simultaneously by the Santa Palomba high-power station, and on the short waves through Prato Smeraldo.

As the Italian cities are now grouped and linked up it will be an easy matter on most nights to capture any of these performances through Rome, Turin, or Milan—whichever channel may be found the most favourable on that particular evening.

It appears that the Belgian trans-

missions still puzzle many readers, for I am asked frequently how many stations that little country possesses and whether all the broadcasts are made by Radio Belgique.

Apart from the odd "small fry" dotted all over Belgium, the fact is, that although we pick up several different calls, the regular programmes, for the present, only emanate from two stations. Radio Belgique, the eldest, still works on 509 metres and, barring minor exceptions, the French language is the one solely used.

But on 338.2 metres there exists a new transmitter known as Brussels No. 2. This method of naming the station is somewhat misleading, inasmuch as the wavelength is eventually destined to the double transmitter now in course of installation at Velthem-Louvain.

In the meantime, on Tuesdays and Fridays on that wavelength, broadcasts are carried out by an Antwerp Socialist association (S.A.R.O.V.), and on Sundays, Mondays, and Thursdays by the K.R.O. (Katholieke Radio Omroep voor Vlaanderen), an off-shoot of the Boerenbond, or Peasants' Union, which is providing the capital for the Louvain plant.

For the present, both transmissions are made from Forest near Brussels, until a move is made to Velthem.

On Sunday mornings until mid-day and sometimes on Saturdays between 3 and 5 p.m. G.M.T., Radio Belgique broadcasts gramophone records on the lower wavelength (338.2 metres) with a power of some 8 kilowatts in the aerial. In the near future, therefore, Belgium will run two separate stations for transmissions in French and Flemish.

Later on, on about 278 metres, a further service will be carried out for the Eupen and Malmédy districts, which were handed over to Belgium in 1919. There is every possibility that it will be made in the German language. It is a small kingdom, but from the broadcasting point of view it is greatly hampered, as is Switzerland, by the fact that three languages are necessary if the bulk of the popu-

lation is to enjoy radio entertainments.

By the time these notes are in print, Radio PTT Strasbourg, the new French State 15-kilowatt, will be daily on the air, for whilst I am writing my loud-speaker is disturbing me with one of the evening tests. Of the French official system, this is one of the largest stations and more money has been and will be spent on it than on any of its unfortunate colleagues.

French and German Items

As it is to serve a district which again has become French since the Great War and still contains a large German-speaking population, programmes will be provided in both languages. Musical transmissions, fortunately, will form the greater part of the day's wireless fare as I see that the weekly proportions work out at roughly 62 hours for this feature as against 12 hours for talks.

The announcer, whose *nom-de-guerre* is Microvox, has not yet standardised his call; on some days I have heard "Ici PTT Strasbourg"; to-night, it was "Ici le Poste des PTT de Strasbourg-Brumath," and so far as I have been able to ascertain, no interval signal has been adopted. However, the new station is a powerful one and concerts by the forty musicians which make up the permanent studio orchestra should be worth hearing.

From the Eiffel Tower

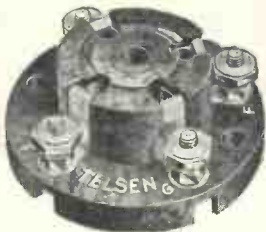
As it is, the "worth while" broadcasts put out by Ecole Supérieure, Paris, on most occasions, can only be received (and held!) through Eiffel Tower. In future, as Strasbourg is part and parcel of the French net to which it is connected by special cable, we may thus find an alternative relay.

It is perhaps as well, for it is currently rumoured in Paris that the Eiffel Tower will abandon its radio entertainments shortly and that it is to devote its last years to experimental work for the benefit of the French military authorities.

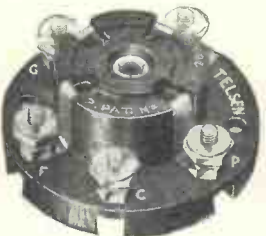
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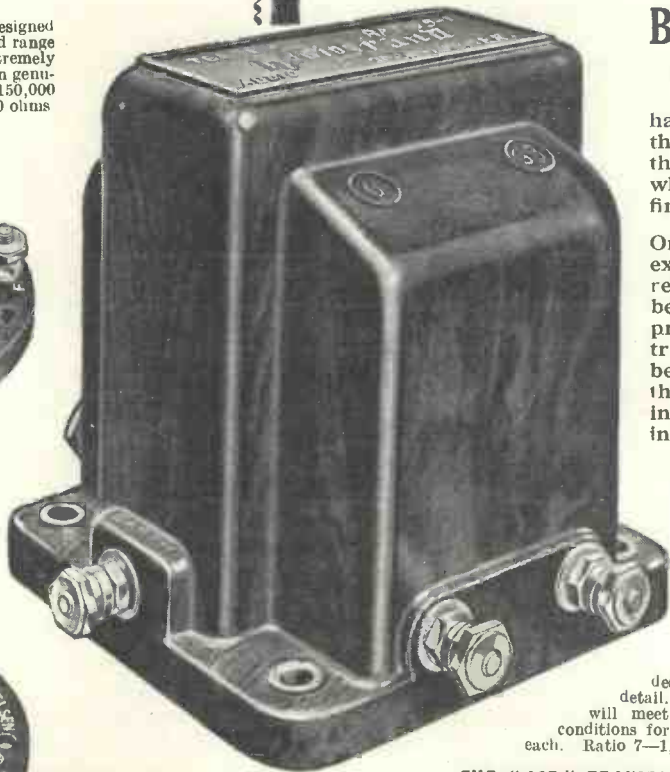
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TELSEN "RADIOGRAND" TRANSFORMER. New model shrouded in genuine Bakelite, with new windings and core, fitted with earth terminal. The outcome of careful research, this transformer is scientifically designed right down to the smallest detail. Made in ratios 3-1 and 5-1 it will meet the needs of modern broadcasting conditions for several years to come. Price 12/6 each. Ratio 7-1, price 17/6 each.

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William Primrose is a gifted young violinist



A tenor who broadcast recently—Tom Purvis



Doris Owens, a popular contralto, heard recently



Famous for his work at Birmingham—Joseph Lewis



Henry Ainley was broadcast in "mechanical" variety

ON glancing through the programmes of the past few weeks, one is immediately struck by the greater variety of matter. Better use is being made of the alternative stations, notably those embracing the London and Midland regional programmes.

Two Distinct Programmes

Almost every evening there are two distinct programmes from these latter stations (although not directly opposed to each other), which will appeal to entirely different tastes.

This is the first step towards the ideal alternative programme and, it is to be hoped, will prove to be the thin edge of the wedge.

To be more explicit, a table is given

HOW THE PROGRAMMES WORK OUT

Day	National	London Regional	Midland Regional
Sunday ...	Brass Band	Symphony Concert	Light Orchestral
Monday ...	Drama, Revue	Chamber Music	Symphony Concert
Tuesday ...	Military Band, Chamber Music	Operatic	Musical Comedy
Wednesday ...	Symphony Concert	Military Band	Popular Orchestral
Thursday ...	Light Orchestral	Play	Symphony Concert
Friday ...	Diversions	Organ and Brass Band	Military Band
Saturday ...	Vaudeville, Light Orchestral	Piano and Chamber Music	Popular Concert

which shows the variations of the main part of the evening programme for a recent week.

A pleasant surprise by the B.B.C. was the announcement of a new series of orchestral concerts that are to be broadcast every Sunday evening till June of next year, with the exception of a fortnight's break at Christmas.

These concerts, performed in the new Number Ten studio, will be planned in conjunction with the Wednesday series that is being relayed from the Queen's Hall.

They will be of a popular type, including

works that are not performed on Wednesdays.

The opening concert included such favourites as the Brandenburg Concerto No. 3 in G by Bach and the "Unfinished" Symphony of Schubert.

Many well-known conductors have been chosen, including Sir Henry Wood, Nicolai Malko, Hermann Scherchen, Igor Stravinsky, and Albert Coates; and amongst the soloists are Arthur Catterall, Lionel Tertis, Adila Fachiri, and Jelly d'Aranyi.

The second concert of this series was an outstanding success. Leslie Heward, conductor of the City of Birmingham Orchestra, conducted remarkably well. His reading of Max Regers' variations on a theme of Mozart was good, and Marcelle

Meyer, the soloist on this occasion, played Mozart's pianoforte concert in K.207 extremely well.

At the Queen's Hall

At the Queen's Hall, the new orchestra has made its name. They have performed splendidly. Under the baton of Dr. Adrian Boult this orchestra has not been shown entirely at its best.

His readings, although good, are not common with most conductors, and perhaps it may be this strangeness that emphasises the fact that something is amiss.

(Continued on page 526)



Gershom Parkington, leader of his own quintet



A well-known conductor—Arthur Coates



A baritone with a striking voice—Dale Smith

P.M.24A

THE HIGH POWER PENTODE

The P.M.24A is a high power pentode designed for operation on anode voltages up to 300 volts and will, therefore give a large undistorted A.C. output.

Owing to its high efficiency this valve is capable of operating on very small signals and may, therefore, be used after the detector valve in a receiver without any other L.F. stage.

The P.M.24A is the ideal output valve for A.C. Mains or 4-volt battery sets.

PRICE
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Max. Filament Voltage	4.0	volts.
Filament Current	0.275	amp.
Max. Anode Voltage	300	volts.
Max. Aux. Grid Voltage	200	volts.
Mutual Conductance	2.0 mA/Volt.	



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Art.

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Music via Ether and B.B.C. News—Continued



Maurice Cole, the distinguished pianist, played in the "Foundations" recently

Rubinstein played the Tchaikovsky Concerto in B flat minor as well as anyone could, and was a great pleasure to hear. This has been the most outstanding item at these concerts up to the present this season.

Number Ten studio, a converted wharf near Waterloo Bridge, London, is the largest broadcasting studio in Europe. There is sufficient floor space for accommodating the whole of the B.B.C. Orchestra and the National Chorus of two hundred and fifty voices.

Artistic Studio Appointments

As usual with all B.B.C. studios, the artistic side has received close attention. The walls are a primrose colour, and a huge green carpet covers the whole floor. Lighting is supplied by nearly thirty groups of four brilliant lamps and the stairway leading into the studio is of rustic design. Truly, a remarkable studio.

Chamber music is by no means a suitable name for the vast fields of music covered by this somewhat vague title. The announcement of a concert under this title often prompts the listener immediately to switch off his

receiver without even giving it a fair hearing.

It is to be admitted that there are types, ultra modern in character, which even the most musically educated of us cannot understand, or have an ear to stand what is often described as a fearful din.

Nevertheless, there are chamber music concerts which are just as musical and make a welcome restful change from music of the orchestral kind.

An evening spent listening to the lieder of Brahms and Schubert or the trios and quartets of Haydn and Mozart is one delight from beginning to end.



Sydney Northcote is a tenor who has been heard via ether

Most Popular Broadcast Music

A recital of Brahms lieder was recently given by Robert Maitland; and Arthur Catterall, Aubrey Brain and Victor Hely Hutchinson were the instrumentalists. A good concert given well.

Light orchestral music is without a doubt the most popular of all broadcasting features. What would broadcasting be like without the favourite compositions of Delibes, Massenet, Finch, Friml and many others?

(Continued on page 528)

THERE'S ANOTHER NEW STATION

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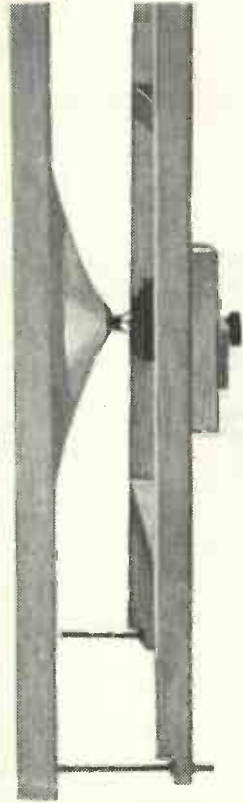
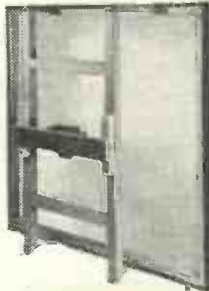
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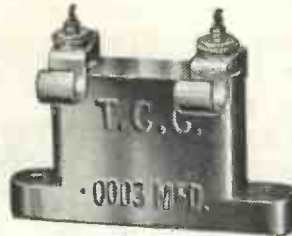


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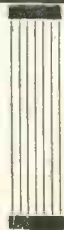
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W.M. 12/30

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Music via Ether and B.B.C. News—Continued

This has been well supplied by the Gershom Parkington Quintet, Squire Celeste Octet, and the Midland Studio Orchestra.

For those who like a selection, the Commodore Orchestra, which broadcasts on Saturdays between 1.0 and 2.0 p.m. fill their needs. The performance is good and this orchestra is well up to scratch, considering the usual standard of cinema combinations.

Gramophone Recitals.

Is the weekly concert of new gramophone records arranged by Christopher Stone given at a popular time? This is one of the most pleasant and interesting of lunch-hour programmes, and is of sufficient importance, surely, to warrant its inclusion in the main body of the evening concert.

The occasional evening half-hour recitals given by Mr. Stone are most enjoyable.

London is to have Joseph Lewis, late musical director at the Birmingham studio, to help arrange the musical programmes.

This transfer will, we hope, brighten up these transmissions. His programmes from Birmingham were always well chosen and imparted natural liveliness into the concerts.

A thorough musician, Joseph Lewis was, for some time, assistant conductor of the City of Birmingham Orchestra under Adrian Boult.

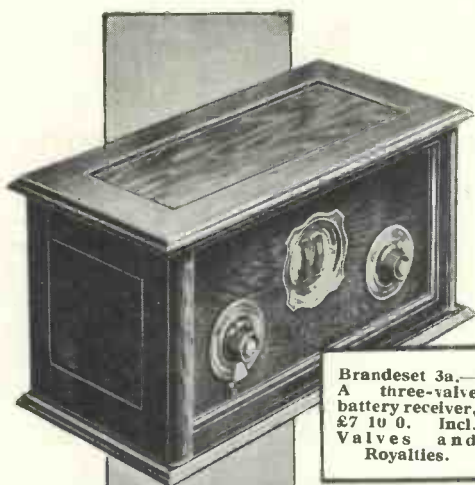
A Blind Organist.

Last month a photograph appeared in these pages describing William Wostenholme as organist of National Institute of the Blind. This was an error. Although he is closely associated with this work, the organist of the Institute is F. W. Warrilow, who has held this position for several years.

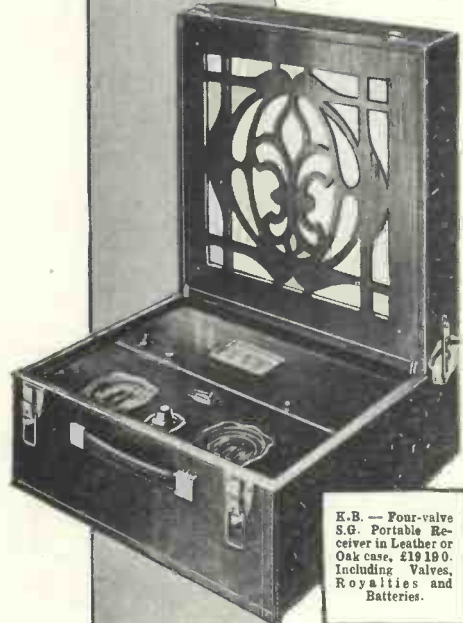
There is a notable change in cinema organ broadcasts. Reginald Foort has taken charge of the organ at the New Victoria cinema and his first broadcast from there was announced for November 4.

The instrument was designed by himself and he describes it as the instrument of his dreams. It will make the weird noises of motor horns, cycle bells, the rushing of

(Continued on page 530)



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A three-valve
battery receiver,
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Valves and
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S.G. Portable Re-
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Cone Speaker,
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but we get lots of foreigners too.”
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TO KNOW
IN RADIO**

W.M.2—12/30

Advertisers take more interest when you mention “Wireless Magazine”

Music via Ether and B.B.C. News—Continued

express trains, saxophones, etc.

This combination will not please the lovers of Bach, but they must refrain from criticising it, as it comes entirely out of their sphere.

Vaudeville programmes have left the rut at last. Quality has been greatly improved, but quantity has been greatly reduced. Secondrate turns have become a thing of the past. Variety, which has been so absent, has come suddenly to the fore.

A novel innovation, introduced on November 3 and 8, proved an immediate success. Given entirely by means of gramophone records, these programmes gave the opportunity of hearing such famous stars as Maurice Chevalier, Sir Harry Lauder, Gracie Fields, Henry Ainley, and others.

It is certain that more of these mechanical concerts will be appreciated. *More Djinn and Bitters*, a revue with music by Harry Pepper, was revived on November 4. Although it was inclined to be on the silly side, it proved interesting in contrast to some others.

T. F. H.

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. Address your inquiry to Set Selection Bureau, WIRELESS MAGAZINE, 58/61 Fetter Lane, E.C.4

Portable S.G.3 Results

"EXCELLENT tone" is the verdict of a Greenhith reader regarding the "James Portable S.G.3" (WIRELESS MAGAZINE, July, 1930). He gets a number of foreign stations moderately well, in spite of screening by a hill:—

A report on my James SG 3 may be of interest. The set was made as far as possible in accordance with the design in WIRELESS MAGAZINE. But, as Ormond dials were used, the panel had to be made one inch wider to accommodate them. Moreover, I happened to get a different pattern of T.C.C condenser from the designer's, and some thought was necessary to get it into place.

The tone of the finished instrument is excellent. More than one person hearing it has exclaimed, "How mellow." Of course, it is necessary to keep the volume down or the small power valve is hopelessly overloaded.

Situated in Kent, nearly twenty miles from London, the set will receive the two National transmissions and the London Regional at wonderful strength. The Midland station comes in less powerfully. Several foreigners, including Rome, come in moderately well. This is not really disappointing, as the Continent is immediately screened by a hill.

Further letters about "W.M." sets will be found on page 540

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.

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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.



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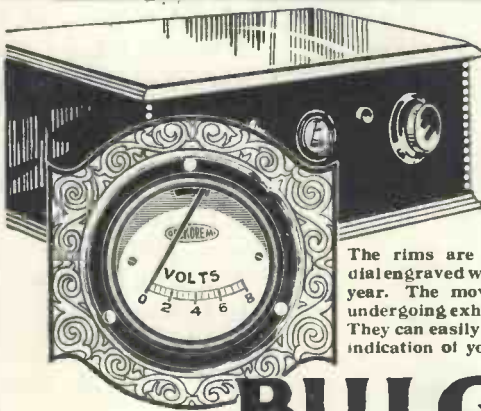
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Hand French Polished
Figured Oak £5 5 0
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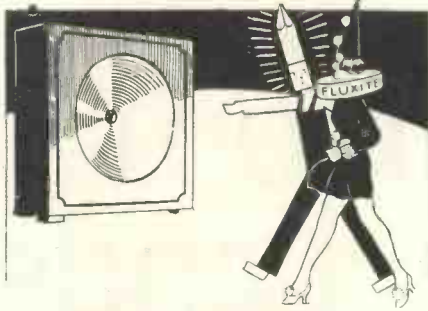
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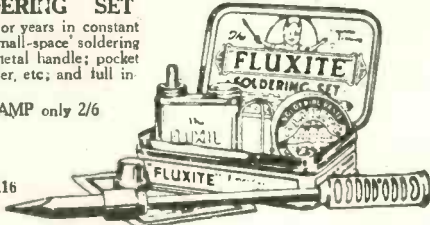
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ANOTHER USE FOR FLUXITE. Hardening Tools and Case Hardening Ask for Leaflet on improved method **FLUXITE SOLDERING SET** Simple to use and lasts for years in constant use. Contains special 'small-space' soldering iron with non-heating metal handle; pocket blow-lamp, Fluxite, Solder, etc; and full instructions.

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MR. JAMES HAS CHOSEN THIS CABINET

FOR THE "REGIONAL A.C. 4 RECEIVER described in this issue

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has again been chosen by an eminent Radio-engineer—because it is solidly constructed, beautifully finished and for remarkable low cost—namely, complete with 15" baseboard, £5 10s. 0d. Oak; £6 15s. 0d. Mahogany. It is suitable for either ELECTRIC or clock-work motors.

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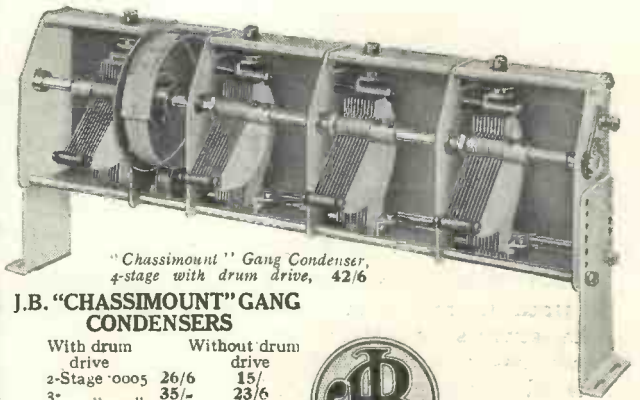


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There is a J.B. Precision Condenser for every purpose. Illustrated here is the new J.B. "Chassimount," giving one-dial control for from two to six circuits.



"Chassimount" Gang Condenser, 4-stage with drum drive, 42/6

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Programmes from Foreign Lands

By Our Special Commissioner

THE last month of the year sees marked progress in the scheme of international broadcasting and the extension of plans for the exchange of complete programmes with foreign lands.

Holland has been added to the West European combination which previously consisted of Great Britain, Belgium, and Germany. A Central European combination has been formed, with Poland, Hungary, and Czecho-Slovakia among its members. A third combination which is now under discussion will comprise Norway, Sweden, Denmark and Finland.

Eighty Programmes

As many as eighty international skeleton programmes have been drawn up with the assistance of the B.B.C. and submitted to the Western and Central European groups as providing suitable material for relaying. Christmastide of 1930 therefore witnesses the dawn of a new era of rivalry in Europe, a rivalry in the giving of pleasure.

Local patriotism has run very much higher since the B.B.C. was launched upon a novelty-loving world than was ever the case in connection with other branches of national work.

But local patriotism has often appeared to be suspiciously akin to parochialism when it has come to a question of providing local patriots with the opportunity of criticising the methods of the B.B.C. in catering for its millions of listeners.

Little Ground for Criticism

Take music, for example. Music, regarded either as an art or as one of the activities of broadcasting, or both, has no regional implications. Rapidly improving technical conditions have necessarily affected the means whereby listeners are furnished with their musical and other programmes, and so long as listeners get the best available material, there should be presumably little ground for criticism.

But local feeling has been expressing itself with renewed emphasis over the way in which the B.B.C. is handling the musical amenities of the various centres from which broadcasting takes place.

The promise of last year, when the foundations were laid of the great new orchestra, has been fulfilled. It is common knowledge that no organisation other than the B.B.C. could have faced the financial demands associated with such an orchestra, and it is now, happily, apparent that in so far as the provision of the best music by the best players is concerned the venture has been justified. The price is high, but the reward is sure.

Now, the establishment of the new orchestra has involved, or will involve, the reorganisation of studio orchestras in Scotland, Birmingham, Manchester and probably Cardiff.

At this point the critics enter the lists, complaining first of all of the "stony-heartedness" of the B.B.C. in throwing local musicians out of work, then of the Corporation's "short-sightedness" in ignoring local aspirations; and next of the unfair competition which was brought about, to the prejudice of orchestral bodies which had been in existence for many years, through the entry of the B.B.C. into the concert business.

Throughout the long period during which the scheme for the national orchestra was being developed the B.B.C. regarded the interests of the general body of listeners as paramount; and along with this the Corporation registered the view that the musical amenities of particular centres should not be prejudiced, but assisted in every way.

To this end, the line taken in Birmingham should be adopted in other places like Manchester, and the co-operation of the civic authorities sought with the objects of increasing the musical facilities of the city generally and of providing for the employment of the maximum number of musicians.

It used to be a standing reproach that we were musically a backward nation, but less has been heard in recent times of the British lack of musical enthusiasm.

This is attributable to the work of Savoy Hill, and the gramophone companies—let the scoffers say what they will about the technical deficiencies of mechanised music.

B.B.C. "Planning Big"

The B.B.C. is gaining confidence in its musical policy with increasing experience and is "planning big." But its development will aim to avoid prejudicing those musical organisations which have kept the flag flying in times when the public appetite for musical fare was less evident than is now the case.

An open letter to the Director-General of the B.B.C. was published recently in a suburban newspaper, and as it was signed by a well-known revue producer who has been to some extent identified in the past with broadcasting from the inside, the misconceptions on which it is founded should not pass without comment.

The writer of the letter suggests that "millions" of ideas are submitted to the B.B.C. by listeners themselves and all that is necessary is the setting up of a sort of committee to analyse, adopt and adapt them. This sounds very comforting and helpful; but unfortunately it isn't true. The B.B.C. is by no means snowed under by listeners' ideas.

Destructive Criticism

The only sort of avalanche that Savoy Hill has ever experienced, so far as one can remember, has consisted of destructive criticism, and the only body of officials approaching to anything like a committee that has been called upon to handle the missives of the more restive listeners has been the Programme Correspondence Section, whose energies have been

(Continued on page 534)



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GIVE TRUE TONE VALUE

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Hegra Cabinet "V" Type

Incorporating the new Hegra "E" unit with triple tapped impedance for use with any type of circuit.

Cabinet of beautiful walnut finish

Price complete **£3 5 0**



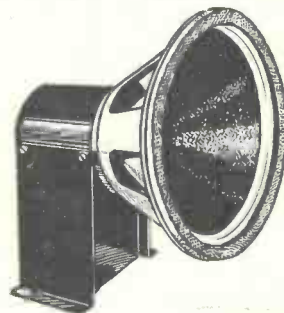
Hegra Moving Coil Speakers

energising winding input at 220 volts 70 m.a. 6 volts 1 amp. Output transformer can be disconnected if required.

Type A 1—for 6 volts or 110/120

volts (D.C.) - - - **£4 10**

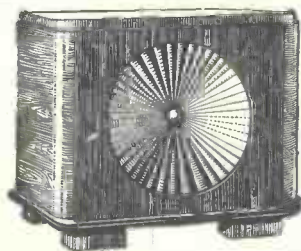
Type A 3—for A.C. mains. **£6**



Hegra Cabinet "T" Type

giving same performance as "V" Type (above) and incorporating triple tapped impedance. In Walnut Cabinet of new design.

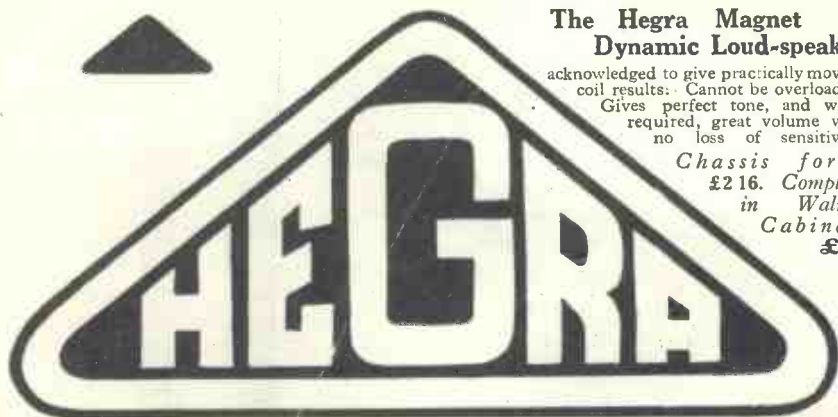
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The Hegra Magnet Dynamic Loud-speaker

acknowledged to give practically moving coil results: Cannot be overloaded. Gives perfect tone, and when required, great volume with no loss of sensitivity

Chassis form, **£2 16.** Complete in Walnut Cabinet, **£5**



Advertisers like to know you "saw it in the 'w'"

Programmes from Foreign Lands (Continued from page 532)

directed chiefly towards explaining and placating.

The open letter proceeds to state what is an admitted fact, namely, that the Director-General, "unfortunately for the listener," cannot possibly direct personally every department of the B.B.C.

Sheer Flattery

The phrase "unfortunately for the listener" is sheer flattery; Sir John Reith himself would be the first to emphasise the physical impossibility of any one person attempting to keep the business of broadcasting entirely in his own hands and to direct by personal contact, day by day, every department of the organisation.

The Control Board, composed of experts in their own spheres, and acting under his supervision and authority, must be of necessity the point of contact with the multifarious activities of broadcasting. The members of this Board he holds directly responsible for the failures or successes of the various departments.

One might as well expect the Prime

Minister to take on his shoulders the duties and responsibilities of each of his Ministers as to suggest that the Director-General of broadcasting should run the whole concern himself.

Hence any suggestions for the better conduct of broadcasting would be dealt with by the Controller, so far as organising the machine is concerned, and by the assistant controllers, so far as the compilation of programmes and the issue of information, etc., is concerned. These assistant controllers in turn have the co-operation of experts in music, the drama, education, the Press, publishing, engineering, research and so forth, the whole forming a kind of genealogical tree whose branches cover all the territory which broadcasting surveys.

One of the latest proposals to be sent to the B.B.C. is that the Corporation should buy or build a theatre, the main argument in favour of such a step being that so much atmosphere is missing when the public has only sound upon which to concentrate and no visual aid to the holding of the attention.

As might be surmised, the idea emanates from a theatrical source; for in its essentials it ranks the science of broadcasting in the same category as the art of the theatre.

If the B.B.C. theatre were to pay its way—an appropriate proportion of listeners' licence fees would not go far in that direction—the B.B.C. would have to stage a show every night, with perhaps two matinees in the week; prices would have to be equal to the usual theatre charges, and the theatrical managers would most certainly oppose this new form of competition.

Programme Changes

Moreover, the broadcasting of performances would mean continual changes of programme, as no broadcast play would stand more than two performances a week, one on the National and one on the Regional wavelength; and if only two performances were broadcast, all other performances during the week being for the visible audience alone, the real purpose for which the B.B.C. exists would be negated.

SELECTIVITY with quality— magnification—convenience

Those are the essential features of the modern set and much depends on the coils used to meet modern conditions. Mr. W. James designed the Binowave coils and their popularity is sufficient proof of the highly efficient manner in which they fulfill every modern requirement. Wearite Binowave Coils are made strictly in accordance with Mr. James' specification and only the highest grade materials are used. By using Wearite Coils you are assured of the full advantages of Binowave efficiency. Type C Dual Range H.F. Coupling for S.C. with alternative transformation ratio and including reaction winding. Type E Band-pass Filter Unit to give a flat-topped sharply-tuned resonance curve.

As specified for the James Regional Band-pass Four
Price 17/- each.

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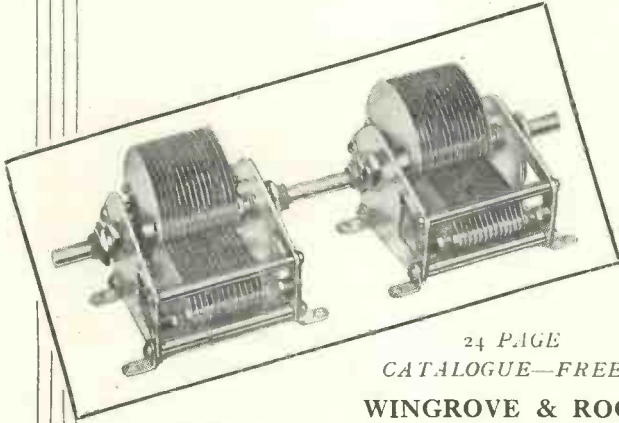
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SPECIFIED FOR THE REGIONAL A.C. FOUR

Every Polar condenser is designed for a specific service and for that reason set designers are able to select one exactly suited to their needs.
Polar supply the widest range of condensers obtainable.
There are over 20 types to choose from.



24 PAGE
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An improved slow-motion drum drive with smooth, yet precise, action. Clearly marked scale, 0-180. Suitable for single or ganged condensers mounted parallel to panel.
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A Condenser specially designed for ganging. Fitted with detachable spindle—various lengths supplied. Baseboard mounting lugs ensure rigidity and accurate alignment. Locked rotor vanes. Screens easily fitted between units.

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·0003 7s. 0d.

Phosphor-bronze
balls 3d. extra.



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For the second year in succession, the FERRANTI MOVING COIL SPEAKER has been selected as the best in the "Wireless World" Olympia Show Ballot for "Loud-speakers of all Types."

Chassis only, as shown, £9.10.0

Also available in Table and Pedestal Cabinets in Oak, Mahogany and Walnut, and a Table Model in Rexine covered Metal case. Ask your dealer or write for descriptive pamphlet.



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Moving Coil MAGNO-DYNAMIC SPEAKERS

FERRANTI LTD. Head Office and Works, HOLLINWOOD, Lancs.

LONDON: Bush House, Aldwych, W.C.2

Advertisers like to know you "saw it in the 'Wireless Magazine'"

BAIRD'S REPLY TO THE EDITOR

"Television is **not** at a standstill!" says SYDNEY A. MOSELEY, on behalf of Baird Television, Ltd., in reply to the comments made by the Editor last month

ONE is accustomed to a good deal of criticism where a new science is concerned. Particularly television. Much of this criticism is ill-informed, and much more ill-natured.

Much of this hostile criticism, however, indeed, nearly all, has of late disappeared in face of actualities.

Cause of Surprise

Imagine my surprise on reading Mr. Bernard E. Jones' editorial in WIRELESS MAGAZINE which he heads: "Is Television at a Standstill?"

Now, this is good journalism. But it is hardly in keeping with the far-seeing and broad-minded attitude

graphic enlargements, and I realised that Mr. Baird, by looking to mechanical details and particularly by making a stride forward in the method of lighting, had very considerably improved his results."

And now, two years later, after having built up so many hopes, my friend must, alas! publicly state that the pictures are of "no better quality—if as good—," and further that the large screen picture that he saw in the Coliseum compared, if anything, unfavourably with the original pictures he saw in 1928!

A terrific indictment!

Indeed, not content with throwing

Since 1928 we have seen the commercialisation and application to everyday use of what was, at that time, still unavailable to the general public. The vast amount of work entailed in this step, and the great development it represents, can only be appreciated by those who have had first-hand knowledge of what is entailed in moving from the laboratory to the commercial world.

An Essential Fact

I take it that Mr. Jones in writing his article must have forgotten this essential fact which, I repeat, is simply that the picture he saw two years ago was in the laboratory, and the picture he sees to-day is in a commercial Televisor.

All the difference in the world.

The only way of making a fair comparison is between the picture he saw in the laboratory in 1928 with the picture he could see *to-day* in the laboratory! He must, in fact, make one more visit to the Baird laboratories and see under laboratory conditions what Mr. Baird can achieve in 1930, as compared with what he was able to do in 1928.

If he will come along with me I think he will be convinced that the answer to his article is: "Television is not at a standstill."

Let me drive this point home.

A Comparison

The arguments put forward by Mr. Jones with, let me admit, friendliness and moderations, is similar to the motorist who was privileged to visit the workshop of a big motor manufacturer, and saw the following year's models; then, having seen the actual model on the road a year or so later, he declared that was no advance.

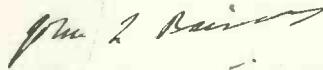
Now, what will the Editor of "W.M." see if he cares to avail himself of the invitation to visit the

(Continued on page 538)

Mr. J. L. BAIRD WRITES US:—

I have read Mr. Sydney A. Moseley's reply to your article: "Is Television at a Standstill?", and beg to say that I agree with his sentiments in every respect.

Yours faithfully,



which Mr. Jones in particular has adopted from the beginning of this interesting controversy.

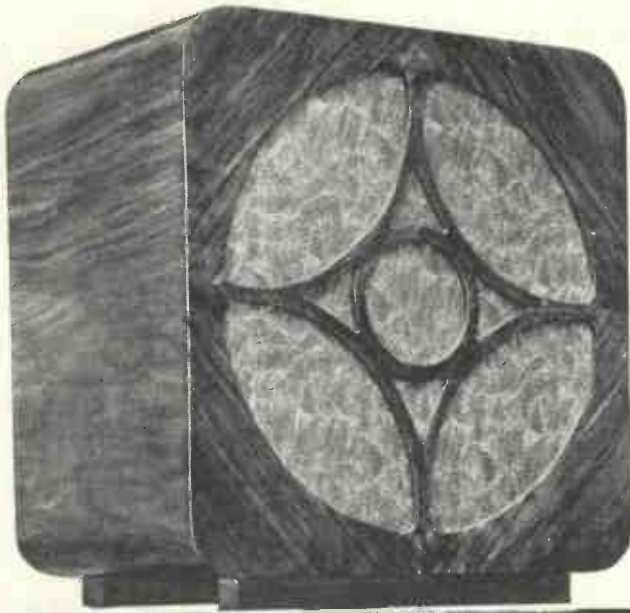
Now, what are the startling facts which Mr. Jones adduces, which has resulted in his changing an attitude of a positive advocate to that of merely a doubter? He remembers, apparently, two years ago seeing a "most beautiful television picture" in Mr. Baird's Long Acre studio. He was delighted with the quality of the line-transmitted pictures—and, indeed, I remember his writing about his experiences at the time.

He adds: "Mr. Baird's pictures had all the quality of soft photo-

this bomb into the camp of his friends, he pokes out his tongue and states that from the Coliseum demonstrations he might be tempted to suppose that television had gone backwards! Heaven help us!

Now, let me take his first point first; that is in regard to the small picture which he saw two years ago.

He forgets that this picture, of which he was one of the few privileged to see, was shown in the laboratory: the picture he sees now is a commercial product, broadcast daily through the B.B.C., and can be received by any one who cares to purchase a set. This is a far cry from the laboratory



BLUE SPOT

51R

Driven by the world's wonder unit, 66R, and cased in a walnut cabinet of exquisite design, this speaker is by far the best available at its price. That we can offer you such a marvellous product at only

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When you send your order don't forget to say you "saw it in the 'W.M.'"

Baird's Reply to the Editor (Continued from page 536)

Baird laboratories afresh? Does he expect that the laboratories and their contents will be the same as on his last visit? Does he imagine for a moment that Mr. Baird, working incessantly as he does, has let the grass grow under his feet?

Let me assure him that, apart from being able to see interesting developments in the laboratories themselves, he will, if he is permitted to enter certain laboratories which have been opened to me, realise that the model of to-morrow is more than in the embryo to-day.

Commercial Limitations

He must remember that the Baird Company is not only a scientific, but a commercial company now, and obviously it cannot put on the market immediately sets which are improved either in size or quality of picture.

Without giving away secrets which are, naturally, jealously guarded, I may say that it would be possible for Mr. Jones to see a picture not only improved in quality, but transmitted on an improved system; he would be able

to see, not only the head and shoulders of a picture on a commercial model, but a full-sized picture of several people.

Let Mr. Jones, who has been one of the most consistent friends of television, exercise a little more patience. After all, the fight in the past has been to put on the market a set which was within reach of the amateur and of the enthusiastic looker-in; that has been achieved, and Mr. Jones will be one of the first to admit that it is no mean achievement. For to-morrow, be assured, supporters will not be disappointed.

The next step has already been taken in the laboratory; and to-morrow another milestone will have been passed—when the new models will have been placed within the reach of the big radio public.

The point that most surprised me in the article was his suggestion that the Coliseum public demonstration was a mistake. He states that "the public looked at a crude representation which I, from my seat in the stalls, could scarcely recognise."

Let me suggest that perhaps Mr.

Jones sat too near the screen—he said he sat in the stalls—and that he attended on an afternoon when the screen was not behaving itself. But he must admit, however, in view of this unanimous chorus of praise from critics, who are often blasé, that the Coliseum demonstration was not only justified, but definitely indicated one more milestone in the progress of television.

Berlin Demonstrations

The same success as attended the London demonstrations was witnessed in Berlin, as I myself saw. The Press there use such adjectives as: "Epoch-making," "Wonderful." Berliner-Westen states: "It was wonderful, and it will certainly not require thirty years for this invention to be as perfect as the film is to-day." And I cannot resist quoting an extract from *Lichtbild Bühne*: "The fact is indisputable: The wonder of television is solved and is no longer a problem."

Surely all this evidence justifies my answer that television is *not* at a standstill?

MAKE YOUR OWN RECORDS

SIMPLE
—
INEXPENSIVE
—
PERMANENT



HERE, at last, is an opportunity to make permanent gramophone records. Records of your children's voices, their musical talents, greetings and messages to your relatives and

friends in your own voices are novelties that will be appreciated and retained by all. The records are made by a simple device connected up to your radio set and gramophone.

See the October issue of WIRELESS MAGAZINE for full description of this Home recorder by Mr. J. H. Reyner. The complete apparatus, complete with six double-sided records, is retailed at £4 12 0. Further supplies of records can be obtained for the remarkably low price of 4d. each.

Write for full details and descriptive leaflet, explaining the secret of this wonderful home recording device, to

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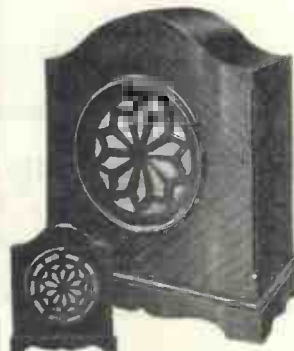
EPOCH MOVING COIL PERMANENT MAGNET SPEAKERS

CABINET MODELS:
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THE Latest and Greatest Value offered by Epoch. The only Cabinet Moving Coil Speaker that renders speech perfectly, and music correctly. The speaker with the "Epoch Characteristic."

More sensitive than a "cone" and much more powerful than most energised moving coil speakers. Absolutely permanent. Magnificently made and finished. An instrument of precision, durability and beauty.

Type C12
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Send for Booklet M.W.4 giving the finest and largest range of Moving Coil Speakers, in both permanent and energised fields, in the world. Manufactured by the greatest Moving Coil Specialists in England.

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REGENTONE

THIS CHRISTMAS



The **REGENTONE 4-VALVE A.C. ALL-ELECTRIC RECEIVER**

Christmas and the need for new radio. The need for the Regentone 4-Valve A.C. All-electric Receiver.

Critics have praised its performance—its simple one knob control, its selectivity, its handsomely designed matched-walnut cabinet. Experts affirm that—tested and tried in all parts of the country—it is the right set for present broadcasting conditions. And it has a quality of reproduction which only correct proportioning could produce.

Impressive as a gift, or in your own home, the Regentone 4-Valve A.C. All-electric Receiver is outstanding in All-mains sets. Hear it for yourself—and remember that there will be no delay in delivery. One knob tuning; two screened-grid stages H.F.; aluminium chassis; completely screened coils and S.G. valves; mains drive enclosed in separate screened case; beautifully finished matched walnut cabinet.

Price 30 gns. complete. Or £5 deposit, balance in 12 monthly payments of £2 9s. 6d

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Write to-day for FREE Art Booklet fully describing the Regentone 4-Valve A.C. All - electric Receiver and giving full details of Regentone products.

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Tel.: Central 8745 (5 lines).

Irish Free State Distributors: Kelly & Shiel, Ltd., 27 Fleet Street, Dublin.

Advertisers take more interest when you mention "Wireless Magazine"

Readers Test Some "W.M." Sets

PORTABLE S.G.3

AT Norwich the James Portable S.G.3 (WIRELESS MAGAZINE, July, 1930) is giving satisfaction, many stations having been received.—

A short time ago I built the James Portable S.G.3. I am very pleased with the set and would never have believed it was possible to get so many stations on the loud-speaker from a three-valve portable.

I have not really had time to identify many stations, but amongst those received so far are Toulouse, Langenberg, Rome, Frankfurt, Paris, Hilversum, Madrid, Barcelona, and the main English stations.

Radio Paris does not seem to be up to the strength I expected, judging from the medium-wave results.

Thank you for an excellent set.

MUSIC MONITOR

"NEEDLE-SHARP" tuning is what an Essex reader likes about the Music Monitor (WIRELESS MAGAZINE, September, 1930), which is giving excellent results with a home-made coil:—

I have at last pulled my One-dial Two to pieces and put together the Music Monitor.

The coil I wound myself, having used ordinary cardboard for the former.

Although the medium waves come in at tremendous power, with exceptional purity (and the greatest of all blessings is that it is needle-sharp in tuning), unfortunately the long waves are not so good—rather weak, but probably this is due to a slight fault in winding.

Strange to say I had an old P.R. H.F. and det. valve (cost 3s. 6d.) which I never tried and I found this to give much better results than a well-known H.F. valve.

My summing up of the set is: a magnificent little two-valver which will do much more than most three-valvers I have heard—it's so simple!

It will be most interesting when the Music Monitor Three is published, but I'm afraid it is not so easy to add an extra valve in this circuit.

In conclusion I would thank the "W.M." for its really excellent sets and am quite sure it is easily first among wireless periodicals for genuine results.

FOUR SOME PORTABLE

THE following report on the Foursome (WIRELESS MAGAZINE, August, 1930) has been received from a London reader:

I feel I must write and say how very pleased I am with the Foursome Portable.

I have used in place of the multi-coupler a Lewcos choke, 2-megohm grid leak and a .0002-microfarad fixed condenser; also a Ferranti A.F.4 in the last stage and a Climax in the first stage.

For the very best results I have a Mullard S.G.; detector, Tungstram H210; first L.F., Lissen L210; and power, Mazda P240.

Now I have been interested in wireless for five years and have experimented with many portables. I honestly say this is the very best thing I have struck yet in home-made sets and credit is due to the designer.

I hope other amateurs will take this friendly advice. Don't waste money on cheap components if you want quality in tone. I am using a Grawor unit.

I have taken this set to Lancashire this week-end and Berlin, Radio Paris, Eiffel Tower, Hilversum and 5XX are well worth listening to.

Birmingham, Manchester, Liverpool, Dublin and Cork, and some foreign stations, not so good on medium waves. This is a candid report on your set and I am in no way connected with the wireless trade.

Kit for the REYNER HYPERDYNE

	£ s. d.
1 Ebonite Panel 14 by 7 (Trelleborg)	0 4 0
2 Formo .0005 Variable Condensers	0 9 0
1 Formo .0002 Variable Condenser	0 2 9
1 Formo .0001 Variable Condenser	0 2 9
1 Pioneer L.T. Pilotment Switch	0 1 3
1 Lewcos D.W.A. Coil	0 15 0
6 W.B. Valve Holders	0 7 6
1 Coil Base (6-pin)	0 1 6
2 Joint Terminal Blocks	0 1 4
1 T.C.C. .01 Fixed Condenser, Flat	0 1 3
1 T.C.C. .01 Fixed Condenser, Upright	0 2 3
1 T.C.C. .001 Fixed Condenser, Flat	0 1 3
2 T.C.C. .0003 Fixed Condensers	0 3 6
1 T.C.C. .00025 Fixed Condenser	0 1 9
1 T.C.C. .0001 s/p Fixed Condenser	0 2 3
2 Lissen H.F. Chokes	0 10 6
1 R.L. Hypermite Transformer	0 12 6
4 Belling-Lee Terminals	0 1 6
7 Belling-Lee Wander Plugs	0 1 9
2 Belling-Lee Spade Ends	0 0 9
1 Special H. & B. Choke (Short Wave)	0 2 0
2 Ormond Slow-motion Dials	0 5 0
2 Black Knobs	0 1 6
1 Intermediate Amplifier	3 3 0
2 Pairs of G.B. Battery Clips	0 1 0

H. & B. KITS

Kit for the James REGIONAL A.C. FOUR

	£ s. d.
1 Igranite L.F. Choke, type C30	0 15 6
1 Parmeko Smoothing Choke	1 7 6
1 Pair Wearite 1930 Binowave Coils, types C and E, with ganging device	1 17 0
1 T.C.C. Fixed Condenser, .002, upright	0 1 6
1 T.C.C. Fixed Condenser, .0005, upright	0 1 6
1 T.C.C. Fixed Condenser, .002, Upright	0 0 1 10
1 T.C.C. Fixed Condenser, .015, Upright	0 0 3 3
1 Hydra, 1 mfd. Condenser	0 2 0
3 Ferranti 2-mfd. Condensers	0 15 0
3 Hydra 2-mfd. Condensers	0 13 4
3 Polar .0005 "Universal" ganged condensers	1 2 6
1 Lotus .00084 Differential Condenser	0 5 6
1 Formo Pre-set, .0003 maximum	0 1 6
2 Polar Drum Drive Dials	0 17 0
1 Trelleborg Ebonite Panel, 18 by 7	0 7 6
3 H. & B. Terminal Blocks	0 1 0
2 Panels; one 5 by 21, and one 4 by 2	0 1 0
2 Microfuses, 230 m.amp. type, with holders	0 5 0
3 Bulgín Grid-leak Holders	0 2 3
2 W. & B. Valve Holders, 5-pin	0 2 6
1 Telsen Valve Holder, 4-pin	0 1 0
1 Junitt, S.G. type Valve Holder	0 1 9
1 Westinghouse Metal Rectifier, Type HT7	1 1 0
6 Belling-Lee Plugs	0 1 8
6 Belling-Lee Sockets	0 1 6
1 H. & B. 630-ohm Fixed Resistance	0 1 6
3 Magnun, 30,000-ohm Spaghetti type	0 2 0
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1 Magnun 20,000-ohm, Spaghetti type	0 1 6
1 Lissen, 100,000-ohm Grid Leak	0 1 0
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2 Claretat 30-ohm Potentiometers	0 5 6
2 Regentstat 1,000-ohm Potentiometers	0 19 0
1 Regentstat 120,000-ohm Potentiometer	0 11 6
1 Igranite 1-megohm Potentiometer	0 6 0
6 Belling-Lee Terminals, marked: Aerial, Earth, L.S., L.S.—Pick-Up (2)	0 2 3
1 Varley Ni-core II, L.F. Transformer	0 15 0
1 Regentone Mains Transformer, type WRM	1 7 6

CASH PRICE for Kit £7 10 10

Note.—Price of Kit includes the Panel all ready drilled, 5-ply Baseboard, Wire, and Screws.

6 Mullard or Mazda Valves, £3 18s. extra.

THE H. & B. HYPERDYNE

Intermediate Amplifier

Built exactly to Mr. Reyner's specification. Supplied complete in Copper Screen Box with Ebonite Lid. Ready for immediate use. Cash Price £3 3s. complete. Post paid. Delivery from Stock. Trade supplied.

COILS.—Set of 3 Special Intermediate Amplifier Coils wound exactly to specification, 17/6 the set. Post paid.

COPPER BOX and Ebonite Lid with necessary Earthing screws, 15/- Post paid.

WE WILL BUILD YOUR SET FREE

All purchasers of H. & B. Kits get their sets built Free by us, if desired

THE "FIVE-POINT TWO" Kit

	£ s. d.
1 Atlas Coil, No. 40, Plug-in	0 2 6
1 Atlas Coil, No. 150, Plug-in	0 3 6
1 Atlas Coil, No. 60, Double Tapped Plug-in	0 5 6
1 Dubilier .0001, Upright Fixed Condenser	0 1 8
1 Dubilier .0002 Fixed Condenser	0 1 8
1 Ormond .0003 type R/428 with S.M. Dial	0 6 0
1 Formo Pre-set, .0003 maximum	0 2 0
1 Formo .0002 Reaction Condenser	0 2 9
1 Trelleborg Panel, 9 by 6	0 2 3
2 H. & B. Terminal Blocks	0 0 8
3 Lissen Coil Holders	0 3 0
1 Lissen Grid Leak Holder	0 3 0
2 Clix 4-pin Valve Holders	0 1 8

2 Mullard or Marconi Valves, 19/- extra.

Note.—Price includes Panel drilled, 5-ply Baseboard, Wire, Screws, COILS FOR "MUSIC MONITOR" Ex-Stock. Exactly as specified by Mr. James. Price 7/6, post free.

We supply KITS for all sets. Components supplied separately, if desired.

Carriage Paid on All Orders accompanied by Cash. C.O.D. Charges paid on orders over £1.

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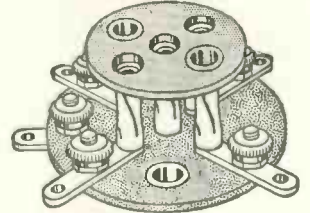
CLIX VALVE HOLDER 5-POINT 2 SET

Specified for the

described in this issue.

Extract from a recent test report in a leading technical journal:

"We have no hesitation in saying that for the short-wave receiver it is the best on the market. It is as nearly air supported as possible. An excellent feature is to be found in the new Clix slotted sockets giving positive contact to either split or solid valve pins."



No. 27. Pro. Pat. Reg. Design.

Usual H.F. losses entirely eliminated. Resilient Sockets air dielectrically insulated and self aligning. Impossible to blow valves.

Type B for baseboard mounting.

- 5 Pin Model with screw terminals - 1/-
- 5 Pin Model without screw terminals - 9d.
- 4 Pin Model with screw terminals - 10d.
- 4 Pin Model without screw terminals - 8d.

Clix 27 different devices for contact.

Write for descriptive leaflets.

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

Xmas with Columbia Radio

Model 308

The New Columbia All Electric Radio-Graphophone, giving perfect reproduction through a Columbia Moving Coil Speaker. Illuminated Controls, calibrated in wave-lengths. Adjustable aerial condenser. For A.C. mains.

Oak - 62 gns.

Mahogany - - - 65 gns.

Walnut 69 gns.

Model 331

A new pedestal cabinet radio! With 3-valve All-Electric set and new balanced armature Speaker. Provision for Gramophone pick-up. Wonderful tone and volume.

Mahogany - - 30 gns.

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A present for yourself . . . good modern radio . . . Columbia Radio . . . made by the makers of Columbia Graphophones and Records. Enjoy the certainty of getting the programme you really want, be it English or foreign. Know the freedom from trouble that all-electric radio alone can give.

Let your family revel in the perfect reproduction, the simple controls that anyone can use. Spend Xmas with Columbia—the perfect instrument for home entertainment.

Model 309

Alternate programme without tuning! Just a switch! No dials, no tuning. All-Electric. A.C. or D.C. Enclosed Speaker. 12 gns.

Model 303

Simple tuning. Wide range of stations. Faithful tone.
Oak 16 gns. Blue Crocodile 17 gns.
Can be made All-Electric by addition of a Columbia power unit.
(A.C. Unit 10 gns. D.C. Unit 7 gns.)

Model 307

Powerful 3-valve circuit—Screened-grid, Detector, Pentode. Illuminated controls, tuning calibrated in wave-lengths, adjustable aerial coupling. Provision for Gramophone pick-up. All-Electric A.C. or D.C.

Oak 20 gns. Mahogany 21 gns.

Model 304

"The choice of the Experts"
5 valves. Including 3 screen-grid. Tuning dial calibrated in wave-lengths. Immense power & range. All-Electric A.C. or D.C.
Oak (A.C.) - - - 26 gns.
Mahogany (A.C. or D.C.) 27 gns.
Walnut (D.C.) - - - 28 gns.



Columbia RADIO

* I should like to hear Columbia Model No. playing in my home. Please arrange this without cost or obligation to myself.

* I should like a copy of the Columbia Radio Book * and/or catalogue of Radio-Graphophones.

Cross out if not required.

Cut this out and post it in an unsealed envelope bearing a 3d stamp to:—

Columbia 92, Clerkenwell Road, London, E.C.1.

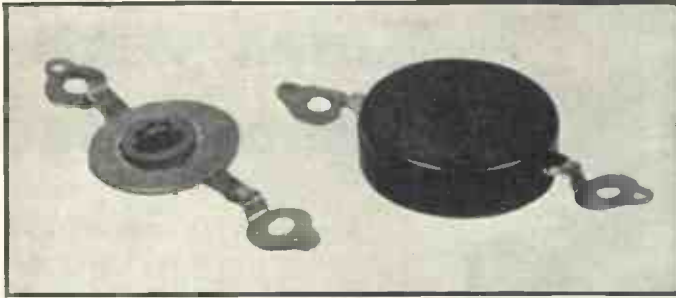
NAME

ADDRESS

W.M. Dec.

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

TESTS OF NEW APPARATUS *for Your Guidance*



NEW AND CHEAP FIXED CONDENSERS

On the left is seen the actual condenser element of the new Formo instruments, while on the right is a complete assembly. These condensers are only 6d. each

FORMO CONDENSERS

MANY readers, during their constructional and experimental work, are continually requiring different values of fixed condensers. Unfortunately, to keep a comprehensive stock of these articles might mean a considerable outlay in expenditure. This and the prospect that many of the values would be ultimately discarded tends to make us economise more than we should like to in these necessary components.

The Formo Co., of Golden Square, Piccadilly Circus, W.1, who are well known for their variable condensers,

have recently produced a series of fixed condensers, selling at 6d. each. These have a mica dielectric and are housed in a circular moulded container 1 in. in diameter. Two tags are provided for connection purposes, and the instrument is so light that it does not require screwing down to the baseboard.

The sample submitted for test had a rated capacity of .00025 microfarad. This value was checked and was found to be .000203 microfarad. We feel that all readers will be able to satiate their appetite for fixed condensers at this price!

WATES CIRCUIT TESTER

THERE are many occasions on which one desires to test the continuity or resistance of a circuit. We therefore think that readers will be interested in a new device, marketed by the Standard Battery Co., of 184-188 Shaftesbury Avenue, W.C.2, designed specially for use with pocket meters.

The Wates Polyscope, as this device is called, consists of a cylindrical container suitable for holding a small standard 4½-volt torch battery. The cells of this battery, when in position, make contact with a long metal prong at one end and a metal socket at the other.

Into the socket one can put the prong of the pocket voltmeter, using in its place the prong of the tester. By this means the battery has been interposed in the voltmeter circuit, and when one end of the meter and one end of the prong are placed across a circuit, continuity will be indicated by a reading.

The makers have worked out the readings which will be obtained on their three-in-one meter for different values of circuit resistance. As a ready means of testing for short-circuits, continuity, or values of resistance up to 3,000 ohms, there is no doubt as to the practical nature of this tester. The price is 3s. without battery.

(Continued on page 544)

Price

10/6

WEIGHS ONLY 7 OZS.!



IGRANIC MIDGET TRANSFORMER

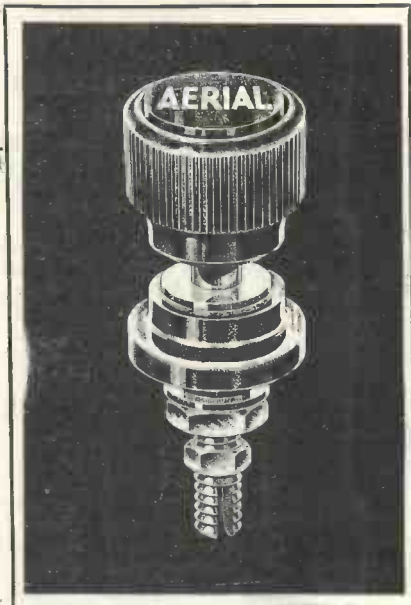
Specified for the FIVE POINT TWO RECEIVER

Although only 2½" × 1½" × 1¼" in size, this Transformer may be termed a "Masterpiece in Miniature." This "Midget" Transformer has a high primary inductance of over 60 henries, and the patented core embodying a new nickel alloy permits overload without ill effect. Ratio 3:1.

Have you a copy of our new Radio Catalogue? If not may we send you one? Write to Dept. J. 1097.



**FOR YOUR OWN SET
—OR YOUR FRIEND'S**



Patent

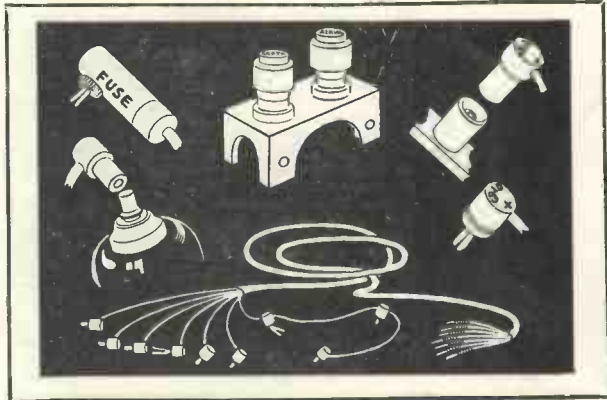
IDEAL XMAS GIFTS

Make sure your set is working at its best for Christmas. Write for free Belling-Lee Handbook "Radio Connections" (2nd Edition). Full of interesting information, it suggests many novel uses for Belling-Lee Products, either for adding to an existing set or building into a new one.

Belling-Lee Radio Connections are the last word in safety, efficiency and reliability. Unique in design they can never come adrift and they add to the appearance of any set.

Remember your friends when you are looking through the free Handbook. Belling-Lee Battery Cords, Spadensers, Wanderfuses, etc., make excellent gifts

- BELLING-LEE TERMINALS**
- Type "B" (ill. above) - 6d.
 - Type "M" - - - 4½d.
 - Type "R" - - - 3d.
 - Wander Plug - - 3d.
 - Plug and Socket - 9d.
 - (Panel portion 3d., Flex portion 6d.)
 - Twin Plug and Socket 1/6
 - (Panel portion 6d., Flex portion 1/-)
 - Terminals Mount - 8d.
 - S.G. Anode Connector 6d.
 - Battery Cords, 9-way 5/9
 - (also made in 5-, 6-, 7-, 8- and 10-way)
 - The New Wanderfuse 1/6
 - (Shore Fuses. (1.50 m/a), 9d.)



BELLING-LEE
FOR EVERY RADIO CONNECTION

Advt. of Belling & Lee, Ltd., Queensway Works, Ponders End, Mdx

**Greedy
for Music-**

Wates Pick-Up
Attractive
Oxidised Finish
21/-

the finest quality of the

**WATES
GRAMOPHONE
PICK-UP**



An actual side-by-side test of the Wates Pick-Up with any other at any price, immediately reveals the wonderful capacity this instrument has for reproducing everything that is on the record.

All those subtle notes at both extremes of the musical scale are heard with definition and accurate tonal quality—nothing is missed, with the result that even with a two-valve set, perfect results in volume and tone are obtained.

1 POINT

that takes the whole responsibility—

But fine amplification gives you all that the needle collects

Hear the Wates Pick-Up at your dealer's and notice how true to tone the recording is—you will choose the Wates on performance alone!

Illustrated leaflets sent free on request from

THE STANDARD BATTERY CO.

(Dept. W.M.)

184/188 SHAFTESBURY AVE., LONDON, W.C.2

A.B.

It helps us if you mention "Wireless Magazine"

Tests of New Apparatus—Continued

R.I. MAINS UNIT

WE have just tested an extremely well-designed unit for deriving high-tension current from A.C. mains. This is a new R.I. product, capable of a wide variety of applications. Its compact size makes it very suitable for portable sets, where it can replace the existing high-tension battery.

One of the outstanding features of this unit is the use of high-permeability material for the cores, so that although the smoothing is as great in this little unit as in very much larger units, a great economy of space is accomplished.

The exterior appearance and finish of the bakelite container of the R.I. unit is very high class, as, indeed, is the workmanship of the interior. Accessible sockets, for three high-tension positive outputs, and for different mains inputs, are let into the bakelite moulding. In the centre of the unit is a smoothly-working voltage-control knob, providing a variable output for the detector or high-frequency valves.

We tested this unit on the laboratory 200-volt A.C. supply. The unit is claimed to give a 20-milliampere output from the maximum socket. We found that, at this load, the high-tension voltage was 135 volts. Progressive

reductions of 1 milliampere in the load resulted in progressive increases of 5 volts in the voltage maximum. Thus at 15-milliamperes' load the maximum voltage was 160 volts.

Screened-grid valves work well when

mended as an entirely reliable source of high-tension current from A.C. mains.



R.I. MAINS HIGH-TENSION UNIT

This unit gives about 20 milliamperes at 135 volts and the price is £4 15s. A D.C. model is available at £2 12s. 6d.

their anodes are connected to the S.G. output socket; and a good variation from zero to 150 volts was obtained from the detector socket with average detector-valve loads.

This unit can be thoroughly recom-

supported and a handle. In oxidised copper the price is 5s. 3d. a set and in oxidised silver 6s. 6d.

With one of the Vibranti boards and a good cone unit and chassis it is possible to assemble a really fine loud-speaker.

Borst Baffles

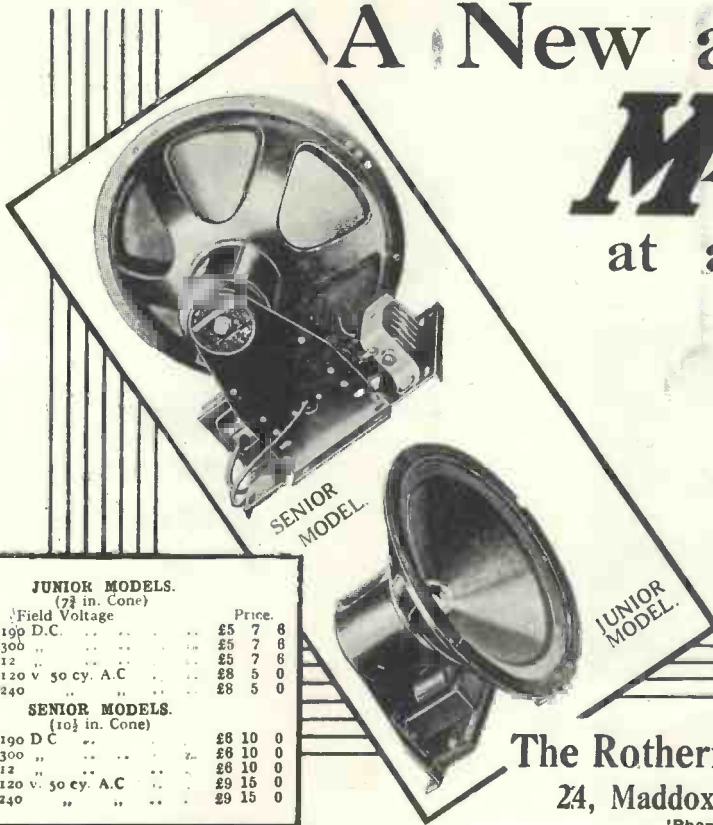
NOW that there are so many good loud-speaker chassis on the market there is a greater demand than ever for baffle boards on which to mount them.

Some of the best boards are those made by Chas. Borst and Sons, of Euston Road, N.W.1. One of these Vibranti boards has been in constant use in the WIRELESS MAGAZINE test department for many months.

The chief point of interest about these baffles are that they are cut from a single piece of wood. The loud-speaker opening is not merely a fretted design placed in a hole cut in the board.

Six different finishes are available—some of them most attractive—at 9s. 6d., 10s. 6d. and 11s. 6d. Special fittings are now available for turning these boards into screens—two floor

A New and Better **MAGNAVOX** at a Lower Price



Once again Magnavox sets the pace in design, quality and performance. Hear either the new Senior Model with 10 1/2" cone or the Junior Model with 7 1/2" cone and you will be convinced that Magnavox gives the finest reproduction and the utmost in value. Remember that Magnavox originated the moving coil speaker and that Magnavox engineers have produced in the new Senior and Junior models speakers which outclass all other types and a new realism in tone and full frequency response.

You have the choice of models for either A.C. or D.C. field excitation both with 7 1/2" or 10 1/2" cones. WHEN THERE IS ANYTHING NEW AND OUTSTANDING IN DESIGN MAGNAVOX WILL ALWAYS BE FIRST IN THE FIELD

JUNIOR MODELS. (7 1/2 in. Cone)			
No.	Field Voltage		Price.
116.	110-190 D.C.	.. .. .	£5 7 8
118.	180-300 .. .. .	.. .. .	£5 7 8
210.	6-12 .. .. .	.. .. .	£5 7 8
410.	105-120 v. 50 cy. A.C.	.. .. .	£8 5 0
414.	220-240 .. .. .	.. .. .	£8 5 0
SENIOR MODELS. (10 1/2 in. Cone)			
117.	110-190 D.C.	.. .. .	£8 10 0
119.	180-300 .. .. .	.. .. .	£8 10 0
211.	6-12	£8 10 0
411.	105-120 v. 50 cy. A.C.	£9 15 0
415.	220-240	£9 15 0

The Rothermel Corporation Ltd.

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Varley

FAMOUS SINCE BROADCASTING BEGAN



**IMPEDANCE MATCHING
OUTPUT TRANSFORMER**

£1 : 2 : 6

6 ratios : 8-1, 10-1, 12-1, 15-1, 20-1, 25-1

Long before Broadcasting became what it is to-day, Varley had won fame for their coil winding.

On this experience is founded Varley's latest achievement in radio. Varley Impedance Matching Output Transformer—a new component of advanced design gives six different ratios. Accurately and without difficulty you can match loud-speaker and output valves.

Remember that Varley Components are descendants of a long line. Since radio came Varley ideal has been quality. The Varley Impedance Transformer is the only adequate answer to a modern radio problem.



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

Mention of the "Wireless Magazine" will ensure prompt attention

NEXT MONTH!

A special section of the January issue of WIRELESS MAGAZINE will be devoted to the interests of those who wish to buy complete receivers. There will be many full-page test reports of the new season's outstanding receivers that will interest all concerned with recent advances in the radio art, as well as prospective buyers.

ANOTHER FINE ISSUE OF "W.M."

Besides this special section for set buyers, all the regular features for which WIRELESS MAGAZINE is so much appreciated by readers will be retained. Among the constructional articles will be one by W. James describing the construction of an A.C. mains set with three screened-grid high-frequency stages.

OUT ON FRIDAY, DECEMBER 19

CUT THIS OUT!

In order that anyone you know who is interested in wireless but is not yet a reader of WIRELESS MAGAZINE may become acquainted with it, a complimentary copy will be sent gratis and post free if you will complete the coupon below and send it to the Publisher.

To the Publisher, WIRELESS MAGAZINE,
58/61 Fetter Lane, E.C.4.

Please send a specimen copy free and post free to my friend:

My own name and address are:

Put this coupon in an unsealed envelope bearing 1d. stamp.

RADIO IN REVIEW

By MORTON BARR

Man-made Static

THE rapid spread of electric-supply networks throughout the country is, of course, generally welcomed by listeners who are anxious to install mains-driven sets, but there is, unfortunately, another side to the matter.

Complaints are being made of increasing interference caused by the use of various kinds of electrical plant, domestic and otherwise. Electric trams are one of the worst offenders, but carpet-sweepers, violet-ray and diathermy apparatus, and similar electrically-driven appliances, all help to swell the total of "man-made static."

It is practically impossible to shield a wireless set from radiated "noise" of this kind. The only remedy is to nip the trouble in the bud, or rather at the source, by means of anti-radiation devices.

Usually all that is required is to fit the offending appliance with a shunt condenser so as to pass the high-frequency currents to earth.

The difficulty is that there is at present no way of enforcing this remedy. The Postmaster-General, who is the legal guardian of the ether, states that he has no statutory power to compel users of electrical plant to avoid creating interference with broadcast reception.

Seeing that excessive noise of the ordinary kind is admittedly illegal if it amounts to a public nuisance, and that a motorist is fined if he cuts out his silencer, the time seems to be ripe for the introduction of a new law to enforce peace and quietness in the ether.

Secret Wireless

It is sometimes argued that the use of wireless telephony for commercial purposes is open to the objection that private messages are liable to be overheard by outside listeners. In the case of the transatlantic service from Rugby, an unauthorised "eavesdropper" would find himself up against a very tough proposition.

In order to maintain absolute secrecy, the speech as it leaves the telephone transmitter is first cut up into small fragments by a rotating device, which rearranges the separate parts in an entirely different sequence.

The message is radiated in this "scrambled" form so that it would be absolutely unintelligible if received on an ordinary set.

At the distant end a special commutator device splits up the message as received, and rearranges it in the original "clear" form. On the short-wave service a somewhat similar method is adopted to ensure secrecy except that in this case the speech "frequencies" are inverted before radiation.

If picked up on an ordinary receiver the inverted message is heard as a mere jumble of sounds, quite unlike any human tongue.

Re-enter the Battery

It is extraordinary how fashions change from time to time in wireless. America specialised in the all-mains set long before we did, so that this type of receiver practically dominates the market over there. This was of course pretty bad for the makers of dry-cell batteries. However, the pendulum is now swinging in their direction. The latest American craze is for motor-car radio, where of course the set is absolutely dependent upon batteries.

The chief difficulty in motor-car reception is to screen the set from "interference" radiated by the ignition system. However, this problem has been satisfactorily solved by screening both the magneto and leads, and the battery makers are now enjoying a fresh lease of life.

New Valves Wanted

Although the all-mains set admittedly reaches a higher standard of performance than a similar set driven from batteries, the real reason for its superiority lies in certain new principles of design which have up to the present only been applied to mains-driven valves. There is practically no difference in the actual circuits used.

This leads one to suggest that manufacturers might now apply their new experience to improving the performance of battery-driven valves along the same lines.

There are and always will be a large number of listeners cut off from access to the electric-supply service, and their requirements should be given every consideration.

Of course, some margin of superiority is to be expected when operating on the unlimited supply of high voltage available from the mains, but there is still plenty of scope for boosting the present efficiency of the battery-driven valve.

Power-grid Detection

Talking of changing fashions, the latest example is to be seen in the return to favour of the leaky-grid detector. Not so long ago, anode-bend rectification was the last word in high-quality reproduction.

Now it has been replaced by the new system of power-grid rectification. All this amounts to is a cutting-down of the size of the grid condenser to one-third its usual value, a reduction to one-fourth of the leak resistance, and doubling of the applied plate voltage. In practice, however, the new method of detection avoids high-note loss and gives a standard of reproduction as nearly perfect as possible.

The use of a smaller grid condenser preserves all frequencies up to 10,000 cycles a second, which includes all the essential high notes, whilst the lower leak resistance allows the condenser to discharge at the same rate, so that there is no tendency for the valve to "choke" and distort on the upper musical register.

Owing to the high plate voltage required, and the corresponding drain on the high-tension supply, the use of power-grid detection is in practice confined to mains-driven sets.



ANOTHER CONVERT

"It's good now," admitted the musical friend when the set was given a new battery. And it *remained* good. The battery was an Ever Ready. Not a battery that weakens soon. Not the average battery but the Ever Ready battery. A process is used for making the Ever Ready which meets a common need. It adds strength of life to length of life. Month after month the Ever Ready provides an even and generous flow of current. It doesn't put the set on a starvation diet. It fills the set with all the strength it needs to pick up a symphony—and pass it to you without a note distorted.

Ever Ready batteries are guaranteed to give satisfactory service by a company that has been making reliable batteries for 28 years.

They are made for all wireless sets. If you own a portable you can obtain an Ever

Ready of the right size to fit

it. Write for free list which gives all particulars, including exact dimensions in inches.



**BRITISH MADE
HIGH TENSION
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The batteries that give unwavering power

The Ever Ready Co. (Gt. Britain) Ltd., Hercules Place, Holloway, London, N.7

IT'S BRITISH ... All British

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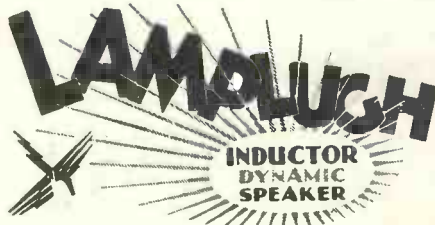
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realism.

Proclaimed by the Press as having all
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its drawbacks—no hum—no heat—no
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Sensitivity is such that we guarantee
adequate volume with amazing quality
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ALL BRITISH LAMPLUGH IN-
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—Naturally the best.



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KINGS ROAD, TYSELEY, BIRMINGHAM
Scottish Representative: Mr. Michael Black, 184 West
George Street, Glasgow.

The Hyperdyne Receiver —Continued from page 513

Parts Needed for Hyperdyne Receiver

- CHOKES, HIGH-FREQUENCY**
2—British General, 11s. (or Lewcos, Watmel DX3).
1—Wound. (Wound specification on page 511.)
- COILS**
1—Lewcos, type D.W.A., 15s.
1—Lewcos, type A.M.S.4., 6s.
3—Wound to specification on page 511.
- CONDENSERS, FIXED**
1—T.C.C. .00025-microfarad, upright type, 1s. 6d. (or Dubilier).
2—T.C.C. .0003-microfarad, upright type, 3s. (or Formo, Igranite).
1—T.C.C. .0001-microfarad, S.P. type, 2s. 4d. (or Formo, Igranite).
1—T.C.C. .001-microfarad, flat type, 1s. 6d. (or Formo, Igranite).
2—T.C.C. .002-microfarad, 4s. 6d. (or Formo, Igranite).
1—T.C.C. .01-microfarad, flat type, 7s. 6d. (or Formo, Igranite).
1—T.C.C. .01-microfarad, upright type, 3s. (or Formo, Igranite).
- CONDENSERS, VARIABLE**
2—Formo .0001-microfarad, midget type, 5s. 6d.
4—Formo .0002-microfarad, midget type, 11s.
2—Formo .0005-microfarad, 9s.
- DIALS**
2—Ormond, slow motion, 7s.
3—Harlie, 2-in., plain type, 2s. 3d.
- EBONITE**
1—Becol, 14 in. by 7 in. panel, 5s. 11d. (or Lissen, Potter).
1—Becol, 9 in. by 4½ in. panel, 3s. 4d. (or Lissen, Potter).
2—Belling-Lee terminal blocks, 2s. 8d. (or Junit, Lissen).
3—Knobs.
- HOLDERS, COIL**
1—Magnum six-pin, 2s. 6d. (or Lewcos).
- HOLDERS, VALVE**
6—Lotus, 7s. 6d. (or Telsen, Benjamin).
- SUNDRIES**
Tinned copper wire for connecting.
Sistolox sleeving.
1—Screening box with foil, to specification, 12s. 6d. (Parouss).
Length of rubber-covered flex (Lewcos).
1—Set of Cortabs, 6d.
- SWITCH**
1—Bulgin, on-off, 1s. 6d.
- PLUGS AND TERMINALS**
4—Belling-Lee, marked:—Aerial, Earth, L.S.—, L.S.—, 1s. 6d. (or Burton, Eelex).
6—Small brass terminals.
2—Belling-Lee spade terminals, one red and one black, 6d. (or Clix, Eelex).
6—Coloured plugs.
- RESISTANCE, FIXED**
1—Dubilier 1-megohm, 1s. 8d. (or Lissen, Watmel).
- TRANSFORMER, LOW-FREQUENCY**
1—R.I. Hypermite, 12s. 6d. (or Telsen, Lissen).
- BATTERIES**
2—Ever Ready 60-volt, high-power type, £1 11s. (or Lissen, Columbia).
1—Ever Ready 16-volt grid bias, 2s. (or Lissen, Columbia).
1—Ever Ready 4.5-volt, type UW6, 1s. (or Lissen).
1—Evide 2-volt, type CZG6, 7s. 6d. (or Young, Tudor).
- CABINET**
1—Pickett, table model, £1 15s. (or W.T. Lock, Gilbert).
- VALVES**
2—Mazda S.G.215, £2.
3—Mazda H.L.210, £1 5s. 6d.
1—Mazda P.240, 13s. 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

reaction condenser to the front of the box.

Although these points are of the same theoretical potential, they are not actually so in practice, due to the high frequencies of the current involved, and two earth points are thus required.

A Final Point

There is just one final point in the wiring. A .00025-microfarad fixed condenser is placed in parallel with the oscillator condenser in order to render the tuning evenly distributed over the dial, with a standard Lewcos AMS9 short-wave coil.

When it is desired to receive ultra-short waves, however, this parallel condenser must be disconnected. The connection to the grid side of this condenser, therefore, should be made with a flexible lead terminating in a spade tag.

If the reader proposes to make a habit of short-wave reception it would, indeed, be advisable to mount a small switch in order to enable this disconnection to be effected easily.

I shall only be able to describe the operation very briefly in the present article. The valves required are as follows, Mazda valves being used in my final tests:

First detector HL210

Screened-grid valves ... SG215
Second detector ... HL210
Output valve P240
Oscillator HL210

The high-tension voltages should be 120 on the power valve and 70 to 80 on the screened grid, and anything from 50 to 70 for the first detector. Start off with about 60 volts and 1½ volts negative bias. When the receiver is working, tune in to a distant station and reduce the high tension on the first detector until the signal strength just begins to fall off. This is the most selective point.

The intermediate condensers should be set at some position above 50 degrees. If a smaller capacity than this is used, numerous little difficulties will be introduced which are somewhat puzzling. The best operating point is about 60 degrees on the dial.

Adjusting the I.F. Amplifier

Get the intermediate amplifier working in the following manner: Set all three dials at the same reading and increase the reaction control until the amplifier oscillates, which will be detected by the usual click in the loud-speaker. Rotate the second dial a little on either side of its setting until the oscillation stops.

(Continued on page 550)

THE DIAMOND

DENOTES QUALITY

PARMEKO



When you see the PARMEKO diamond on any piece of apparatus, you can buy in perfect confidence. All PARMEKO apparatus undergoes the most stringent tests before it is allowed to pass out of our factory. The raw material used in its manufacture is the best of its kind in every class, and skilled English workmen are employed. In fact, PARMEKO apparatus is practically fit for laboratory work, though the price is on the usual level. In addition to a very wide stock range of transformers, chokes, eliminators, etc., we make to your specification when desired. Ask for quotations. For the best results buy PARMEKO—

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Parex S.G. Valve holder 2/-

HYPERDYNE
Special Screening Box and Foil. Price, 12/6

SECOL D.C. H.T. ELIMINATOR and TRICKLE CHARGER

30/-

Makes your set an All-Mains Receiver. Does away with batteries, and charges your accumulator Improves reception 50% NO hum.

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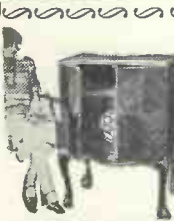
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G. Scott Sessions & Co., officially approved as Wireless Doctors by the Radio Society of Gt. Britain and the Wireless League, will diagnose your most intricate radio trouble and offer you the simplest and most inexpensive solution.

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:—
“Five-point Two,” “The Hyperdyne,” “Regional A.C. 4.”

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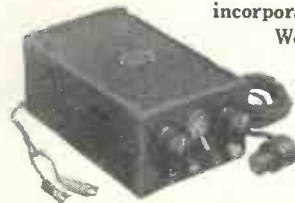
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B. TAYLOR, 57 Studley Road, Stockwell, London



The Hyperdyne Receiver—Continued from page 548

24 Park Lane, Wembley.

October 21, 1930.

To J. H. Reyner, B.Sc., A.M.I.E.E.

Dear Mr. Reyner,

I must thank you for the opportunity of visiting the Furzehill Laboratories and inspecting your new Hyperdyne Receiver. I was certainly much impressed.

The simplicity and cheapness of construction are the first points of interest, the intermediate-frequency couplings being easily capable of home construction and the screening boxes being very simple.

The performance was equal to the super-het, but with better quality and freedom from heterodyne whistle, and from the annoyance with super-hets of the station appearing at two places on the dial.

To separate the two Brookman's Park transmissions at five miles range, and get several foreigners clear in between, was very good, while the "bag" of thirty odd stations in as many minutes proves the set well worth making up by those who enjoy "reaching out."

Wishing you every success with the set.

Yours faithfully,

H. E. COMBEN,
Secretary, Wembley Wireless Society.

Gradually reduce the reaction setting, when the arc over which the circuit oscillates will be found to decrease, until finally the circuit ceases to oscillate altogether.

Now on rotating the first dial it will probably be found that at one point the circuit starts to oscillate again, and the same process should be adopted here, the reaction being gradually decreased until the circuit just starts oscillating. The intermediate stages will then be approximately in tune.

Searching for Stations

Now search for your stations. Set the bottom small knob on the panel (oscillator coupler) about the mid-way position. Set the reaction control (top small knob) about one-third of the way in. Set the left-hand dial where you expect the local station. (This circuit tunes exactly as an ordinary circuit.)

Set the oscillator approximately to this wavelength from the chart given with this article. Rotate the oscillator very slowly. At one point the local

(Continued on page 552)

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Merlin Two (AC Set) (D, Trans) .. WM213
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Five-Point Three (SG, D, Trans) .. WM212
Falcon Three (AC Set) .. WM217
New Brookmans Three (SG, D, Trans) .. WM218

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 iii 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.

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Britain's Favourite Three 1930 (D, 2 Trans) .. AW244
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Searcher's Four (SG, D, RC, Trans) .. WM194
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Each blueprint shows the position of each component and every wire and makes construction a simple matter. Copies of "Wireless Magazine" and of "Amateur Wireless" containing descriptions of all these sets can be obtained at 1s. 3d. and 4d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine" sets.

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

Wireless Magazine

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58/61 FETTER LANE,
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QUERY RULES

How to Make the Best Use of the "Wireless Magazine" Information Bureau When You Are in Difficulty

Those readers who send queries to the WIRELESS MAGAZINE must observe the simple rules connected with the service; otherwise replies are delayed and trouble is caused all round. 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 1s.

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.

Practical queries should contain all the relevant information that may help to solve the problem. It is often important, for instance, to know exactly what valves are in use and what is the high-tension supply.

In short, give every piece of information you can in the most concise way. Then we can help you without delay.

DO NOT FORGET THE COUPON!

The Hyperdyne Receiver—Continued

station will be heard very loud. Tune in on the left-hand dial to maximum signal strength.

It is now best to follow up very slowly to find a distant station. Remember that the left-hand dial should move approximately twice as fast as the right-hand one, in order to keep in tune.

Final Adjustments

This point requires a little getting used to at first. The best way is to move the left-hand condenser, say, 20 degrees up from the tuning point of the local station, and then gradually and slowly to rotate the oscillator dial. You will be almost sure to find a station.

Tune on both the oscillator and first detector dials until the signal is a maximum. Now the intermediates can be finally adjusted. Leaving the controls on the panel alone, tune in the station on the three dials of the intermediate amplifier. The tuning will be found to be very sharp.

Adjust the reaction control on the intermediate amplifier to give good strength without being too near the oscillation point, as otherwise the quality will suffer. The intermediate amplifier then does not require to be touched any more. All further operations can be carried out on the main controls on the front panel.

No Lack of Stations

In searching it is best to rotate the oscillator dial one degree (not more) and follow it up with the left-hand dial. Once the receiver is working properly there will be no lack of stations and the slightly unusual handling will readily be mastered.

For the long waves, simply push in the switch rod on the dual-range coil and tune in the long-wave stations in their normal places on the dial. The oscillator setting will be found within the last 10 or 15 degrees on the condenser, as already pointed out.

Further details of this set will be published next month. In the meantime constructors will have plenty of work with which to occupy themselves. Don't forget that a full-size blueprint will simplify the construction considerably. When you have got the Hyperdyne working write and let us know of your results for the benefit of other amateurs.

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