WITH 16-PAGE BROADCAST GUIDE FOR EVERY SET-OWNER

132 PAGES

Wireless Magazine

NO. 74 MARCH, 1931

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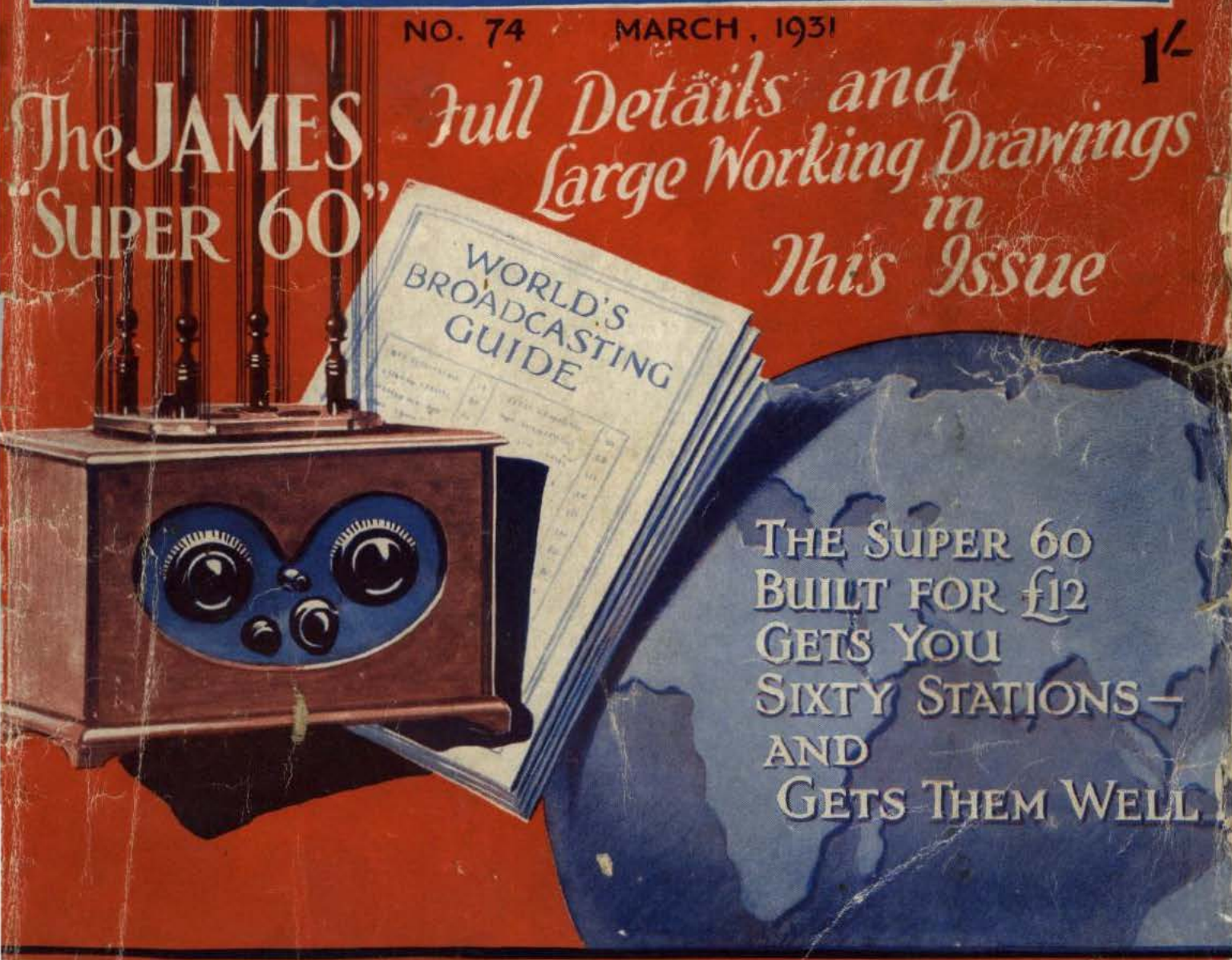
The JAMES "SUPER 60"

Full Details and Large Working Drawings in This Issue



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WHAT DO WE OWE TO THE NEW VALVES? :: A RADIO FAN'S CAUSERIE :: EIGHT PAGES ON GRAMO-RADIO :: TO BUILD OR BUY? TESTS OF SETS BEFORE YOU BUY :: A MAINS UNIT FOR BIG SETS

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Wireless Magazine

The Best Shillingsworth in Radio

Vol. XIII :: MARCH, 1931 :: No. 74

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W. JAMES

Assistant Editor:
D. SISSON RELPH

CONTENTS

SPECIAL SUPPLEMENT

(*After page* 176)

The "W.M." World's Broadcasting Guide

GENERAL ARTICLES

FOR THE CONSTRUCTOR

TECHNICAL FEATURES

GRAMO-RADIO SECTION

I RATHER like this March issue, and as my job is to do my best to interpret your needs and wishes, I am hopeful that you will like it too.

Perhaps I had better start with a word about our special supplement on tinted paper, containing a survey of conditions of broadcasting in forty countries; complete list of European stations in order of wavelength; broadcast map of Europe showing distances from London; the identification of the fifty best stations, with a two-page log map; list of the short-wave stations, etc.

THE SUPER 60

The W. James set is well named the "Super 60." It certainly is "super" and is at least a "60." In other words, it is a super-het (undoubtedly we are returning to it; we needs must), simple instead of complicated, and easy instead of difficult to control. It is "60" because it gives you at least sixty stations. Mr. James is enthusiastic over this set and tells me that he believes it is the finest set any radio periodical has ever introduced to its readers. Perhaps a "six" is not everybody's set, but please don't be misled into supposing that it is expensive.

On the contrary, the components cost only about £12, and to get an absolutely up-to-date super-het, controlled by two knobs and capable of receiving stations with satisfaction, at anything like this price is remarkable.

OTHER SETS

What of our other sets this month? There is an A.C. unit for supplying multi-valve sets with anode current at high voltages, and there is a simple two-valver designed for just one purpose—as a general broadcast receiver for family use; it contains a note of novelty inasmuch as although it uses two-pin plug-in coils, there is a special means whereby the wavelength range is altered merely by operating a knob and without any need to change the coils themselves.

Mr. Reyner, in asking "What Do We Owe to the New Valves?" discusses the merits of new screen-grid valves and attempts some prophecies regarding future types of coils. Other articles in this issue raise interesting points regarding the uses of the new valves. Then Mr. James, in his article, "How to Set Up a Valve Voltmeter," has in mind readers who enjoy making tests of a more definite nature than is possible with ordinary apparatus.

I hope you enjoy our feature "Radio Medley," a chatty and lightly controversial talk, based very largely on readers' letters from all over Great Britain and, indeed, "from the ends of the earth." I think you will find it both entertaining and helpful, and if you can contribute a suggestion which BM/PRESS can turn to good use in his "Causerie," by all means let us hear from you.

IN A NEW VEIN

"Radiosyncrasies" is an article in a new vein. Its author, Whitaker-Wilson, passes under shrewd and humorous review certain personalities, peculiarities, and other trivialities, and mentions so many names with which readers are familiar that I am sure you will enjoy his witty comments.

This month we are "testing before you buy" five sets—an A.C. "four," an A.C. transportable, a special American set, a battery "three," and a three-valver for either battery or A.C. working. If you don't already do so, you must read these test reports. You will find they keep you up to date.

GRAMO-RADIO

Finally, our Gramo-radio Section is as strong as ever, Capt. Barnett contributing a number of most interesting items and Whitaker-Wilson providing, as usual, special reviews of the latest records from which you can make your own wise selection.

Last month we offered full-size blueprints of twelve sets at half price, with the result that thousands of applications were received and the magazine itself went rapidly out of print. Although this offer will not be repeated, you can still get blueprints of all WIRELESS MAGAZINE *sets at the full prices.*

In each issue you will find a special coupon entitling you to a half-price blueprint of any new set described that particular month. This month's coupon you will find on page 224; why not make use of it? You will save 6d. or 9d.

THE EDITOR.

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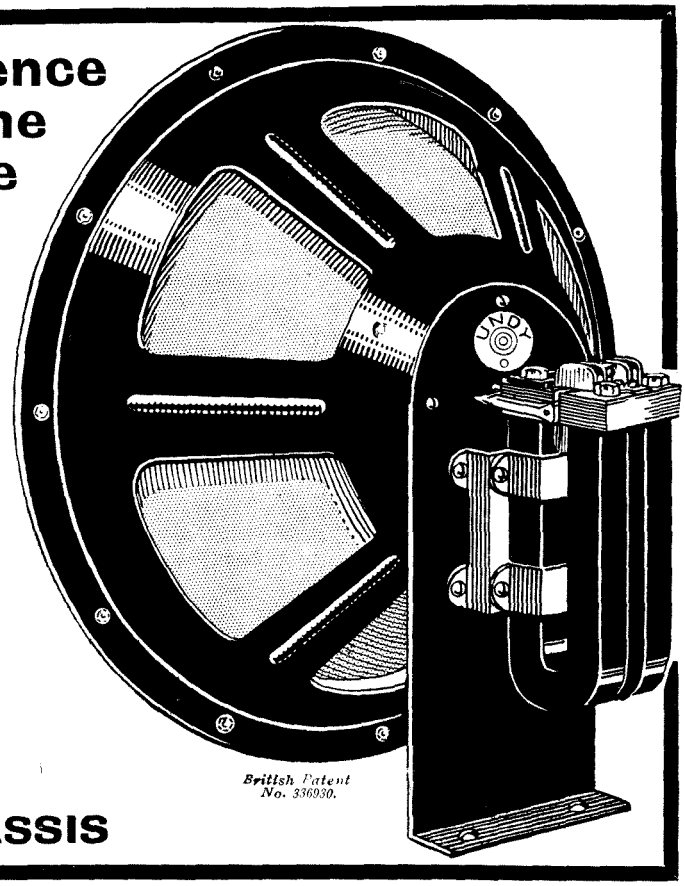

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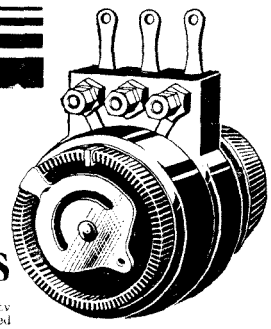

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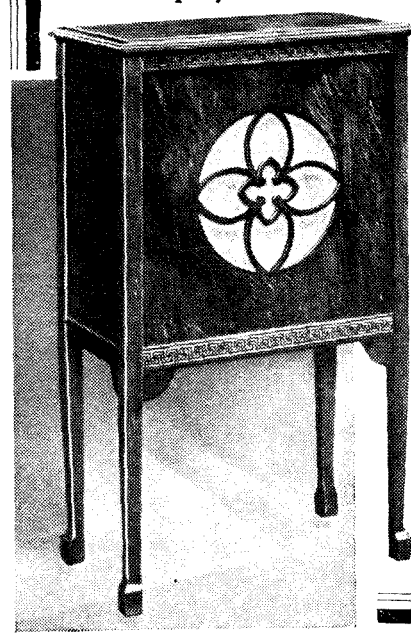

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VALVES TO USE IN YOUR SET

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	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	.5	.5	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	.7	.75	1.5	1.5
Cossor ..	210RC	50,000	36	.1	.72	1.5	—	1.5
Tungsram	R208	50,000	35	.1	.7	1.0	—	1.5
Marconi	H2	35,000	35	.1	1.0	.5	—	1.5
Osram ..	H2	35,000	35	.1	1.0	1.0	—	1.5
Six-Sixty	210HF	25,000	19	.1	.75	2.75	—	—
Tungsram	H210	25,000	25	.1	1.0	2.0	—	—
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
Marconi	HL2/c	20,000	22	.1	1.1	—	—	—
Osram	HL2/c	20,000	22	.1	1.1	—	—	—
Cossor ..	210Det.	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
Mullard	PM1LF	12,000	11	.1	.9	3.0	4.5	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
Marconi	L2/b	10,000	15.5	.1	1.55	4.0	—	—
Osram	L2/b	10,000	15.5	.1	1.55	4.0	—	—
Mazda ..	L210	10,000	15.5	.1	1.55	5.0	2.5	4 5
Tungsram	LG210	10,000	10	.1	1.0	4.0	—	—
Dario ..	Super Det.	7,500	15	.15	2.0	3.0	1.5	3.0
Six-Sixty	220P	4,800	7.2	.2	1.5	7.0	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	9.0
Cossor ..	215P	4,000	9	.15	2.25	—	3.0	7.5
Marconi	LP2/c	4,000	8	.2	2.0	10.0	—	—
Osram	LP2/c	4,000	8	.2	2.0	10.0	—	—
Mazda ..	P220	3,700	12.5	.2	3.4	11.0	3.0	6.0
Tungsram	P215	3,300	5	.2	1.5	12.0	—	—
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	PM252	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
Tungsram	SP230	2,500	5	.3	2.0	15.0	—	—
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
Marconi	P2/b	1,850	6.5	.2	3.5	15.0	—	—
Osram	P2/b	1,850	6.5	.2	3.5	15.0	—	—
Cossor ..	230XP	1,500	4	.3	2.3	18.0	12.5	22.5
Two-volt Screened-grid Valves								
Tungsram	S210	430,000	300	.12	.8	—	—	—
Mazda ..	215SG	400,000	450	.15	1.1	—	1.5	1.5
Cossor ..	215SG	300,000	330	.15	1.1	—	—	—
Dario ..	SG	250,000	250	.15	1.0	—	—	1.5
Mullard	PM12	230,000	200	.15	.87	—	—	—
Six-Sixty	215SG	220,000	190	.15	.87	2.0	—	—
Cossor ..	220SG	200,000	320	.2	1.6	—	—	1.5
Lissen ..	SG215	200,000	180	.15	.9	—	—	1.5
Marconi	S215	200,000	170	.15	.85	—	—	—
Osram ..	S215	200,000	170	.15	.85	—	—	—
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	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 ..	230Pen.	—	—	.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 ..	HLD410	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 ..	L 410	8,500	15	.1	1.77	3.5	3.0	4.5

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*								
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
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
Six-Sixty	410P	4,200	7.7	.1	1.85	18.0	6.0	9.0
Cossor ..	410P	4,000	8	.1	2.0	17.5	4.5	9.0
Dario ..	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	14.0	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	18	12.0	22.5
Cossor ..	425XP	2,000	7	.25	3.5	—	6.0	13.5
Mullard	PM254	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 ..	P425	1,950	3.5	.25	1.8	26.0	14.0	26.0
Cossor	4XP	1,100	3	.6	2.75	30	15	30
Marconi	FX4	1,050	3.5	.6	3.3	30.0	13.0	23.0
Osram ..	PX4	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	15.0	7.5	10.5
Cossor ..	415PT	20,000	40	15	2.0	14.0	6.0	9.0
Mazda ..	425Pen.	—	—	.25	2.0	14.0	14.0	14.0
Six-volt Three-electrode Valves								
Mazda ..	H607	90,000	40	.07	.45	1.0	.8	1.5
Cossor ..	610RC	60,000	50	.1	.8	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
Marconi	LS5B	25,000	20	.8	.8	-	-	-
Osram ..	LS5B	25,000	20	.8	.8	—	—	—
Lissen ..	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
Mazda ..	HL610	20,000	20	.07	1.0	1.8	1.5	3.0
Mullard	PM5D	20,000	26	.075	1.3	—	1.5	3.0
Six-Sixty	6075HF	15,200	17	.075	1.1	4.1	2.0	4.0
Mullard	PM5X	14,700	17.5	.075	1.2	1.0	3.0	4.5
Six-Sixty	D610	9,250	18.5	.1	2.0	8.0	—	4.0
Lissen ..	L610	9,000	18	.1	2.0	2.0	3.0	4.5
Mullard	PM6D	9,000	18	.1	2.0	2.0	3.0	4.5
Cossor ..	610LF	7,500	15	.1	2.0	3 4	3.0	4.5
Marconi	L610	7,500	15	.1	2.0	3.0	2.0	4.0
Osram ..	L610	7,500	15	.1	2.0	3.5	1.5	4.5
Marconi	DE5	7,000	7	.25	1.0	3.0	4.5	10.0
Marconi	LS5	6,000	5	.8	.8	—	—	—
Osram ..	LS5	6,000	5	.8	.8	—	—	—
Lissen ..	P610	4,000	8	.1	2.0	6.0	6.0	16.0
Marconi	DE5A	4,000	3.5	.25	.87	9 0	12.0	(at 120v.) 10.5
Mullard	PM6	3,550	8	.1	2.25	7.0	6.0	9.0
Cossor ..	610P	3,500	8	.1	2.28	8.0	4.5	7.5
Marconi	P610	3,500	8	.1	2.28	6.0	6.0	9.0
Osram ..	P610	3,500	8	.1	2.3	7.0	6.0	9.0
Six-Sixty	610P	3,400	7.8	.1	2.3	19.0	6.0	10.5
Marconi	LS5A	2,750	2.5	.8	.9	—	—	—
Osram ..	LS5A	2,750	2.5	.8	.9	—	—	—
Cossor ..	625P	2,500	7	.25	2.8	13.0	6 0	9.0
Lissen	P625	2,500	7.5	.25	3.0	8.0	7 5	12.0
Mazda ..	P625B	2,500	7	.25	2.8	11.0	6.0	12.0
Marconi	P625	2,400	6	.25	2.5	11.0	6 0	24.0 (at 250v.)
Osram ..	P625	2,400	6	.25	2.5	11.0	6.0	12.0
Cossor ..	610XP	2,000	5	.1	2.5	22.0	12.0	22.5
Six-Sixty	625SP	1,950	6.5	.25	3.3	50.0	12.0	24
Mullard	PM256	1,850	6	.25	3.25	—	9.0	18.0
Marconi	P625A	1,600	3.7	.25	2.3	20 0	13.5	36.0 (at 200v.)
Mazda ..	P625A	1,600	4	.25	2.5	27.0	10.0	20.0
Osram ..	P625A	1,600	3.7	.25	2.3	16.0	13	24.0

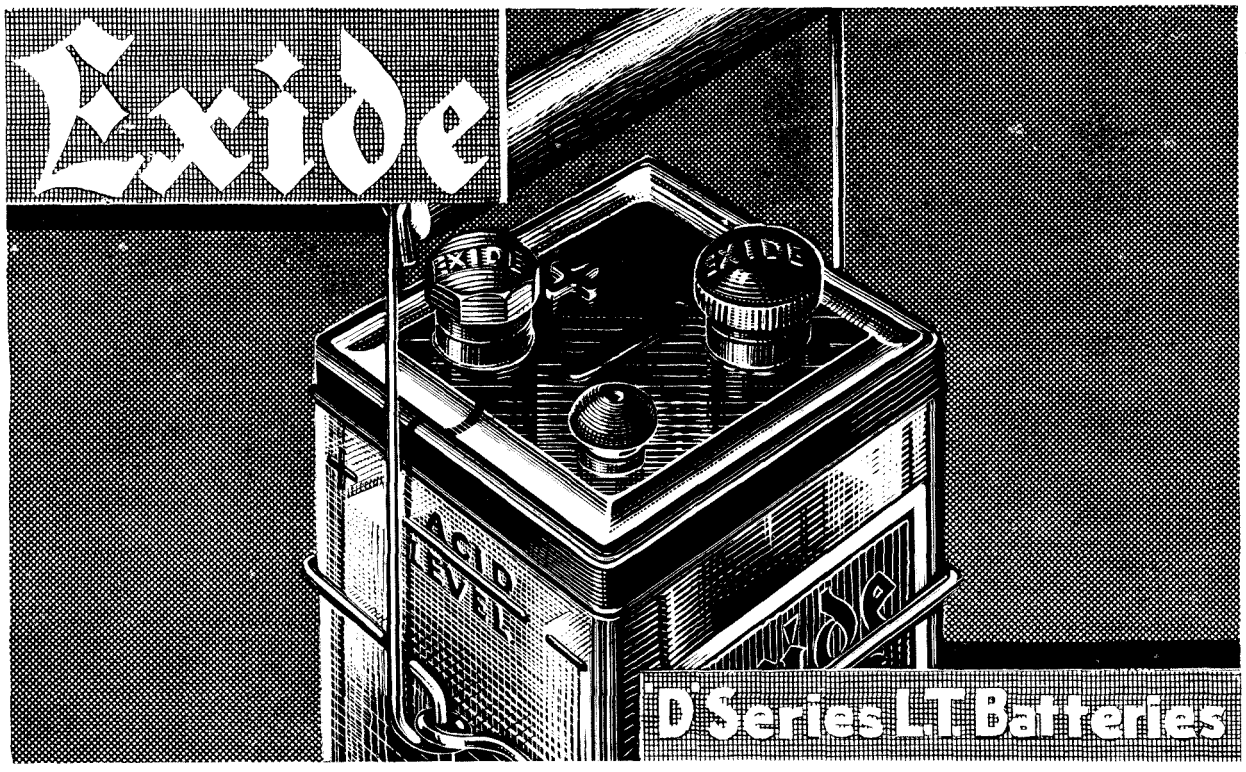
(Continued on page 118)

Listening at less cost per hour . . . . .

Here are low tension batteries specially made for economical sets. You know that with ordinary batteries you do not get the full saving from modern low consumption valves, because the battery has to be recharged every two or three weeks even if it has not completely run down. This is to prevent it sulphating. Here are batteries that **will not sulphate.** They are made with special "mass" type plates for slow discharges that will stand for months without taking harm. These robust batteries are called the Exide "D" Series.

They mean that you can now use with advantage a battery of a much larger capacity than before, and so **reduce recharging.** This, together with their low price, makes them the world's most economical batteries.

Note, too, their **convenience.** Terminals differently coloured and shaped that can be distinguished even in dark corners. Trough to catch acid. Strong metal carrier. All owners of small sets should avail themselves of an Exide "D" Battery.



"D" Series L.T. Batteries. Prices per 2-volt cell: DTG, 20 amp. hrs. 4/6 DFG, 45 amp. hrs. 8/6 DMG, 70 amp. hrs. 11/- DHG, 100 amp. hrs. 14/6

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

Exide Batteries, Clifton Junction, near Manchester. Branches at London, Manchester, Birmingham, Bristol and Glasgow M 10

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 Three-electrode Valves								
Lissen ..	P625A	1,500	4.5	.25	3.0	12.0	13.5	24.0
Six-Sixty	625SPA	1,500	3.9	.25	2,6	60.0	12.0	22.5
Mullard	PM256A	1,400	3.6	.25	2.6	—	—	—
Marconi	LS6A	1,300	3.0	2.0	2.3	—	—	—
Mazda ..	P650	1,300	3.5	.5	2.7	30.0	12.0	25.0
Osram ..	LS6A	1,300	3.0	2.0	2.3	—	—	—
Marconi	DA60	835	2.5	4.0	3.0	—	—	—
Osram ..	DA60	835	2.5	4.0	3.0	—	—	—
Six-volt Screened-grid Valves								
Six-Sixty	SS6075SG	210,000	190	.075	.9	—	—	—
Cossor ..	610SG	200,000	200	.1	1.0	—	—	1.5
Mullard	PM16	200,000	200	.075	1.0	—	—	—
Osram ..	S610	200,000	210	.1	1.05	4.0	1.5	—
Six-volt Pentode Valves								
Marconi	PT625	43,000	80	.25	1.85	10.0	6.0	15.0 (at 250v
Osram ..	PT625	43,000	80	.25	1.85	—	—	—
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								
Six-Sixty	SS4SGAC	1,330,000	1,000	1.0	1.0	1.5	—	—
Mullard	S4V	909,000	1,000	1.0	1.1	—	—	—
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	1.5
Osram ..	MS4	500,000	550	1.0	1.1	2.2	—	—
Mullard	S4VA	430,000	1,500	1.0	3.5	1.7	—	—

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	41MSG	400,000	1,000	1.0	2.5	2.0	—	1.5
Mullard ..	S4VB	257,000	900	1.0	3.5	4.0	1.5	1.5
Cossor ..	M41RC	20,000	35	1.0	1.75	2.4	1.5	3.0
Tungsram	G150	20,000	10	.5	.5	—	—	—
Tungsram	R150	18,000	25	.5	1.4	1.5	—	—
Six-Sixty	SS4GPAC	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
Tungsram	AR4100	14,000	33	1.0	2.0	1.5	—	—
Mazda ..	AC/HL	13,500	35	1.0	3.0	4.5	1.5	3.0
Mullard	354V	11,700	35	1.0	3.0	2.0	2.0	3.0
Marconi	MHL/4	8,000	20	1.0	2.5	5.0	3.0	6.0 (at 200v.
Osram ..	MHL/4	8,000	20	1.0	2.5	5.0	3.0	6.0
Tungsram	AG4100	8,000	16	1.0	2.0	5.0	—	—
Cossor ..	M41LF	7,900	15	1.0	1.9	4.5	4.5	6.0
Six-Sixty	SS4Dist. AC	7,000	16	1.0	2.3	7.5	3.5	8.0
Mullard	164V	6,650	16	1.0	2.4	5.0	4.5	6.0
Cossor ..	M41P	5,000	10	1.0	2.0	6.5	4.5	7.5
Tungsram	L190	4,200	10	.9	2.4	8.0	12.0	16.5
Marconi	ML4	3,000	9	1.0	2.0	9.0	10.0	22.0 (at 200v
Osram ..	ML4	3,000	9	1.0	2.0	9.0	10.0	16.0
Six-Sixty	SS4PAC	3,000	10	1.0	3.3	10.0	5.0	8.0
Mullard	AC104	2,850	10	1.0	3.5	—	—	10
Mazda ..	AC/P	2,650	10	1.0	3.75	14.0	6.0	12.0
Tungsram	P190	2,500	6	.9	2.4	8.0	—	—
Cossor ..	M41XP	2,000	4	1.0	2.0	15.0	12.0	19.5
Mazda ..	AC/P1	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
Mullard	AC044	1,150	3.4	7	3.5	17.0	16.5	28

Remember the Date

MARCH 25

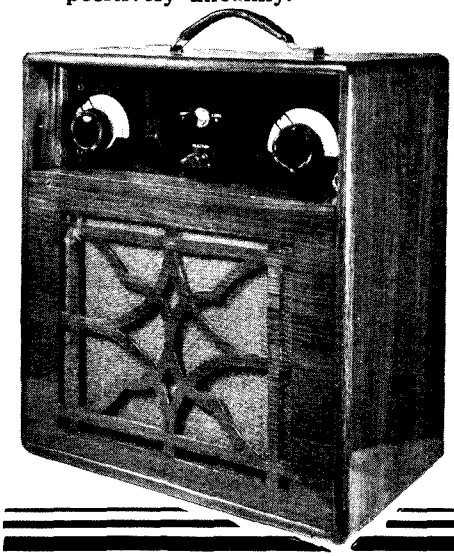
On that day will be published the April issue of WIRELESS MAGAZINE. It will contain more about W. James' fine new set, the Super 60.

See page 223 for our Blueprint List

"...POSITIVELY UNCANNY"

"When I first switched on my Mains Radio Receiver, I was astounded by the perfect reproduction."

"To hear the human voice and the orchestra with its score of instruments, each clearly defined, flowing from this little instrument, was positively uncanny."



See test report on page 154 of this issue.

The quality of the Mains Radio Transportable is a revelation. Speech—crisp; music—well-balanced tone, great volume without slightest trace of overloading. Sensitivity for a three-valver is remarkable. Practically every high-powered European station received at good loud-speaker strength. The National, London, and Midland Regional stations are separated with ease.

The Mains Radio Transportable is, in fact, a receiver you will be really proud of.

SPECIFICATION.

VALVE COMBINATION—H.F. Amplifying stage, Detector Power—Mazda AC/HL and AC/P. Rectifying Valve—U30/250.
POWER SUPPLY—A.C. 100/125, 200/250 and D.C. 200/250.
POWER CONSUMPTION—30 watts. A.C. 120 watts. D.C.
CONTROLS—Two Tuning Dials, Reaction, Wave-change switch.
SPEAKER—Self-contained Linen Diaphragm.

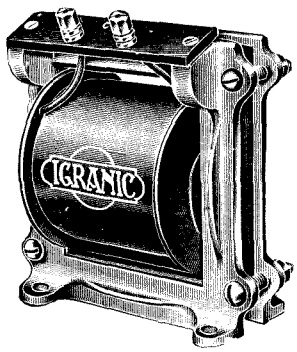
Price 28 Guineas, complete.

Write for free illustrated leaflet and details of easy terms.

MAINS RADIO MANUFACTURING CO.,
42, Green Lane, Thornton Heath, London, S.W. *Pollards 3373.*

Quality Radio Components

Designed for those who truly appreciate fine quality in radio reception



Igranic Choke

IGRANIC L.F. CHOKES

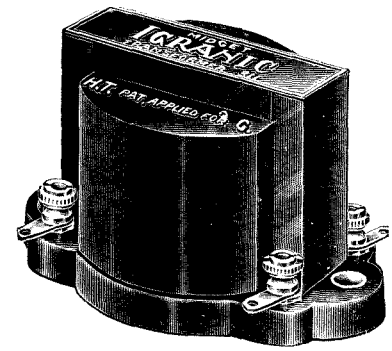
Type C.15	20 Henries 15 milliamps	Price 10/6
,, C.30	20 Henries 30 milliamps	,, 15/6
,, C.60	20 Henries 60 milliamps	,, 21/-
,, C.150	20 Henries 150 milliamps	,, 45/-

IGRANIC FIXED CONDENSERS

2 Mfd. 250 volts ... ... Price 3/-
2 Mfd. 550 volts ... ... ,, 4/2

IGRANIC MIDGET TRANSFORMER

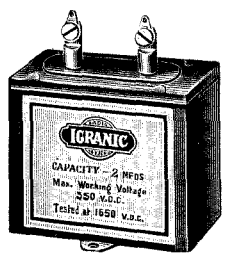
Price 10/6 each



Igranic
Midget Transformer

IGRANIC DIFFERENTIAL CONDENSER

.00015 Mfd. each side ... ... Price 3/9

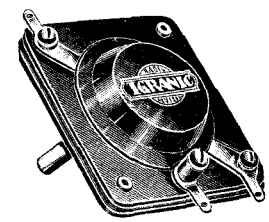


Igranic
Fixed Condenser

147 Queen Victoria St., LONDON

COMPANY IGRANIC ELECTRIC LIMITED

Write for copy of our new catalogue to Dept. J.1117



Igranic
Differential Condenser

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

It helps us if you mention "Wireless Magazine"

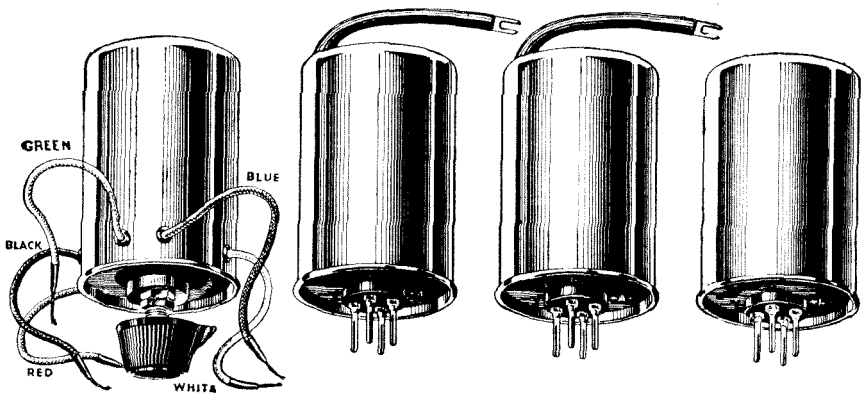
REVOLUTIONARY ADVANCE IN RADIO RECEPTION

WEARITE

PATENTED SUPER-HET COILS

ARE INCORPORATED IN MR. W. JAMES'

"SUPER 60"



O.2 OT.2 OT.2 OT.1

The wonderful performance of the "SUPER 60" is only made possible by the use of

WEARITE SUPER-HET COILS

PRICE OF COMPLETE SET OF COILS AS ILLUSTRATED

50/-

Illustrated descriptive Leaflet explaining the unique construction of these coils may be had on request.

WEARITE
COMPONENTS

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740 High Road, Tottenham, N.17.

Phone: Tottenham 3847-8-9

Write for Free Illustrated List

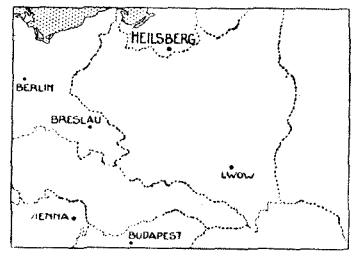
Broadcast Identification Sheets

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.



276.5m.
(1,085 *kc.*)

Power: 75 *kw.*

HEILSBERG
(Germany)

878 *miles from London*

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

Announcer: Man.

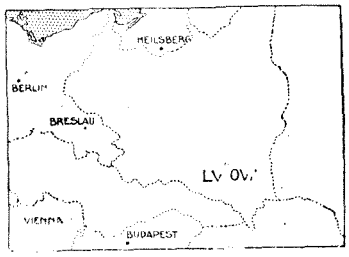
Call: *Achtung! Achtung! Hier Ostmarken Rundfunksender (Heilsberg, Königsberg und Danzig).*

Interval Signal: Two notes (D flat, A flat), repeated for 4½ seconds, followed by similar interval.

Main Programme: G.M.T. 06.00, early morning concert; 12.05, gramophone records; 13.30, concert; 19.00, main evening entertainment; dance music frequently relayed from Berlin.

Closes down with usual German *Gute Nacht* greetings followed by National Anthem (*Deutschlandslied*).

Relays: Danzig, 453.2 m. (662 kc.), 0.25 kw.; Königsberg (temporarily), 216.3 m. (1,387 kc.), 1.7 kw.



381m.
(788 *kc.*)

Power: 2.2 *kw.*
(Temporarily)

LVOV*
(Poland)

1,055 *miles from London*

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

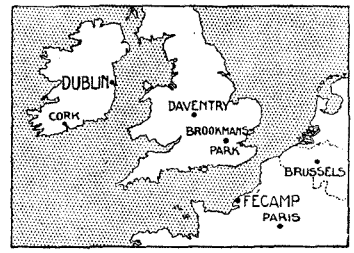
Announcers: Man and woman.

Call: *Rhalo! Rhalo! Polskie radjo Lvov* (phonetic; Lvoof).

Main Programme: Relays Posen, Cracow, Wilno, Warsaw and Katowice. Between these transmissions gramophone records are broadcast. G.M.T. 23.00, dance music from local restaurant or cabarets (Monday, Thursday, Saturday).

Closes down as other Polish stations (*vide* Warsaw) with National Anthem.

*In pre-war maps Lvov will be found under the name Lemberg.



222.9m.
(1,346 *kc.*)

Power: 0.5 *kw.*

FECAMP
(France)

114 *miles from London*

Standard Time: Greenwich Mean Time.

Announcers: Man and woman.

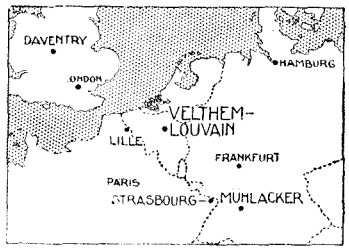
Call: *Ici le poste de Radio Normandie.*

Opening Signal: Gramophone record (Song: *Nos vieux pommiers*).

Interval Signal: (irregular) High toned bell.

Main Programme: G.M.T. 20.30, news; 21.00, concert from studio; relay from The Havre or Rouen or gramophone records (daily except Sundays).

Closes down with a vocal record of a local folk-song (*Ma Normandie*), followed by usual French good-night greetings and by *La Marseillaise*.



(Revised)

360.1m.
(833 *kc.*)

Power: 75 *kw.*

MÜHLACKER
(Germany)

454 *miles from London*

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

Announcer: Man.

Call: *Achtung! Hier Suedfunk (Stuttgart und Freiburg-im-Breisgau).*

Interval Signal: Three notes (C, D, G), repeated ad lib.

Main Programme: G.M.T. 06.00, concert (Sunday); 07.00, physical exercises; 11.15, 15.00 and 18.30, concert or gramophone records; 19.30, main evening entertainment; 21.45, dance music (not daily). Frequently relays Frankfurt-am-Main programme, when the call heard is from that station, namely: *Achtung! Hier Suedwestfunk.*

Closes down with German good-night greetings followed by National Anthem.

Relay: Freiburg-im Breisgau, 570 m. (527 kc.), 0.3 kw.

Revisions

The following alterations should be made in the sheets already published:—

Belgrade now transmits on 430.9 m. (696.2 kc.).

Frankfurt-am-Main. Call has been altered to: *Achtung! Hier Suedwestfunk.*

Hilversum. Until March 31 on 1,875 m. (160 kc.).

Huizen. Until March 31 on 298.8 m. (1,004 kc.).

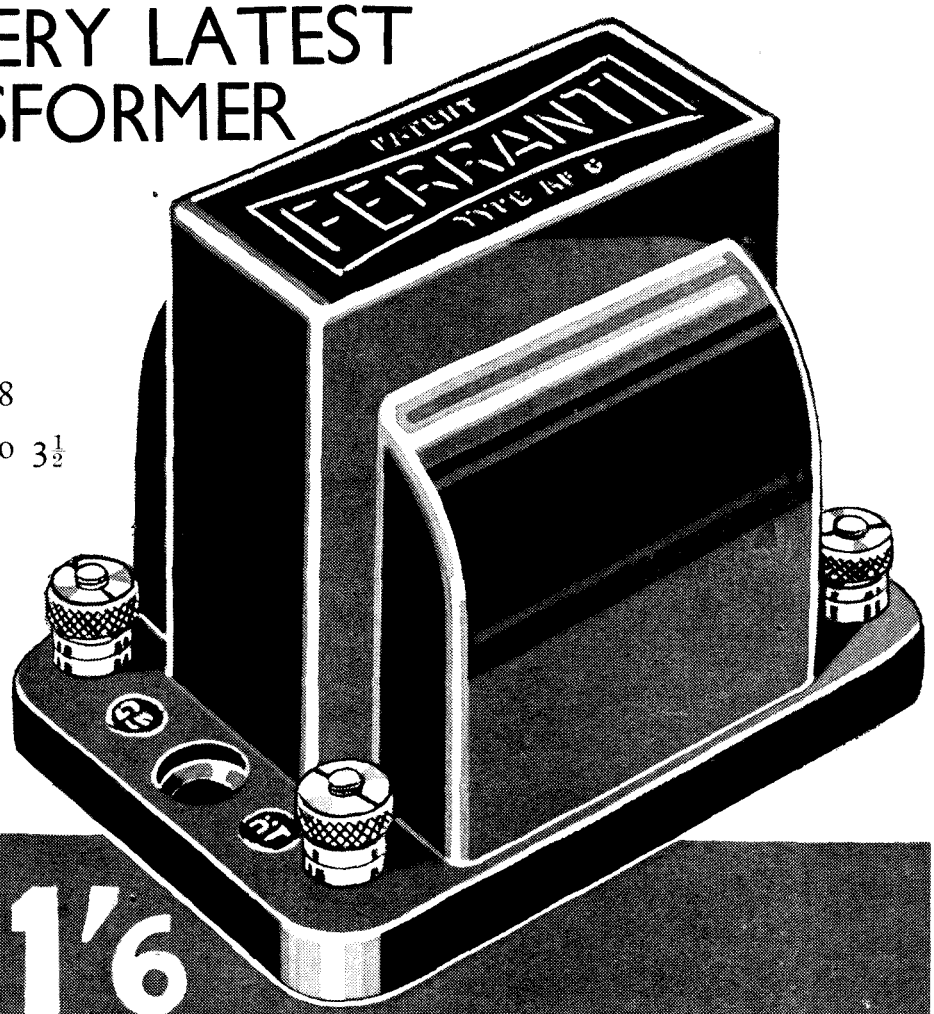
Velthem-Louvain. Power has been increased to 12 kw.

Munich. The relays Augsburg and Kaiserslautern now transmit on a common wave, 559.7 m. (536 kc.).

Oslo: Alteration to be made in Relays; Hamar, 584.4 m. (513.3 kc.) 0.8 kw.; Nidaros, 493 m. (608 kc.), 1.35 kw.; Porsgrund (1.5 kw.); Tromsö (0.11 kw.), 453.2 m. (662 kc.); Notodden (0.9 kw.); Rjukan (0.17 kw.); Aalesund (0.4 kw.), 447.1 m. (671 kc.); Fredriksstad, 367.1 m. (817.1 kc.), 0.8 kw.; Stavanger, 240.6 m. (1.247 kc.), 0.5 kw.; Kristianssand, 235.5 m. (1,274 kc.), 0.5 kw.

Turin transmits on 296 m. (1,013.4 kc.).

THE VERY LATEST TRANSFORMER



Type AF8
Ratio 1 to $3\frac{1}{2}$

only 11'6

—and a FERRANTI at that!

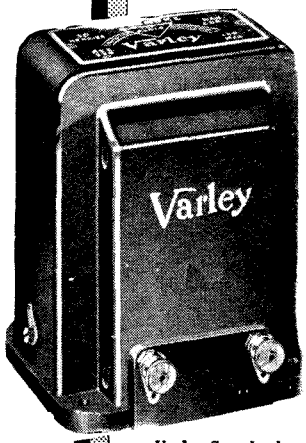
Competent constructors know that no receiver can produce satisfactory reproduction unless the transformer is capable of reasonably uniform amplification. While this transformer will not—and is not claimed to—give the more uniform amplification attainable with the AF3 and the AF5, it is definitely better than any other transformer in the same price class.

It employs the FERRANTI patent air-spaced sectionalised windings, which are known the world over, and no nickel-iron is used in its construction.

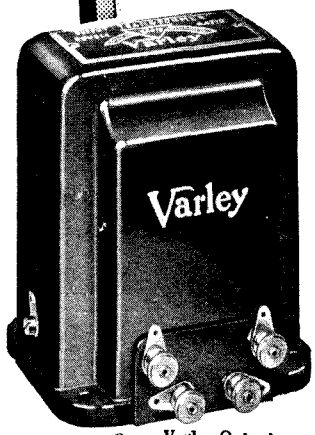
FERRANTI

FERRANTI LTD. Head Office & Works: HOLLINWOOD, LANCASHIRE. London: Bush House, Aldwych, W.C.2

GET MORE OUT OF YOUR H.T.



Varley Standard L.F. Choke, £1 : 0 : 0



Varley Output Transformer, £1 : 1 : 0 (Double ratio)

Varley Impedance Matching Transformer for low resistance Speakers. £1 : 2 : 6

Don't waste your H.T. . . . The higher the voltage on your output valve the better will be its reproduction. By letting its anode current flow through the loud-speaker a big portion of it is lost in the windings—perhaps 15 or 20 volts.

Feed your output valve through a Varley L.F. Choke or a Varley Output Transformer and put an end to this waste. You will get increased power and purity from your output valve. The sensitivity of your loud-speaker will be increased and its windings safeguarded against burning out.

By choosing a suitable Choke or Transformer from the Varley range you can match the impedance of your speaker to that of your output valve, strengthening the bass and giving life to the reproduction.

Write for Section D of Varley Catalogue

For RADIO

OLIVER PELL MANUFACTURE

Varley

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

A British triumph

The undisputed champion All-Mains Unit

MAKES ANY SET ALL-MAINS STANDARD OR PORTABLE

The Clarke's "ATLAS" Model A.C.188 which was voted first in the "Wireless World" Competition, at Olympia, is entirely British made, and is the finest All-Mains Unit on the market at the price. A demonstration will immediately convince all Radio owners of its outstanding features and of the perfect results which can be obtained by its economic and reliable service.

This amazing model is fitted with two variable Tappings of 0/100 and 0/120 Volts respectively, and one fixed of 150 Volts, and the Output of 150 Volts at 25 m/a is twice that of any other Unit at the price. The combined L.T. Trickle Charger automatically charges either 2, 4 or 6 Volt Accumulators from the Mains. A.C.188 is guaranteed for 12 months and is built to conform with all necessary regulation.

CASH PRICE £6

CLARKE'S "ATLAS"

ALL MAINS UNIT

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OLD TRAFFORD, MANCHESTER

London Office: 60 CHANDOS STREET, STRAND, W.C.2
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For the "Wireless Magazine" Baffle-board **Three** insist on the "ATLAS" Coils as recommended.

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

WHAT'S NEW IN RADIO?

Brief Details of Some Recent Developments

One of the new Drydex high-tension batteries produced by the manufacturers of Exide accumulators

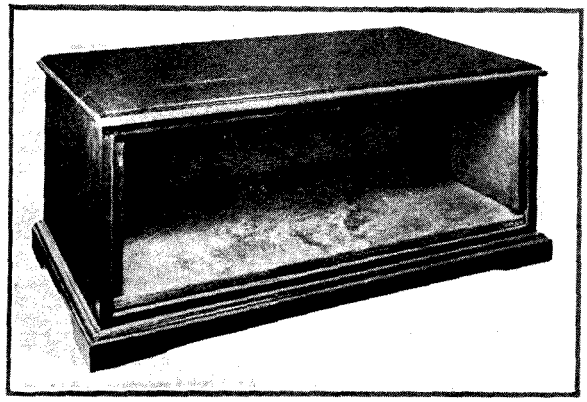
IT is surprising for a world-famed firm of accumulator makers to turn to dry batteries, but that is what the Exide people have just done. They are now producing a complete range of high-tension batteries, which will interest all users of battery-operated sets. So now we have Exide accumulators and Drydex batteries—a good combination for any receiver.

◆ ◆ ◆

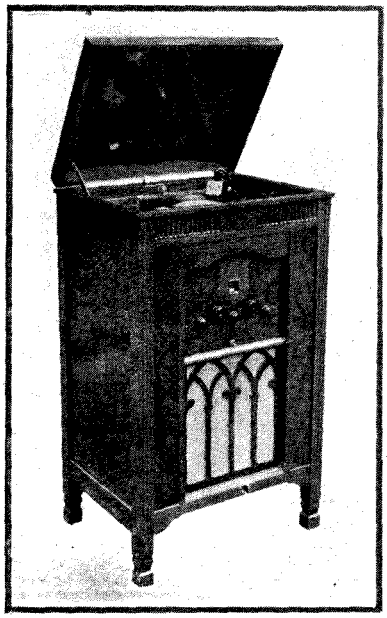
Ferranti's have a new radio gramophone in oak, walnut, or mahogany, which gives an output of approximately six watts. The price is 75 guineas; it incorporates the Model 32 A.C. mains set with an additional stage of two LS5A's in push-pull and a Ferranti moving-coil loud-speaker. The last two valves have 400 volts on the anodes.

◆ ◆ ◆

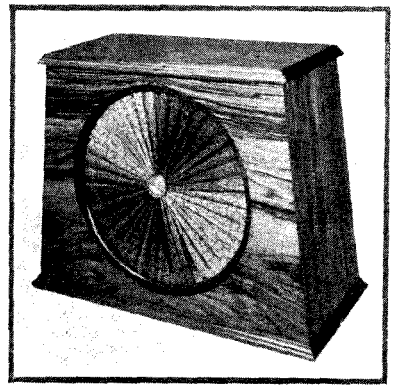
Constructors are always in need of cabinets for their sets; they will therefore be interested in the activities of Osborn's, who make cases for any receiver. Illustrated on this page is a cabinet for the New Brookman's Three, but it is, of course, suitable for any other set with the same panel and baseboard dimensions. Details of other cabinets suitable for WIRELESS MAGAZINE sets can be obtained from the makers.



A cabinet produced by Osborn's for the New Brookman's Three. It is very well made



The handsome appearance of this Ferranti radio gramophone will attract many set-buyers



Notice the neat cabinet of the Edison Bell permanent-magnet loud-speaker

Two models of a new Edison Bell permanent-magnet loud-speaker are available. One model is for use with ordinary power valves and the other is specially designed for a pentode output valve. In each case the price is £5 15s. Skeleton models with a 14-in. baffle are available at £5 12s. 6d.

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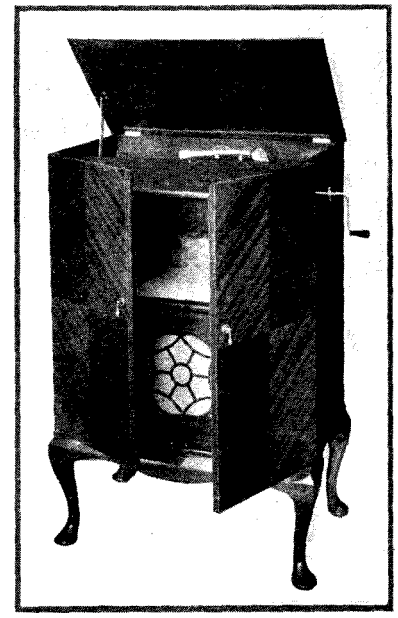
A good cabinet for home-constructed radio gramophones is being made by Pickett's; it is called the Radiogram de Luxe. This cabinet is supplied in oak or mahogany, and the panel opening can be cut to suit any particular set. The maximum panel size is 28 in. by 8 in., and the baseboard is about 10 in. deep. This is worth looking into if you want something extra special for a new receiver.



Just the thing for constructors—the Radiogram de Luxe cabinet made by Pickett's

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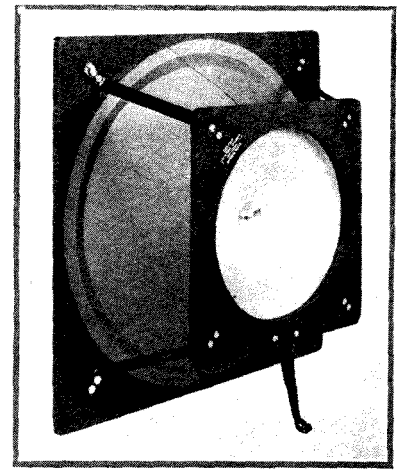
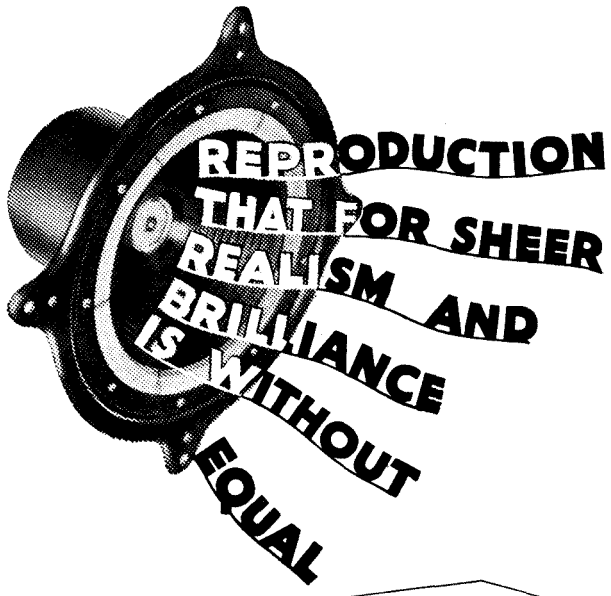
Wates loud-speakers are now well known; the 14-in and 20-in. double-cone models have been standard productions for some time. Now comes a new type, Model 31, which has a 12-in cone made of a special kind of paper. This seems to be just the thing for those who want a good chassis at a low price. The cost is only 11s. 6d for the chassis, but a driving unit is required as well, of course.



The new 12-in. Wates double-cone chassis will interest all set builders. It can be easily fixed in a cabinet

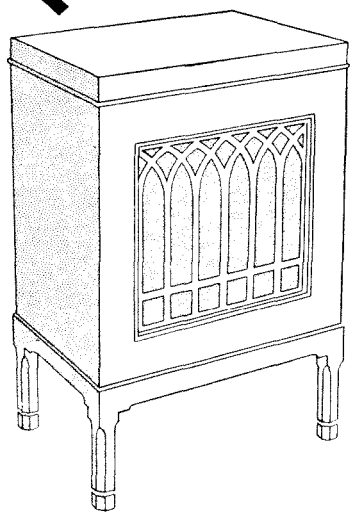


PERMANENT MAGNET R.K. UNIT (as illustrated).
Price £6.15.0

PERMANENT MAGNET R.K. Complete with Oak Cabinet.
Price £16.16.0

SENIOR R.K. UNIT with built-in rectifier for A.C. Mains Field Excitation.
Price 10 Gns.

SENIOR R.K. UNIT without Rectifier.
Price £6.15.0



The R.K. is the standard of excellence by which other loudspeakers are judged. First in 1926, it has led the way ever since as the finest loudspeaker it is possible to buy.

B.T.H. RK REPRODUCERS

Gives you better music

makes records last longer

PRICE *with 4 Adaptors* **27/6**

When you hear gramophone music reproduced with the aid of a B.T.H. Pick-Up you will scarcely believe the evidence of your ears. So crisp and clear-cut are the notes that you seem almost to be listening to the real thing.

By excellence of design, material and workmanship the B.T.H. Pick-Up has built up a reputation as the finest Pick-Up ever offered to gramophone enthusiasts. It fits any gramophone because it is supplied with four adaptors.

Fit one to your gramophone to-day and enjoy record-music at its best.

THE B T-H PICK-UP and ADAPTORS

ASSOCIATED ELECTRICAL INDUSTRIES LTD. AEI

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Incorporating the Wiring Supplies, Lighting Engineering and Radio Business of the British Thomson-Houston Co., Ltd.
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EDISWAN W.128

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IN TUNE WITH THE TRADE

FETTER LANE'S Review of Catalogues and Pamphlets

SEND TO US FOR THESE CATALOGUES!

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

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

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

My name and address are :—

Send this coupon in an unsealed envelope, bearing ½d. stamp, to "Catalogue Service," WIRELESS MAGAZINE, 58/61 Fetter Lane, E.C.4. *Valid till Mar. 31*

PRECISION CONDENSERS

VERILY, there is nothing more annoying than having to operate a set with poor controls. Slow-motion devices which wobble, slip and fail to give an accurate indication are generally a sign that the components behind the panel are not too good either. In contrast to this maudlin state of affairs I would refer you to the fine condensers and controls made by Jackson Bros.

I know that it is not my position to act as a technical critic, but simply to refer you to the latest literature. However, I am moved to praise these J.B. parts because I have been reading very thoroughly through the new J.B. catalogue bearing the title *Precision Instruments*.

It does not need too close perusal to convince one that J.B. condensers are precision instruments. I am greatly attracted by the new drum dial and thumb controls, while a new line is the J.B. illuminated vernier dial. You should have this booklet. **175**

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MAINS PARTS

SET users are realising that as they can so easily build their own receivers they can with equal simplicity make up their own mains units. And why there was ever any suggestion as to any intricacy in the construction of a mains unit I do not know. They are the simplest things in the world to build providing you have a WIRELESS MAGAZINE circuit and that you use good parts. The WIRELESS MAGAZINE you have already, so the first point is settled.

You can go a long way towards solving the second point by studying the latest Parmeko list of transformers and chokes for home-built eliminators. No matter whether you have alternating- or direct-current mains; whether you want to have a low-tension supply or not; and whether you want to build an eliminator for a two-valver or for a big ten-valve super-het, you will find suitable parts here.

This is a useful catalogue because it really does give all the technical details you will need to know and presents them in so clear a fashion that you will not have to work out complicated formulæ before discovering the right type of transformer or choke for your unit. **176**

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THOSE RESISTANCES

I EXPECT some day some technical genius will invent a circuit in which there are no resistances; not even the humble grid leak. But in the meantime in every set you will find a resistance of some kind and very often the resistances are called upon to carry comparatively heavy currents.

It has been found that one of the best types of resistance to carry currents in the nature of 10 and 20 milliamperes are whose which are wire wound. Sovereign Products, Ltd., the well-known condenser people, have put out a series of wire-wound power resistances. These are wound astatically with silk-covered resistance wire in sections on a bakelite former.

The resistances can be obtained in various values from 1,000 to 100,000 ohms, and the current carrying capacity varies from 5 to 50 milliamperes. Bases with plated clips and terminals are supplied with these resistances and a useful point is that the actual values are all guaranteed to be within 5 per cent. of the stated figures.

I think I have told you practically everything you need to know about these new "impeders," but a leaflet can be had from Sovereign, giving the resistance, current-carrying capacity and price of each of the eighteen units available. **177**

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IN SEARCH OF NEW PARTS

YOU know, of course, that the Formo people make fine condensers and vernier dials. They are pioneers, too, in the production of small compression-type condensers, which have come to be known as Formo-densors even when referring to condensers of this type not made by Formo !

I wonder, though, if you are so fully acquainted with the other Formo parts—high-voltage mains condensers, for example, the low-frequency transformers, high-frequency chokes or decoupling units. It would be futile of me in the small space available to attempt to describe any of these parts in detail.

I refer you to the new Formo catalogue, copies of which can be obtained free through my usual catalogue service. The latest catalogue is an 18-page production. **178**

MOVING COILS EXPLAINED

ALTHOUGH moving-coil loud-speakers are now not used only by experts (for you come across many enthusiastic moving-coil owners who know not one jot or tittle about their technical working), it is still advisable to have a rough idea of the principles involved.

A fine booklet has just come to hand published by Star Engineering, makers of the Webson moving-coil loud-speakers.

This is called *Moving Coil Loud-speakers Simply Explained*, and really the title is self-explanatory. There are some useful illustrations and a whole heap of information on such points as the use of baffles, output circuits, and other matters connected with the intricacies of moving-coil use.

It applies principally to users of Webson moving-coil instruments, but this booklet is not in any way in the nature of a catalogue confined exclusively to one make. It is a truly helpful publication which I recommend to all moving-coil users. **179**

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THOSE GRAMOPHONE MOTORS

THERE is a world of difference between a radiogram fitted with an electric turntable drive and one with a clockwork motor. Clockwork motors are very well in their way. They are (nowadays) practically foolproof and, of course, they are the only thing for those who have no mains.

But I think it would be safe to say that the average radio gramophone is mains driven and in this event really the best thing for you to do is to have an electric turntable drive. It does away with the bugbear of winding and it obviates the possibility of the motor running down in the middle of a play—than which there is nothing more annoying.

I admit that there are several users of clockwork motors who have tried electric motors and have been disappointed with them; but that is because they tried inferior types. They will find nothing of which to complain in the new Blue Flyer and Green Flyer motors supplied by the Rothermel Corporation, Ltd. **180**

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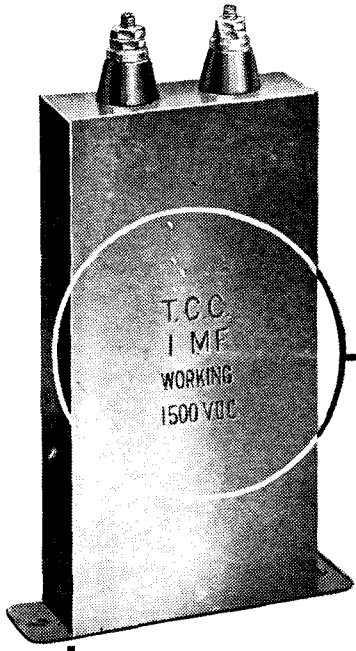
SIMPLE-TO-BUILD SPEAKERS

IT is a very simple job to make up a good cone loud-speaker with the aid of a diaphragm which can be cut from drawing paper, driven by a unit such as the Loewe type LS71. Realising that many users of this unit wish to home-construct speakers, the Loewe Radio Co., Ltd., have published a folder giving very clear details of a cone speaker which can be knocked together in an hour or so.

Details are given for making the cabinet and the total cost is trifling. **181**

TELLING THE TRUTH ON A CONDENSER



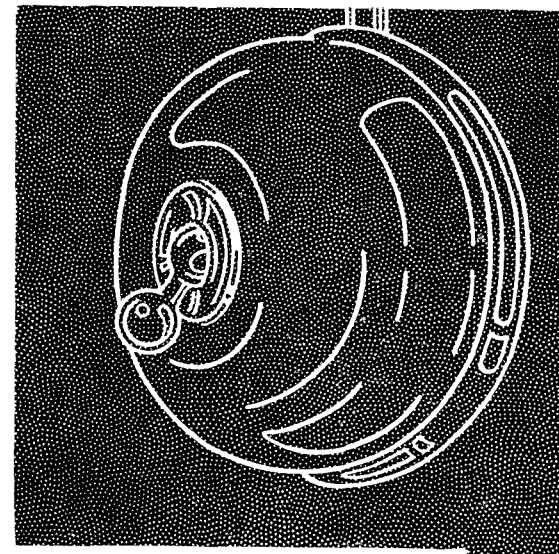
Test Voltages or Working Voltages?

SOME condensers are marked in a misleading manner. They indicate *test* voltages, which are obviously so much higher than actual *working* voltages, you may believe you are buying more efficient and better insulated condensers. This is not necessarily the case. The old idea that the continuous working voltage of a condenser was half its stated test voltage cannot now be relied upon, for Condensers of similar capacity and size have been sold stamped with varying test voltages, but with no indication of the working voltage. Do not take risks, therefore. See that the condensers you buy are definitely marked with their maximum **working** voltage. You will always find this on

T.C.C. CONDENSERS

TELEGRAPH CONDENSER CO. LTD. N. ACTON. W.3

YOU CAN SIMPLY SWITCH ON!



Wherever electric current is available, batteries are definitely out of date. Running your set from the mains means less trouble, less uncertainty. It means better reception and greater economy.

Most mains provide alternating current, which is, of course, unsuitable for radio purposes, and has to be converted to direct current by means of a rectifier.

The Westinghouse Rectifier is quite different from all others. It is all metal and contains nothing to burn or wear out. It converts—in conjunction with other components—existing battery-run sets to mains sets; it is ideal for use in constructor's kits; and it is incorporated in most good makes of mains receivers—if you are purchasing, make sure it is in yours.

There is not sufficient room to give details here, but a great deal of interesting technical information and complete descriptions are given in our forty-page booklet, "The All-Metal Way, 1931," which will be sent to you on receipt of the coupon (please enclose 3d. for your copy).

WESTINGHOUSE METAL RECTIFIERS

WESTINGHOUSE BRAKE AND SAXBY SIGNAL CO., Ltd.,
82 York Road, King's Cross, N.1.
Telephone: North 2415.

COUPON

Please send your forty-page booklet, "The All-Metal Way, 1931," for which I enclose 3d. in stamps.

NAME .....

ADDRESS .....

Please write in block letters.

LISSEN

FIXED CONDENSERS

Deliver all their stored-up energy

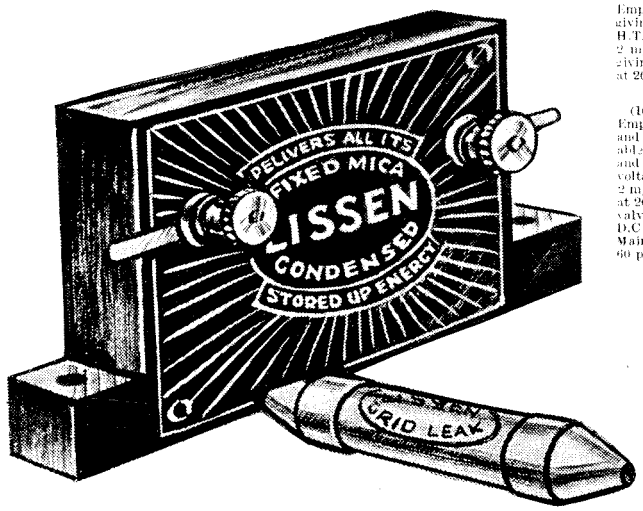
BECAUSE you are using bigger H.T. voltage—because you are seeking always more power and more purity from your set—because you are going out for ever more distant stations—your need for condensers that will stand up to all demands without leakage and without breakdown is more urgent now than ever.

Lissen Fixed Condensers have become the standard fixed condensers in almost every published circuit. Accurate to within 5 per cent. of stated capacity.

·0001 to ·001 mfd., **1/-** ea.

·002 to ·006 mfd., **1/6** ea.

Insist upon Lissen parts always



H.T. ELIMINATORS YOU CAN USE LIKE A BATTERY

MOULDED CASES MADE of INSULATING MATERIAL—HEAVY "CAB TYRE" FLEX LEADS

D.C. MODEL "A"
(100-150 volts and 200-250 volts)
Employs 8 H.T. + tappings: H.T.+1 giving 80 volts for S.G. valves; H.T.+2 giving 60 volts at approx. 2 m/A for detector valves; H.T.+3 giving 120/150 volts at 20 m/A. PRICE .. **27/6**

D.C. MODEL "B"
(100-150 volts and 200-250 volts)
Employs 8 H.T. + tappings: H.T.+1 and H.T.+2 are continuously variable (by means of two control knobs) and capable of giving any desired voltage up to 120/150 volts at approx. 2 m/A; H.T.+3 giving 120/150 volts at 20 m/A. for power valves. PRICE .. **39/6**
D.C Models working on 100/110 Mains Voltage give output of approx. 60 per cent. above value.

The current you get from Lissen Batteries is the purest form of current you *can* get for radio. But if you want to use an eliminator, use a Lissen Eliminator. You'll then get H.T. current from your mains smoother, steadier, better than before.
There are 4 types of Lissen Eliminators: one of them will almost certainly be just right for your set. Tell your dealer what voltage your mains supply is and whether it is A.C. or D.C.; tell him what output you require, or what valves you are using and he will demonstrate for you the Lissen Eliminator to suit your needs.

A.C. MODEL "A"
Tappings as in D.C. Model A.
100-125 volts and 200-250 volts.
PRICE **£3 : 0 : 0**

A.C. MODEL "B"
Tappings as in D.C. Model B.
100-125 volts and 200-250 volts.
PRICE **£3 : 15 : 0**

LISSEN ELIMINATORS

LISSEN LIMITED

WORPLE ROAD, ISLEWORTH, MIDDLESEX.

An Editorial Word

TO BUILD OR TO BUY?

THERE has been fierce argument on the position of the home constructor in the scheme of things wireless. The wise men looked across to America and found that the constructor there had become a negligible quantity, and so they came round and told me that everybody would soon give up the preposterous idea of building their own sets and take the far more logical course of buying them.

Every summer the wise men pay me further visits. "Next season sees the end of the constructor," they say. "Mass production of sets will put the lid on him." But really wise men would not prophesy; they would wait for the facts. And what are the facts? Judging from our own experience, there is more wireless construction than ever. Sales of blueprints steadily increase and a home-constructed three-valve set described in recent issues of *Amateur Wireless* has set the town afire.

It is an interesting problem when you come to think of it. In the face of all the mass-produced wireless sets—in most cases thoroughly reliable and selling at very attractive prices—how and why is there a public that insists on building sets for itself? Are not the manufactured sets good enough? Brains and money in plenty have gone to their production, and the majority of them are remarkably efficient and have reached a high degree of merit.

There is, perhaps, a key to the enigma in remembering that a receiver is not just a mere musical instrument. It is a delicately balanced device for collecting and amplifying with but little distortion the minute electrical impulses that radiate from the broadcasting transmitters. It is the world's mystery box.

You never get over the wonder of it. As you approached it for the first time you thought it the greatest scientific wonder in the history of the world. Old-fashioned witchcraft is nothing to it, and even the hardened wireless experimenter must needs pause now and again to regard afresh this astounding achievement.

It is human nature to pry into a mystery; to attempt to get to the bottom of it; to try to understand it; and it is this that accounts for the peculiar fascination that a wireless set has for hundreds of thousands of people. Fortunately, a wireless set is not all mystery.

To learn anything of the why and wherefore of a receiver you must pull it about; you must even pull down and build up again; and in your early experiences you may provide a new version of the old joke of the man who took to pieces his watch (or was it the —— car?), and after re-assembling found enough parts left over to make another one.

The wise men were misled by paying too much attention to conditions in the United States. They forgot that Great Britain has the most intelligent and, in addition, the best served constructional public in the world. The American constructors started earlier than we did and got tired quickly. To-day the American home constructor is of small account.

The American public seems to have no time for anything but work and play, and play means anything rather than fiddling around with tools and components, whereas the average Englishman ("Britisher" is an ugly word) likes nothing better than a hobby providing occupation for both hands and brain.

A wireless set is such a "kittle-kattle" thing. You take a couple of evenings to build a set and find that it works or does not work, in which latter case the fault may be that a bit of copper is one-hundredth of an inch out of its proper position, and the simple tightening of a screw may flood the room with melody; or, on the other hand, the trouble may be so subtle or so fundamental as to defy your severest application for hours on end. Well, there is nothing so educative as dealing with and overcoming snags.

Most people are motorists to-day, and know more about internal-combustion engines and gears than engineers themselves did thirty years ago. In most cases, how have they got their knowledge? You as a motorist will remember the troubles that beset you as a novice — that carburettor with the choked jet; the petrol system with the dirty gauze strainer; the flat tyre which you were bound to mend because no other help was near; the plugs or magneto points that had to be scraped before the car would proceed on its way. How mysterious all these things were until necessity obliged you to approach them, and how quickly they lost their mystery!

A shut-in receiver is all mystery which will never be solved by looking at its polished cabinet.

In our considerable experience we find that builders are nearly always buyers as well. They have learned to recognise a good thing when they see it, and their practical knowledge sets them up as wireless advisers in their own particular circles, big or little; and just as, twenty years ago, we took the advice of the friend "who knew all about cars" before we made a deal, so to-day it is common for the lay public to consult the home constructor before they buy their sets.

There is plenty of humour in home construction, although the lady of the house does not always see it that way. Wireless, to her, is something that should at will bring to her fireside the music of the world; but her husband, the constructor, sees in wireless the most fascinating hobby yet dreamt of, and the two ideas are sometimes at war. The solution that appeals to us is to make or buy a set for the family's enjoyment; and, after all, the keenest buyer and the best critic of a bought set is the man who can make one for himself.

The constructor never stops, the fascination of creation never fades, and, whether he builds or buys, he yet shall build again. In wireless there is no finality, either in the sets or what their builders expect of them.

It is quite a normal course for the constructor to build a "last-word" set and to be delighted with the result, only, however, to re-build it in a month or two's time to meet a change in requirements or to adapt it to his advancing ideas, using, of course, as many as possible of the old components. Then he may buy a commercial model as a change.

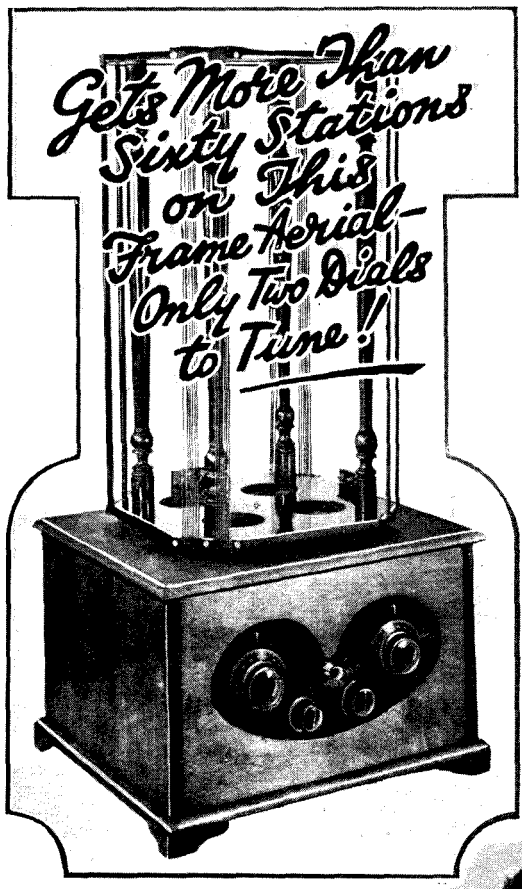
Cannot you buy a commercial set for less than the cost of the components?" we are asked. Often the answer is "Yes," especially in the case of simple three-valve sets, and in every case where the consideration of cost looms largest and is perhaps the only consideration worth mentioning, by all means *buy*. There are some fine receivers waiting for you.

The constructor, however, will not let the question of "Build or Buy?" be settled by price considerations. The best of the commercial sets are reliable, efficient, and remarkable value for money, and if in any particular case he does not buy, but prefers to build, it is not because the home-built set wins on price, as sometimes it does, but simply because the building of a set is the best fun in the world and the most fascinating hobby that science has yet provided.

B.E.J.

The Editor of WIRELESS MAGAZINE Introduces

The SUPER 60



A Revolutionary Six-valve Super-het Specially Designed by W. JAMES. It Can Be Built for £12 and Is Very Simple to Construct. Amazing Selectivity and Volume Are Outstanding Features of This Set

EVERYONE on the staff of WIRELESS MAGAZINE *is convinced that W. James' new Super* 60 *is the best set ever designed for home-construction. It is a set that anybody would be proud of and it is with more than ordinary pleasure that I present constructional details in these pages.*

You will see from another page that an independent test by a member of the WIRELESS MAGAZINE *staff resulted in the reception of no fewer than sixty-five stations from twenty countries. Here is an opportunity to tour all Europe from your fireside.*

Entertainment Value

Many three-valve sets—such as the Brookman's Three, for example—will receive fifty stations, but as a rule not more than fifteen of them will give you really high-quality reproduction. *This means that the entertainment value of an average set is about* 30 *per cent.*

With the Super 60, *on the other hand, forty or more of its sixty-five stations can be received so well that* they are really enjoyable. *The set therefore has an actual entertainment value of the order of* 80 *per cent.*

Another point about the Super 60 *I should like to emphasise is that it is at once ideal for reception close to a regional station and also in places where conditions are difficult.*

Uncanny Selectivity

The Super 60 *combines selectivity with power to an almost uncanny degree. Even at a distance of four miles from Brookman's Park the London Regional and National stations have a spread of only one degree and there is not the slightest trace of overlap with powerful foreign stations working on adjacent wavelengths. Muhlacker and Graz can both be separated from London Regional.*

Quite apart from its amazing results, you will find the Super 60 *interesting for its simplicity of construction. The set can be built in three hours.*

Constructional Details

In the following ten pages you will find many photographs with the names of the parts clearly indicated; a large-scale layout and wiring diagram, with each wire numbered separately in the best order of assembly; a large drawing showing how to connect the external batteries, frame aerial and loud-speaker—in short, every detail that will enable you to build the Super 60 *with the minimum of trouble and with the assurance that it will work at once!*

You can take my word that the Super 60 *is the best set ever described in* WIRELESS MAGAZINE—*and that is saying something!*

W. JAMES KEEPS HIS PROMISE

In his New Year's Resolution (published in "Wireless Magazine" for January) W. James said:

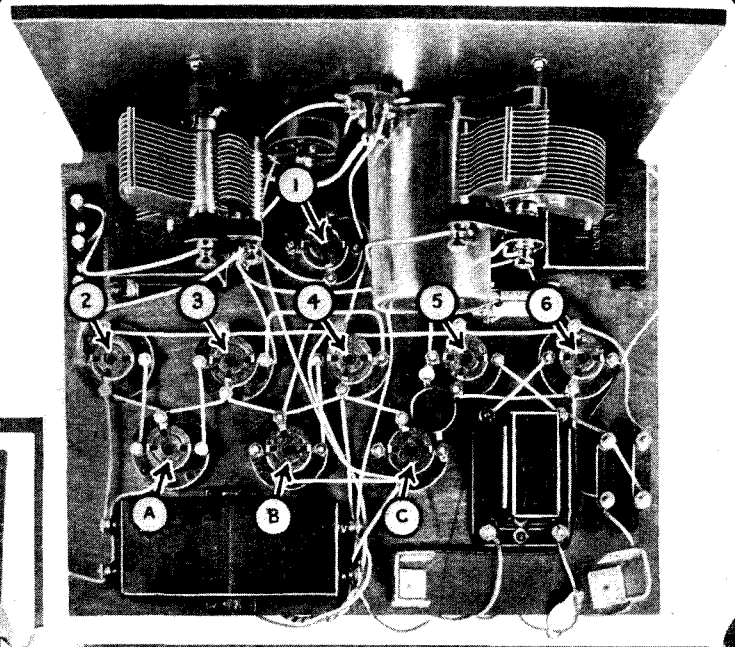
"I intend doing everything in my power to encourage the use of bigger and better wireless sets.

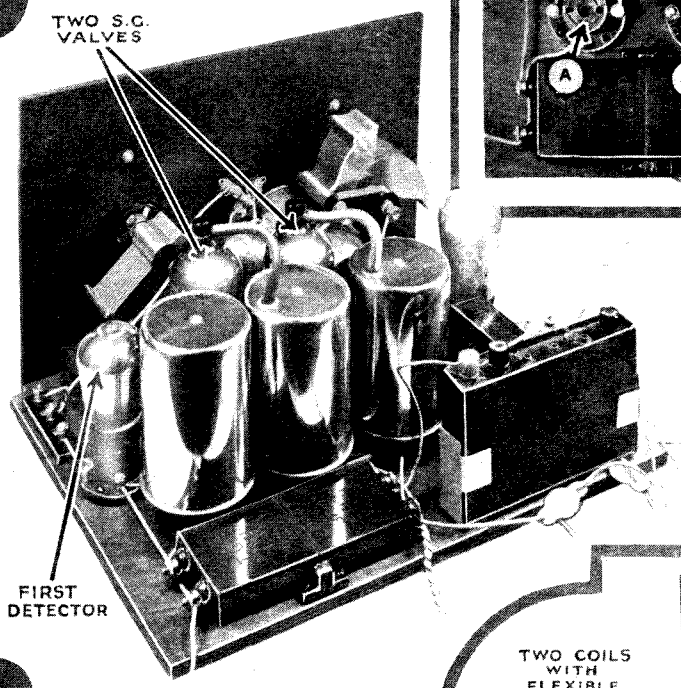
"Too many small receivers are employed. Their users do not obtain good reproduction. They may be satisfied, but only because they are not aware of the lifelike results to be obtained from better sets."

This promise has resulted in the Super 60, *the most selective and powerful set ever made available to home-constructors.*

WHAT THE NINE VALVE HOLDERS ARE FOR

On the right is a photograph of the Super 60 without its valves and coils. The holders numbered 1 to 6 are for the valves, as follows: 1, oscillator; 2, first (anode-bend) detector; 3 and 4, screened-grid intermediate amplifier; 5, second (leaky-grid) detector; and 6, power valve. In the holder A insert a plain coil, and in holders B and C two coils with flexible leads for connection to the terminals at the tops of the screened-grid valves. For types of valves and coils see the component specification



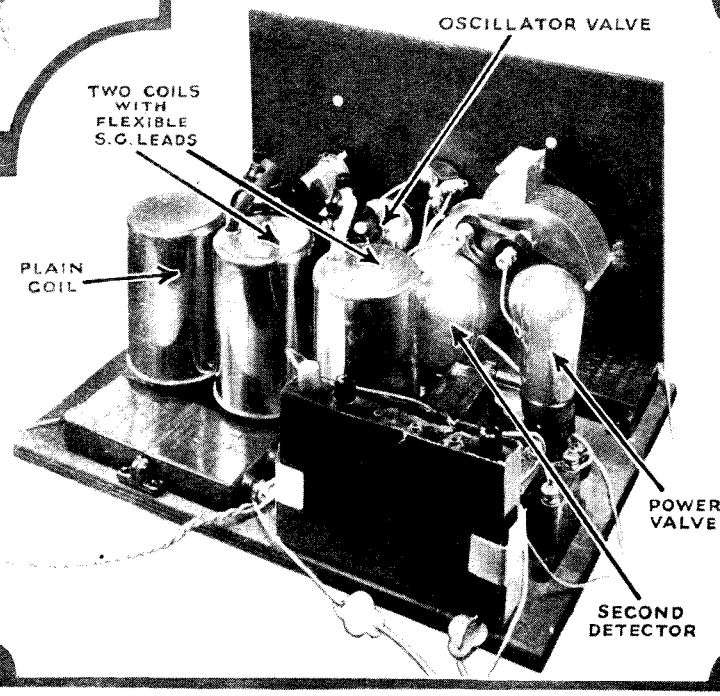


ALL READY FOR USE

Here you see the Super 60 with valves and coils in position all ready for use. The grid-bias battery is mounted at the right-hand end of the baseboard. The other battery connections will be clear from the diagram on page 137. All the coils are matched and the two with flexible leads are interchangeable, so that it does not matter in which holders they are placed. It will be found that the frame aerial is almost entirely non-directional except at its position of minimum strength—a great convenience in operation

AMAZING PERFORMANCE FOR ITS SIZE!

The Super 60 is the best set ever described in WIRELESS MAGAZINE *and its performance is all the more remarkable when its small size is taken into consideration. The front panel measures only 12 in. by 8 in. and the baseboard is only 10 in. deep. But, in spite of this, the set is not at all cramped and the wiring can be completed, even by a beginner, without any difficulty. As explained on page 139, a full-size blueprint can be obtained for half-price (that is, 9d., post free) if the coupon on page 224 is used by March 31. Construction can be completed, even by a beginner, in about three hours. The cost of all the parts is only about £12, including a cabinet, dual-range frame aerial, and valves. A complete list of parts appears on page 138*



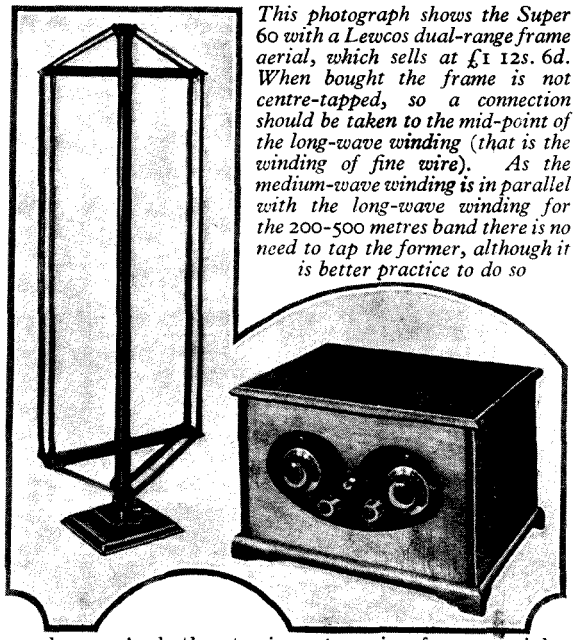
W. James Describes His Latest Set Design

THE SUPER 60

What It Is and How To Build It

THIS receiver is a powerful and selective super-heterodyne providing good quality. Its entertainment value is remarkably high.

With an ordinary set you may log thirty or forty stations. But how many programmes can you get loud and clear? Only a fraction of the number. And the tuning, too, is difficult, rather tricky in fact, as you must use the reaction very carefully.



This photograph shows the Super 60 with a Lewcos dual-range frame aerial, which sells at £1 12s. 6d. When bought the frame is not centre-tapped, so a connection should be taken to the mid-point of the long-wave winding (that is the winding of fine wire). As the medium-wave winding is in parallel with the long-wave winding for the 200-500 metres band there is no need to tap the former, although it is better practice to do so

This super-heterodyne, on the other hand, is very easy to tune. It tunes sharply, but without tricks.

You set the two dials for London Regional and the station is in and gone again in less than one degree of the left-hand dial alone. Nine kilocycles lower in frequency is Muhlacker, quite free from London, brought in loud and clear on the next degree of the dial.

Turn the knob the other way one degree and in comes Graz (Austria) with a bang—no trace of interference and got as easily as London.

So you will see that this set is not an ordinary receiver by any means as regards performance.

Several have been constructed. It takes about three hours from start to finish. Mr. Relph has one and he got over fifty stations the first time he put it on with a scratch lot of valves and batteries.

The "W.M." Technical Staff made another one up, just to see that it would perform as the others, and the report is elsewhere in this issue

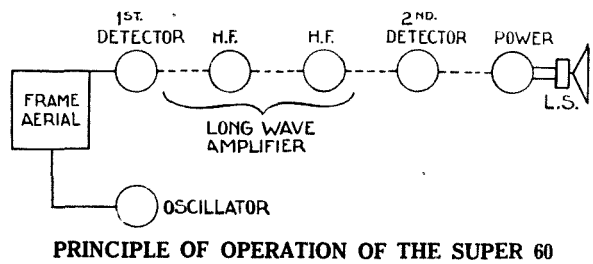
So you will gather that the set is easily built; there are no snags or difficulties; no squeals or howls; **and the entertainment value of the set is much higher than that of any other set that I have tried.**

Of the knobs on the front, two are for tuning, one for volume, another for the wave range, and the small one is the on-off switch. The large left-hand dial is the control for the tuning of the oscillator and that on the right tunes the frame aerial. As you would expect, the tuning of the oscillator is sharp, while the frame circuit is not so sharp.

As a matter of fact, each degree on the dial of the oscillator condenser represents roughly nine kilocycles. You do not get a station in and out in a fraction of a degree, but the station is held over a fair part of a degree, showing the band-pass action of the amplifier.

Thus the station comes in suddenly and goes out suddenly as the left-hand dial is turned, and the station is held over part of a degree.

The principle of the receiver may be followed with the assistance of the diagram below.



PRINCIPLE OF OPERATION OF THE SUPER 60

This diagram shows the sequence of operation of this new super-het, which has screened-grid valves in the intermediate stages (these do not need tuning)

How the Set Works

We have joined to the first valve, which is an anode-bend detector, the frame aerial and also a coupling coil from the oscillator. The frame aerial tunes to the stations we want.

Next come two stages of long-wavelength amplification. What we do is first to collect the desired signal in the frame-aerial circuit and to turn this signal into a long-wavelength one, in this instance to about 2,400 metres. Then we magnify the signal at this wavelength and detect it. The output is then taken to the power valve in the usual way

Great Magnification

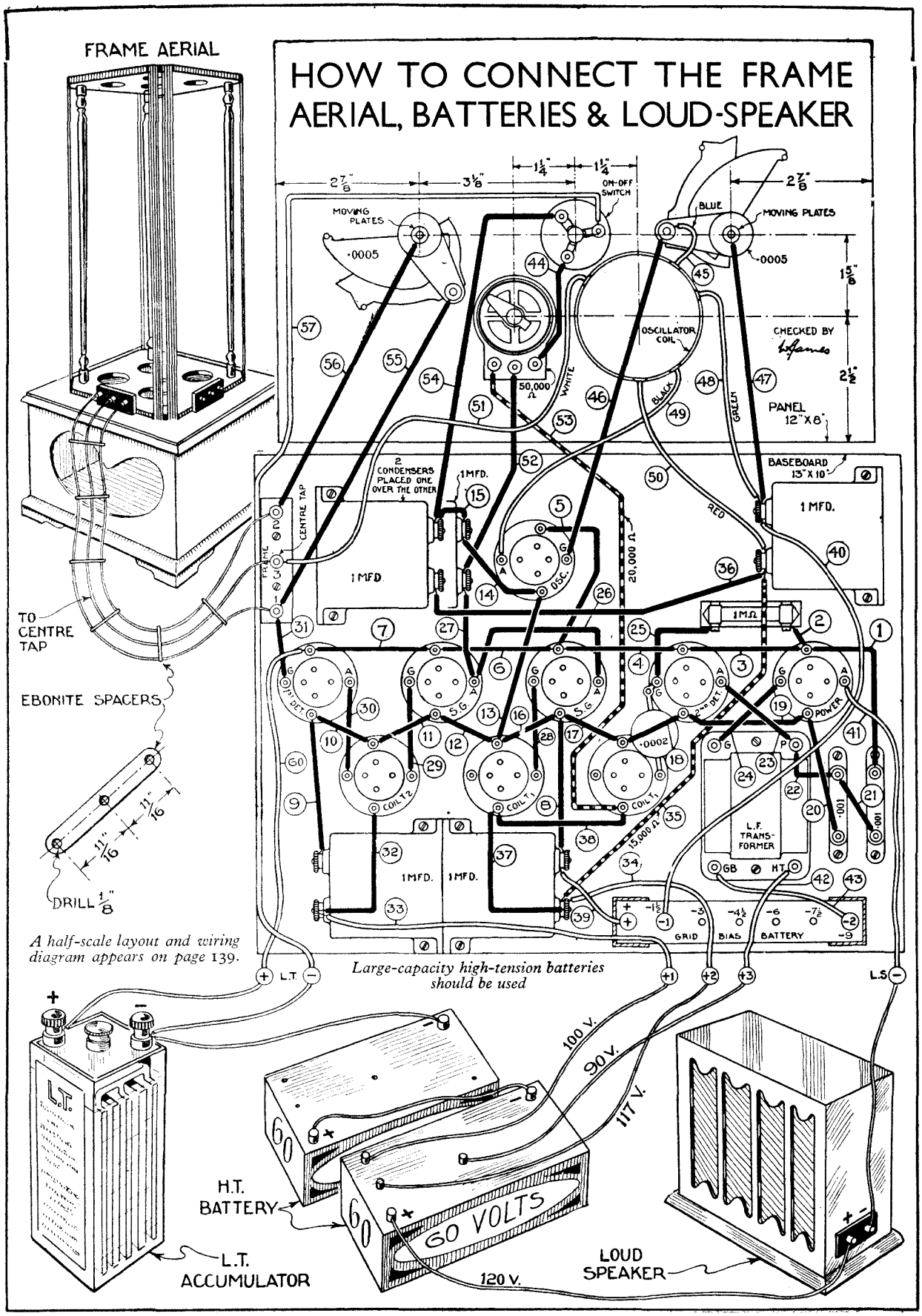
We therefore have, briefly, a frequency changer at the beginning of the set, and a long-wave amplifier followed by a detector and power stage. An obvious advantage is the great magnification to be obtained on the long wavelength, with complete stability.

A further advantage, and one which I know will carry weight with readers, is that the long-wavelength amplifier has fixed tuning and band-pass characteristics.

Then again, as the long-wave amplifier is fixed, all we have to do to tune is to adjust the frequency changer. You tune the frame aerial to the station desired, say on 300 metres or 1,000,000 cycles. Next you adjust the oscillator to beat with this frequency and to produce a new frequency of 126 kilocycles, the frequency of the long-wave amplifier.

Thus the oscillator can be

(*Continued on page* 142)



A half-scale layout and wiring diagram appears on page 139.

Large-capacity high-tension batteries should be used

LENGTHS OF CONNECTING WIRES

Connection No. 1	..	..	3½ in.
Connection No. 2	..	..	3⅜ in.
Connection No. 3	..	..	2⅜ in.
Connection No. 4	..	..	2⅜ in.
Connection No. 5	..	..	3 in.
Connection No. 6	..	..	2½ in.
Connection No. 7	..	..	2⅛ in.
Connection No. 8	..	..	2½ in.
Connection No. 9	..	..	2½ in.
Connection No. 10	..	..	1 in.
Connection No. 11	..	..	1 in.
Connection No. 12	..	..	1 in.
Connection No. 13	..	..	2⅞ in.
Connection No. 14	..	..	2½ in.
Connection No. 15	..	..	⅜ in.
Connection No. 16	..	..	1 in.
Connection No. 17	..	..	1 in.
Connection No. 18	..	..	1 in.
Connection No. 19	..	..	2⅛ in.
Connection No. 20	..	..	2½ in.
Connection No. 21	..	..	1 in.
Connection No. 22	..	..	1¼ in.
Connection No. 23	..	..	1¼ in.
Connection No. 24	..	..	1½ in.

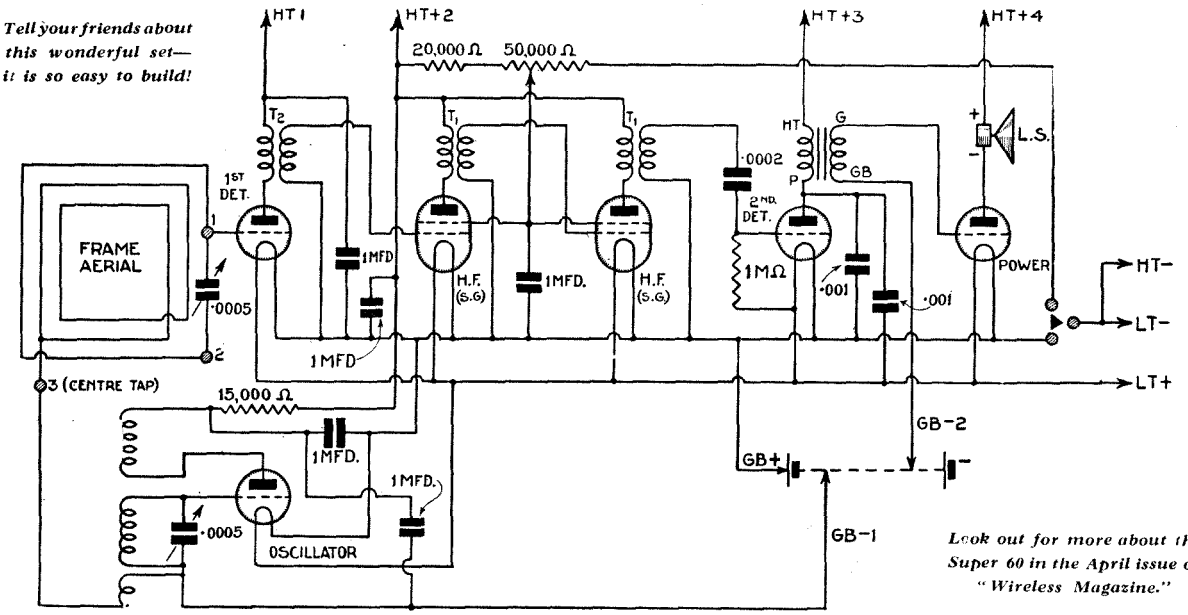
The length indicated against each number is that of the insulated sleeving needed for each lead. In all cases the wires should be cut about 1¼ in. longer than the sleeving to allow for screwing under terminal heads. Use No. 20-gauge tinned-copper wire. If either of the two flexible resistances is too short a piece of wire should be joined to one end to make up the length.

Connection No. 25	..	..	1⅜ in.
Connection No. 26	..	..	4 in.
Connection No. 27	..	..	2 in.
Connection No. 28	..	..	1½ in.
Connection No. 29	..	..	1½ in.
Connection No. 30	..	..	1½ in.
Connection No. 31	..	..	1⅜ in.
Connection No. 32	..	..	2½ in.
Connection No. 33	Flex to H.T.+1		
Connection No. 34	Flex to H.T.+2		
Connection No. 35	15,000-ohm flexible resistance		

Connection No. 36	6½ in.
Connection No. 37	2½ in.
Connection No. 38	2½ in.
Connection No. 39	Flex to G.B.+, about 5 in.
Connection No. 40	Flex to G.B.—1, about 16 in.
Connection No. 41	Flex to L.S.—
Connection No. 42	Flex to H.T.+3
Connection No. 43	Flex to G.B.—2 about 6 in.
Connection No. 44	2 in.
Connection No. 45	Blue lead from oscillator coil
Connection No. 46	4 in.
Connection No. 47	3½ in.
Connection No. 48	Green flex from oscillator coil
Connection No. 49	Black flex from oscillator coil
Connection No. 50	Red flex from oscillator coil
Connection No. 51	White flex from oscillator coil
Connection No. 52	2½ in.
Connection No. 53	20,000-ohm flexible resistance
Connection No. 54	3½ in.
Connection No. 55	5 in.
Connection No. 56	5 in.
Connection No. 57	Flex to L.T.—
Connection No. 58	Flex from L.T — to H.T.—
Connection No. 59	Flex from L.S.+ to H.T.+4
Connection No. 60	Flex to L.T.+

HERE IS THE CIRCUIT OF THE SUPER 60

Tell your friends about this wonderful set—it is so easy to build!



Look out for more about the Super 60 in the April issue of "Wireless Magazine."

Six valves are used—an oscillator, first (anode-bend) detector, two screened-grid intermediate-frequency amplifiers, second (leaky-grid), detector and power stage. The anode-current consumption is between 12 and 15 milliamperes.

COMPONENTS NEEDED FOR THIS SET

COILS
1—Set of 4 Wearite super-het coils (one O2, two T1, and one T2), £2 10s.

CONDENSERS, FIXED
1—Formo .0002-microfarad, 6d. (or Ormond).
2—T.C.C. .001-microfarad, upright type, 3s. 8d. (or Dubilier, Telsen).
5—T.C.C. 1-microfarad, type 50, 14s. 2d (or Dubilier, Franklin).

CONDENSERS, VARIABLE
2—Ormond .0005-microfarad, type R426, with slow-motion dials, 12s. (or Polar, Jackson).

EBONITE
1—Red Triangle panel, 12 in. by 8 in., 6s. (or Becol, Lissen).

HOLDER, GRID-LEAK
1—Bulgin, porcelain type, 6d. or Dubilier, Lissen).

HOLDERS, VALVE
9—Telsen, four-pin type, 9s. (or W.B., Lotus).

PLUGS AND SPADES
8—Belling-Lee wander plugs, marked: H.T.+4, H.T.+3, H.T.+2, H.T.+1, H.T.—, G.B.+, G.B.—1, G.B.—2, 2s. (or Clix, Eelex).
2—Belling-Lee spade terminals, marked: L.T.+, L.T.—, 9d. (or Clix, Eelex).

RESISTANCES, FIXED
1—Magnum 15,000-ohm, spaghetti type, 1s. 6d. (or Bulgin).
1—Magnum 20,000-ohm, spaghetti type, 1s. 6d. (or Bulgin).
1—Lissen 1-megohm grid leak, 1s. (or Dubilier, Watmel).

RESISTANCE, VARIABLE
1—Rotorohm 50,000-ohm potentiometer, 6s. (or Regentstat).

SUNDRIES
Tinned-copper wire for connecting.
Lengths of Sistoflex sleeving.
1—Set of Cortabs de luxe.
1—Ebonite strip, 2½ in. by ⅜ in.
3—Small brass terminals.

SWITCH
1—W.B. three-point, 1s. 3d. (or Bulgin, Pioneer).

TRANSFORMER, L.F.
1—Ferranti, type AF8, 11s. 6d. (or Telsen, Igranic Midget).

ACCESSORIES

BATTERIES
2—Columbia 60-volt triple-capacity type 4780, £1 15s. (or Ever Ready, Pertrix).
1—Columbia 9-volt, type 4756, 2s. (or Ever Ready, Pertrix).
1—Exide 2-volt accumulator, type 1CZ3, 11s. 6d. (or C.A.V., Pertrix).

CABINET AND FRAME AERIAL
1—Peto-Scott, with dual-range frame aerial, £2 5s.

VALVES

OSCILLATOR
1—Marconi L2/b, 8s. 6d. (or Mullard PM1 LF, Osram L2/b).

FIRST DETECTOR
1—Marconi H2, 8s. 6d. (or Mullard PM1HF, Osram H2).

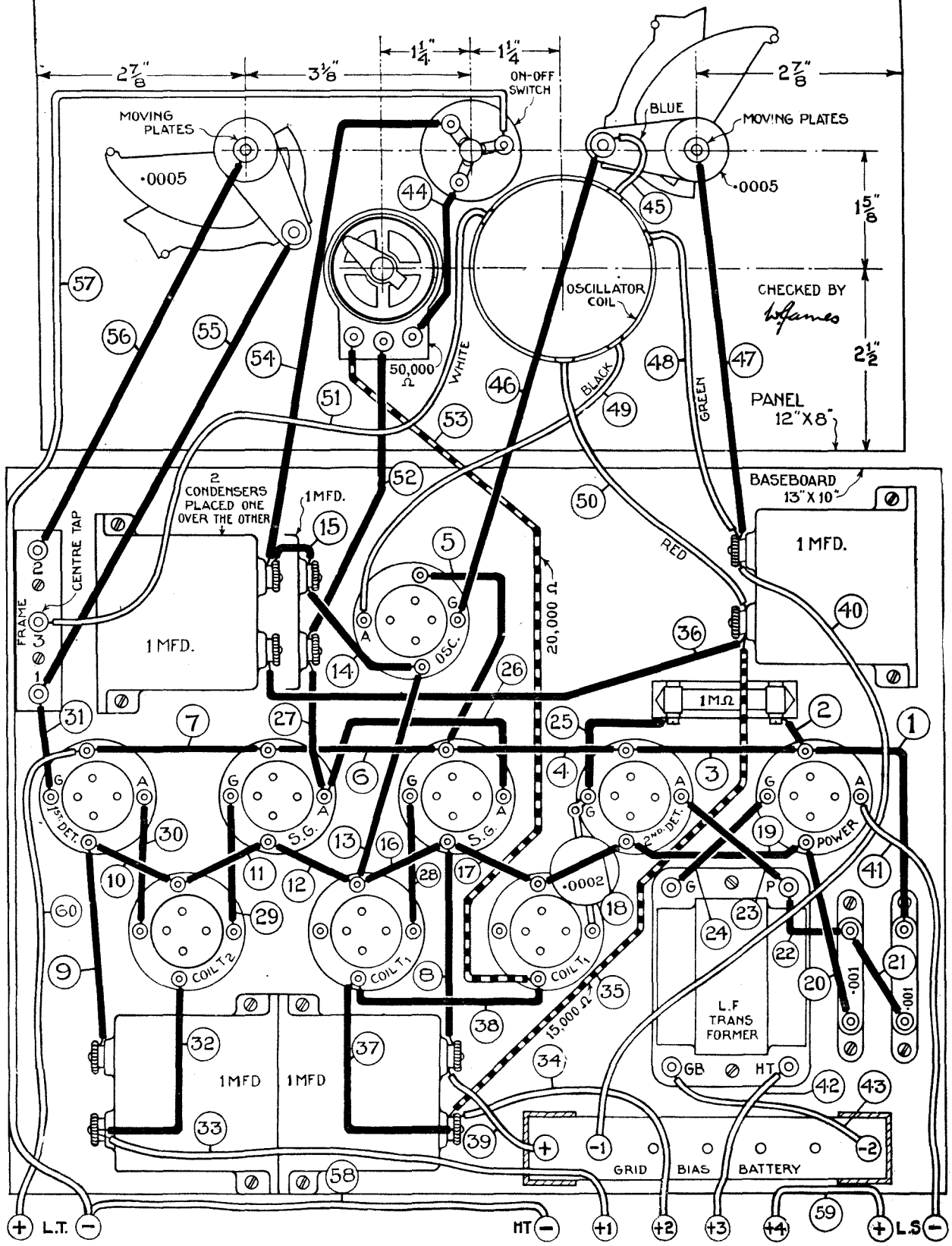
S.G. INTERMEDIATES
2—Cossor 215SG, £2 (or Mullard PM12, Osram S215).

SECOND DETECTOR
1—Marconi HL2/c, 8s. 6d. (or Mullard PM1HF, Osram HL2/c).

POWER
1—Mullard PM2, 10s. 6d. (or Cossor 215P).

LAYOUT & WIRING PLAN of the SUPER 60

This diagram is half-scale, but if desired, a full-size blueprint can be obtained for half-price, that is 9d., post free, if the coupon on page 224 is used by March 31. Ask for No. W M 229. and address your application to Blueprint Dept., WIRELESS MAGAZINE, 58/61 Fetter Lane, London, E.C.4.



See page 137 for external connections

TOURING EUROPE with the SUPER 60

IF you had a set that could tune in sixty stations at full loud-speaker strength—and I have had such a set on test—you would have to allow only two minutes per station during a two-hour sitting. This explains why my tour of Europe, a radio tour of real entertainment value, took two evenings instead of one.

Apparatus Used

For my test I used a batch of Osram valves and Columbia super-capacity batteries. The loud-speaker was an Ultra linen-diaphragm type.

Before explaining the accompanying list of stations received during the evenings of January 26 and 27, some notes on the operation as I found it will be of value to constructors.

When everything is ready for reception, and the on-off switch has been pulled out, the first control to be adjusted is the wave-range switch connected to the oscillator coil. This switch, controlled by a black knob just to the right of the oscillator condenser, has three positions; left for ultra-short waves, centre for medium waves, and right for long waves. Only the medium- and long-wave switch positions are involved.

Having set the switch to the medium waves, and having made sure that the medium-wave frame aerial, with its centre tap, is connected to the three terminals provided near the first detector valve, one can start operating in earnest.

How to Tune

The procedure recommended by W. James, and followed during my tests, is to set the oscillator condenser at say, 50 degrees and then, swing round the frame condenser until a characteristic rushing noise is heard. This unmistakable sign of "liveliness" provides one with the relative settings of the two tuning controls, namely the frame tuner on the right and the oscillator tuner on the left.

I have tried the set with the Lewcos and Peto-Scott frame aerials, which differed somewhat in inductance value. Because of this the frame readings for a given station were different, but I noted that the oscillator settings were identical with both frames.

Here we present details of an independent test made by a member of the WIRELESS MAGAZINE *Technical Staff on W. James's Super 60. This test was carried out on a duplicate set, such as can be made by any reader from the details given in these pages.*

To the constructor of the set, this point should be reassuring, for it means that the oscillator readings given in the table are very closely related to the readings that will be obtained on all other Super 60 sets made up.

I suggest that, with the help of the Broadcasting Guide given with this issue, the constructor of the Super 60 should select six key stations as a check for the oscillator settings. On the medium waves Cologne, London National, Heilsberg, Bordeaux, Strasbourg, Toulouse, Rome, and Brussels No. 1 should be readily identified.

I started on the medium waveband by logging the London Regional, at 125 degrees on the oscillator and 111 on the frame.

A slight readjustment of the frame condenser to 113 brought in Mühlacker. Now the amazing point about this reception was not the enormous strength of Mühlacker, but the entire absence of the London Regional. This powerful local station was actually cut out within one degree of its tuning point!

MEDIUM-WAVE STATIONS RECEIVED ON THE SUPER 60

All stations received on the evenings of January 26 and 27 at good loud-speaker strength in South London.

Wavelength	*Station*	*Country*	*Oscillator*	*Frame*
217	Königsberg	Germany	58	35
221	Helsinki	Finland	59	36
224	Cork	I.F.S.	62	39
227	Cologne	Germany	64	45
230	Malmö	Sweden	65	44
232	Kiel	Germany	68	47
239	Nürnberg	Germany	71	50
242	Belfast	Ireland	73	51
248	Juan-les-Pins	France	76	55
257	Hörby	Sweden	80	59
259	Leipzig	Germany	81	61
261	London National	Great Britain	84	65
263	Moravska Ostrava	Czecho-Slovakia	85	65
265	Lille	France	86	68
276	Heilsberg	Germany	91	73
279	Bratislava	Czecho-Slovakia	93	74
296	Turin	Italy	100	82
299	Huizen	Holland	102	85
301	Aberdeen	Great Britain	104	86
304	Bordeaux	France	105	87
310	Cardiff	Great Britain	108	90
322	Göteborg	Sweden	112	95
325	Breslau	Germany	114	97
338	Velthem-Louvain	Belgium	118	101
442	Brunn	Czecho-Slovakia	120	102
345	Strasbourg	France	121	106
349	Barcelona	Spain	122	107
352	Graz	Austria	**124**	109
356	London Regional	Great Britain	**125**	111
360	Mühlacker	Germany	**126**	113
364	Algiers	North Africa	128	114
372	Hamburg	Germany	130	117
376	Manchester	Great Britain	132	119
	Lvov	Poland	133	120
385	Toulouse	France	134	120
390	Frankfurt	Germany	135	122
	Belgrade	Jugoslavia	138	125
399	Glasgow	Great Britain	139	126
403	Berne	Switzerland	140	128
409	Katowice	Poland	142	130
413	Dublin	I.F.S.	144	132
416	Rabat	North Africa	145	133
418	Berlin	Germany	146	134
424	Madrid	Spain	147	136
431	Belgrade	Jugoslavia	148	138
436	Stockholm	Sweden	150	138
441	Rome	Italy	152	140
466	Lyons	France	159	150
473	Langenberg	Germany	162	151
479	Midland Regional	Great Britain	163	153
487	Prague	Czecho-Slovakia	166	157
501	Milan	Italy	168	160
509	Brussels No. 1	Belgium	170	161
516	Vienna	Austria	174	160
533	Munich	Germany	175	167
542	Sundsvall	Sweden	177	176
550	Budapest	Hungary	178	172

Gets All Stations

It is not enough to say that the Super 60 has a nine-kilocycle reception separation; for implied in such a statement is something extraordinary in selectivity. What we ought to say is that the Super 60 gives equal treatment to all stations allocated under the Prague Plan. It brings in a foreign station just as easily as a local station. That means it is a very sensitive set. It tunes out local stations just as easily as foreign stations. That means, it is a very selective set.

The only spaces in the wavelength allocations were where common wavelengths prevented the reception of stations on those common wavelengths, and where heterodynes prevented the logging of the two stations causing the heterodyne.

I should like to emphasise the fact that all the stations logged were free from interference and were heard at full loud-speaker strength.

The average set does not bring in Cork at full loud-speaker strength in London. Nor can Aberdeen and Cardiff be clearly heard in London on *any* set. These stations were at full loud-speaker strength during the test period.

No Interference

Due to the swamping effect of the London Regional I have seldom heard Graz or Barcelona. But both these stations were logged at full loud-speaker strength, clear of all interference. On quite selective sets I have difficulty in getting Prague clear of Midland Regional. But during the test there was a one-degree silent space between these stations as received on the Super 60.

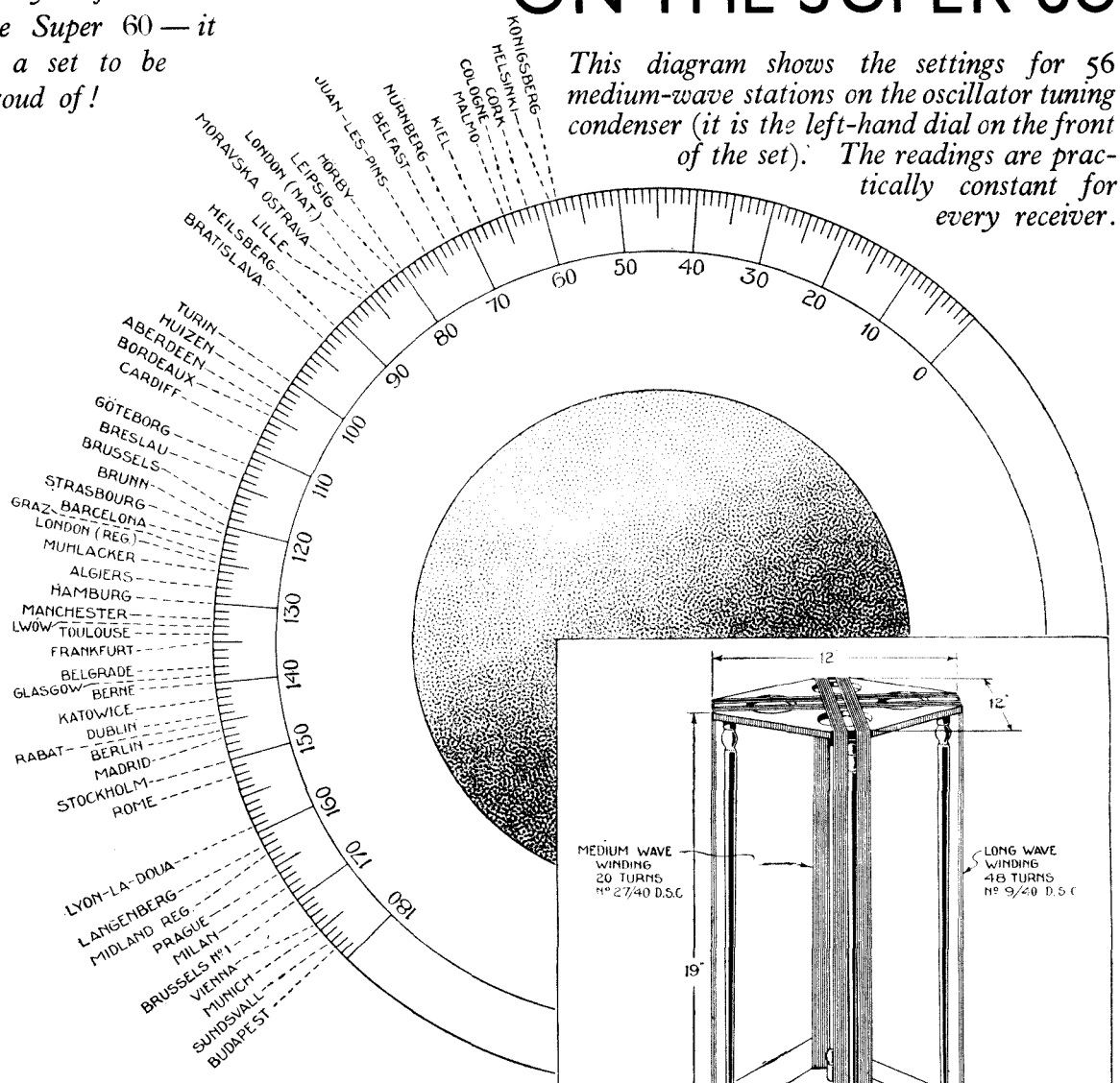
Finally, I ought to say that this log is a conservative estimate of what can be done with the Super 60. I rejected several stations owing to heterodyne interference. But conditions change so rapidly that stations not included in the log may, by the time this is printed, be quite clear again. Every constructor should be able to get a minimum of sixty stations!

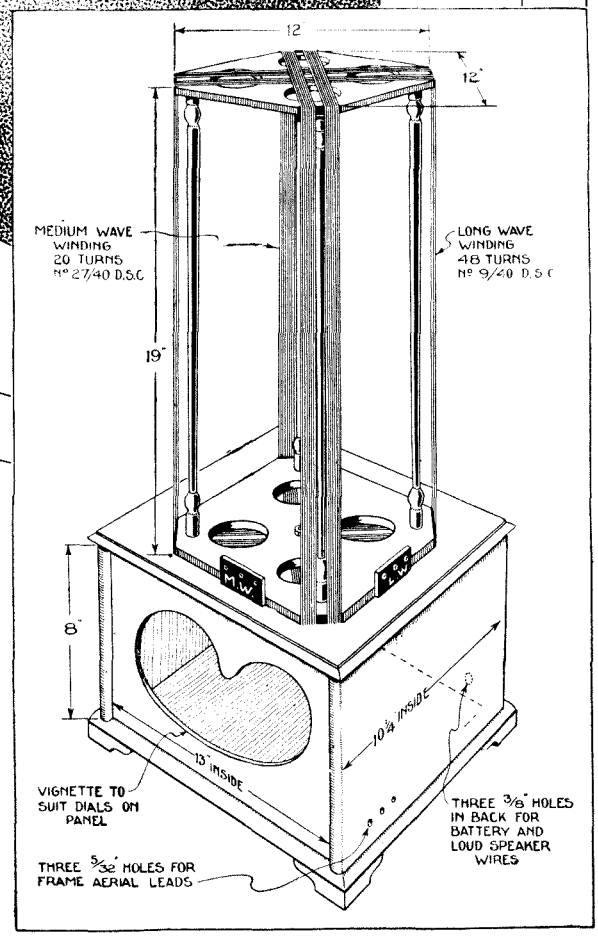
A.S.H.

HOW THE STATIONS COME IN ON THE SUPER 60

Tell your friends about the Super 60 — it is a set to be proud of!

This diagram shows the settings for 56 medium-wave stations on the oscillator tuning condenser (it is the left-hand dial on the front of the set). The readings are practically constant for every receiver.





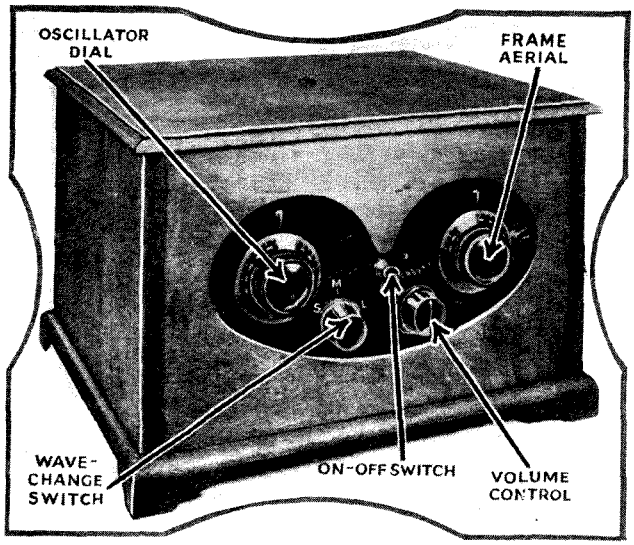
ARRANGEMENT OF THE CABINET

On the right is a diagram showing how the Peto-Scott frame aeria and cabinet are arranged. It is not necessary to move the aerial round much, as it is not very directional, except at its position of minimum strength.

LONG-WAVE STATIONS RECEIVED ON THE SUPER 60

Wavelength	Station	Country	Oscillator	Frame
1,060	Oslo	Norway	125	105
1,153	Kalundborg	Denmark	135	116
1,304	Moscow	Russia	150	130
1,348	Motala	Sweden	155	137
1,411	Warsaw	Poland	160	140
1,446	Eiffel Tower	France	162	144
1,554	Daventry, 5XX	Great Britain	173	160
1,635	Zeesen	Germany	177	163
1,725	Radio Paris	France	180	170

THE SUPER 60—Continued



ONLY TWO KNOBS TO TUNE!

To pick up dozens of stations it is only necessary to rotate the left-hand dial degree by degree and turn the right-hand dial slowly through an arc of several degrees

tuned to 1,000,000 cycles plus, or minus, 126 kilocycles. Now in the grid circuit of the first valve, which is working as an anode-bend detector, we have the two signals, the broadcast received and oscillations from the oscillator.

Long-Wave Amplifier

These together are rectified and in the anode circuit we have a signal of 126 kilocycles. This is magnified by the long-wave amplifier, rectified by the second (grid-leak) detector, and passed to the power-valve.

In the anode circuit of the first detector are currents of other frequencies besides those of 126 kilocycles, but these are shunted away by the first circuit.

The process of tuning is, therefore, one of adjusting the frame-aerial circuit to the wavelength of the station desired and of adjusting the oscillator to provide the beat frequency.

Two Tuning Points

Actually, you can tune the oscillator to two points where the necessary long-wave signal is produced, one oscillator frequency being above that of the station and the other below.

You will notice that the frame aerial has a centre tap. This is necessary in order that oscillations from the oscillator of sufficient strength may be injected into the frame, and the stability of the circuit is improved.

A good frame is an advantage both from the point of view of the signal strength collected and selectivity. With a good frame we start with the strongest signal. We now want in the frame circuit good strong oscillations in order that the rectifier may work efficiently. Therefore, the oscillator must provide strong oscillations and be coupled properly to the frame-aerial circuit.

We use an oscillator unit comprising a copper can inside which are the coils and switch for the wave ranges. Coloured flex leads are brought out from the coils in the can, and they are taken to the tuning condenser and valve as shown in the circuit diagram.

There is nothing else of importance at this part of the circuit, excepting the by-pass condensers of 1 microfarad, and the unit is fastened to the front panel by one-hole fixing with the wavelength knob.

For the long-wave amplifier we use three shielded coils, two having leads for connecting to the anodes of screen-grid valves. These coil units have valve pins, so we wire valve holders into the circuit and plug the coil units into the right holders afterwards. The cans are earthed during manufacture and so no external earthing is necessary; indeed the cans must not be joined to earth externally. Neither must the cans be allowed to touch.

The three long-wave units are accurately matched by the makers, with the result that all you have to do is to plug them in.

No trimming condensers are needed.

The second detector is of the grid condenser and leak type, with a .0002-microfarad condenser and 1-megohm grid leak. Actually the leak can be from .5 megohm to 1 megohm.

Two by-pass condensers are used in the anode circuit of the detector, one going between the anode and filament positive and the other from anode to the negative. An ordinary transformer is used and is directly coupled to the power valve.

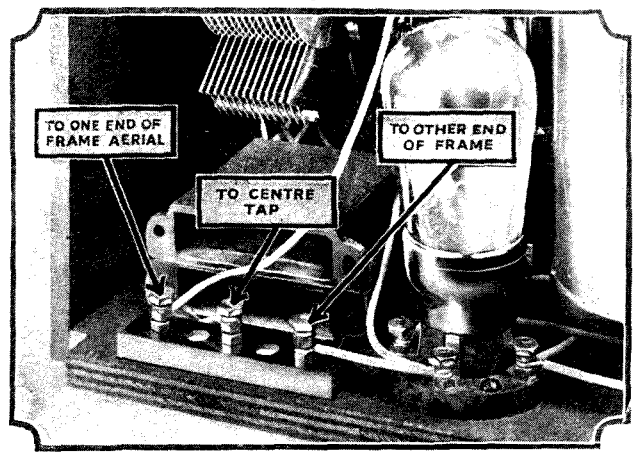
Controlling Amplification

The amount of the amplification is controlled by adjusting the screen-grid voltage, using a potentiometer. This has a resistance of 50,000 ohms and in series with it on the positive side is a 20,000-ohm resistance. There would always be the danger of applying too much voltage to the grids of the screened-grid valves were the fixed resistance not used.

You will notice, too, that a three-point switch is fitted; one of the points is connected to the potentiometer and the other two go to the filaments and negative low tension. This switch therefore breaks the potentiometer circuit.

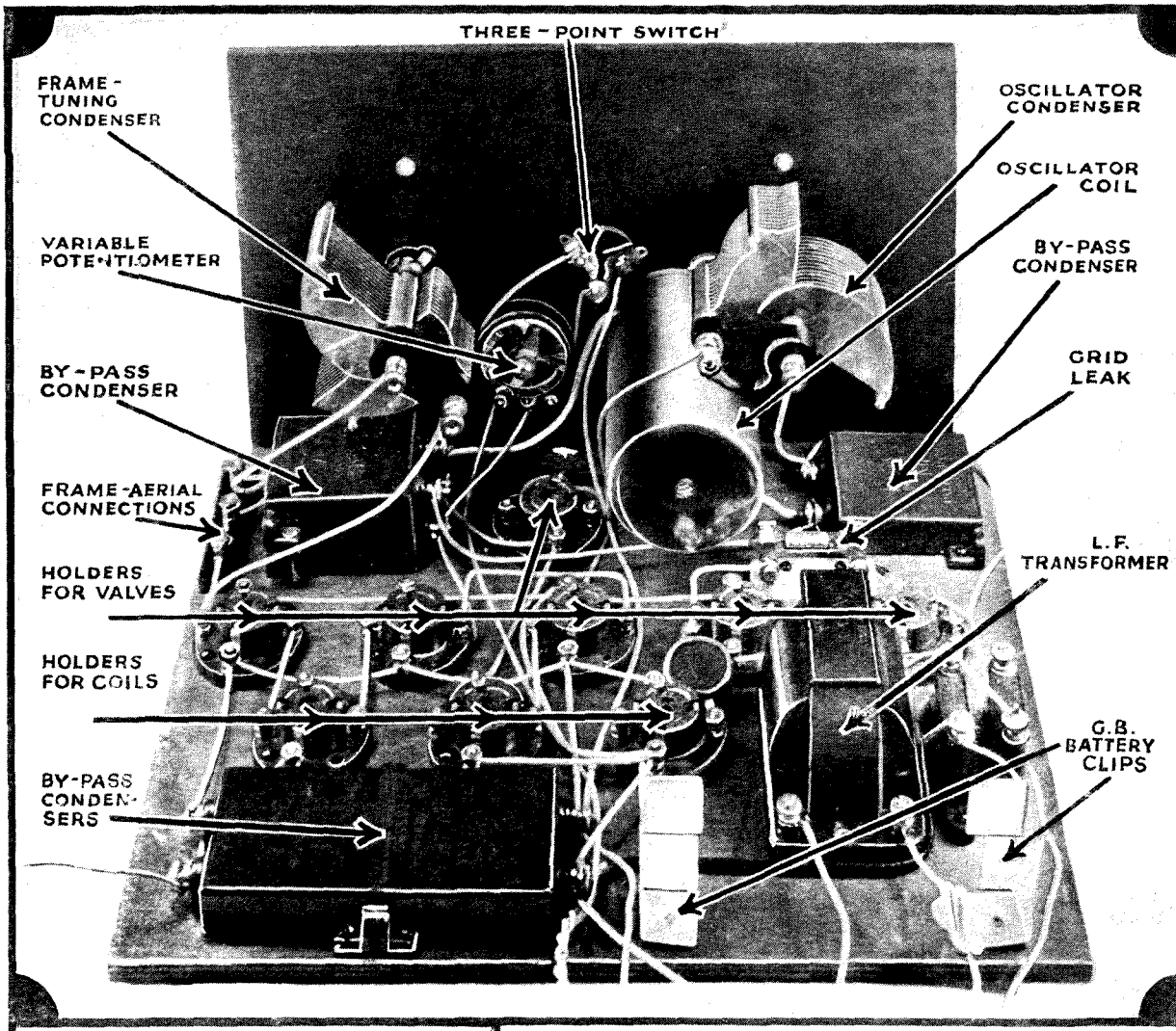
A frame aerial having two separate windings is used, one being for the medium wavelengths and the other for the long waves. The outer ends and the centre point are taken to

(*Continued on page* 144)



MAKING THE FRAME CONNECTIONS CLEAR

This photograph shows how the frame aerial is connected to the three terminals mounted on the baseboard. See also the diagram of external connections on page 137

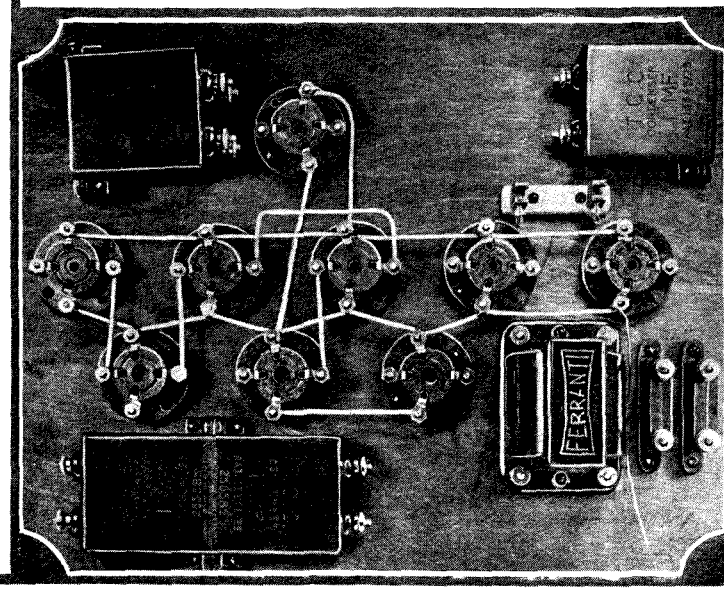


HOW THE PARTS ARE ARRANGED IN THE SUPER 60

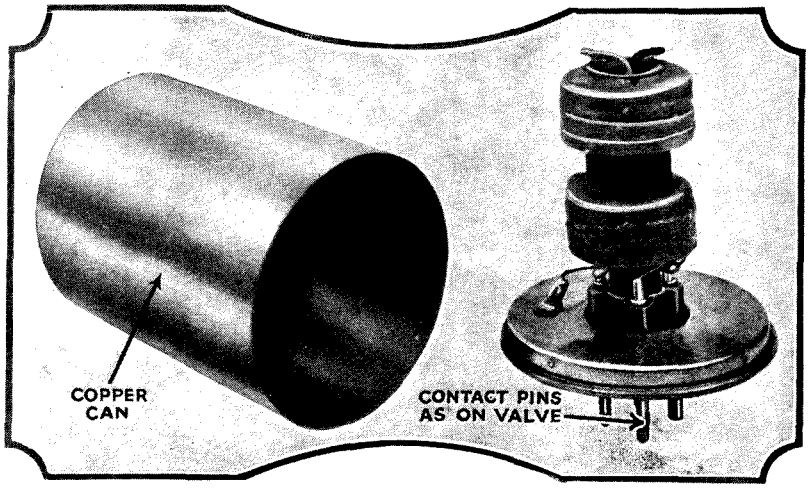
Above is a photograph of the Super 60 that shows clearly the positions of all the components on the panel and baseboard. When building the set, all the baseboard components should be fixed in position first and then wired up, as shown in the view alongside. Afterwards the panel components can be mounted and the panel itself screwed to the front edge of the baseboard, so that the remainder of the wiring can be completed. A half-scale layout and wiring diagram appears on page 139 and the lengths of insulated sleeving for all the connections are indicated on page 138. There are no snags in the construction, as you will find for yourself

Apart from the frame aerial and the special coils, all the components in the Super 60 are standard. Many constructors will already have a number of suitable parts on their shelves—such as fixed and variable condensers, valve holders, a low-frequency transformer and perhaps a valve or two. If variable condensers different from those used in the original model are utilised, it may be necessary to alter the panel layout a little so that the oscillator condenser clears the oscillator coil

Look out for more about the Super 60 in "Wireless Magazine" for April—out March 25.



THE SUPER 60—Continued



ONE OF THE SPECIAL COILS USED IN THE SUPER 60
Here you see the internal construction of one of the Wearite band-pass intermediate transformers, made by a special process that ensures absolute matching. The operator does not have to tune the intermediate stages

sockets fitted to the frame.

For connecting the frame to the set a three-way plug is used, having three pieces of flex. The ends of the flex are taken to a small connecting block in the set, just by the frame-tuning condenser.

There is no difficulty in the construction. You will be able to build the set in three hours.

First arrange the parts on the baseboard. The fixed condensers are laid flat in order to keep wiring short and convenient. You must be sure to space accurately the valve holders which later will carry the coils so that the cans do not touch.

Then fit the parts on the panel. See that the condensers are in the positions shown and that the movements are working properly. Good slow-motion tuning is needed.

Departing from Layout

There is ample room for all parts, yet the set is most compact and convenient. If you use larger tuning condensers the coils and valves must be placed back a little, but **the set is so straightforward that I do not mind your departing a little from the layout.**

No battery terminals are used, but flex leads are brought out. When these are fitted marked plugs or tags ought to be put on in order to avoid mistakes later.

Do not make an error in the frame connections. There are the three wires to go to the small connecting block. Join on the three lengths of flex and later, when the set is put in the cabinet, take the ends through the holes provided in the side. Then cut them off to the desired length and fit the plug for connecting to the frame.

Too much slack is not needed; leave just enough to allow the frame to move through 90 degrees.

Now as to the valves used, I have tried the following types:—Oscillator, Marconi L2/b (10,000 ohms, magnification factor 15.5); first detector (at right-hand end of set looking from the front panel), Marconi H2 (35,000 ohms and 35); long-wavelength amplifier, two Cossor 215SG; second detector (second valve from left-hand end), Marconi HL2/c (or any 20,000 to 10,000 ohms valve); power stage, Mullard PM2, or any good power valve

A large dry battery should be used and 120 volts may be applied to all circuits. The power valve could be given all that is available, of course, and the second detector will work nicely with about 90, but you can to begin with put 120 volts on the lot You must be careful of the grid bias

I have used a mains unit, the Regentone model W5, with good results. Tapping H.T.+1 was taken to the adjustable output, and H.T.+2 to the fixed output, the other circuits being given the full output.

Best Adjustments

At G.B.—1 try 1½ or 3 volts, and at G B.—2 you will need the full 9 volts as a rule The only point to note about the voltages is that first detector (Marconi H2) valve works on the anode-bend principle, so you might try adjusting the anode voltage of this valve at H.T.+1. It is not critical at all, but if the bias at G.B.—1 were 3 volts and the high tension happened to be down the signals would be weak.

If you have a meter connect it to H T +1 and set the circuit, with the oscillator valve *out*, to pass .1 milliampere or a little more.

How to Operate the Set

Set the frame-aerial condenser to a given reading and adjust the oscillator condenser, leaving the screen-grid potentiometer about half way. If nothing is heard advance the potentiometer a little and try again. You will soon find how to tune.

Turn the oscillator condenser very slowly and control volume with the potentiometer.

The clear-cut reproduction to be obtained, with remarkable selectivity, is a revelation to those who have never before heard a set of this type.

REPORTS WANTED QUICKLY, PLEASE!

NATURALLY we want everybody to know all about the Super 60; we are proud of it. But some people may think we are unduly prejudiced in its favour.

That is why we want as many readers as possible to send us reports that we can publish. Comments by users are much more convincing than anything we can say.

We have no doubt that when you have built the Super 60 you will be as keen about it as we are and will be glad of the opportunity to record your opinion.

Please send us your report quickly so that we can publish it in an early issue. Names and addresses will not be disclosed unless permission is given.

Moreover, we offer half a guinea for every photograph of the Super 60 published in these pages, so get out your camera and see what you can do. Prints should be reasonably large and clear.

Send your comments to the Editor, WIRELESS MAGAZINE, *58/61 Fetter Lane, E.C.4. Queries should be sent to the Information Bureau in the ordinary way.* (See page 224).

RADIOSYNCRASIES

AN INTIMATE DISCUSSION BY WHITAKER-WILSON

A Frank (but Amiable) Review of Some Personalities, Peculiarities, and Other Trivialities by the WIRELESS MAGAZINE *Music Critic*

LISTENING TO BROADCASTING WITH EVIDENT ENJOYMENT!

This group of happy listeners are hearing radio programmes via a Marconiphone portable set

I AM very keen on personalities; they help to spin the world round. The whole evolution of not only music and art but of *everything* has depended on outstanding personalities.

The advent of wireless has brought many interesting personalities into the homes of England; I am conscious of having frequently pictured to myself speakers, singers and instrumentalists whose likenesses chance not to have been published alongside the programmes, and have wondered what they looked like.

I once formed a mental picture of one of the announcers and sustained something of a mental shock when I actually met him at Savoy Hill.

Disillusioned!

When it has so happened that I have seen pictures of people in whom I have been thus interested it has invariably been to find that they are not in the least as I thought they were.

I think that is all to the good, obviously each personality exists in dual form, even if its owner does not go so far as to lead a double life. Every broadcaster owns a personality *as he sounds* and another as he really *appears in the flesh*.

I have made no special list of victims for this piece of idle gossip; I have merely allowed several familiar personalities to come into aural view, so to speak, just as they feel inclined.

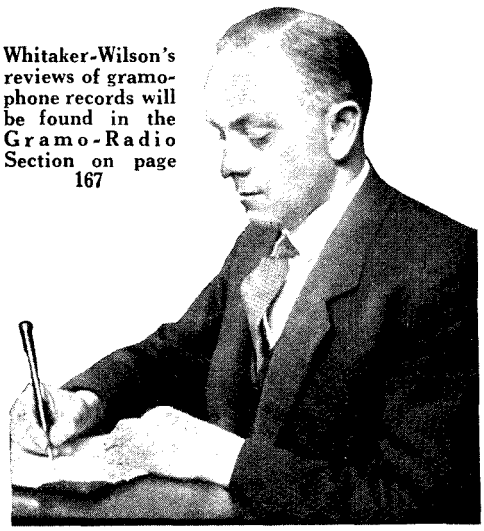
I have been listening to Vernon Bartlett. I have never seen him, nor do I remember having seen a picture of him, though there has, doubtless, been one before now in the press. I like him; he talks to me about things which only interest me vaguely and I feel the comfort of his evident knowledge. I like his voice; it has a slightly affected tone but it never irritates.

A. J. Alan's voice is built of much the same material. Of course, he simply drives me to distraction. I have sworn I will never listen to him again, and yet when the announcer next says, with a twinkle in his voice: "Ladies and Gentlemen—A. J. Alan," I know I shall listen. And he will have me, as he has always had me.

I imagine he must sleep from sheer satisfaction the nights he broadcasts, but one day he will get a letter from me *with a story*. It will be an exciting story, and just when I have got him beat I shall end off and write at the bottom of the page: "Put an ending to *that*, you brute!" And he will never tell another story over the wireless.

I have never seen Clapham or Dwyer in the flesh and am not at all sure which of them it is that always gets everything wrong. There are two clearly-defined personalities. One is always intent upon improving his listeners; the other is a Master Digressor. That hesitation is really very clever.

Whitaker-Wilson's reviews of gramophone records will be found in the Gramo-Radio Section on page 167



"Vernon Bartlett . . . talks to me about things which only interest me vaguely"

Singers Next

Singers, I think, come next—at least they stand the second best chance of broadcasting their personalities, because they have words to help them. Of course, I know that most of them keep their words to themselves; that is, probably, part of their retiring natures.

RADIOSYNCRASIES—Cont.

"Harold Samuel . . . shut one eye and put out his tongue"

Those who do occasionally allow a syllable to escape and filter through a loud-speaker can often do a great deal towards making their personalities real. As is well known, some singers benefit by coming to the microphone; others would allow us to benefit if they stayed away from it.

"Eugene Cruft, quite the best double-bass player in Europe"

". . Hermann Scherchen was the most fidgetty conductor in the world"

Some have charming personalities on the concert platform; others are more charming when they are not seen.

As a broadcast personality I think Dorothy Silk is often very successful. When I see her at Queen's Hall her features wear a seraphic expression which makes me feel quite holy. I begin thinking of angels; the only trouble is that I do not always want to think of angels. Why should I?

When I hear her through my loud-speaker I stand some chance of thinking of the music. Then I like her.

Keith Faulkener looks surprisingly juvenile on the concert platform; broadcast, he gives the idea of maturity, which, of course, is excellent for him. I have a record of him singing Bach's "How Jovial Is My Laughter," in which he gives me an animated picture of old J. S. B. having a good giggle all to himself.

I adore Bach, but I rarely want to laugh when I hear him. But the good Keith manages to convey to me that Bach had a sense of humour.

English Beef

Just as I prefer Dorothy Silk broadcast so do I prefer to watch Norman Allin. He is a nice, big thing with plenty of good English beef about him and he pulls such lovely faces on his low notes.

Talking about pulling faces, Harold Samuel is as good as anyone at that. His broadcast personality is perfectly satisfactory for his *pianissimo* tone suits the microphone, but his presence on the platform gives a better idea of him.

He played with great understanding the night of that memorable Brandenburg Concerto Concert at Queen's Hall; on a paused chord he shut one eye and put out his tongue at Sir Henry Wood in a way that caused me great delight.

Sir Henry also shut one eye and did something expressive to his beard; I was very pleased with the whole incident.

Casals, the 'cellist, is another charming personality. He does not pull faces; he simply goes to sleep. He reminds me of the power station at Lots Road; the turbines sleep there, and out of their sleep comes the power to move London's population. That is Casals.

He makes his 'cello snore and has the happy knack of broadcasting his personality without bending it the wrong way. His 'cello playing is one of the wonders of modern civilisation.

"I always enjoy Woodhouse's entry for a Prom."

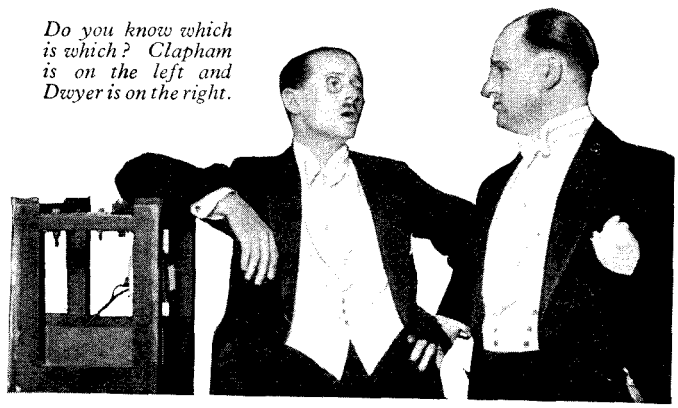
Has a string quartet a personality? I think so, decidedly. It is simply made up of four quarter-personalities. The Virtuoso String Quartet manages very well. Marjorie Hayward does not detach herself from the others. That is where some of the lesser people fail.

I can think of a quartet where the leader is perfectly hopeless in this respect. The result is that their playing is a first violin solo with the rest acting as accompanists.

Personalities exist amongst dance orchestras; I have found that out by reviewing gramophone records. By the time these words are in print I shall have listened to two thousand of them, and I have long concluded that certain dance orchestras have distinct personalities in the collective sense.

Strangely enough, this does not apply to symphony orchestras. There

Do you know which is which? Clapham is on the left and Dwyer is on the right.



"Clapham and Dwyer . . . are two clearly-defined personalities"

By WHITAKER-WILSON

is a good reason, so perhaps it is not strange.

Jack Payne and HIS B B.C orchestra is the answer to the question. It is *his*; so far as I know it is no one else's. He always conducts it; it never does anything without him. Therefore it assumes his personality.

It is not possible to argue the same way about the B.B.C. Symphony Orchestra. It may be paid by the B.B.C., but the B.B.C does not conduct it. Anybody conducts it. It never knows from one month to the next who may conduct it. Thus it has no personality of its own.

Sir Henry's Personality

When Sir Henry Wood takes charge of it he slogs it hard; it has to work (and serve it right, the lazy hound!) Sir Henry's personality is a very matured one; he is an old hand. The Queen's Hall has almost grown up with him, he seems part of it. He always does the same thing at the same bar of the same symphony or concerto; when you *know* him, what

"Then, of course, there is Catterall"

he does oozes through your loud-speaker.

I know that, even when they clap and try to get encores that are not allowed (being British)—even then, when my loud-speaker makes a rattling sound, I know what *he* is doing. First central, then left, then right After that, more applause.

If enough, he makes the orchestra stand up and disclaims having had anything whatever to do with it. He points to it as much as to suggest that *he* cannot help the funny noises it makes on the nights it lets loose contemporary British music.

Yes, he gets through all right. There is no mistaking him.

I said that orchestras of this type have no personalities of their own. It is true—at least, to my way of thinking; but there are personalities *in* the orchestra.

I always enjoy Woodhouse's entry for a Prom. He sails along, tall and dignified, and sweeps round when he reaches the front desks, treading on

"Marjorie Hayward does not detach herself from the others"

Marie Wilson's feet—or so it seems to me—before he smiles his acknowledgements to the recognition accorded him.

Then, of course, there is Catterall. His black head, very shiny as to the hair, scintillates as he plays. Sir Henry gives him a baneful look of artistic intensity and he sways about in his own artistic agony.

Far different is Eugène Cruft, quite the best double-bass player in Europe. He thoroughly enjoys himself. He cuddles his huge instrument (polished up so that you can see the trams go by in it) and slashes out his tone in fine style

Sometimes Sir Henry's left hand is raised; Eugène visibly and aurally melts. But he just waits until he thinks Sir Henry is not looking and he is at it again.

"Keith Faulkener looks surprisingly juvenile"

Sometimes I hear his double-bass in my loud-speaker and I wonder whether he engineered it on his own, or whether a baton was pointed at him.

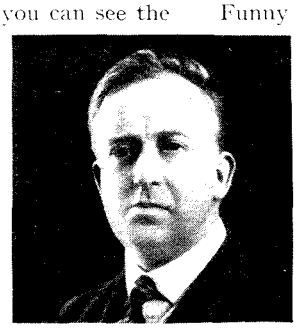
Conductors, of course, *must* have personalities, most of them cultivate them as part of their stock-in-trade. Some of the papers said that Hermann Scherchen was the most fidgetty conductor in the world. I confess that at the beginning of his first concert I did not understand him at all; neither did the orchestra, judging by the playing.

But his conducting of the Beethoven Mass was not amiss by any means, and I came to the conclusion that his fidgets did mean something.

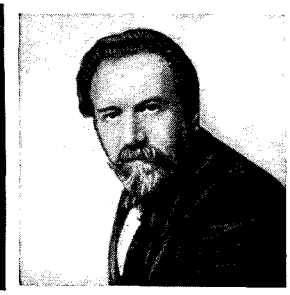
Sane and Sensible

Lastly, there is Adrian Boult. He is very much liked, especially by the orchestra, probably because he lets them do more or less what they like. He is just a kindly, amiable musician, and can be relied upon to give a sane and sensible view of a Beethoven Symphony without making anybody do anything silly. After all, that has great advantages.

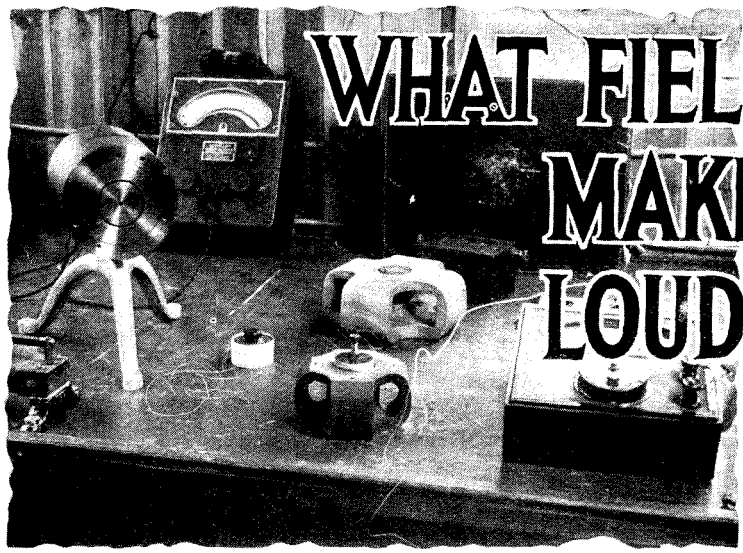
Funny things, personalities!



". . . . I prefer to watch Norman Allin"



"Sir Henry Wood . . . slogs it hard"



WHAT FIELD STRENGTH MAKES A GOOD LOUD-SPEAKER?

In this article J. H. REYNER, B.Sc., A.M.I.E.E., discusses many points about moving-coil loud-speakers—particularly the permanent-magnet type—that will interest listeners. On the left is seen some of the apparatus used at the Furzehill Laboratories for measuring the field strengths of loud-speaker magnets.

ANYONE who has experimented with moving-coil loud-speakers cannot have failed to notice the marked difference that exists between one sample and another.

One of the principal causes of difference in reproduction is undoubtedly the diaphragm itself, but this does not explain altogether the differences which undoubtedly exist. One loud-speaker will handle the input supplied to it more comfortably than another, rather in the same way as a six-cylinder car will negotiate a corner or a hill smoothly, where a four-cylinder car will complain.

Strong Field Desirable

One of the most important factors in obtaining good reproduction in a moving-coil loud-speaker is that the field shall be strong. Fig. 1 represents a cross section of a moving-coil instrument. There is a magnetic system or "pot," as it is often called, which is completely enclosed except for a small gap in which the coil vibrates.

In the case shown an electromagnetic system is employed, and a coil is wound round the centre core. When current is passed round this coil a magnetic field is produced which flows through the iron, much in the way as an electric current will flow through an ordinary circuit.

Starting from the point A, therefore, the field would flow through the core, up the back, along the outer shell, and back home across the small gap.

The action of the loud-speaker depends upon the fact that if the speech currents are passed through the moving coil, which is supported in the gap, it will tend to vibrate in and out of the gap and consequently cause the diaphragm to produce sound waves.

The action depends upon the existence of the magnetic field flowing across the gap, and the larger this field can be made the more sensitive does the instrument become. This can be demonstrated by disconnecting the field winding of a moving-coil reproducer, when the signal strength falls away to quite a small value.

The strength of this field also has quite an important effect upon the quality. The even balance between the high and the low frequencies necessitates a high value of magnetic field. This is capable of mathematical proof, but there is not the time in the present instance to discuss the matter more fully.

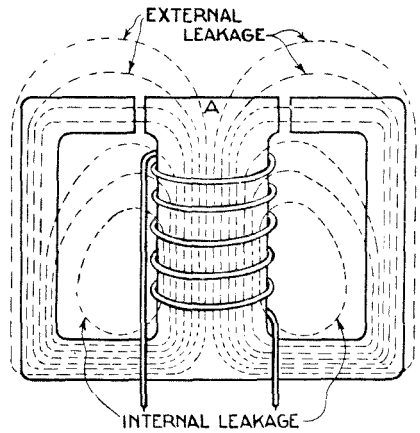


Fig. 1.—Cross-section of a moving-coil loud-speaker, showing how the electro-magnetic field is formed. Internal and external leakages are indicated

The fact remains that if the field strength is reduced the loud-speaker tends to become shrill and tinny. This again can be demonstrated by disconnecting the field winding; not only does the strength go down, but the quality at once rises in pitch and often becomes quite unpleasant to listen to.

Such an example, of course, is carrying the reduction of the field strength to extremes, but it serves to illustrate the point.

In passing, some readers may wonder why a moving-coil loud-speaker should work at all if the field winding is disconnected. This is because the iron holds a small amount of "remanent" magnetism, as it is called, and this is sufficient to provide a very weak flux across the gap.

Effect on Quality

The reduction in sensitivity also exercises an effect on the quality. As the sensitivity falls off, it is necessary to provide more input in order to obtain a decent volume of sound

In most cases the amplifier is designed to provide a satisfactory power output for normal purposes, and if this output has to be increased to make up for an inefficient loud-speaker, overloading will take place. This is usually manifested by a cracking of the reproduction, particularly on the higher frequencies.

The sensitive ear readily notices this overloading, which is really the beginning of blasting, and I think the term "cracking" adequately describes it. It is particularly noticeable with a piano, when the notes sound cracked instead of true.

Therefore, we can say that it is

essential for satisfactory reproduction that the field strength of a moving-coil loud-speaker shall be good. For those readers who are sufficiently interested we may define, in figures, the order of field strength required for good working.

A certain amount of confusion has arisen in the past, because adequate allowance has not been made for the leakage. If we revert to Fig. 1, the main magnetic field flows in the iron, and jumps the gap on its return home. It is possible, however, for some of the magnetic field to take a short cut and to jump across from the outside shell of the pot to the core without ever reaching the gap.

Percentage of Leakage

The percentage of this leakage is quite high, usually ranging in a good loud-speaker from 15 to 20 per cent.

Again, some of the magnetic field which reaches the front face of the loud-speaker objects to turning the corner, as it were, and reaches home by a devious route, spreading out in front of the loud-speaker instead of going straight across the gap. This is also indicated in Fig. 1, and constitutes what is known as external leakage.

This is not so serious as the internal leakage, but nevertheless is in the neighbourhood of 10 per cent. and sometimes a little more.

Thus we only use about 70 to 75 per cent. of our total flux, the rest being lost as far as we are concerned because, obviously, the only part that is useful to us is that actually flowing across the gap.

When we are making measurements of the magnetic field on a loud-speaker of this kind, the internal leakage does not trouble us very much, but the external leakage is quite likely to produce misleading results unless special allowance is made for it.

Method of Measuring

The method of measuring the field strength is to place a small coil, of perhaps fifteen turns, on a former which will just fit in the gap, so arranged that the coil is just below the bottom of the magnetic pole, as shown in Fig. 2. Then if this search coil, as it is called, is removed sharply from the gap a certain amount of electricity will be induced.

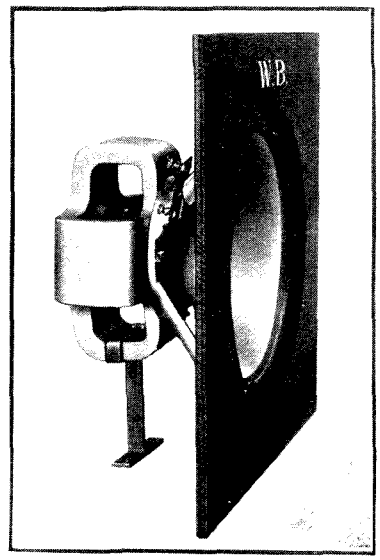
The coil is connected to a special form of galvanometer, known as a ballistic galvanometer, which has the property of taking a long time over its movements. In practice, therefore, one removes the search coil from the field, and then watches the galvanometer.

The needle will slowly move over to a certain point and from this figure one is able to calculate what the field strength is.

Now a crude measurement of this sort will only measure the field in the gap; it will not measure the external leakage. Therefore, it is necessary to make another measurement to determine the external leakage and subtract one from the other.

I need not go into details as to how this is done, but the results show, as I have already indicated, that the effective field in the gap is only 85 to 90 per cent. of that obtained by the simple measurement first outlined. What is more, this only applies when the loud-speaker is running at its best point.

If the field strength is too weak or too strong the leakage increases. Generally speaking a field strength of 8,000 to 10,000 lines per sq. cm



GUARANTEED FOR 5 YEARS

This permanent-magnet reproducer, made by the Whiteley Electrical Radio Co., Ltd., is guaranteed for five years against perceptible loss of magnetism

actually in the gap may be considered satisfactory. In some cases it is possible to get a little above this figure, but careful design of the iron circuit is necessary.

At the other end of the scale there is quite a number of loud-speakers which only have a field strength of 5,000 or 6,000 lines, and with these the effect of high-pitchedness and cracking are likely to be noticed.

It is this question of adequate field strength which has so long delayed the satisfactory production of the permanent-magnet instrument. Attempts to produce a magnetic system which would give the field required proved quite abortive as long as straightforward methods were adopted.

Special magnet steels had to be employed, and the most popular

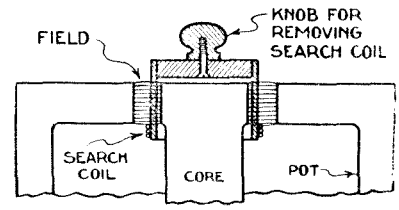


Fig. 2.—How an easily removable "search coil" is used to measure field strength

form of magnet to-day is of the type made by Swift Levick or Darwin, both of Sheffield.

The general arrangement of the magnet can be seen in the foreground of the photograph accompanying this article, and special machinery has had to be constructed in order to magnetise these units to the high degree required.

Even so it takes a good permanent magnet to reach a field strength of 8,000 lines per square centimetre, and I have not always agreed with the claims made by some manufacturers with regard to their loud-speakers. The large magnet shown in the foreground of the picture attained this figure and gave good results on test. It seems, therefore, that the permanent-magnet loud-speaker can be considered a satisfactory proposition.

Lasting Properties

Some people may express doubts as to the lasting properties of a permanent-magnet arrangement. It is a well-known fact that a permanent magnet tends to demagnetise itself. The leakage magnetic field is primarily responsible for this, and as we have seen this reaches 30 per cent. or even more, with the particular form of construction adopted for moving-coil loud-speakers, so that there must be quite an appreciable demagnetising action.

In view of what has been said it will be clear that loss of field strength is much more important with a moving-coil loud-speaker than with the usual moving-iron type.

In order to minimise the demagnetising effect, and stabilise the magnet, it is customary deliberately to demagnetise the system by 10 per cent. after it is first magnetised.

LISTENER'S FORUM

A Selection of Readers' Letters to the Editor

AUSTRALIAN LIMITATIONS

SIR,—In your October number you gave an excellent logging map, and I was delighted to get it, as fully 50 per cent. of those stations can be logged here.

We find it amusing here to read of some of the English listeners growling about their programmes and reception of various stations. I note where one of your writers states that 5XX on the long waves is the only hope of some of your listeners receiving broadcasts in remote (?) districts.

When you come to think that West Australia is about six or eight times larger than England and is served only by one 5-kilowatt station (6WF, on 435 metres), it is amazing that English listeners have any trouble to get a programme with your fine lot of high-power stations.

English Stations

We take it as a matter of course here to get our evening programme from Eastern Australia (2,000 to 2,500 miles away), or from Calcutta, India, which is still further away, and we often listen to many of your English stations in the early hours of the morning.

I first logged 2LO on September 13, 1925, and am still using the same set.

I am not making out that English listeners are less capable than we are. I think the trouble is that they have got lazy with being so well catered for.

It is funny, too, to hear them knocking about their musical fare. I wonder how they would rave if they had to listen to a musical diet of records and sopranos most of their time.

R. C. WHITEFORD.

West Australia.

◆ ◆ ◆

SPONSORED PROGRAMMES

SIR,—I have looked through your October issue carefully, and have no difficulty in detecting a dominating strain of criticism underlying it, with regard to the programme policy of the B.B.C.

As one of the millions of listeners—and critics—I am puzzled at the constant reiteration of such expressions as "lack of high lights," "programmes of more or less stereotyped value," "jaded ears," etc., and the discussing of means, such as sponsored programmes, for radically improving the level of entertainment, while everywhere taking for granted that such improvement is an obvious necessity.

Improvement Welcomed

While not disputing that in broadcast programmes, as in everything else, improvement is heartily welcomed, I confess I am unable to see in what way the present organisation so manifestly falls short of what one would expect after so short an existence, that you should not desire it to continue to progress along the present lines.

If you have anything to say that is of general interest to listeners, you are invited to write to WIRELESS MAGAZINE *about it. We are always glad to hear from readers about any matters of radio interest, so let us have your views.*

It seems to me that before discussing radical changes, in all fairness one must substantiate the necessity for them by other than vague and destructive criticism.

It may be that you have knowledge of potential broadcast artistes who, at the disposal of commercial interests, would form the "highspots" among the more mediocre contributors, such as H.M. the King, the Prince of Wales, Einstein, Toscanini, Sir Harry Lauder, Rubinstein, Gracie Fields, Sir Oliver Lodge, Chaliapin, Jack Hylton, Sir Henry Wood, Ramsay MacDonald, Will Hay, Bernard Shaw, and others provided by the B.B.C.

It may be that those who in your pages yearn for our publicity kings to lift broadcasting out of its tedious rut are aware of types of programme altogether different from those provided by the symphony orchestras of England, Scotland, Ireland, Wales, America, Germany, Austria, Holland, and Belgium, by the military bands, dance bands, octets, septets, sextets, quintets, quartets, trios, duets, solos (I refrain from going on with the list for it would cover several pages), with which we are bored meantime.

Canned Everything, Ltd.

Doubtless you can reveal those who would be called forth by Canned Everything, Ltd., the Brighter Beer Corp., and other national advertisers to put on original and typically broadcast shows, such as Mr. Cecil Lewis and Mr. Lance Sieveking, after all their years of research have never dreamed of, or better operas than those of Covent Garden, better jazz than that of Jacks Hylton and Payne, better variety shows than those presented to the King, greater dramatists than Barrie and Shaw, brighter entertainments than those of Cochran and Charlot.

Yet I in my ignorance know nothing of them. And is it a conceit to suppose that there are others among your readers equally benighted? I feel, Sir, that your in istence on the invigorating effect of the touch of commerce would be well illustrated by the drawing up of a schedule of a year's broadcasting for all stations, to demonstrate the kind of thing we might expect if sponsored programmes were to be introduced.

In concluding I have a question to ask. Who pays for sponsored programmes? Like most questions there is a catch in it.

M. G. SCROGGIE.

Lee, S.E.12.

SIR,—During the past two years I have spent much time listening to sponsored programmes from the Canadian, American, and (to a lesser extent) South African broadcast stations.

It was with great interest that I read your editorial words "To Advertise or Not to Advertise" in the October issue of "W.M." and perhaps I may be allowed to use up a little of your valuable space in showing "W.M." readers another side of this interesting question.

After a few hours listening to the programmes of any of above countries one immediately notices the total absence of British adverts. *Why?*

In these times of trade depression and when Great Britain is desirous of increasing her exports to the Dominions WHY, OH WHY don't the British manufacturers use the radio systems in the Dominions as a medium for bringing their goods before the public?

Thirty to Forty Stations

There is in Canada a chain of thirty to forty stations waiting to fling out from the Atlantic to Pacific coast a sponsored BRITISH programme, ready to increase the sales of British manufactured articles. How in the world do British firms expect to sell goods to Canadians when their advertising system is very inferior to that of their American rivals?

Nearly every Canadian owns a radio set and throughout the day, or at least 75 per cent. of the day, his loud-speaker is telling him about the wonderful "so and so" which some Yankee firm wishes to sell.

At present I am listening to station CFCF (Montreal), and during the past hour three programmes sponsored by American firms have been radiated.

One of these programmes was actually relayed from the sponsor's own studio.

The interest taken over here in the relay of B.B.C. programmes proves that Canadian and even American listeners would welcome a few British sponsored programmes.

Not Up to Standard

In South Africa, owing to the lack of funds, the programmes are not up to the standard of other countries and here is a chance for British firms to sponsor some good programmes, but NO! we hear: "By the kindness of —— Radio, Ltd., makers of the well known all-electric radio receivers, you will now be entertained by the —— military band."

Unfortunately that firm is a Continental one and because of its wonderful advertising system their all-electric radio receivers are actually a household word in South African homes.

Surely it is time British manufacturers came out of their shell and got going!

J. E. NAYLER.

Montreal, Canada.

We Test Before You Buy

In the following pages we give detailed reports of our tests on five representative sets. All of these sets have passed through the WIRELESS MAGAZINE *Laboratory; and have satisfied us as regards sensitivity, selectivity, ease of control and quality of reproduction.*

In addition to laboratory tests, these sets have been tried out under normal domestic conditions. We emphasise the fact that only a selection of the total number of sets tested is reviewed each month. As space is limited we therefore include only favourable test reports.

To help readers of WIRELESS MAGAZINE *to select suitable sets we conduct a Set-Buyer's Advice Bureau. To take advantage of this free service the reader is asked to state:*

(1) *The maximum price and whether this is for the set alone or inclusive of accessories;* (2) *where the set will be used;* (3) *what stations are desired, whether local or foreign;* (4) *whether a self-contained set or an ordinary set with external accessories and aerial is preferred;* and (5) *whether battery or mains operation is wanted; if mains operation, whether D.C. or A.C. mains.*

A stamped-addressed envelope for reply is the only expense. Write to Set Selection Bureau, WIRELESS MAGAZINE, 58/61 *Fetter Lane, London, E.C.4.*

FULL-PAGE REPORTS ON FIVE COMMERCIAL RECEIVERS FOR THE GUIDANCE OF PROSPECTIVE BUYERS

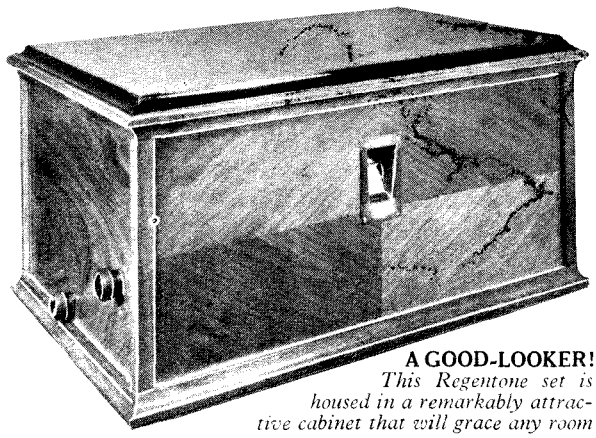
REGENTONE ALL-ELECTRIC FOUR

Makers.—Regentone, Ltd.

Price.—30 guineas.

Power Supply. — A.C. mains. This receiver is designed for A.C. of 50 cycles and voltages between 200 and 250 volts, but special models are available for 25-cycle A.C. supplies.

At the back of the set is a plug attached to a connecting cord. This plug is already wired for supplies of 230 to 250 volts, but when the voltage of the mains supply is from 200 to 220 volts the socket has to be removed from the set and a small brass pillar moved to the section marked "200 to 220."



A GOOD-LOOKER!
This Regentone set is housed in a remarkably attractive cabinet that will grace any room

Power Consumption. — 35 watts.

Valve Combination.—This Regentone set employs two stages of high-frequency amplification, a detector and a super-power output valve. The first two valves are the Mullard S4VB screened-grid type, the detector a Mullard 354, and the power valve a Mullard 064. The back of the instrument is readily removed for the insertion of these valves, the two screened-grid valves being fitted under aluminium covers.

Controls.—These are reduced to the last degree of simplicity. On the front of the set only the escutcheon plate carrying the 0-to-100 degree tuning dial is fitted. This dial is actuated by a knob on the left-hand side of the cabinet. Nearby is the knob for changing the tuning range from medium to long wavelengths. At the other end of the cabinet is a knob for controlling volume. So altogether there are only three controls. No mains on-off switch is provided, so the wall plug must be inserted and removed to switch the set on and off.

From tests, we can say that tuning is very simple. Station-finding is not at all critical. We noted that each station received had a spread of a degree or so on the dial, indicating that the coils have been designed not to cut off the sidebands too rapidly. The resulting good quality, due to the preservation of top notes, fully justifies the coil design.

The volume control was exceptionally good. It did what few of the species can do—it gave a wide range of audibility. The change from a much-too-loud signal to one of bearable strength was slowly and gradually effected over an appreciable segment of the complete rotation.

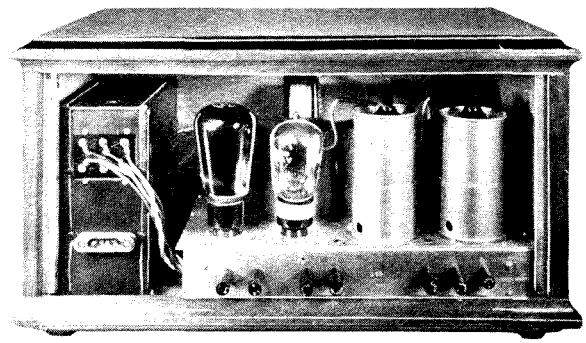
Another good point about this volume control was that no variation could be detected in the tone as the volume was varied from maximum to minimum. The mechanical action of this control is also very good.

Truly, this is a family set, capable of being operated by any member of the family with complete success. A notable omission for a set of this kind is a wavelength-calibrated dial. This seems a pity to us, since the settings of the dial were found to be quite independent of the length of aerial. We proved this point by using our standard 50-foot aerial and then changing over to a short 15-foot aerial.

Sensitivity.—The makers claim that with a short indoor aerial there is a considerable choice of stations with this set. We consider this claim is justified, because with the 15-foot aerial we were able to bring in seventeen medium-wave transmissions at really good loud-speaker strength. With the 50-foot aerial the strength even of distant stations was overpowering.

One of the remarkable features of the set is that the length of aerial, however short, does not seem to affect the range.

This is how some of the stations came in on the dial:—Budapest 85, Munich 81, Vienna 74, Milan, 70, Midland 64, Langenberg 61, Lyons 59, Rome 53, Stockholm 50, Berlin 38, Regional 32, Strasbourg, 26, and National 7 degrees.



WELL THOUGHT OUT AND THEN WELL MADE
The main chassis of the set is seen on the right, while on the left is the mains unit. A metal rectifier is used

On the long-wavelength range we logged six excellent signals, including Hilversum 86, Paris 74, Daventry 62 and Eiffel Tower 50 degrees. The absence of a mushy background was particularly notable.

Selectivity.—The use of a small aerial is recommended, not because the set is inherently unselective, but because it has a very great range even with a small aerial. The total length of wire should certainly not exceed 50 feet and in most locations it need not be more than 20 feet.

The London Regional had a spread of 17 degrees and the London National a spread of 16 degrees. On the long wavelengths Daventry spread 10 degrees either side of its maximum tuning point. It was not found possible to get Zeesen clear of Daventry.

Quality.—A high-resistance loud-speaker is recommended by the makers, so we tested the set with a linen-diaphragm model. Reproduction was first-rate, the balance of high and low notes being exceptionally good. Tested with a low-resistance moving-coil loud-speaker, with a suitable output transformer between the set and loud-speaker, we obtained even better quality. The volume control in no way affects this good reproduction.

Appearance.—No one can fail to be attracted by the well-finished walnut cabinet of the Regentone set, which has an unusually dignified appearance.

Gramophone Playing. — To play gramophone records through a pick-up it is necessary to disconnect the aerial of this set and turn the volume control to zero. A pick-up can then be connected to suitable sockets provided at the back of the set.

Summary. — The Regentone four-valve set is ideal for present broadcasting conditions, providing selectivity with great amplification and at the same time a quality of reproduction that will certainly please the most critical. Further points are ease of control and good regulation of the volume.

BURTON EMPIRE S.G. THREE

Very satisfactory for battery reception

Makers. — C. F. & H. Burton, Ltd.

Price.—£8 12s. 6d. (no valves).

Power Supply.—Batteries. As three valves are used, a double-capacity battery of not less than 120-volts is recommended. A 2-volt 30-ampere hour accumulator would be suitable for the low-tension supply.

Power Consumption. — When we tested with the three valves mentioned later, we found the total anode current consumption was 12 milliamperes. The low-tension current was .4 ampere. This is a moderately economical set to run if provided with suitable batteries.

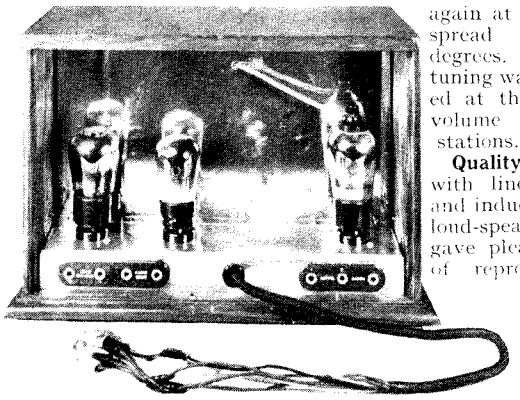
Valve Combination.—The sequence is high-frequency amplifier, detector, and transformer-coupled power valve. Valves are not supplied with the set. For our test we used a Cossor 215SG for the high-frequency stage, a Mullard PM1HF for the detector, and a Cossor 215P for the power valve.

Controls. — The makers have achieved a distinctive layout of the controls by embodying the set in a handsome cabinet of unique shape. There is an impression of simplicity about the controls that is enhanced by actual tests. At the top of the cabinet is a curved section carrying the main control for tuning. This is a thumb-operated disc, rotating a clearly engraved scale, reading from 0 to 100 degrees. The sloping position of this control makes for easy operation.

Let into the lower part of the front of the cabinet is a clearly-engraved metal panel carrying the remaining controls. There are two large black knobs, left for fine tuning and right for volume control. Between these is a substantial three-way switch, providing long-wave tuning on the left, medium-wave tuning on the right, and switching off the set altogether in the centre position.

Tests show that the fine-tuning control is extremely smooth in action. It does not have to be turned for every station received, so that successive logging of stations can be done by the simple rotation of the main tuning control at the top of the set. We would have preferred the control on the right to be called reaction instead of volume.

This control has the effect of increasing the strength very considerably of the many distant stations receivable. In this sense it is a volume control, but since it cannot decrease the strength of the local stations, it is not fully entitled to be called a volume control. After an evening of tests we were thoroughly impressed with the general ease of control.



NOTE THE CHASSIS CONSTRUCTION

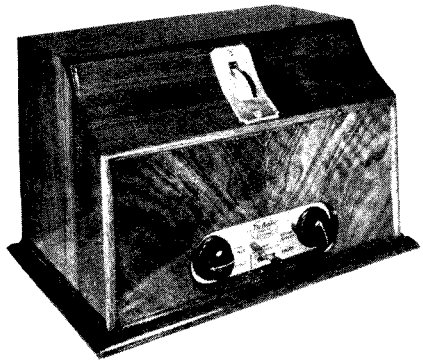
The back of the set is easily removed without the necessity of undoing screws or bolts

Sensitivity. — First tests to gauge the sensitivity of this set were made on the long wavelengths. We found the set more sensitive from 50 to 100 degrees than from 0 to 50 degrees. Thus Radio Paris at 80 and Eiffel Tower at 67 were really fine signals on each side of 5XX at 75 degrees. Kalundborg at 37 and Oslo at 25 were medium-strength signals and completed quite a creditable long-wave log.

Switching over to the medium waves we obtained an excellent log of stations. The set had a lively feeling. Again we were impressed with the fact that operation was not critical. This is how some of the stations came in:—

Munich 93, strong; Vienna 92, strong; Brussels 91, fair; Milan 89, strong; Midland Regional 86, very strong; Lyons 84, strong; Rome 80, strong; Stockholm 79, very strong; Berlin 75, strong; Katowice 73, strong; Frankfurt 70, fair; Toulouse 68, very strong; London Regional 63, very strong; Strasbourg 55, strong; Grenoble 52, strong; Göteborg 50, strong; Bordeaux 43, fair; Bratislava 30, fair; National 25, very strong.

Most of these stations were tuned in by rotation of the main tuning control. We did not find it necessary to readjust the fine tuning control more than two or three times over the whole wavelength range.



PLEASING IN APPEARANCE

As this photograph shows, the appearance of the Burton set is very attractive for the price

Selectivity. — Two aerial terminals are provided on this set to make it suitable for use with short or long aerial systems. With our 50-foot aerial and either of the two aerial terminals provided we had no difficulty in obtaining selective tuning. For example, the London National, maximum at 25, had gone again at 15 and 30, a spread of only 15 degrees. London Regional, maximum at 62, had gone again at 55 and 68, a spread of only 13 degrees. This sharp tuning was not achieved at the expense of volume on distant stations.

Quality.—As tested with linen-diaphragm and inductor dynamic loud-speakers, this set gave pleasing quality of reproduction. If provided with a P2 type of power valve and sufficient high-tension supply, the set is capable of very satisfactory results with most loud-speakers. We were quite pleased with the reproduction of the low-frequency-amplifying equipment used as a gramophone amplifier.

Appearance. — Exceptionally good for an inexpensive battery-operated set. We like the finish of the woodwork and the pleasing layout of the controls. The back is easily removed without the necessity for undoing screws or bolts. A neat battery cord helps to maintain the generally pleasing effect.

Summary. — In our opinion the Burton Empire S.G. Three is a very satisfactory broadcast receiver for battery operation. It brings in foreign stations at good loud-speaker strength, free from local-station interference. Operation is simple and upkeep costs moderate.

For listeners living in a regional broadcasting area, such as Brookman's Park, Daventry or in the Northern region around Manchester, this Burton set will separate the twin high-power transmissions quite easily. A fairly short aerial is recommended to ensure selectivity; there will be very little loss of range.

There is no space inside the cabinet for the high-tension and low-tension supplies, but these could be unobtrusively housed underneath the table on which the set is resting. The battery cord is quite long enough to enable this to be done.

MAINS RADIO TRANSPORTABLE

Maker.—Mains Radio Mnfg. Co., Ltd.

Price.—28 guineas.

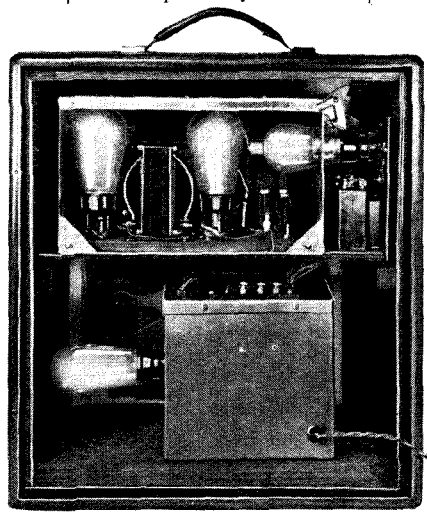
Power Supply. — A.C. mains. Supply voltages of 100 to 125 volts and 200 to 250 volts are covered. An accessible mains tap with three connections was provided on the model tested. No provision has been made for D.C.-mains operation or for the use of batteries.

Power Consumption.—30 watts.

Valve Combination.—There are three receiving valves, consisting of a high-frequency-amplifying stage, followed by a detector, transformer coupled to a power valve. Mazda valves are employed in the sequence of AC/SG, AC/HL, and AC/P. All are four-volt indirectly-heated valves.

There is also an indirectly-heated valve for rectifying the A.C. current to make it suitable for the anode voltages of the receiving valves. This rectifier is a Mazda U30/250.

With A.C. heated valves such as the Mazda types employed in this set the overall amplification of three stages is considerable. Even with a frame aerial a wide range of reception can be expected.



WELL DESIGNED

The simple and straightforward construction is clear from this photograph, which shows the back of the set

Controls.—Two tuning knobs have to be operated for the reception of any given station. Slow-motion movement is provided for the pointers, which travel over white ivorine scales reading from 0 to 100 degrees. Between these two tuning controls is a knob for reaction, also provided with a slow-motion movement; in operation it is extremely smooth. Above the reaction knob is a push-pull switch knob for changing from medium to long wavelengths. It is marked to indicate that when pushed in the long waves are available and when pulled out the medium waves are received.

A notable omission is a volume control. In the reception of the local stations we found it necessary to detune, even when the frame aerial in the set was at right angles to the direction of the incoming signals.

Sensitivity. — The first stations we received were the locals, easily located by rotation of the two tuning dials. London Regional was logged at 55 and 54 degrees on the left- and right-hand dials respectively. London National came in at 30 and 31 and Midland Regional at 85 and 80 degrees. These readings indicate that the two tuning dials keep together round the wavelength range. The logging of more distant stations is therefore not very difficult, because if something is heard of a distant station at any particular setting of one dial one can be fairly sure that the setting for the other dial will need to be within five or so degrees of the first reading.

Before exploring the medium wavelength band more fully we switched over to the long wavelengths. There we found Daventry 5XX at 70 and 70. Eiffel Tower, 64 and 65, was next heard. Motala, which appears to have increased its strength, was very strong at 56 and 60 degrees. Moscow, broadcasting propaganda in English, was very clear at 51 and 55.

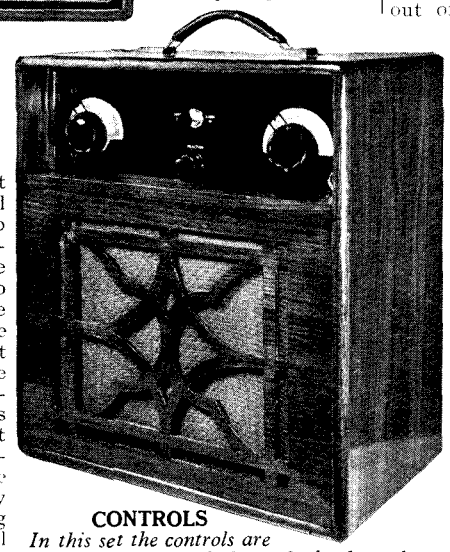
Later we got Radio Paris at 82 and 84. Huizen was heard at 95 and 95 degrees. All these stations were received at full loud-speaker strength with a generous application of reaction. Although a terminal is provided for an earth lead we did not find it necessary.

Returning to the medium wavelengths, we bagged a good dozen foreign stations at full loud-speaker strength. Outstanding among them were Budapest 98 and 92, Milan 89 and 84, Rome 75 and 72, Stockholm 74 and 70, Berlin 70 and 68, Katowice 69 and 65, Toulouse 64 and 60, Göteborg 48 and 45, Bordeaux 45 and 42, Bratislava 38 and 38, Konigsberg 35 and 35, Rennes 34 and 34, and finally Cologne 19 and 21 degrees.

Selectivity. — Readings taken during the reception of the London Regional and National stations indicate that this set has an average degree of selectivity. The National, maximum at 39 and 40, could still be heard at 30 and 31, and at 19 and 20, a total spread of 11 degrees. The London Regional, maximum at 55 and 54, was heard up to 63 and 60, and down to 42 and 44. The spread was therefore 21 degrees on the left-hand dial and 16 degrees on the right-hand dial.

These readings were taken with the fullest reaction applied to the stations nearest in wavelength to the locals that could be heard clear of the locals. Langenberg was not quite clear of the Midland Regional. The average selectivity of the two tuned circuits, one for the frame aerial and the other for the high-frequency amplifying coupling, is augmented by the special selectivity derived from the self-contained frame aerial.

Several stations that would have been mutilated by adjacent transmissions were received clear by careful rotation of the cabinet so as to bring the frame in line with the desired transmission and, where possible, out of line with the interfering transmission.



CONTROLS

In this set the controls are arranged on a panel above the loud-speaker

Quality.—The small self-contained linen-diaphragm loud-speaker produced a fine bass-note response and appeared to be well suited to the AC/P power valve. Considerable volume was handled without the slightest trace of overloading. The speech was crisp and music had a brilliant but quite well-balanced tone.

Summary.—Here is a set with two distinct advantages. It works off the A.C. mains and so dispenses entirely with batteries. It is entirely self-contained, the frame aerial obviating the need for any external wires.

This transportable can be relied upon to give good reception. Results in London prove that it is capable of functioning well under modern conditions; that is to say, in localities where two strong local stations have to be contended with.

MULLARD 1931 ORGOLA

A good constructor's kit set for battery or A.C. mains operation —excellent for modern conditions

Makers.—Mullard Wireless Service Co., Ltd.

Price.—£8 for the kit, complete with valves.

Power Supply.—Batteries. It should be noted that the Orgola can be adapted for A.C. mains operation in conjunction with the Orgola Junior Power unit.

Power Consumption. — With a 120-volt high-tension supply the total anode current was found to be 11 milliamperes. A double-capacity battery would give long service with this set.

Valve Combination. — A screened-grid high-frequency amplifying valve precedes a steep-slope detector valve, transformer coupled to a power valve. The sequence of Mullard valves employed is PM12, PM2DX, and PM2.

The PM2 is a normal 2-volt power valve, but if greater power output is wanted the PM252 can be used; or if great amplification is needed the PM22 pentode can be used.

If the pentode power valve is used we suggest using a triple-capacity high-tension battery.

Construction.—As this is a kit set, the various components must be assembled by the constructor. This work has been greatly simplified by a very straightforward layout, especially in the screening between the high-frequency and detector valves. The wiring is also simple and the whole assembly could certainly be completed within four hours, even by a novice.

Circuit.—Constructors of kit sets are naturally interested in the circuit arrangement. We find in the 1931 Mullard Orgola every evidence of latest practice. The aerial is variably coupled to the grid-tuning circuit of the screened-grid valve. This is done by means of a small untuned winding fitted as a rotor inside the aerial-tuning coil, which consists of a single winding for the medium wavelength range and slotted windings nearby for the long waves.

The screened-grid valve is coupled to the detector valve by means of the choke-capacity system. The high-frequency choke is connected in series with the screened-grid valve and the high-tension supply. The coupling condenser from the anode goes to a tap on the grid-tuning coil of the detector valve. Reaction is applied to this grid-tuning circuit by means of a differential reaction condenser. The low-frequency transformer is coupled in the standard way to the detector and power valves.

Controls.—The circuit just described has been interpreted very simply, as the layout of the set clearly proves. The centre of the cabinet is occupied by the tuning control, a knob rotating a clearly-engraved scale as well as the two halves of the two-gang condenser, which simultaneously tune the grid circuits of the screened-grid and detector valves.

Symmetrically arranged on each side of this main tuning control are pairs of knobs and switches. The switch on the left operates the coil wave-changing mechanism, which is both simple and foolproof. The switch on the right is the master control for putting the set in action by switching on the filament current. The knob on the left is for controlling volume. This is actually a rheostat in the filament circuit of the high-frequency valve. The knob on the right controls reaction.

In effect, the makers of this kit set have achieved single-dial tuning, although it is interesting to note that to the left of the main tuning knob is a trimming disc for final tuning adjustments. This auxiliary control is particularly useful when receiving distant stations.

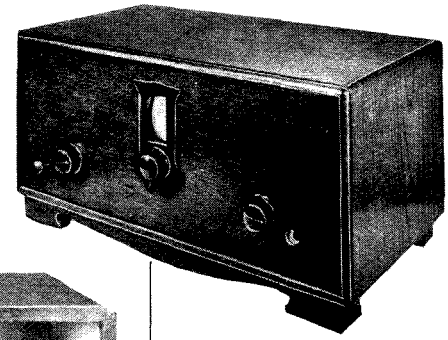
Sensitivity. — The search for distant stations is considerably facilitated by referring to the calibration chart supplied with the kit. Dial readings are given for every 10 metres on the medium waves. Thus, 200 metres corresponds to 20 degrees, 260 metres to 43 degrees, 350 metres to 64.5 degrees, 480 metres to 88 degrees. The dial readings for six long-wave stations are also given.

We found that with an aerial of 50 feet total length, these readings were accurate enough to be of use in searching for distant stations. We got Budapest, Vienna, and Milan above the Midland Regional. Below that station Lyons, Rome, Stockholm, Katowice, Bucharest, Frankfurt, Toulouse, and Manchester were received before we came to the London Regional. Then Barcelona, Gôteborg, Bordeaux, Bratislava, and Rennes were heard before the National. Below that station we got Leipzig, Nürnberg, and Cologne—all at loud-speaker strength.

Selectivity. — This was gauged by the spreading effect of the London National and Regional stations. The National, maximum at 42, had a total spread of 10 degrees and the Regional, maximum at 65, had a total spread of 11 degrees. We were able to get Langenberg clear of the Midland Regional, another indication that this set is selective.

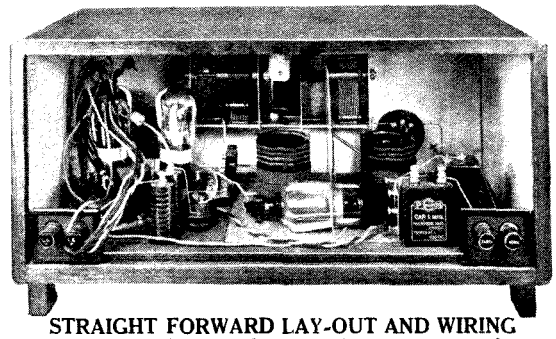
A.C. Mains Operation. — With the completed Orgola kit wired for A.C. valves, we were also supplied with the Mullard Orgola Junior power unit, which supplies a 160-volt output at 30 milliamperes, with a centre-tapped 4-volt winding for the A.C. filaments. The price of the power unit is £6 4s. 3d., and it complies with I.E.E. regulations.

Summary.—We consider the 1931 Mullard Orgola is an excellent three-valve kit for modern conditions



EASY TO BUILD

Any novice can assemble this Mullard three-valve set

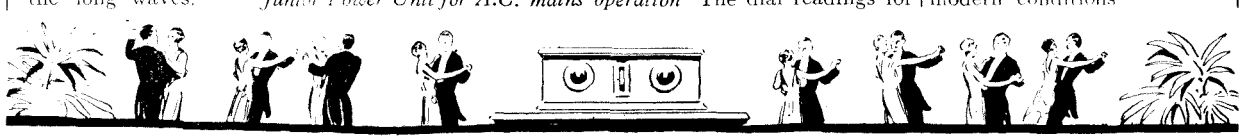


STRAIGHT FORWARD LAY-OUT AND WIRING

This photograph shows the general arrangement of the components in the Mullard A.C. Orgola

FOR A.C MAINS

Here is the Orgola Junior Power Unit for A.C. mains operation



PEERLESS A.C. SCREENED-GRID 8

Although it is not our policy to encourage the buying of foreign sets when equivalent British productions are available, we are here presenting details of a typical representative American design that is creating considerable interest amongst listeners—indeed, we have had a number of special requests for a report on this set. This mains receiver includes three screened-grid high-frequency valves and is quite different in conception from any British set at present on the market.

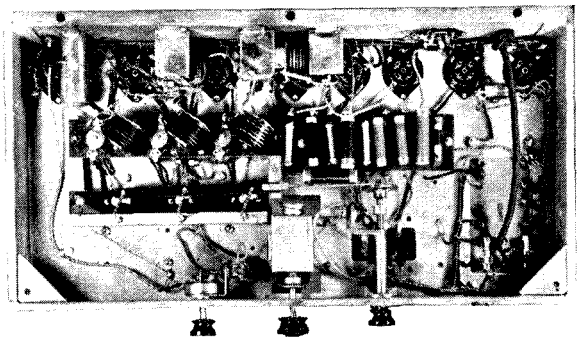
Distributor. — Rothermel Corporations, Ltd.

Price.—£38. This is for the chassis, complete with moving-coil loud-speaker and valves. The price includes a £2 royalty.

Power Supply. — A. C. mains of 110 volts or 220 to 250 volts 50 cycles.

Power Consumption.—98 watts.

Valve Combination.—Conforming with the usual American practice this set employs three stages of high-frequency amplification, a power detector—resistance-capacity coupled to the first low-frequency valve which is transformer-coupled to two super-power push-pull valves. All the valves are supplied with anode current by means of a large valve rectifier.



HOW THE "WORKS" ARE ARRANGED

This view shows the arrangement of the parts on the underside of the Peerless chassis

When we find a seven-stage set selling for the same price as a four-stage British set we have to determine whether the improvement in performance justifies the present American practice. Because if it does we shall have to see whether our manufacturers cannot widen their horizon in the interests of better broadcast reception.

Controls. — Before determining the performance of the Peerless chassis we noted the simplicity of the controls. Altogether, there are only three knobs. That on the left is a combined master switch and wave-change switch. In the Peerless set we have the first example of an American product specially adapted for British conditions. Hitherto, the omission of tuning for the long wavelengths has been a serious drawback to the use of an American set in this country, where a set of good efficiency is expected to bring in six or so high-power transmissions between 1,000 and 2,000 metres.

On the right of the chassis is a knob for controlling volume. The fine smooth action of this control was notable. It varies the volume from inaudibility to a very considerable maximum output.

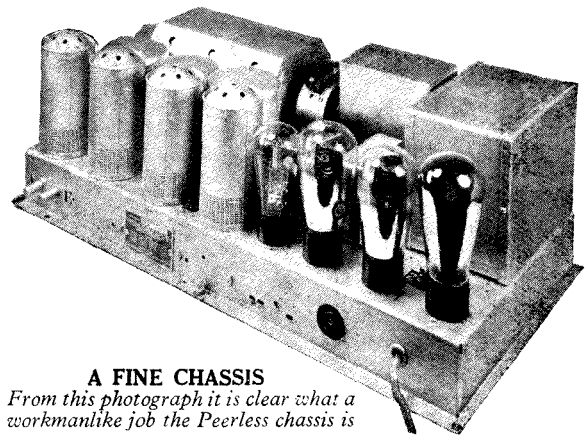
The main control is fitted between the master switch and volume control. This centre knob works on a special pulley drive and controls the tuning-condenser unit, varying three separate tuned circuits. The dial is illuminated from behind and is engraved in degrees from 0 to 100.

As tests showed, the operation of this Peerless chassis is extremely simple. By setting the volume control about half-way towards maximum, we were able to log station after station with precision

Sensitivity.—The enormous power of this set made us start tests with a 15-foot aerial. The stations received on this modest "pick-up" were so strong and so numerous that there was no necessity to try the larger standard aerial.

Nearly every station worth listening to on the medium wavelength range was tuned in at full loud-speaker strength. Some indication of the tuning range can be seen from the fact that the London National was logged at 10 degrees, London Regional at 35 degrees, and Midland Regional at 73 degrees.

Some of the foreign stations were really terrific in strength. Budapest at 92, Munich 83, Milan 75, Langenberg 70, Rome 61, Stockholm 60, Katowice 50, Frankfurt 45, and Hamburg 40 degrees are some of the more important readings from our log.



A FINE CHASSIS

From this photograph it is clear what a workmanlike job the Peerless chassis is

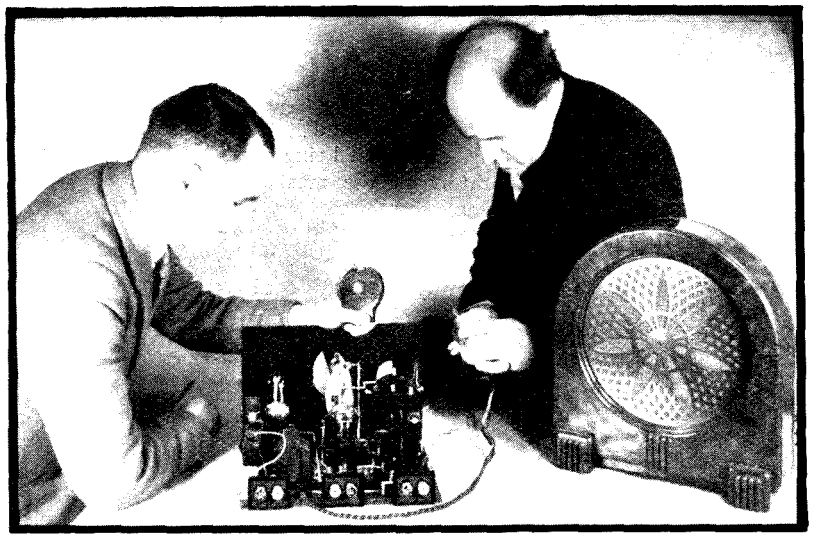
We were particularly interested to determine the capabilities of this American set when tuned to the long wavelengths. We obtained the most powerful signals yet experienced from Hilversum at 90 and Oslo at 20. In between we got Paris at 75, Zeesen at 69, and Daventry at 60 degrees. Motala at 45 was unusually strong.

Selectivity. — The selectivity was of a different order from that of the average British set. The London Regional and National stations were tuned out *within four degrees*. The tuning is of the knife-edge variety. It is evident that sharply-tuned coils are employed to achieve this selectivity. The theory that high notes are lost by this procedure was not borne out by actual results. Possibly, the low-frequency-amplifying apparatus is designed to counteract any high-note loss due to sharp tuning.

The idea of not being able to separate Langenberg from the Midland Regional seemed a little absurd during tests, for there was one degree clear space between these two transmissions. Hamburg was quite clear of the London Regional. We gained the impression that selectivity is not quite so good on the long waves. Even so, the tuning was sufficiently sharp to enable Zeesen to be received quite clear of Daventry and Radio Paris.

Quality. — With the moving-coil loud-speaker supplied, this set gave very good quality reproduction. The bass register was extremely fine. Speech was clear of all suspicion of boominess. The moving-coil chassis is quite small, but of very robust construction. It works from the valve rectifier. A five-pin plug from the loud-speaker is inserted into a socket on the chassis.

Summary. — An extraordinarily powerful American chassis, the Peerless Screened-grid Eight is specially adapted for use in this country. No less than ten long-wave stations were received at loud-speaker strength. Quality is well up to the best British standard. Selectivity is exceptional



THE ALADDIN TWO

Here is a simple two-valve battery set particularly suitable for general family use. Although two-pin plug-in coils are used, the set is adjusted for long- or medium-wave reception by means of a single switch and without the changing of any coils. Another special feature is the inclusion of a switch that allows of the set being used with a pick-up for record reproduction without any alteration to the circuit.

SO many people still use two-pin plug-in coils that we are certain there will be considerable interest in this two-valve set. Its chief feature is a new coil base provided with switches by means of which the wavelength range can be altered by a single knob without the need for changing the positions of the coils.

Wave-change Switching

In this set two pairs of plug-in coils are used; one pair (an aerial coil and a reaction coil) is used for medium-wave reception, while the second pair is used for long-wave working. The switch incorporated in the base puts either pair of coils in circuit as desired. The knob on the front panel is turned to the right for medium waves, and to the left for long waves.

Apart from this special switch-base, all the components of the set are quite standard, so here is a good opportunity for many listeners to reconstruct old plug-in coil sets into a more modern and convenient form.

Not only is the set more convenient to use for radio reception than when plug-in coils have to be changed over to alter the wavelength range, but provision is made by means of a simple switch for reproducing gramophone records through a pick-up.

It will therefore be appreciated that the Aladdin Two is ideal for those who want a cheap and efficient radio-gramophone combination for general family use. The cost of construction can, of course, be very greatly reduced if use is made of some of the old parts that most constructors have lying about.

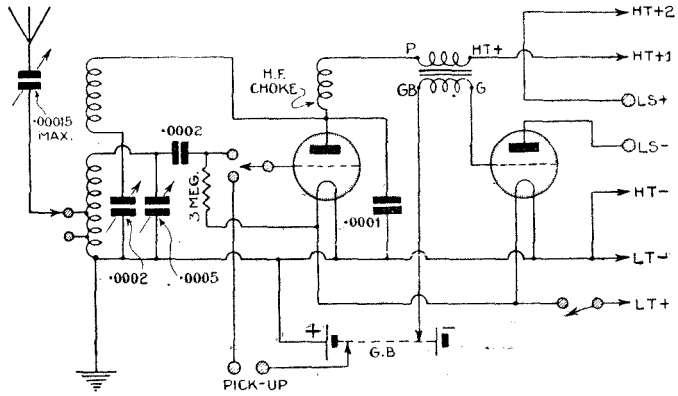
Actually the circuit includes a leaky-grid detector and a transformer-coupled power valve. Such a combination can be relied on to give good reception from regional stations up to a distance of fifty miles, and it will also be possible in most cases to pick up one or two Continental transmissions.

Gramophone Volume

We wish to point out particularly that the volume obtained from gramophone reproduction can never be greater than the volume when the local station is being received.

For some reason many listeners have the impression that a set will give a greater output when used with a pick-up than can be obtained from ordinary radio reception, but a moment's reflection will show that the output is limited in both cases by the characteristics of the power valve.

As far as possible, the set has been made simple to use by employing marked switches. For instance, the filament switch is clearly marked "On" and "Off," while the pick-up switch is marked "Gramo" and



STRAIGHTFORWARD CIRCUIT

The circuit includes a leaky-grid detector and a transformer-coupled power valve. A special switch enables a pick-up to be used without any alteration

THE ALADDIN TWO—Continued

"Radio." A non-technical listener will therefore have no difficulty in putting the set on and off, or adjusting it for radio reception or record reproduction.

A fault of many receivers employing simple two-pin plug-in coils is that they are not sufficiently selective for modern conditions. In this case the maximum selectivity is obtained by the use of a semi-variable condenser in series with the aerial and triple- or double-tapped (referred to as X-tapped) aerial coils.

Strength

The only drawback to this method of increasing selectivity is that the more selective the tuning is made, the more signal strength is reduced. This is unavoidable, however, unless extra valves are used, in which case the cost of construction goes up and the assembly becomes proportionately more difficult.

As it is, the construction is quite straightforward and can be accomplished even by a novice in two or three hours. Although all the essential details are reproduced in these pages, many constructors will prefer to work from a full-size blueprint. One of these can be obtained for half price with the coupon on the last page.

Ordering

This must be sent, together with a postal order for 6d., to Blueprint Department, Wireless Magazine, 58-61 Fetter Lane, London, E.C.4. Ask for blueprint No. WM 231.

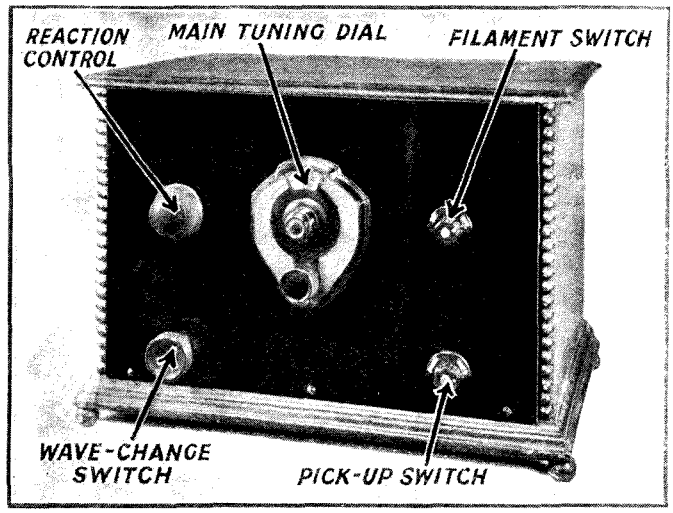
Those who have not previously availed themselves of the Wireless Magazine blueprint service should note that the drawings supplied are absolutely full-scale and show (1) the positions and sizes of all the holes to be drilled in the panel, (2) the positions of all the components on the panel and baseboard, and (3) the actual wiring, each lead being numbered separately in the most convenient order of assembly.

It should be noted that in the photographs that appear in these pages a five-way battery cord is shown connected to the set, but on the blueprint the external connections are shown separately in the most convenient positions.

The grid-bias battery is mounted along one edge of the baseboard; this saves the necessity for external grid-bias connections.

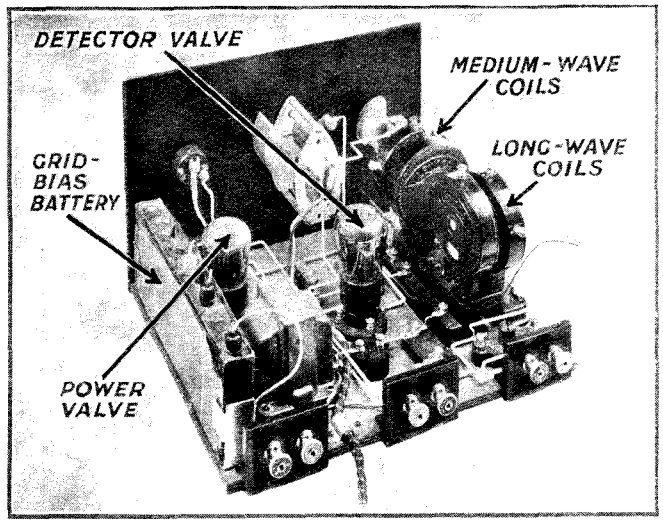
There is no need to describe the construction of the set in detail. The design is not at all cramped and there is plenty of space to accommodate any alternative components that may be larger than those used in the original model.

It should be noted, however, that the gramo-radio switch should be so mounted that, looking from the back of the set, the name "Bulgin" appears at the top and the words "British Made" are upside down at the bottom.



CONTROLS THAT ANY LISTENER CAN OPERATE

This photograph shows how the panel controls are arranged on the Aladdin Two



AN EASY SET TO BUILD

From this illustration it will be clear that the construction is quite straightforward and easily accomplished

Valves to Use

This set is not at all critical as regards valves. It is possible to use any medium-impedance valve, that is of between 20,000 and 50,000 ohms, in the detector stage. Remember that the higher the impedance the greater will be the magnification factor and therefore signal strength will be increased.

There is only one difficulty about the choice of a power valve, and that is to choose one that can be economically run from the particular high-tension battery to be used. In this respect, the valve tables that appear on pages 116 and 118 will be found particularly helpful.

Output

The actual output of the set will be increased by using a low-impedance valve, but it will be found on reference to the characteristics published that no valve with an impedance lower than 4,000 ohms can be economically supplied from the standard-capacity battery, which has a normal discharge rate of 7 milliamperes.

Those who want good volume for gramophone reproduction should use a valve with an impedance of the order of 2,500 ohms and double- or triple-capacity high-tension batteries. It is most uneconomical to attempt to use standard-capacity batteries.

FOR GRAMO-RADIO

As was mentioned at the beginning of the article, two pairs of plug-in coils are used. The two coils for medium-wave reception should be placed in the switch-base at the end nearest the panel.

In the holder marked A1 should be inserted a No. 60X or triple- or double-tapped aerial coil, while a No. 25 coil should be placed in the socket marked R1, for reaction.

Positions of Long-wave Coils

The second pair of coils is placed in the opposite end of the switch base (nearest the pre-set condenser on the baseboard). In the socket marked A2 place a No. 200X or triple- or double-tapped coil, and in the socket R2 a No. 100 coil for reaction.

Where the set is to be used at some considerable distance from a local station then sufficient selectivity may be obtained by the use of centre-tapped coils in the aerial circuit. Indeed, if the constructor already has a number of centre-tapped coils these should be used before X- or double-tapped coils are obtained.

Although there is no need for the reaction coils to be tapped, it will not matter if they are, for there is no need to take a connection to whatever tap is provided.

Some trouble should be taken when the set is first put into use to find the settings of the coil taps and pre-set condenser that will give the best compromise between selectivity and volume of reproduction.

In the first place, the knob of the pre-set condenser should be screwed right down to obtain the maximum capacity, at which point the sensitivity of the set will be at its greatest. When this has been done, both of the tappings on the X- or double-tapped coils should be tried. One tapping will be found to give more selective results than the other.

Reducing Spread of Local Station

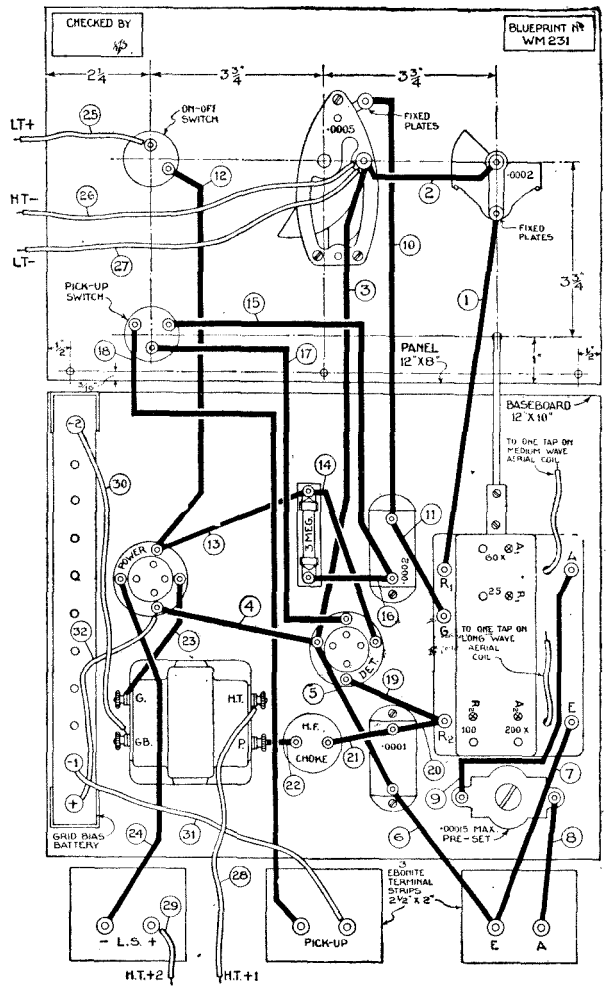
Should the local station spread too far round the dial, the knob of the pre-set condenser can then be unscrewed until the tuning becomes sufficiently selective.

When the local station is not working, of course, the capacity of the pre-set condenser can be increased by screwing down the knob as one then has no local interference with which to contend.

The circuit is so arranged that for radio reception the grid of the detector valve is biased positively, but when the switch is adjusted for record reproduction, negative bias is applied to this valve so that it will work on the straight part of its characteristic and amplify without distortion.

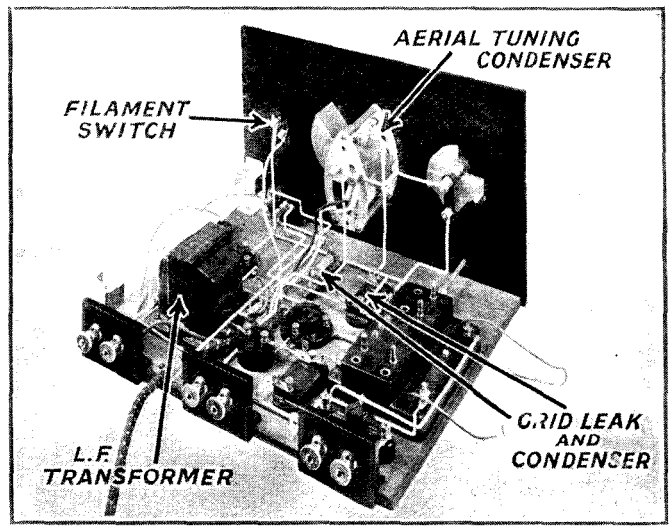
It is a common practice to supply detector valves with a comparatively low value of anode voltage, but in this case, where the detector is used as an amplifier for gramophone work, it will be an advantage always to supply it with a high voltage so that the maximum amplification is obtained without the need for changing the high-tension tappings when the set is used in conjunction with a gramophone pick-up.

For this reason the full voltage recommended by the makers (it will normally be 120 volts) should be applied to the detector and the power valve. In the case



LAYOUT AND WIRING DIAGRAM

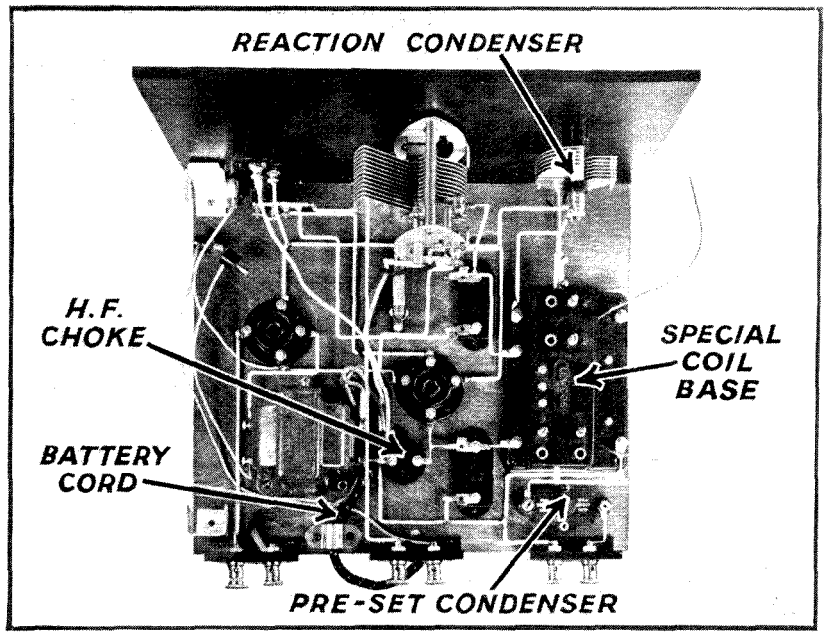
This can be obtained as a full-size blueprint for half price, that is 6d., post free, if the coupon on the last page is used by March 31. Ask for No. W.M. 231



A CHANCE TO USE UP OLD PARTS

Many old components can be used in the Aladdin Two

THE ALADDIN TWO—Continued



SEE HOW SIMPLY THE SET IS ARRANGED

This plan photographic view shows the disposition of all the parts in the Aladdin Two

of the latter it may be possible to use as much as 150 volts, in which case the reproduction will be all the better.

Panel Controls

There will be little difficulty in mastering the panel controls. In the centre of the panel is the main tuning dial, which is of the slow-motion type. On the left of this dial is the knob of the reaction condenser, with the wave-change switch below

On the right of the panel is the filament switch, while the gramo-radio switch is mounted in the bottom right-hand corner

To adjust the set for radio reproduction the first switch should be put to the "On" position, while the pick-up switch should be turned to "Radio" Next the wave-change switch should be turned to the left or right for the desired wavelength range.

Adjusting Reaction

Before searching for stations turn the reaction knob a little to the right until the set is on the verge of oscillation. It will be found that as the main tuning dial is advanced it is also necessary to advance the reaction control

For gramophone-record reproduction it is only necessary to turn the switch on the bottom right-hand corner of the panel to its "Gramo" position and connect a pick-up to the terminals provided in the centre of the baseboard

No provision is made for cutting out the aerial-tuning circuit, so it will be advisable to detune the set from the local station, which may otherwise break through and interfere with the record reproduction

GOOD POWER VALVES

THE introduction of power valves having slopes of as much as 3 5 milliamperes per volt shows how greatly the valve makers have progressed lately

Sensitive Types

A valve having a slope of 3 5 is very sensitive, a small grid-circuit input controlling a large amount of power in the anode circuit.

We must be careful not to overload valves of this type. Overloading seems to show up rather more than with older types of valves having slopes of 1 5 or thereabouts And naturally, the effect of grid bias variations is much more marked. Therefore a closer adjustment of the bias seems necessary.

Is Pentode Worth While?

With such sensitive power valves the pentode seems not quite so attractive. All things considered—price, quality, and service—there is not a great deal in favour of the pentode, is there?

W JAMES.

COMPONENTS REQUIRED FOR THE ALADDIN TWO

CHOKE, HIGH-FREQUENCY
1—Readi-Rad, 2s. 6d. (or Watmel, British General).

COILS
1—Lewcos No 25 plug-in, 3s. 6d. (or Atlas, Edison Bell).
1—Lewcos No. 100 plug-in, 4s 6d (or Atlas, Edison Bell).
1—Lewcos No. 60x triple-tapped plug-in, 4s. 9d. (or Atlas, Edison Bell).
1—Lewcos No 200x triple-tapped plug-in, 6s. 6d. (or Atlas, Edison Bell)

CONDENSERS, FIXED
1—Lissen .0001-microfarad, 1s. (or Dubilier, T.C.C.)
1—Lissen .0002-microfarad, 1s. (or Dubilier, T.C.C.)

CONDENSERS, VARIABLE
1—Lissen .0005-microfarad, type LN283, 6s. 6d. (or Lotus, Jackson).
1—Formo .0002-microfarad, midget type, 2s. 9d. (or Bulgin, Keystone).
1—Igranic pre-set .00015-microfarad max., 2s. (or Formo, Lewcos).

EBONITE
1—Trelleborg, 12 in. by 8 in. panel, 4s. 6d. (or Pilot, Becol)
3—Junit terminal blocks, 2s (or Belling-Lee)

HOLDER, COIL
1—Lewcos twin two-pin base, 12s. 6d

HOLDER, GRID-LEAK
1—Lissen, 6d (or Watmel, Bulgin)

HOLDERS, VALVE
2—W.B four-pin, rigid type, 2s. (or Benjamin, Lotus)

PLUGS AND TERMINALS
3—Belling-Lee wander plugs, marked; G.B. +, G.B —1, G.B. —2, 9d. (or Clix, Eelex).
6—Eelex terminals marked; Aerial, Earth, L.S. +, L.S.—, Pick-up (2), 2s. 3d. (or Clix, Eelex).

RESISTANCE, FIXED
1—Lissen 3-megohm, 1s. (or Watmel, Dubilier).

SUNDRIES
Glazite insulated wire for connecting.
1—British General 5-way battery cord, 5s. 6d.
1—Pair Bulgin grid-bias battery clips, 6d.

SWITCHES
1—Bulgin rotary "on-off", 1s. 9d.
1—Bulgin gramo-radio rotary change-over, 2s.

TRANSFORMER, LOW-FREQUENCY
1—Telsen Radiogrand, ratio 1 to 3, 12s. 6d. (or Burton, Lewcos).

ACCESSORIES

BATTERIES
1—Lissen 120-volt, standard type, 15s. 10d. (or Siemens, Ever Ready).
1—Lissen 9-volt grid-bias, 1s. 6d (or Siemens, Ever Ready).
1—Lissen 2-volt accumulator, type LN507, 9s. 6d. (or Exide, C.A.V.)

CABINET
1—Pickett, 15s (or Osborn, Camco).

LOUD-SPEAKER
1—Blue Spot, type 41K, £2 10s. (or Hegra, Turner).

VALVES
1—Cossor 210HF, 8s. 6d. (or Mazda HL210, Six-Sixty 210HF).
1—Cossor P215, 10s. 6d (or Mullard PM2, Six-Sixty 220P).

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

RADIO IN REVIEW

By MORTON BARR

Coming Events

LISTENERS who complain of interference caused by high-powered Continental stations are likely to have their patience much more severely tried in the near future.

Germany alone has decided to install nine regional stations, each rated at a minimum of 75 kilowatts with a possible output of double that figure. Langenberg is the next on the list to be converted to the higher rating, and six more are to come, Mühlacker and Heilsberg being already in operation.

Prevailing Fashion

Other European countries will, no doubt, soon follow the prevailing fashion of increased power output. In fact, they will be compelled to do so in self-defence, if they are to cater for the needs of their own nationals.

The International Broadcasting Committee at Geneva can, of course, make recommendations for the regulation of ether traffic to the various governments concerned, but they have no power to enforce them, or, indeed, to exercise any effective control apart from whatever can be achieved by mutual agreement.

It is difficult to know where to look for a remedy. More ether space could be found by dropping all broadcasting stations down to the short and ultra-short wavelengths, but this does not at present offer a practicable solution.

In the first place, it would mean that nearly every receiving set now in use would have to be adapted or re-designed for short-wave working. In the second place, short-wave radiation does not normally give a reliable local service; that is, within comparatively close range of the transmitting aerial.

Short-wave Troubles

The trouble with the shorter waves is that they prefer to travel upwards rather than along the ground. Signals can, in fact, be received better 500 miles away, after reflection from the Heaviside layer, than at distances less than, say, a hundred miles of the transmitter.

Obviously, the Germans do not want to broadcast primarily for our benefit—or for the Italians or Spanish—but for themselves.

Even with wavelengths between 250 and 500 metres the tendency is for a large part of the energy to radiate upwards. A reliable local service, which depends upon the earthbound wave as distinct from the space wave, can only be secured with wavelengths of this order by using high powers. Hence the present rage for increasing power at the transmitting end.

On the other hand, by using wavelengths over 1,000 metres the problem of the space wave disappears. The great bulk of the radiation is earthbound, and a wide and reliable service area is readily ensured.

But, unfortunately, another problem—that of elbow room—becomes very acute on this band of frequencies. Between 1,000 and 2,000 metres there is room for a total of only fifteen stations, without mutual overlap, allowing for the regulation gap of 10 kilocycles between each.

By contrast, if all broadcasting was confined to the band of wavelengths between 50 and 150 metres, no less than 400 stations could be accommodated without overcrowding each other.

Less Power—More Selectivity

As things are at present, it would seem that if ultimate chaos is to be avoided, the number of high-powered transmitters must be more strictly rationed by agreement between the various governments concerned, unless an entirely new method of transmission can be discovered to give some measure of relief.

For instance, it may be found possible to radiate short-wave energy more or less along the ground, and to eliminate the troublesome space-wave component. Such a development would undoubtedly open up a fresh field for broadcast expansion.

Meanwhile the most promising alternative is to concentrate on improved selectivity in reception. The appearance of the Stenode Radiostat shows, for instance, that there are still opportunities for the inventor to find fresh ways and means of tackling this problem.

Some day somebody will find the right clue—possibly along quite unsuspected lines—and will produce a really selective receiver at a price we can all afford to pay.

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A Talking Beacon

A new type of wireless beacon has recently been installed at the Cumbrae Lighthouse in the mouth of the Clyde, to help to navigate ships in foggy weather. The ordinary wireless beacon, as used at Inchkeith, consists of a small rotating "beam" aerial which sweeps the horizon with a directed ray of wireless "call" signals. As it rotates, signals corresponding to the cardinal points of the compass are also automatically emitted in morse code.

A navigating officer can then estimate his bearing relative to the beacon by noting the interval between hearing, say, the "North" signal and the moment when the "call" signal comes in at maximum or minimum strength.

Sound and Radio Waves

This is a rather complicated business, which the new "talking" beacon is intended to simplify. It is well known that wireless waves travel through space nearly a thousand times faster than sound waves.

If a sound signal, such as a fog-horn, is used to modulate a local wireless transmitter, it travels outwards first as a wireless signal and, secondly, as a direct sound wave. Any ship's navigator can then estimate his distance from the signal station by measuring the time interval between the receipt of the wireless signal *via* the headphones and the moment when the audible signal impacts directly upon his ears.

Announcing the Distance

The talking beacon, however, saves the trouble of making any calculations, because directly the fog blast has sounded, it starts transmitting by wireless telephony a series of measurements, so timed that the correct distance from the beacon is heard by the navigating officer of the ship in the headphones at the precise moment when the sound waves from the fog-horn reach his ears directly through the air.

The "distance" figures are transmitted from a previously-prepared gramophone record through a pick-up connected to the transmitter.

Under My Aerial

HALYARD'S CHAT ON THE MONTH'S TOPICS

SKETCHES BY GLOSSOP

SOMETHING LIKE AN AERIAL, ISN'T IT?

Here you see what a real transmitting aerial looks like from below. It is one of the specially-treated wooden masts near Munich

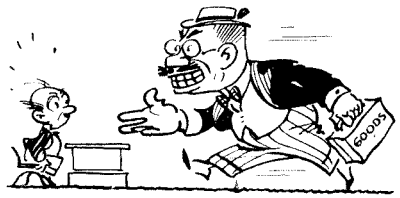
Trouble Ahead

WHAT is your view regarding the crowding of the ether? Some folk seem to think there is very serious trouble ahead of us because of the projected increase in the number of high-power European stations.

As I happen to have been considerably astonished at the way the German giants have come roaring in on my three-valve set this last week, I am more or less inclined to agree.

I don't know how you are fixed, but I am certain there are many listeners in the British Isles these days who are obtaining better strength from some of the Continental stations than from our own.

The congestion of the European ether is bad enough at the present time, but it looks as if it will become worse instead of better. Germany contemplates building seven new broadcasting stations of extremely



German giants have come roaring in

high power, 75 kilowatts in all probability.

France, Belgium, and Switzerland are also busy planning high-power stations. Away in the distance Soviet Russia is reported to be busy with the planning of a 500-kilowatt station for propaganda purposes.

When you consider all these things you cannot help feeling a little bit anxious about the future of broadcasting, can you?

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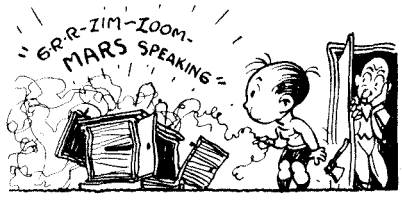
Regional Developments

Although the present year began in a quiet and unostentatious way, and although the first few weeks of the year have passed in uneventful fashion, 1931 will be marked by some stirring wireless events.

To northern listeners the first and foremost event of the year will be the opening of the new Northern Regional station near Huddersfield. Already a good many northern dials have been turned up and down scale in search for the testing signals.

Our friends in Scotland will, no doubt, look upon the commencement of the building of the new Scottish Regional twin transmitter near Falkirk as the most important event of the year. Possibly those in Wales and the West Country will enjoy similar satisfaction in seeing a start made in the building of the new Western Regional station somewhere in Somerset.

These interesting developments in the regional scheme will undoubtedly be amongst the most important wireless events of the year. Let us hope that the end of the year will not find us worse off as regards choice of programmes than we are at present.



Stirring wireless events

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Hum Cured

George and I had put in a strenuous day's work on our new all-from-the-mains receiver. When, late in the evening, we both sank tired and happy into the armchairs in my sitting-room, George said:

"To-day's work reminds me of a riddle a schoolboy acquaintance once propounded to me. What is the difference between having a mains receiver and a dog?"

"Too deep for me, George. What is the difference?" I said.

"No difference at all. They both hum in the house."

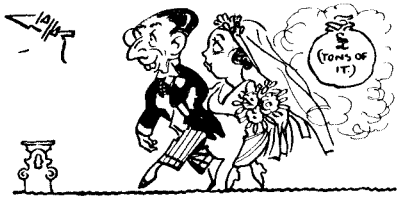
Considering that we had spent pretty well the whole day trying to eliminate hum, I appreciated George's schoolboy's riddle.

Let me tell you all about it though. It started in this way. I had picked up a really good bargain in metal rectifiers and George was as anxious

as I was to try it. When we first used it we obtained a most awful hum. Being a couple of very determined enthusiasts we set to work to eliminate that hum.

After several hours spent on more or less disconnected attempts to stop the hum, we decided to put together a three-valve receiver incorporating the most likely hum-stopping devices we knew.

Accordingly we built a receiver in which (1) a high-frequency choke



Picked up a really good bargain

took the place of the grid leak, negative bias being given to the first valve through this choke, (2) the component parts of the first valve circuit were placed in a screening box, (3) the two low-frequency transformers were also placed in screening boxes and (4) choke output to the loud-speaker was used.

Our newly-built receiver proved a great success. There was only the faintest of hums, but I have no idea which of the four things quoted above did the trick, have you?

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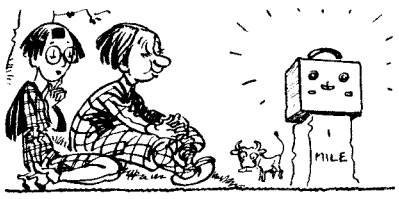
New Style

Have you noticed how the American receiver is taking an altogether new style? In the past American sets have been on the big side and they have looked very much like the large stand gramophones we see in our music shops. At the present



Wireless fashions in our country

time the American receiver is tending to become much smaller and to look more like a big mantelpiece clock than anything else.

Wireless fashions in our country sometimes follow American fashions, and I am hoping that the midget receiver will become as popular over here as it is in America. I like these small receivers and I think they ought to prove a good proposition with us.

A small mantelpiece receiver appeals to me very much. It is a good idea to have a set placed in the centre of the mantelpiece where everbody can see it. Granted a pleasing design, such a set cannot help but draw more attention to wireless and make it even more popular in the home than it is now.

These American midget receivers differ considerably as to circuit arrangements, valves and component parts, but they are all very much alike in size and price. If you should happen to run across one of these receivers I wish you would write and tell me about it.

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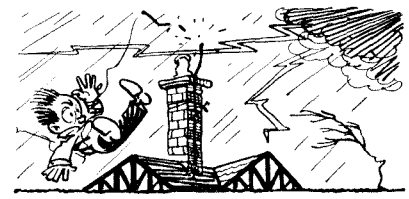
Puzzlesome

What a jolly lot of interesting and puzzling problems there are about a transmitting station! We have our little points of interest at the receiving end, and we have our puzzles also, but such are tiny matters when compared with the interesting and puzzlesome things at the transmitting end.

Here is one little puzzle I have just been reading about. When the aerial at a transmitting station becomes covered with ice in frosty weather, the ice is thawed by passing an electric current through it. The electric current is of such an intensity that the heat it generates in the aerial melts the ice and there you are.



An electric current through your aerial

Simple, isn't it? Wait a minute, though. Just you tell me how you could pass an electric current through your aerial without climbing up the aerial mast and fastening a return wire to the free end of the aerial. Puzzlesome, isn't it? Yet they do it at the transmitting station somehow.

Here is another little problem concerning transmission. Suppose the water flowing round a water-cooled valve ceases to flow and water remains round that valve, how long will it be before the water boils?

Another one. Why is it that a thunderstorm does not make it impossible for a transmitting station to transmit? One more. How far away from the transmitter can a cow draw a spark from a wire fence?

Perhaps I had better stop at that last one. If you happen to have a spicy transmitting problem, send it along, not to me, though, but to the technical staff, or better still, to George.

NOT THIS YEAR!

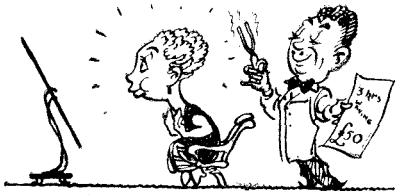
For a wireless man the Spring's "no go"—
The house is in a state of fluster,
The housewife to her maids doth crow:
"Up, girls! Let's get a brush and duster—
The Spring is here. Clean every room,
And leave no single thing alone;
Get busy with the pan and broom,
And pay no heed to Master's groan!"

Last year this mad, careering throng,
This seething mob, this aproned army,
Did everything they could that's wrong—
The whole lot went completely balmy!
And in their senseless war on dust
(Which many doctors say is healthy),
The poor benighted maidens bust
My best set—and I'm not too wealthy.

But ah! This year I think I've got 'em,
They won't go breaking up more sets;
I've rent their schemes from top to bottom
(Bless their dear hearts, the little pets!).
For now I've bought a "Suitcase Five," sir,
And when I hear the usual ditty,
I'll just vacate the seething hive, sir,
And take the darned thing to the City!

C. P. P.

UNDER MY AERIAL—Continued



Three hours spent on short-wave work

The Wireless Organ

"Well! well! well! there is no end to the uses of wireless," I remarked to George last night as we smoked a quiet pipe—at least mine was, George's was a bubbly one—after an energetic three hours spent on short-wave work.

"What is it now?" asked George.

"Nothing less than the doom of the church organ, George."

"That won't make much difference to you, old man, since you belong to the little church that is too far away to go to."

"Listen, George. Apparatus has been tried successfully for the reproduction of organ music from a small and inexpensive organ. The amplifying equipment was of familiar type to all wireless listeners, and the loud-speaker was of the moving-coil type."

"What is the idea of it all?"

"Cheapness primarily. The whole equipment would cost very little as compared with the cost of a full-sized church organ. There would also be an advantage in the much smaller space occupied."

"I can see one very serious disadvantage in the thing."

"What is that, George?"

"If the organist failed to suppress a sneeze, the wireless organ would emit a noise resembling the rushing waters of Niagara. With the present type of organ the organist's sneeze passes unnoticed save by one or two of the more garrulous spirits amongst the choirboys."

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Electrical Interference

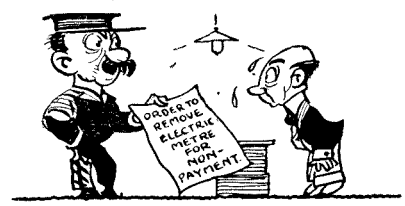
Two of the most interesting facts to be brought to light recently regarding the year 1930 are those relating to oscillation and to electrical interference. During that year oscillation troubles decreased and I think we ought to be very thankful for that decrease, which was largely caused by a better understanding of better sets.

On the other hand, trouble from electrical interference of various kinds increased considerably.

Now this trouble is a difficult thing to combat. The person who causes the interference may know nothing at all about wireless and may therefore be unsympathetic over our wireless troubles.

When a case of interference of this kind is reported to the B.B.C., a special anti-interference pamphlet is sent to the wireless sufferers and to the producer of the interference. The pamphlet will be read all right by the wireless sufferers, but I am inclined to doubt if the other side always reads it.

Electrical interference may be caused by all sorts of curious things, sparking commutators on D.C. electric fans, a loose connection on an electric iron, or even on an electric soldering bit, for example, but the worst form of electrical interference in our country probably comes from electric trams.



The worst form of electrical interference

THE SUPER-HET CRAZE

WITHIN the last couple of years I have not come across anybody outside of England who is working a super-het; although when I was in Paris last year I saw several very ante-deluvian super-hets still working. I doubt if a large proportion of present-day listeners even knows what a super-het is, or how it works.

Well, perhaps they will shortly have the opportunity to do so, because there seems to be signs of a revival of the super-het craze.

For myself, I should not like the job of making up a modern broadcast-band super-het, but if one were made up, with screened-grid valves in the I.F. high-frequency stages, it would be a sheer joy to work.

K. U.

Now turn back to page 134 *and read about what W. James has accomplished for "W.M." readers*

The most amusing example of electrical interference I have heard was caused during the demonstraton of a wireless set by the accumulator-charging plant in the same wireless shop.

There must be a tidy-sized fortune awaiting the experimenter who can devise a means of killing this electrical interference. What about it, then?

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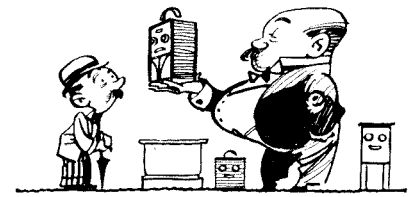
Good Reproduction

I have just returned home from a visit to my big wireless dealer in the City. It is not often that I go to my City dealer, for I can obtain most of the apparatus I require from our local dealers, who are very good fellows, and who are very kind to me.

This afternoon's journey was made chiefly to obtain a semi-permanent crystal detector. I have had one such detector for some months, but it does not seem to function properly, and I thought a new one was necessary. Our local dealers had none in stock. Such things are more or less obsolete these days.



My big wireless dealer in the City

To my great disappointment my big City dealer could not supply one. While I was in his shop, however, I was amply repaid for my journey by hearing what I thought to be the very best reproduction of a gramophone record I have ever heard. I have a pretty good ear for music electrically reproduced, and what I heard this afternoon was so good that it took me completely by surprise.

The apparatus used was made by a firm whose name is as familiar to you as it is to me. I can tell you I was charmed and I felt no end of satisfaction because the radio gramophone I heard was the product of a British manufacturer.

In these days of poor reproduction of gramophone discs in so many of our cinema houses, it is very gratifying to know that at least one British manufacturer can make apparatus which will reproduce records really wonderfully.

RECORDS OF BOW BELLS, WHICH HAVE BEEN SILENT FOR FIVE YEARS

This is the apparatus used for making records of the famous Bow Bells. This is being done to help an appeal for funds to put the church, steeple and bells in order

HEROIC CHAMBER MUSIC

A FEW months ago I received from Radio Paris *Saint Saens' Septette* for strings, piano and trumpet I thought it the most brilliant and melodious and quite the jolliest little suite for a salon orchestra that I had ever heard.

Parlophone Odeon

Now I am delighted to find it issued as a record on the Parlophone Odeon list

Recorded in Paris, the performers are as follows: trumpet, Vignal; piano, Freichville; violins, Boulanger and Mignot; alto, Gino; 'cello, Lopez; double-bass, Dupour.

There are four movements, one to each side of two 12-inch discs, at 6s 6d. each These are Prelude, Minuet, Intermezzo, and Gavotte Finale

Packed with Melody

The prelude opens with the piano and then the other instruments crowd in and carry through a movement contrapuntal in style and often with fugue character, but packed with melody never dwarfed by "treatment."

The minuet is light in character but there is an electrifying series of four octave drops on the trumpet at the end of the principal melody

The intermezzo is contemplative, rising to some breadth and then gradually subsiding; harmoniously strong and relatively modern in character.

The gavotte finale is *jolly*, packed with interesting treatment of several melodies, the principle of which begins with a couple of octave drops.

The composition might have been written for recording, each movement being sufficient for one side of a 12-inch disc The score may be obtained from Novello's, price 8s 6d H. T. BARNETT.

AN AERIAL DIFFICULTY

ONE of the disappointments suffered by some purchasers of radio gramophones can be traced to the need for an external aerial to operate the radio side of the machine. I know of several people who, after deciding how nice it would be to have a radio gramophone in a certain room, have abandoned the idea on learning that an aerial wire must be connected

It is the exception rather than the rule to find a radio gramophone with a self-contained aerial. I think more use might be made of the fact that, for the reception of near-by stations, the electric-light conduit makes quite a good aerial

Trying out one of the new radio gramophones recently, I was surprised at the strength, not only of the local stations, but of at least half a dozen foreign stations, using only the mains for the aerial. The new A.C. valves, as incorporated in the latest radio gramophones, are so powerful that the meanest aerial suffices

Self-contained Frames

Quite apart from the use of the mains for an aerial, greater use might be made of self-contained frame aerials There is usually more than enough room in the massive cabinets of radio gramophones for the inclusion of a frame aerial

The advantage of the frame lies in the increased selectivity it imparts to the radio set. A.S.H

BLASTING RATTLE, CHATTER & DITHER!

Discussed by H. T. BARNETT, M.I.E.E.

UNWANTED grating noises when reproducing from records (other than surface noise, a little of which, of course, we all must put up with) are invariably due to mechanical faults and are preventable.

I get so many letters from correspondents in difficulties which may be classified under this heading that I am encouraged to enumerate all the causes I know and to outline the means necessary for cure where such is possible.

Before supposing that in fact our reproducing apparatus is faulty, we must make quite sure the records themselves are not imperfect.

Improvised Magnifier

Take the big lenses out of your field glasses, put them one on top of the other (the convex sides together), and then in a good light examine the records to see if there is any roughness on them in the places where rattle occurs.

The magnification obtainable with a double lens extemporised in this way is ample to show the least sign of roughening or of groove-wall deformation due to too great a latitude of motion by the recording stylus.

Nearly every collection of records I come across contains at least a few records that had blast in them when quite new and *very many* which have been roughened in the loud passages by improper usage.

If you have a *new* record that is perfect to visual examination and also on reproduction by another machine, but which shows imperfection on your own apparatus, then you may assume there is a mechanical fault somewhere.

Too steep a needle angle is a frequent source of trouble. Let the angle of your needle be 50 degrees and then the needle will often glide over roughnesses that with a 60-degree angle would cause it to chatter badly.

An exceedingly frequent cause of trouble is a split in a horn or in a loud-speaker case or an imperfect join in a case or cabinet. A buckle in the paper of a cone loud-speaker will cause a horrid jarring at times.

Any of these faults is extremely difficult to localise but when found, of course, the remedy is obvious.

Bad track alignment will cause such trouble, especially with vigorous records, and this should always be looked to.

In gramophones I have had many cases of trouble through extraneous objects in the inside or even resting against the outside of the metal amplifier. Giving the machine a vigorous shake will sometimes cure this fault.

Tonearms or pick-up arms having swivelling turn-over ends are a terrible nuisance. So far as my experience goes, at least one machine in three, even when new, having an arm of this type, will blast on loud records.

The tonearm or pick-up arm *must be rigid*: any "lost motion" on a joint near the soundbox or pick-up will permit oscillation of the reproducer on loud passages such as not only sounds very ugly, but which will also *ruin every loud record with one playing*.

Obvious Rattles

Loose base sockets to arms sometimes cause trouble, but not frequently. Where the fault occurs the noise is such an obvious *rattle* that it is easily identified.

Just in the same way that a buckle in a paper loud-speaker diaphragm will cause blast on loud passages, so will a quite inconspicuous dent in an aluminium soundbox diaphragm do the same thing.

Insufficiently tightened trunnion screws for a soundbox stylus-bar pivot will not always be indicated with weak records, but will show up easily with strong ones.

There are several things that will cause a pick-up to blast; a loose armature pivot of too little distance between armature and one of the polepieces.

Iron Filings

You must be very careful not to get your pick-up near any iron filings—a single one of these between the armature and a polepiece will cause grotesque reproduction.

Look always to the connection between the pick-up and arm: should this permit the pick-up to oscillate there will be blast on loud passages.

Now I believe I have dealt with all those causes of blast that come within my own province. It is possible, I know, for a valve set to *blast* (to cause a rattling noise in the loud-speaker indistinguishable from severe mechanical trouble) with loud records, but not with weak ones.

HUMMING PICK-UPS

IN the average home-built radio gramophone it is not easy to keep the pick-up leads short, nor to keep them well away from the turntable electric motor, both of which the text book tells us should be done.

Using a Grid Leak

If you really cannot arrange for the pick-up leads to be shorter than about 18 in. or 2 ft., and you find that in consequence they pick up mains hum or commutator ripple from the turntable drive, then you might try the simple experiment of putting a grid leak across the pick-up terminals, that is, if a pick-up volume control is not used.

When a pick-up volume control *is* used, you will probably find that cutting down the volume a little reduces the hum to negligible proportions; it all depends upon the value of the shunting resistance forming the volume control.

You should try various values of grid leak, connected in a holder wired directly across the pick-up terminals, at the set end. You will probably arrive at a value which reduces the hum without cutting off the low frequencies too much.

K. U.

CHOOSING YOUR RECORDS

Here are reviews of the latest releases by WHITAKER-WILSON, the "W.M." Music Critic. Read them carefully before buying your next batch of records. Outstanding records are indicated by an asterisk (★) against the title.

Classical Orchestral Music

★**Concerto No. 4, in G major,** Op. 58 (Beethoven), Wilhelm Backhaus and London Symphony Orch. (d.s.), 8s. 6d. (4 discs).
H.M.V. DB1428
A fine piece of work. Backhaus always gives a good account of Beethoven. I remember a splendid rendering of one of the big sonatas over twenty years ago when he was but a boy (I likewise). No one need fear to acquire this set of four discs; the production is admirable.

★**Crown of India,** Suite Op. 66 (Elgar), London Symphony Orch. (d.s.), 6s. 6d.
H.M.V. D1899
This was very popular some years ago, when Elgar conducted it at the Coliseum. This is a beautiful rendering of it, with almost perfect recording. I suggest you get it without delay.

★**Jubel, Overture,** Berlin State Opera Orch. (d.s.) 4s. 6d. **H.M.V. C2041**
This is Weber at his best and should find a wide appeal. The recording is not so good in this instance, but there is not much amiss with it.

★**Scheherazade,** Op. 35, Rimsky-Korsakov, Philadelphia Symphony Orch. (d.s.), 6s. 6d. (5 records).
H.M.V. D1436-1440
This is an achievement of which H.M.V. may justly be proud. Lovers of modern, but *not* higher modern, orchestral music should invest in this. There are five complete discs; I imagine that if you buy the first you will buy the other four. It gave me great enjoyment.

Symphony No. 1 in C (Beethoven), Mengelberg and the New York Phil. Orch.
H.M.V. D1867-1870
I took this home to hear it at my leisure. Candidly, I am disappointed. Mengelberg is dull and the recording none too good in places. Come, H.M.V., this is not your style at all. I was in hopes of hearing a great thing. I am really disappointed.

★**Toccata and Fugue** (Bach), Philadelphia Symphony Orch., conducted by Stokovsky.
H.M.V. D1428
I play this work (in its original form, of course) on the organ. Knowing every note of it, I was delighted at the orchestrated version. I have no hesitation in saying that I consider this record not only one fitted for the month's best records, but I go further; I think it is about the "best ever."

Grand Opera and Classical Arias

I Pagliacci, Grand Opera Co., with full orch. (d.s.), 2s. (2 records). **BRDCST 5209**
I have listened with pleasure to both these discs; Broadcast always make a good job of its operatic records. I cordially recommend this excellent selection from an ever-popular opera.

Soldiers' Chorus, Grand Opera Chorus, with full orch., 2s.
BRDCST 5202
Also the Pilgrims' Chorus from *Tannhauser*. Both are admirably rendered and recorded. A cheap two-shillings' worth.

Light Opera & Songs

Ash Grove, London Welsh Male Choir, 1s. 6d.
IMP 2386
Welsh readers should buy this. *Men of Harlech* is the companion.

Beautiful Bird, Sing On, Chris. Hall, with orch., 2s.
WIN 5181
A pleasant ballad with no originality about it. It is well sung, though, as is *The Song of the Thrush* on the other side. The dicky-bird effects are not very good. The bird sounds as though he wants a spot of oil

Bye and Bye : I Got a Robe John Payne, negro singer, 2s. **BRDCST 5211**
A very pleasant voice. He does *Deep River* on the other side and also *Go Down, Moses*. If you like these negroidals you will like everything he does except his top notes, which are faultily produced, in my opinion.

Christmas Melodies by the Fireside, Radio Melody Boys (d.s.), 1s. 3d.
RAD 1267
If there is any use for these so-called seasonable records, this is certainly good as they go.

Dada ! Dada ! Miss Elsie Carlisle, with orch., 1s. 6d.
IMP 2381
I am not impressed with this; rather silly, I think ! I prefer *Go Home and Tell Your Mother*, which she performs (I won't say "sings") on the other side.

David the Bard, London Welsh Male Choir, 1s. 6d.
IMP 2387
This choir is worth hearing. If you like male voices ask to hear the record.

Desert Song, London Light Opera Co., with orch. (d.s.), 1s. 3d. **RAD 1413**
Quite pleasing—but the voices are not as good as I have heard on records from this excellent house. Someone ought to see about it.

Drink to Me Only with Thine Eyes, Sinclair Logan, bar., with acc., 2s.
BRDCST 5204
And *Elegiac* I am rather tired of both, personally, but for those who are not I can recommend this as being well done.

'Fonso, My Hot Spanish (K)night, Walter Miller, with Harry Hudson's Melody Men, 1s. 3d.
RAD 1421
Very good — also *Hunting Tigers Out in India* on the other side.

★**Go Home and Tell Your Mother,** Nick Lucas, 3s.
BRUNSWICK 1026
There is some very fine recording in this record. I do not often place anything of this type amongst the month's best records, but I should be unfair to Brunswick if I did not do so in this case. I am not personally a bit interested in the *Kiss Waltz*, but on the other side it is sung most effectively. A fine record.

Gopak, Maxim Turganoff, ten., with orch., 2s. **PIC 5126**
The recording is not quite good enough for a room of this description; it is rather woolly in places. *La Mantilla* (Alvarez), on the other side, is more successful.

I Passed by Your Window, Percy Clifford, ten., with orch., 1s. 3d.
BRDCST 649
If you want it, it is quite well done, with *Mighty Like a Rose* on the other side.

I'd Like to Find the Guy that Wrote the Stein Song, Nat Star and his Dance Orch., 1s. 6d. **STERNO 570**
A very good version of it, but I am not struck with Nat's voice, candidly speaking. He sounds better in *Let's Have a Sing-song* on the other side. This may be a popular record.

In Old Dahomey, Terence O'Neill, with orch., 1s. 3d.
RAD 1429
And *Old New England Moon*. His voice is admirable on a record. I recommend this sincerely.

It's a Lovely War, Debroy Somers Band, (d.s.), 4s. 6d.
COL DX199
This is a medley of war-time songs. If anyone has a use for such things I can say that the record is well produced.

Lilac Time, Athenaeum Symphony Orch., (d.s.), 2s.
PIC 5121
A very good selection for two shillings. Those who were attracted by the play should hear this.

Londonderry Town, St. Patrick's Day Episode (d.s.), 1s. 3d. **RAD 1424**
This is worth hearing; it is very pleasantly Irish. Those interested should ask to hear it.

Love's Old Sweet Song, Blackstone Trio, 3s.
BRUNSWICK 1033
This is my first Brunswick record; I find it very attractive. The surface is exceptional and the recording of the very best. The Blackstone Trio play tastefully and well together. The other side contains *Silver Threads Among the Gold*, which I like even better than the above. Ask to hear the record.

Maid of the Mountains, Savoy Light Opera Singers and Players (d.s.), 2s.
WIN 5178
Very good. Ask to hear this.

(w), Zonophone Salon Orch., 2s. 6d.
ZONO 5791
And *Paradise for Two* from the same work. Those of you who have recently witnessed the revival and like Lonsdale's music should procure this without delay.

Mother's Pie Crust, Nellie Wallace, com., with orch., 3s. **H.M.V. B3683**

CHOOSING YOUR RECORDS—Continued

And *Cuckoo*. These are, it seems, the compositions of Miss Wallace. Perhaps her personality saves them when you see her—but as a recording possibility both miss the mark. *Cuckoo* is decidedly the better of the two; in some ways it is attractive.

My Cradle is the Desert, Robert Gwynn, with orch., 1s. 6d. **IMP 2378**

This is pleasantly Eastern in character; he sings it well. Also Jack Gordon sings *My Desire* quite effectively on the other side.

My Heart Belongs to the Girl Who Belongs to Somebody Else, Mellow and Rich, with acc., 1s. 3d. **BRDCST 662**

And *My Baby Just Cares for Me*. A very pleasing version. These two are distinctly good.

O, Dry Those Tears, Zonophone Concert Quartette, with orch., 2s. 6d. **ZONO 5771**

And *Mother o' Mine*. There they are—quite well done if you want them.

Old and New, Scala Concert Orchestra (d.s.), 2s. **WIN 5179**

A pot-pourri of ancient and modern, quite well executed, and chiefly consisting of hackneyed songs sung with an orchestral accompaniment.

Old New England Moon, Bob and Alf Pearson, 1s. 3d. **BRDCST 661**

And *Adeline*. These two are improving; they ought to do an outstanding record. This is quite worth hearing.

Polly Wolly Doodle, Vernon Dalhart, with violin and guitar, ten., 2s. 6d. **ZONO 5779**

I see no justification for recording this. I say, Zonophone! Who chooses your material? Ask him to do a little thinking; we shall then get something worth while. This is simply irritating!

Same as We Used to Do, Maurice Elwin, bar., with orch., 2s. 6d. **ZONO 5749**

And *You'll Never Realise*. Of the type of song that these two are, they are quite good. I recommend them for those who like sentimental ballads.

Selections from the Film "Whoopee," Gandino and his Orch., (d.s.), 1s. 6d. **IMP 2357**

Very well done; all the popular tunes appear. Ask to hear it, especially if the film itself has attracted you.

She'll be Coming Round the Mountain when She Comes, H. M. Barnes and his Blue Ridge Ramblers, orch., 3s. **BRUNSWICK 102**

This is described on the label as being traditional; it deserves respect on that account alone. It is sung by a male choir and a band. It is very effective, the melody being of the "Darny" type. *Who Broke the Lock on the Hen-house Door?* on the other side, is distinctly entertaining—also "darky." I recommend this record on account of its fine surface.

★**Sing Something Simple,** Revellers, with piano, 3s. **H.M.V. B3704**

This is delightful. As a light vocal record it is of a very high order. I also like the Revellers singing *Happy Feet* on the other side—a very creditable production.

Song of Hybrias, the Cretan, Bernard Dudley, bar., with orch., 2s. **PIC 5127**

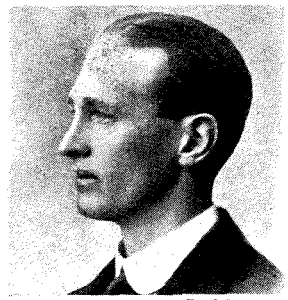
A kind of dramatic ballad, very well sung. You should hear it and then make a decision; it will not appeal to everyone.

Songs of the Western Front, Nat Star and his Band (d.s.), 1s. 6d. **STERNO 561**

I cannot see much use for this sort of thing personally, but if there are any amongst you who can, I can cordially recommend the record for it has an excellent surface.

★(*a*) **Take, O Take Those Lips Away : (*b*) Hey, Ho, Wind and the Rain,** Hubert Eisdell, ten., with piano, 3s. **COL DB334**

A Hubert Eisdell record is always worth buying. He sings



HUBERT EISDELL

these two songs (by Quilter) and *Go, Lovely Rose* (same composer) most appealingly. I strongly recommend it.

That Man of My Dreams, Elsie Carlisle, with orch., 1s. 6d **IMP 2400**

Those who admire Miss Carlisle may appreciate this. I do *not*!

Sophie Tucker, with orch., 2s. **BRDCST 5208**

This rather misses me. I loathe her voice, for one thing.

SOPHIE TUCKER

You must hear it and judge. If you appreciate Miss Tucker you may want to buy it.

There's a Good Time Coming, Jan Ralfini and his Band, 1s. 6d. **STERNO 575**

And *Roamin' Through the Roses*. Both very well done. If you have not these records in your light library, may I recommend them to your notice?

To-morrow is Another Day, Layton and Johnstone, 3s. **COL DB352**

This is a very good specimen of their particular art. On the other side they are excellent in *The Same as We Used to Do*.

Volunteer Organist, Stanley Kirkby and Hardy Williamson, with orch., 2s. **WIN 5184**

I am disappointed in this. I thought it was going to be a comic imitation of the volunteer organist which would turn out to be an exact representation of the technical abilities of the average *recorded* organist. Instead of which I find it to be a cheap ballad about someone who volunteered to play for a service. *Old Jim's Christmas Hymn*, on the other side, defies my powers of description.

Sacred Music

★**Comfort Ye, My People** (Handel), Herbert Thorpe, ten., with orch., 2s. 6d. **ZONO 5745**

I consider this well worth having; it has *Comfort Ye* on the other side, and both are sung admirably. The singer's phonetics are not *perfect* and not too good in places. However, to have these two movements from Handel's *Messiah* so well sung and accompanied for 2s. 6d. is certainly something in the nature of a bargain.

★(*a*) **He was Cut Off Out of the Land of the Living,** (*b*) **But Thou Didst Not Leave His Soul in Hell,** Herbert Thorpe, ten., with orch., 2s. 6d. **ZONO 5772**

Thy Rebuke and *Thou Didst Not Leave*, also from the *Messiah*, are the two solos on the back. They are very well sung and the recording is first-rate.

★**Up, Up, Up My Soul with Gladness** (Bach), King's College Chapel Choir, Cambridge, 3s. **H.M.V. B3707**

This is beautifully rendered. Those of you who, like myself, are never weary of Bach, should ask to hear this. *God Liveth Still* is the companion, sung equally well. A notable addition to the Bach records. Go on, H.M.V. As many more of them as you like!

Organ Music

Allegro from Organ Concerto No. 1 (Handel) (d.s.), Prof. Hans Bachem, organ, 3s. **H.M.V. B3578**

A very fair organ record, though by no means perfect. The worthy professor has rather a detached touch of which I strongly disapprove. The pedals come out fairly well on the whole. To anyone who does not play this work this record will be quite satisfactory, but organists will not be thrilled by most of it.

Down the River of Golden Dreams, Lew White, organ, with Marinba and guitar, 3s. **BRUNS 1040**

This is novel; the steel guitar makes an excellent effect with the organ.

★**Hungarian Rhapsody No. 2** (d.s.), Quentin M. MacLean, organ, with piano, 4s. 6d. **COL DX193**

This is very well done. MacLean is about the only

QUENTIN MACLEAN

cinema organist I can tolerate. I congratulate him—and the pianist—on this production. As the good Abbé Liszt approved of arrangements of all kinds, I think he would have passed this of one of his own favourite compositions.

Piano Solo

If I Could be with You, Lee Sims, piano, 3s. **BRUNS 1025**

Very attractive indeed. The recording is so perfectly satisfactory that I urge Brunswick to issue some serious piano music with some good pianist. If you get this—and I recommend it—you will agree with me that such recording is worthy of the greatest artistes. What about it?

★**Rondo** (Hummel), Benno Moiseivitch, piano, 6s. 6d. **H.M.V. D1941**

One of the best piano records I have recently heard. Moiseivitch's tone is of the "unblasting" quality. On the other side he plays Liszt's attractive *Isoldens Liebstod*. A very attractive record.

BENNO MOISEIVITCH

Slavonic Dance No. 15 (Dvorak), Ethel Bartlett and Rae Robertson, piano, 3s. **H.M.V. B3634**

This is, of course, an arrangement for piano duet of an orchestral work. It is very effective, as is the waltz from the same composer's first orchestral suite. I am not sure that I see any point in recording a piano duet arrangement when the work in the original form can

READ THESE HELPFUL REVIEWS

be had for the asking. Rather a waste of time. But the record is good.

Spoken Records

Caller Herrin', Columbia Dramatic Players, 4s. 6d.
COL DX200

Not bad, though much of the dialogue sounds forced and unnatural. *My Ain Folk*, on the other side, is about the same in dramatic value. Both are strongly flavoured with Scottish seasoning.

Miner's Dream of Home (d.s.) Stanley Kirkby, with orch. 2s. **WIN 5185**

I am not impressed. I think the subject unsuitable for recording as, indeed, most of the subjects of these dreadful descriptive records are.

Music Hall Trial Turn (d.s.), Horace Kenney, 4s. 6d.
COL DX169

There is something entertaining about this; one imagines it might have occurred, in which case it is rather pathetic. I am inclined to suggest you ask your dealer to let you hear it. It certainly held me; I listened interestedly. I am putting it amongst the spoken records—not necessarily amongst the humorous records.

Light Orchestral Music

Coster's Courtship, Band of H.M. Life Guards, 1s. 3d.
BRDCST 651

An 'an effusion called *Beppo*. A very good military band record; the playing is far in advance of the material.

Fly's Courtship, J. H. Squire's Celeste Octet, 3s.
COL DB332

Both this and the *Ant's Antics* are recorded in the Central Hall, where, one would think, there must have been plenty of room! The former contains a clever imitation of the buzzing of the fly. The second is a good tune, but not so descriptive. A very good record.

Follow a Star, Scala Salon Orch. (d.s.), 2s.
WIN 5186

This is very tuneful light music and, of course, well known. It is here played effectively and makes acceptable lunch-time music.

Funiculi, Funicula, International Novelty Quartette, 2s. 6d. **ZONO 5777**

And the *Water Melon Fete*. Both are excellently produced and come as a welcome change from some modern light music I have recently reviewed. Ask to hear this.

Horatio Nicholls' Inspirations, 1st Selection, New Mayfair Orch. (d.s.), 3s.
H.M.V. 3706

Wrong name for some of them, in my opinion. But they are well done. If you like his music, here's your chance—this is a distinctly good record.

B.B.C. SYMPHONY CONCERTS

ITEMS OF WHICH THERE ARE RECORDS

WEDNESDAY, MARCH 11

Of the first item, Beethoven's Overture "Coriolan," there exist at least three records. Columbia does two, the first being by Sir Henry Wood and the New Queen's Hall Orchestra (L1021), and the second by Mengelberg, with the Concertgebouw Orchestra (L1848). Of these two I should certainly recommend that by Sir Henry Wood. H.M.V., I find, publishes a rendering under Casals with the London Symphony Orchestra.

The last item is Berlioz' lovely "Symphonie Fantastique." Columbia does it on seven discs with Weingartner and the London Symphony Orchestra, and very good it should be (L1708-13). H.M.V., apparently, has not recorded it.

WEDNESDAY, MARCH 18 (Beethoven Concert)

The first item is the overture to his opera "Fidelio," which may be had of Columbia (DB9208), played by the Garde Republicaine Band. I know nothing of this band and can, therefore, offer no opinion.

The other two items in this programme are the Fourth Symphony in B flat and the Ninth in D minor (the Choral). Of No. 4, Columbia offers Harty and the Halle Orchestra on L1875-9, but H.M.V. has not done it. As to the "Choral," Columbia produces it with Weingartner and the London Symphony Orchestra (catalogue number, L1775-82). Anyhow, the fact remains that Columbia does both these symphonies.

H.M.V.'s "Choral" is conducted by Albert Coates and the soloists are well known to wireless listeners. They are Elsie Suddaby, Walter Widdop, and Stuart Robertson. Columbia says nothing about soloists.

WEDNESDAY, MARCH 25

Rossini's Overture to "Semiramide" can be had of H.M.V. on C1420, played by Creatore's Band, while Columbia produces no less than three versions. DB9663 is by the Milan Symphony Orchestra; DB9076 is with Percy Pitt and the B.B.C. Orchestra; and, to their eternal shame—on DB9374 they have had the effrontery to produce it on a "Mandoline Band." Try Percy and the B.B.C.!

Schumann's beautiful Symphony in D minor is issued by Columbia on L2209-12, with the Mozart Festival Orchestra, conducted by Bruno Walter. It should be good.

WHITAKER-WILSON.

Hungarian Rhapsody, No. 2, Band of H.M. Welsh Guards (d.s.), 2s.
BRDCST 5205

Although not scored for a military band, it is astonishing how well this lends itself. I am not sure that Liszt would have appreciated it, although he himself was guilty of arranging almost anything for something else. Anyhow, the record is worth hearing, decidedly.

Knights of the King, H.M. Royal Horse Guards, 4s. 6d.
COL DX192

Here is a fine military band record, if you want one. *Gallantry* is on the other side. It is very well produced, with plenty of good bass about it.

Le Cygne, (Saint Saens), English Instrumental Sextet, 2s. **BRDCST 5213**

Very effectively rendered from the playing point of view. The surface, however, is not perfect; Broadcast generally does better than this.

Looking Backward, Metropolitan Police Band (d.s.), 1s.
RAD 1383

As the title suggests, this is a record of time-worn tunes of the popular type. It is excellently produced.

Lover Come Back To Me, Lennington H. Shewell, theremin, with piano, 3s.
H.M.V. B3626

The instrument used here is a theremin, named after its inventor, a Russian scientist. The tone is very appealing and it is played by hand manipulation of an oscillating apparatus. The result is so good that I want to hear a good work rendered by its means. The pianist in this instance is not good. H.M.V., please record Chopin's E flat Nocturne on a theremin with a good accompanist. It would be a test of the instrument.

★**Masaniello, Overture,** Milan Symphony Orch. (d.s.), 4s. 6d. **COL DX187**

By Auber. This is a fine piece of orchestral recording. I recommend it to lovers of light orchestral music. It will not be found "highbrow" at all. You can safely invest in it, even if you are a "lowbrow"!

Oh, Fir Tree, Steiner Quintette, 1s. 6d. **IMP 2385**

A very nicely-balanced quintet. The music comes rather under "light orchestra" than under "chamber music," but the result is quite pleasing.

★**Pomp and Circumstance March, No. 5,** (Elgar), London Symphony Orch., 6s. 6d. **H.M.V. D1900**

Admirably produced. I have already reviewed *The Crown of India Suite*, part of which appears on the other side of this record.

Radetzky March, Ceylon Military Band, 1s. 6d.
IMP 2373

A good military band record. Both this and the *Florentine March* will appeal to lovers of this kind of music.

Rosamunde Ballet Music, Celebrity Octette, 2s.
PIC 5124

An excellent arrangement of it—one of the best Piccadilly records I have recently heard. *Londonderry Air* on the other side.

Sanctuary of the Heart, String Orch., with organ, 2s. **BRDCST 5206**

Quite effective; so is *In a Monastery Garden*, the companion. In both cases there is a male chorus and the organ is not *too* cheap in effect.

★**Selection from "La Boutique Fantasque,"** Royal Opera Orch., Covent Garden (d.s.), 4s. 6d.
H.M.V. C1996

H.M.V. is up to form this month. I never heard better recording from this house. This is a good specimen of Rossini and will appeal to lovers of light orchestral music. It ought to be a big hit.

Wonder Bar, Gandino and his Orch., (d.s.), 1s. 6d.
IMP 2395

A good version, of which I have heard many, by the way. Ask to hear it.

London Theatre Orch. (d.s.), 4s. 6d. **COL DX201**

The recording is one of the features of this well-produced record. The music appeals to me so much more than much I have heard of this type, because the melodies are broad and clearly defined. It is modern (by which I mean "fashionable" or "in the vogue"). The record contains most of the popular themes. I recommend it.

Humorous Records

Boots, 'Ow I 'Ate 'Em, Herbert Mundin, com., with orch., 3s. **COL DB343**

The musings of an 'Erbert, a boot-black. Very good, though not funny. *All the way home*, which he gives on the other side, wants hearing. You may be attracted by it.

★**Buying a House,** Clapham and Dwyer (d.s.), 3s.
COL DB338

In top form! They are really admirable. Get it, of course!

CHOOSING YOUR RECORDS—Continued

Crown and Anchor Board, Jock McKay, com., 1s. 6d.
STERNO 571
Rather boring. *Hooch! But she is a Bonnie Wee Lass*, on the other side, is not much better. The day for Scotch records has passed, I think. I may be wrong, but I don't think either of these wonderful. The patter is not up to standard.

Gorgonzola, Leslie Sarony, with orch., 1s. 6d.
IMP 2379
Not worth hearing. *Put your Worries through the Mangle* is much better (on the other side, sung by Albert Whelan).

Hollywood Will Never be the Same, Sophie Tucker, with orch., 1s. 3d. **BRDCST 657**
This wants hearing before buying. I should *not* buy it – but you may feel different about it. I suppose it should be labelled humorous. So be it, then!

In 1930, Stainless Stephen, com., 1s. 3d.
BRDCST 658
Our model man is splendid as he always is. His dialogue is characteristic. He dictates

STAINLESS STEPHEN

very solemnly, punctuation and all, and makes the usual mess of his s's. The dialogue is called *Last Year's Calendar.*

In the Waxworks Late Last Night, Charlie Higgins, com., with orch., 1s. 3d.
BRDCST 659
Rather original and certainly amusing, though not a very refined type of humour.

★**Mr. Potter Waxes Historical,** Gillie Potter (d.s.), 3s.
COL DB357
Excellent, as he always is. He is essentially a written-down comedian, but his humour is often brilliant. Do not miss this; it is very good.

Naughton and Gold in the General Post Office, Naughton and Gold, 1s. 6d.
IMP 2367
This is very amusing indeed. Naughton and Gold are equally good on *Insurance* on the other side. Here you are, ladies and gentlemen, a *funny record* at last!

Nip and Nunky in Fireworks, Lupino Lane and Wallace Lupino (d.s.), 1s. 3d.
BRDCST 646
There is some very amusing dialogue in this; personally I was glad to be able to laugh, which is more than I do at most of the so-called humorous records. The first side is the better of the two. Candidly, the second side is rather poor.

On the Dole, Sandy Powell, com., (d.s.), 1s. 3d.
BRDCST 647
I am sorry to hear that Sandy has no longer a profession. This account of his experience "signing on" makes amusing material, but he is *not* as funny as he *has* been.

Sandy McGregor's Wedding, Scottish Mummers (d.s.), 2s.
WIN 5180
I say, Winner, steady with the descriptive records; this is the third I have received in the last hour! I *cannot* honestly recommend any of them.

Slippery Sam the Stoker, Albert Whelan, with orch., 1s. 6d. **IMP 2366**
Vulgar and not very funny. I cannot recommend it.

Tit for Tat, W. P. Lipscomb and Alex. Field (d.s.), 3s.
H.M.V. 3650
A barber and a dentist. The dentist suffers at the hands of the barber on one side; they reverse the position on the other side. It is not good; neither actor is natural, and the whole thing is forced. It promised to be funny, but I could not laugh anywhere. Some of it is positively silly!

What Happened to the Manx Cat's Tail? Florrie Forde, with orch., 1s. 3d.
RAD 1430
Not a good dance rhythm, but not a bad tune. The words are amusing in places—and weak in others. *Stein! Stein! Everywhere We Go* is a very poor effusion.

Dance Music

Absence Makes the Heart Grow Fonder (f.), Jock McDermott and his New Carlton Players, 1s. 6d. **PIC 692**
This is well known; also *Roamin' thru' the Roses.* Both are well done; the recording is better than much I have heard by this house. Quite a good record.

Adeline, Hal Swain and his Band, 1s. 3d.
BRDCST 652
This is a quick-step and quite a good one; one appreciates the change of rhythm. *That's Where the South Begins* is the fox-trot on the other side.

Bells of Bodensee (w.), Ferdinand and his Bohemians, 3s. **COL CB173**
An old-style waltz. Very pleasant, too. And a good version of *Oh Donna Clara* (tango).

Bye, Bye, Blues (f.), Waikiki Serenaders, 1s. 3d.
BRDCST 644
This is very well done and makes a most attractive dance record. The Serenaders make a very good job of *Old New England Moon* on the other side.

Cheer Up, Good Times are Coming (o.s.), Ben Selvin and his Orch., 3s.
COL CB182
And *Here Comes the Sun.* Very cheerful dance tunes. The recording is admirable and I cordially recommend this as being of considerable value, particularly if reproduced electrically.

Dance of the Wooden Shoes (f.), Ray Starita and his Band, 3s. **COL CB177**
This is a good dance record; it has the attractive waltz, *Were You Just Pretending?* on the other side. Excellent recording is a feature of it.

Dancing on the Ceiling (f.), Blue Jays, 1s. 3d.
RAD 1425
May I be forgiven for suggesting a lack of *gravity* for this to be executed correctly? I find it difficult to be more *specific* than that, except to say that I like the tune, which makes an excellent dance number. The *First Week-end in June*, on the other side, is not bad; it is a little monotonous, but not enough for me to suggest that the title be changed to the *First Weak End in the Tune.*

Dear! Dear! (f.), Jock McDermott and his New Carlton Players, 1s. 6d.
PIC 690
A moderate-paced fox-trot, and quite an effective tune. It is the first time I have heard it. The other side is the acrobatic effort, *Dancing on the Ceiling.* Both are well produced.

Don't Tell Her What's Happened to Me (f.), Jock McDermott and his New Carlton Players, 1s. 6d.
PIC 681
And *My Baby Just Cares for Me.* Both are well known. The recording is good and the general production pleasing.

★**Fiddles Croon** (t.), Sevilla Serenaders, 1s. 6d. Tango
IMP 2370
It is pleasant to hear a tango again. This is an attractive one, well played. *Oh Donna Clara* is on the other side in tango form. Ask to hear this. It is properly *sung*, for one thing! I am putting it amongst the best records on that account.

Girl Friend of a Boy Friend of Mine, Jacques Renard and his Orch., 3s.
BRUNS 1037
A very good tune. Again the bass that comes through makes the record of high technical value. I like *Hullabaloo* on the other side. You must try one of these records for dancing. You will be surprised.

Go Home and Tell Your Mother (f.), Hal Swain and his Band, 1s. 3d.
BRDCST 653
My Baby Just Cares for Me, which title seems to complete the above, is the companion. Both well known and well done.

Orpheus Dance Band, 2s. 6d.
ZONO 5786
And also a splendid fox-trot, vigorous in style, called *Sing!* Another dance success!

Good Evening (f.), New York Night Birds, 2s.
BRDCST 2503
The Birds always make a good record; this, I consider, is one of their best. *I Still Get a Thrill* is on the other side. Very effective.

Gone (f.), Rhythm Maniacs, 2s. **DEC 2000**
A very good, moderate-paced fox-trot. *Without My Gal* is on the other side. Both are played by the Maniacs, who are not so mad as their pseudonym would seem to suggest.

Good for Nothing but Love, Lou Abelardo, 2s.
DEC F1778
And *Singing a Vagabond Song.* Both are well done. Lou Abelardo makes a safe record.

Here Comes Emily Brown Robert Lane, 1s. 3d.
SOLEX 31
On a xylophone. Very well done and might be useful for dancing; it is rhythmical to a degree. *The Dance of the Wooden Shoes* is on the other side.

I am the Words, You are the Melody (f.), Stanley Hare and his Band, 1s. 6d.
PIC 693
This is from the film, *Just Imagine!* It is not a bad tune, but neither I (the words) nor you (the melody) are anything to rave over. The other side contains *There's Something about an Old-fashioned Girl.*

I Don't Mind Walking in the Rain (f.), Ted Summers' Dance Devils, 2s.
BRDCST 2608
And *Go Home and Tell Your Mother.* Another distinct dance success.

I'd Like to Find the Guy that Wrote the Stein Song, Hal Swain and his Band, 1s. 3d.
BRDCST 666
And *Soldier on the Shelf.* Both quite well produced.

(f.), Jay Wilbur and his Band, 1s. 6d. **IMP 2369**
And the ridiculous *Tid-dle-id-dle-um-pum.* But he makes a good job of both.

(f.), Rhythmic Eight, orch. 2s. 6d. **ZONO 5756**
The Rhythmic Eight improve each time I hear them. Ask for this; I think you will agree with me.

I Still Get a Thrill (f.), Hal Swain and his Band, 1s. 3d.
BRDCST 667
And *If I Could be With You.* A very good band. The record has dancing possibilities.

If I Had a Girl Like You (f.), Blue Jays, 1s. **RAD 1431**
And *Bye, Bye, Blues.* Both up to standard.

In the Valley of Dreams (f.), Jay Wilbur and his Band, 1s. 6d. **IMP 2388**
A good dance record with some individuality about it. *My Desire* (f.) on the other side.

King's Horses (f.), Midnight Merrymakers, 1s. 3d.
BRDCST 656
Yet another version of it. One of the best I have heard and I seem to have heard many. The *Love Waltz* is the companion. A very good record.

★Solemn and Gay, with orch., 2s. 6d. **ZONO 5750**
This is a very good version of it. I consider this one of the outstanding tunes of the season. The companion is the *Chum Song*—very well done. Admirable recording—so good, that I feel I must mark it as one of the month's best records.

Little Russian Rose, Norman Blair, bar., with orch., 2s. 6d. **ZONO 5774**
And *Oh Donna Clara.* Both are well known. You can safely buy this edition.

Little Sunshine, Irving Kaufmann, with orch., 1s. 6d.
IMP 2396
Good singing is a feature of this record. I wish all the dance voices were as resonant.

SPECIAL REVIEWS BY WHITAKER-WILSON

Make up Your Mind You're Gonna be Young (f.), Randolph Sutton, with orch., 1s. **RAD 1437**

He *sings* his songs, which is more than most dance singers do. This is very good and a jolly tune. *Practice in the Moonlight*, another quick fox-trot, is equally attractive. I recommend this record.

Moonlight on the Colorado (w.), Ferrachini's Hawaiian Band, 2s. **BRDCST 2605**

Quite pleasant to listen to and, in a degree, rhythmical. I recommend it more for its melodic value than as a dance number; there it fails a little, in my opinion. *Cuban Love Song* on other side—rather well done.

Moonshine is Better than Sunshine (f.), G. H. Elliott, 1s. 3d. **RAD 1415**

He is always good. I recommend this unreservedly. He sings, on the other side, *Swingin' in a Hammock*. He DOES *sing*, which is more than most of these dance people can do.

My Cradle is the Desert (f.), Jock McDermott and his New Carlton Players, 1s. 6d. **PIC 689**

This is quite pleasant; I liked it the first time I heard it. It is not Eastern enough for my liking, but quite effective. *King's Horses*—another rage—is the companion.

Midnight Merrymakers, 1s. 3d. **BRDCST 654**

Not Eastern enough for the title, but otherwise attractive. I prefer *Day by Day* on the other side; it is quite an effective waltz. Excellent recording.

My Description of You (f.), Sam Browne, with orch., 1s. 3d. **RAD 1428**

His voice is above the general run of dance voices, but he mispronounces his words sadly through ignorance of English phonetics. He needs lessons. Otherwise the record is pleasant enough.

My Heart Belongs to the Girl Who Belongs to Somebody Else (w.), Jock McDermott and his New Carlton Players, 1s. 6d. **PIC 691**

A very effective waltz, now well known. *Go Home and Tell Your Mother* is the fox-trot on the other side. This latter bids fair to being a rage this season.

Never Swat a Fly (f.), Abe Lyman and his California Orch., 3s. **BRUNS 1034**

A vigorous fox-trot, perfectly recorded. *There's Something About an Old-fashioned Girl* is another excellent fox-trot. I recommend this. The words in both cases are excellent.

Arthur Riscoe, with orch., 1s. 6d. **IMP 2401**

A good version, and also of *Sing Something Simple*.

★Jack Hylton and his Orch., 3s. **H.M.V. B5943**

A very good rendering. *Sing Something Simple* appears on the other side, also excellently done. The standard of recording leaves very little to be desired.

O-kay, Baby (f.), Rhythmic Eight, orch., 2s. 6d. **ZONO 5784**

A very good dance record; the pace is moderate. *What Good am I Without You?* is on the other side. I recommend this for dance purposes.

Oh, Donna Clara (f.), Rhythmic Eight Orch., 2s. 6d. **ZONO 5757**

A good dance record. The companion is *Living a Life of Dreams*, which I like very much.

Old-fashioned Song of Love (w.), Leroy Shield and the Hollywood Orch., 3s. **H.M.V. B5941**

And *Sing Song Girl* (fox-trot). Both are good and well recorded. A very rhythmical dance record. The fox-trot is the better and is moderate in pace.

Put Your Worries Through the Mangle (f.), Randolph Sutton, with orch., 1s. 3d. **RAD 1426**

This is distinctly good. The companion is the well-known *Under the Sweetheart Tree*.

Roamin' Thru' the Roses, Les Allen, with orch., 1s. 6d. **IMP 2376**

A sleepy fox-trot tune and very attractive, too. His voice is adenoidal, but most dance voices are! I prefer Robert Gwyn singing *Silver Tone Chimes of the Angelus* on the other side (another slow fox-trot song).

Radio Melody Boys, 1s. **RAD 1427**

And *Sunny Days*. The R.M.B.'s make a good record. Ask to hear this.

Same as We Used to Do (w.), Al Benny's Broadway Boys, 2s. **BRDCST 2601**

And *The Love Waltz*. I recommend this disc for dance purposes; you will find it quiet and peaceful after the noisier fox-trots.

Bob and Alf Pearson, with piano, 1s. 3d. **BRDCST 648**

And *Little White Lies*. I like those two; they produce a very acceptable record.

★**Say "Oui," Cherie** (f.), Jack Payne and his B.B.C. Dance Orch., 3s. **COL CB174**

A splendid version of it; and of *Love is Like a Song*. I recommend this strongly as being an outstanding dance record.

Silver-toned Chimes of the Angelus (w.), Midnight Merrymakers, 1s. 3d. **BRDCST 655**

A very fair waltz tune; I have heard better. *Don't Tell Her What's Happened to Me* is on the other side, which rather makes up for this side.

Sing Something Simple (f.), Fred Rich and his Orch., 1s. 6d. **IMP 2390**

And *Three Little Words*. Very good recording makes this excellent for dancing, with electrical reproduction, especially.

★Marius B. Winter and his Dance Band, 2s. **BRDCST 2606**

And *Never Swat a Fly*. Both are so well produced that I include the record in the "month's best."

Singing a Song to the Stars, Lewis James, ten, with orch., 2s. 6d. **ZONO 5752**

And *With My Guitar and You*. Both are film features and well known and both are well known here.

Ted Summers' Dance Devils, 2s. **BRDCST 2610**

A very good dance record. *Just a Little Closer*, on the other side, makes an excellent companion, especially for electric reproduction.

Sittin' on a Five-barred Gate (one-step), Jack Payne and his B.B.C. Dance Orch., 3s. **COL CB197**

A very jolly one-step, played excellently. Melodically it is not so good as *You're Gonna be Young*, another one-step on the other side.

Sobbin' Blues (f.), Ted Lewis and his Band, 3s. **COL CB189**

This band has much to recommend it in the dance sense. Also I like the melody. *Yellow Day Blues*, on the other side, is even better. Ask to hear it; the recording is admirable.

So Beats My Heart for You (f.), Al Benny's Broadway Boys, 2s. **BRDCST 2602**

Very rhythmical and in every way suitable for dancing. *If I Could be With You* is on the other side; very effective. A very good dance record.

Soldier on the Shelf (f.), Marius B. Winter and his Dance Orch., 2s. **BRDCST 2600**

We can do with a few more of these descriptive dance tunes indeed, I think if the gramophone companies concentrated on dance records for their descriptive efforts they would do better. The ordinary descriptive record is hopeless. This is distinctly good. I also like *Beware of Love* on the other side.

Soldier on the Shelf (f.), Jack Hylton and his Orch., 3s. **H.M.V. B5917**

A quick fox-trot. Very effective. I like, also, *Somewhere in Old Wyoming*, on the other side. It is a taking waltz. A very good dance record.

Somewhere in Old Wyoming (w.), Dixie Marimba Players, 1s. 6d. **IMP 2372**

And *Falling in Love Again* played by Jay Wilbur and his Band. Both good.

Sunny Days (f.), Marius B. Winter and his Dance Orch., 2s. **BRDCST 2607**

And *Roamin' Thru' the Roses*. Both very well done and thoroughly to be recommended for dance purposes.

Swingin' in a Hammock, Mellow and Rich, 1s. 3d. **BRDCST 642**

Also *I Remember You from Somewhere*, which is attractively rendered. The standard of these small *Broadcast* discs is better than ever.

Syncopated Melody (w.), Jock McDermott and his New Carlton Players, 1s. 6d. **PIC 678**

A misnomer, the melody is not particularly syncopated. Its accents fall on the beat almost everywhere. I like it notwithstanding. *Let's Have a Singsong* is on the other side; that I do *not* like.

Telling it to the Daisies (f.), Bert Maddison and his Orch. 1s. 6d. **STERNO 579**

And *Oh Donna Clara* (tango). A good version of both, with excellent recording.

There's Danger in Your Eyes, Cherie! (f.), Vincent Lopez and his Orch., 1s. 6d. **IMP 2356**

As a quick fox-trot, this has much to recommend it. So has *I Love You So Much* on the other side. A pleasant orchestra.

That's Where the South Begins, Orpheus Dance Band, 2s. 6d. **ZONO 5758**

And *Little White Lies*. Both are excellently done. A very good record.

Three Little Words (f.), Duke Ellington and his Orch., 3s. **H.M.V B5945**

I like the Duke (of) Ellington's Orchestra; it is rhythmical and expressive. I am not too keen on these *Three Little Words*; I prefer *Ring dem Bells*. But this record is up to H.M.V.'s *new and higher standard*.

Underneath the Spanish Stars (w.), Midnight Merrymakers, 1s. 3d. **BRDCST 668**

And *Somewhere in Old Wyoming*. This is quite a good dance record, and I recommend it for that purpose.

Wedding of the Birds (f.), Earl Burtnett and his Los Angeles Orch., 3s. **BRUNS 1036**

A splendid fox-trot. The amount of bass that is coming through on the electrical machine here (as I write) is amazing. *Say "Oui," Cherie* is the companion; it is an attractive fox-trot. I recommend this record for its surface and dancing possibilities. Get it and try it out on your pick-up.

What a Perfect Night for Love (f.), Marius B. Winter and his Dance Orch., 2s. **BRDCST 2599**

This is an admirable dance record; the recording is really excellent. *Oh Donna Clara* is the companion. Out of many such records, I consider this to stand out clearly.

What Good am I without You (f.), Jay Wilbur and his Band, 1s. 6d. **IMP 2391**

Quite good. His band is always worth hearing.

Where Can You Be? (f.), New York Night Birds, 2s. **BRDCST 2604**

The N.Y.N.B.'s produce a safe record. These tunes are too well known to discuss, but you are safe in buying if you want them.

Who Cares (f.), Rhythm Maniacs, 2s. **DEC F2036**

Very good. So is *Liza Lee*. The Rhythm Maniacs always produce a safe record. Ask to hear this.

Wonder Bar, Jack Leon's Concert Orch. (d.s.), 1s. 6d. **PIC 683**

This is a splendid selection from this remarkable production. It is well sung and played. Ask to hear it.

Yoi! Yoi! Mr. Cohen (one-step), Jack Payne and his B.B.C. Dance Orch., 3s. **COL CB186**

A vigorous one-step; the words are very good. This and *What's the Matter, Abie?* should prove to be very popular.

THE CONDUCTING KNOB

NOT electrically conducting, but capable of being used for conducting musically either an orchestra, a solo, or an accompaniment! How useful the volume control is, whether it be upon the radio set or on the radio gramophone.

Putting in More "Life"

We can only use it to increase or decrease volume, nevertheless, by keeping one's fingers on the knob, what tremendous *life* one can put into a reproduction by quite tiny movements, properly timed of course.

From the long, slow motion back and forth necessary to produce a march past effect with a military band march (good drums in H.M.V. B2327 and B2361), to the frequent little swells that will so greatly improve the vitality of such music as Percy Grainger's *Mock Morris* (Winner 5144, 2s.).

And how one can *push* effects with a waltz like *Delilah* (Parlo E6286, 2s. 6d.).

With dance music the volume control is just as useful, but one rarely needs to shift it except suddenly and to aid a change of treatment, but the scratch reducer is extremely valuable for changing degrees of frequency in tone.

H. T. B.

A NEW SHAPE IN GRAMOPHONE HORNS

I SUPPOSE the Limit Engineering Co., Ltd., make more than half the internal gramophone horns used in the United Kingdom. During the winter rush I have seen thousands a day going away and thousands more in process of manufacture.

Recently they have produced a metal horn for medium-sized cabinets at once of such unusual design and having such an unequalled performance that a description of it will be of interest.

It will be seen from the photograph that the acoustic system is anything but a long one (4 ft. 7 in., including the tonearm), and that the flaring is comparatively rapid.

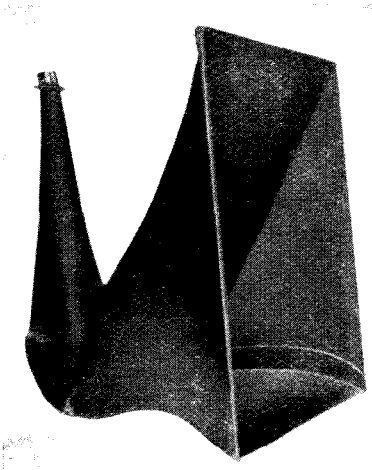
The lead-covered iron sheet is of a stout gauge and the panels of the horn mouth are stiffened by impressed lines. The dimensions of the horn mouth are such as to suit a cabinet opening 17 in. by 22 in.

Reflex action occurs (possibly a *double* reflex) at, and close to, the point where the downtake joins the horn mouth, the curves of the bottom and top of the horn mouth being contributory to this.

Unquestionably the horn behaves in bass reinforcement like a simple horn of much greater length, and yet its very open construction permits the middle and top of the scale to be extremely clean and brilliant.

The actual volume of tone all over the scale is considerably greater than I ever heard from a machine of its size, with entire absence of all false effects and resonances.

The horn is a feature of the new Model 83 Dulcetto (£15 15s.), and of two cheaper models that may be seen at the Dulcetto-Polyphon showroom.



FOR MEDIUM-SIZED CABINETS

This new gramophone horn is a product of the Limit Engineering Co., Ltd.

I must remind those who wish to fit such a horn to an existing case that it is imperative that the tone arm should fit the horn mouth and that, like the horn, it must be of relatively rapid flare. A 55 m.m. soundbox should be used for best results.

H. T. B.

QUERIES

AT some time or other you are certain to want to know something about gramo-radio that only an expert can answer. In such cases you are invited to consult Capt. H. T. Barnett, M.I.E.E., through the "W. M." Information Bureau.

Getting Advice

Capt. Barnett is a recognised authority on all gramo-radio matters and his advice can always be obtained by conforming with the query rules indicated on the last page of this issue.

A fee of 1s. must accompany each query, as well as a stamped addressed envelope and a coupon;

LARGER SOUNDBOXES

NO doubt quite the best-known soundbox of the past year is the half-guinea Limit. The diameter of the diaphragm is 47 millimetres, and, for its size and at its price, in my opinion, it is still the best soundbox procurable.

But I am glad to say the makers have learnt that on most gramophones a larger diaphragmed box may be used with advantage, and they have now produced a new box, the Excelcis, at 15s. 6d., having a diaphragm diameter of 43 millimetres.

With a large box, of course, it is difficult to get the motion of the stylus bar communicated to a sufficient area of the diaphragm, and in this case the makers have overcome the difficulty by reinforcing that portion of the diaphragm extending right from the stylus bar end to the inner edge of the indented outer flange.

Handsome Finish

The finish of the box is very handsome—plating and indigo enamel, and a new provision is a safety feature preventing the stylus bar from being moved far enough to buckle the diaphragm. The needle grip is cut for fibre or steel needles.

This Limit soundbox should be given a trial.

H. T. B.

AN A.C. UNIT for BIG SETS

This unit is for supplying multi-valve sets with anode current at high voltage. With a total consumption of 100 milliamperes a voltage of approximately 180 volts is available, but if the load is reduced to 50 milliamperes the voltage rises to about 210 volts. Five different output tappings are provided for supplying the various stages of a multi-valve receiver. The whole unit is housed in a metal box

Here you see the switch which cuts off the mains when the lid of the box is opened. It is impossible to get shocks

MORE and more constructors are converting their receivers for operation from the electric-light mains. Obtaining high-tension supply in this way does away with all battery troubles and a set so supplied with anode current can be relied on to put up a consistently good performance at all times.

Large Output

During the past few weeks many requests have been received by WIRELESS MAGAZINE for a high-tension unit to work from A.C. (alternating-current) mains and giving an output of the order of 50 milli amperes at a high voltage.

Here, then, we present details of a high-tension unit suitable for supplying large multi valve sets. The unit is quite straightforward in construction and is assembled in a metal safety box, so that the possibility of accidental shocks is entirely eliminated.

We will briefly outline the essential features of a unit for obtaining high tension current from electric mains

Essential Parts

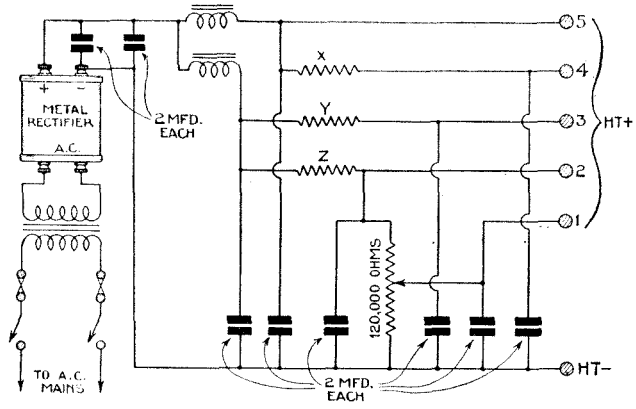
Every unit for operation from A.C. supplies contains four separate parts which are essential for correct operation. They are (1) a mains transformer, (2) a device for converting alternating current into direct current, (3) a smoothing circuit to "even up" any irregularities in the supply, and (4) resistances to control the voltage applied to the set.

The mains transformer is used to reduce the supply voltage to a suitable value for application to the converting apparatus, which in this case is a metal rectifier. After the metal rectifier comes the smoothing circuit, consisting of a combination of large-capacity condensers and low-frequency chokes.

Following the smoothing circuit are the voltage-regulating resistances and by-pass condensers that prevent low-frequency oscillation, or motor-boating as it is more usually termed.

In the unit described in these pages five separate output terminals are provided so that five different values of voltage can be obtained for supplying the various stages of a multi-valve receiver.

A particular feature of the unit is that it is built up in a special metal box that incorporates a mains switch and a pair of fuses in the lid. When the lid is opened the switch is broken and the apparatus inside the box is completely isolated from the main supply. There is thus no possibility of getting a shock when making adjustments inside the unit.



NOTHING COMPLICATED ABOUT THE CIRCUIT

This unit makes use of a metal rectifier for converting A.C. to D.C. The values of the resistances X, Y and Z are easily calculated for any particular valves

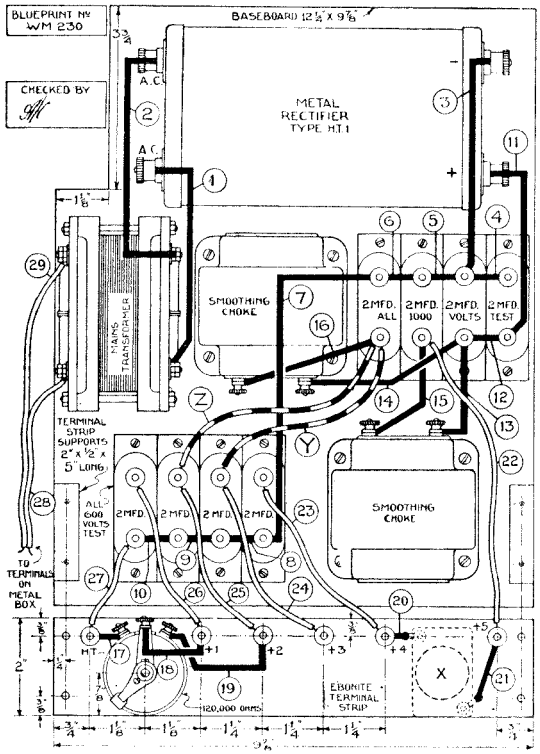
Raw D.C.

The mains transformer is so designed that the secondary gives 230 volts for application to one side of the metal rectifier, the output of which is direct current. The rectifying action is not absolutely smooth, however, and if the raw D.C. were applied direct to the receiver, unpleasant noises would result.

Smoothing is effected in this unit by two 2-microfarad fixed condensers, and it is important that these should

Even if you do not want to build a mains unit of this type, you will learn something from this article, which explains many important points in the use of electric mains for radio

AN A.C. UNIT FOR BIG SETS—Continued



LAYOUT AND WIRING DIAGRAM

This diagram can be obtained as a full-size blueprint for half price (that is, 6d., post free) if the coupon on the last page is used by March 31. Ask for No. WM230

be of the type tested at 600 or 1,000 volts.

Following these smoothing condensers are two low-frequency chokes; the first smooths the supply taken from the output terminals marked H.T.+5 and H.T.+4, while the second choke smooths the current taken from H.T.+3, H.T.+2, and H.T.+1.

H.T.+5 is connected direct to the choke and gives the maximum voltage that can be obtained from the particular rectifier used.

Voltage Regulation

The voltages obtained from H.T.+4, H.T.+3 and H.T.+2 are controlled by the fixed resistances marked X, Y and Z respectively. The values of these resistances must be calculated for each individual case, and the method of doing this will be explained in detail later.

The output from H.T.+1 is taken from a 120,000-ohm potentiometer and is intended for supplying the screening grids of shielded valves. It will be noted that the potentiometer is actually in series with resistance Z; it is almost impossible to overrun the screened-grid valves as the voltage obtained from H.T.+1 can never exceed that taken from H.T.+2.

Beginners in mains radio often fail to understand that in a mains unit the voltage obtained depends on the load actually applied, whereas in the case of a battery the voltage remains practically constant at all loads within the capacity of the cells.

It has already been said that this unit is intended for supplying sets with an anode-current consumption of the order of 50 milliamperes, but, in fact, it will supply up to 100 milliamperes. The point to note is that the maximum voltage depends on the load taken.

Following is a rough indication of the voltages available when different current outputs are taken from the unit:

At 20 milliamperes the maximum voltage is approximately 250; at 30 milliamperes, 240 volts; at 40 milliamperes, 230 volts; at 50 milliamperes, 210 volts; at 60 milliamperes, 205 volts; at 70 milliamperes, 195 volts; at 80 milliamperes, 190 volts; at 90 milliamperes, 180 volts; and at 100 milliamperes, 170 volts.

Before calculating the values of resistances needed at X, Y and Z, it is essential to know the anode currents required by the valves used in the set in conjunction with which the unit is to be employed.

Valve Consumption

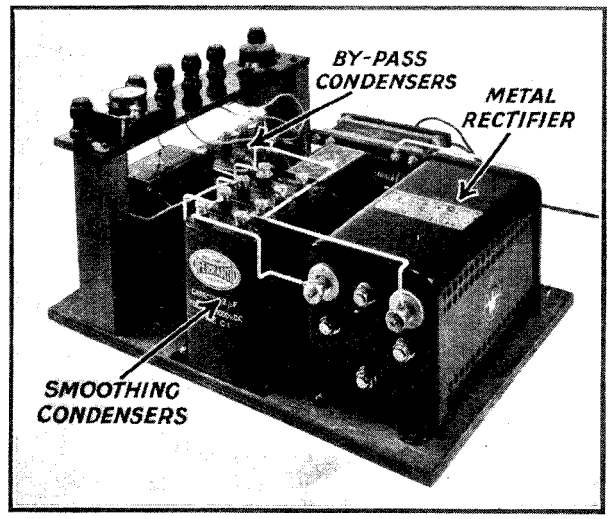
The easiest way to find the anode-current requirements is to refer to the characteristic curves supplied by the valve manufacturers, but if these are not available, the details given in the special valve tables on pages 116 and 118 will be found a useful guide. Not only must the total load be determined, but the current for each individual valve must be ascertained.

This A.C. mains unit is particularly suitable for supplying large radio-gramophone combinations with high tension. The voltage varies between 170 and 250 volts, depending on the load taken by the valves in use

As an example, we will consider the case of a five-valve set consisting of a screened-grid high-frequency amplifier, leaky-grid detector, intermediate low-frequency stage and two power valves arranged in push-pull.

Simple Examples

We will assume also that the following currents and voltages are needed for supplying the particular valves in use: (1) Approximately 60 volts for application to the screening grid of the shielded valve; (2) 2 milliamperes at 80 volts for the detector valve, which could be taken from H.T. + 2; (3) 4 milliamperes at 120 volts for the anode of the screened grid valve, which could be taken from H.T.+3; (4) 8 milliamperes at 150 volts for the first low-frequency valve, which could be taken from



EASY TO BUILD AND EASY TO USE

Any constructor can build up this unit without difficulty. It is quite safe to use when in its metal case

DESIGNED BY "W.M." TECHNICAL STAFF

This article explains points about mains units that every listener should know. Read it even if you do not intend to build an eliminaior at present; you will learn some important things

H.T.+4, and (5) 20 milliamperes at 200 volts for each of the push-pull power valves, which could be obtained from H.T.+5.

Now it will be seen that in this case the total current consumption will be 54 milliamperes and, as we have already seen, the maximum voltage available will be about 210 volts. We now have to calculate what values of resistances at X, Y and Z will give the currents and voltages required from H.T.+4, H.T.+3, and H.T.+2.

Well-known Formula

At this stage we have to fall back on the well-known formula derived from Ohm's Law, which states that the current flowing in a circuit is proportional to the voltage divided by the resistance. In this case we can transpose the formula to the form

$$R = \frac{E}{C}$$

because in this particular case the voltage and current are known and we have only to determine the resistances.

It is important to notice in this formula three things: (1) the resistance is in ohms, (2) the voltage is that which has actually *to be dropped* by the resistance, and (3) the current is in amperes.

Simpler Expressions

This can easily be expressed in the following way. We can say that the value of resistance required is equivalent to

$$\frac{\text{Output Voltage from Unit—Voltage Required}}{\text{Current in Amperes}}$$

but as a milliampere is a one-thousandth part of an ampere, we can express the above equation more simply in the form

$$\frac{\text{Output Voltage from Unit—Voltage Required} \times 1{,}000}{\text{Current in Milliamperes}}$$

Now we can easily calculate the value of resistance z by inserting the proper figures in the above formula; in this case

$$\frac{210 - 80 \times 1{,}000}{2} = \frac{130{,}000}{2} = 65{,}000$$

Actually no manufacturer makes a 65,000-ohm resistance, so we must use the nearest commercial value, which is 60,000 ohms.

In the same way for resistance Y we get

$$\frac{210 - 120 \times 1{,}000}{4} = \frac{90{,}000}{4} = 22{,}500$$

In this case it would be necessary to use a 20,000-ohm resistance, which is the nearest commercial value.

For X we get

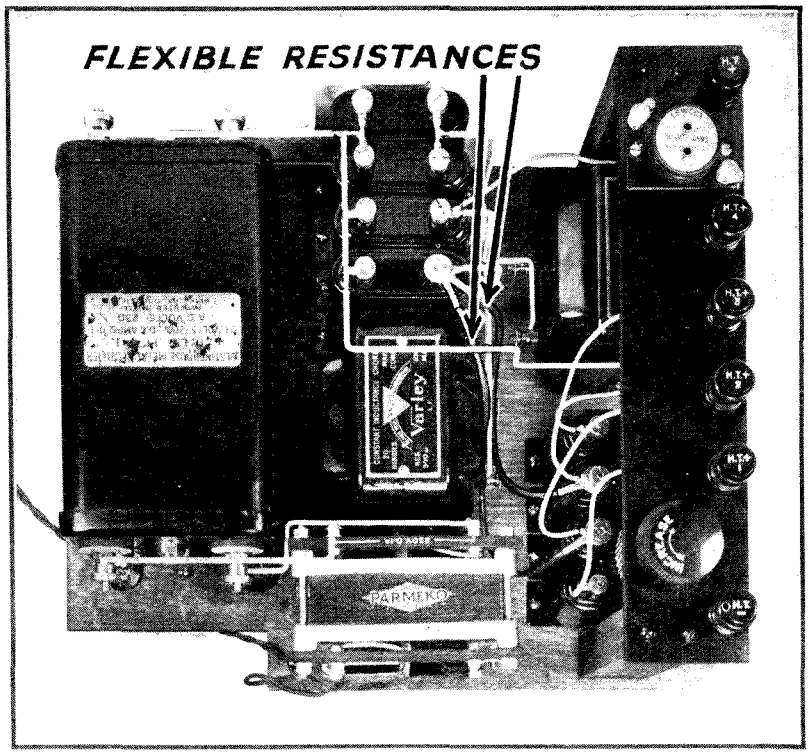
$$\frac{210 - 150 \times 1{,}000}{8} = \frac{60{,}000}{8} = 7{,}500$$

Here it would be necessary to use a 5,000-ohm resistance.

From these examples it should be quite clear how to calculate the proper resistances for supplying any particular valves.

In the case indicated the power valves could be supplied with 210 volts directly from H.T.+5, while the voltage from the screening grid from H.T.+1 can be varied up to 80 volts by means of the potentiometer.

If the power valves to be supplied do not need more than 150 volts on the anode they should be supplied from H.T.+4, or a resistance and by-pass condenser inserted in the feed marked H.T.+5.



HOW THE PARTS ARE ARRANGED ON THE BASEBOARD

This plan photograph shows clearly the disposition of the parts in the unit. Flexible or bobbin-type resistances can be used for voltage regulation as explained in the article, which is very simple to follow

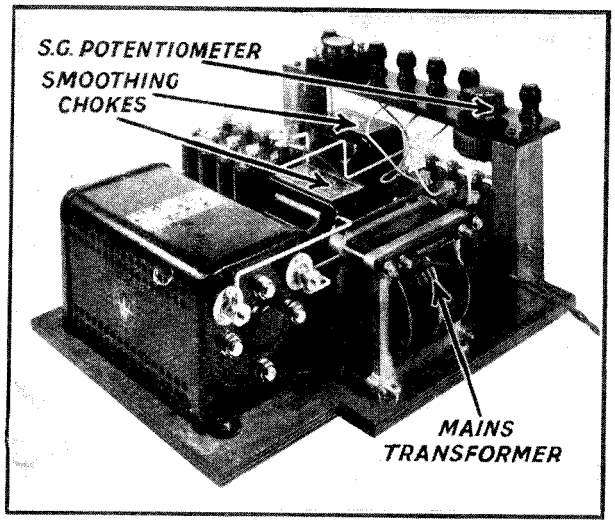
Do not use this unit for sets needing only 20 milliamperes at 120 volts. For such purposes we recommend the "W.M." Standard A.C. Unit described in October, which is similar in design and much cheaper

Two Valves from One Tap

Should it be desired to supply two valves from a common tapping, it should be remembered that the current flowing through the resistance will be the sum of the currents for the two valves, while the voltage applied to each valve will be the same.

In the original unit we have used an interchangeable bobbin type of resistance at X and two spaghetti, or flexible, resistances at Y and Z. If

AN A.C. UNIT FOR BIG SETS—Continued



JUST THE THING FOR A MULTI-VALVER

This unit is intended for supplying sets that need 50 to 100 milliamperes anode current; it is not recommended for small sets

desired, all three resistances can be of the bobbin type (there is room to mount three bases on the ebonite terminal strip) or of the flexible type.

It is most important to see that the resistances used will carry the required current, and for the guidance of constructors we give below the

This unit can be adapted for use with any large set by using the proper values of voltage-regulating resistances, the calculation of which is a simple matter. Read this article and see how it is done.

current-carrying capacities of three makes of resistances:

LEWCOS.—5,000 ohms, 12 milliamperes; 10,000 ohms, 8.5 milliamperes; 20,000 ohms, 6 milliamperes; 30,000 ohms, 5 milliamperes; 40,000 ohms, 4.5 milliamperes; and 50,000 ohms, 4 milliamperes.

Flexible Resistances

MAGNUM.—1,000, 1,500 and 2,000 ohms, 30 milliamperes; 2,500 and 10,000 ohms, 20 milliamperes; 15,000 ohms, 10 milliamperes; 20,000 ohms, 8 milliamperes; 30,000, 40,000 and 50,000 ohms, 5 milliamperes.

BULGIN.—1,000 ohms, 12 milliamperes; 2,000 ohms, 10 milliamperes; 3,000, 4,000 and 5,000 ohms, 8 milliamperes; 10,000 ohms, 5 milliamperes; 15,000 and 20,000 ohms, 4 milliamperes; 25,000, 30,000 and 40,000 ohms, 3 milliamperes; and 50,000 ohms, 2.5 milliamperes.

It may be found that there is no resistance available that will carry the current required. In such cases it will be necessary to use two resistances of twice the value actually required wired in parallel.

Those who want a smaller unit, giving 20 milliamperes at 120 volts, are recommended to build the "W.M." Standard A.C. Unit, fully described in WIRELESS MAGAZINE for October, 1930. A full-size blueprint is, of course, available.

Tell All Your Friends About the

SUPER 60

A Super-het That Can Be Built in Three Hours

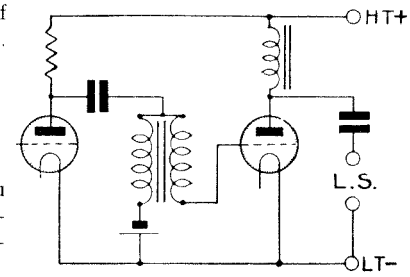
TRANSFORMER CONNECTIONS

WHICH way round would you join the windings of the transformer used in the circuit arrangement illustrated?

That the two windings, the primary and secondary, must be connected in the correct sense is obvious, for if one is reversed the magnification is cut down. Thus, to take an example, with a 3 to 1 transformer we obtain a step up of 4 to 1 when the two windings are properly joined, but only 2 to 1 when one of the coils is reversed relative to the other.

The grid (G) terminal of the transformer must be taken to the grid of the valve, as a rule, and the difficulty is to know which two of the remaining terminals must be connected.

Unfortunately, transformers of different makes are not wound and wired alike. The result is that no rule can be given. Some makers provide a slip in the box with the transformer showing how to connect the component in various circuits. But others do not, and you therefore have to find the connections yourself by trial



Circuit of auto-transformer connections, explained in accompanying note

This is an easy enough job, fortunately. Incidentally, when using this circuit do not overlook the voltage drop in the resistance. You may find, if too high a resistance is used, that the voltage applied to the valve is not enough for good results. On the other hand, when the resistance is relatively low, the amplification is less than the optimum.

W. JAMES.

COMPONENTS REQUIRED FOR THE MAINS UNIT

CHOKES, LOW-FREQUENCY
2—Varley constant inductance, type DP12, £2 2s.

CONDENSERS, FIXED
4—Ferranti 2-microfarad, type C2, 15s. (or T.C.C., Hydra).
4—Ferranti 2-microfarad, type C1, £1 2s. (or T.C.C. Hydra).

EBONITE
1—Terminal strip, 9¾ by 2 in.

METAL RECTIFIER
1—Westinghouse, type H.T.1, £3 15s.

RESISTANCES, FIXED
3—Fixed resistances, values to be calculated (Magnum or Bulgin flexible, or Lewcos bobbin type).

RESISTANCE, VARIABLE
1—Regenstat 120,000-ohm potentiometer, 9s. 6d. (or Rotor)

SUNDRIES
Glazite insulated wire for connecting.
Short length of rubber covered wire (Lewcos).
2—Wood supports, 5 in. by 1¼ in. by ¾ in.
1—Baseboard, 12 in. by 8¾ in.

TERMINALS
6—Belling-Lee, marked: H.T.—, H.T.+1, H.T.+2, H.T.+3, H.T.+4, H.T.+5, 3s. (or Clix, Eelex).

TRANSFORMER, MAINS
1—Parmeko, type 2M, £1 10s.

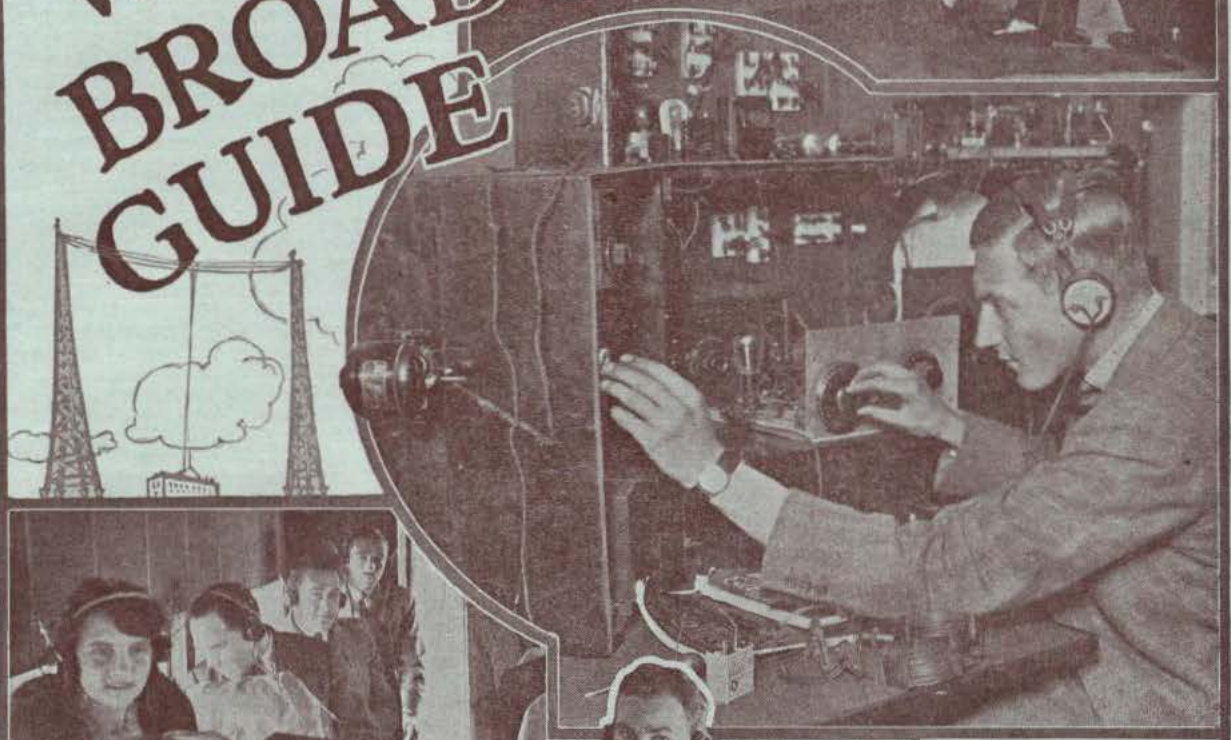
ACCESSORIES

SAFETY BOX
1—Ferranti, £1 10s.

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

This is the fifth special Supplement to be presented with WIRELESS MAGAZINE *since November last. It will be found a real help to every set owner. Keep it near your receiver for reference.*

THE "W.M." WORLD'S BROADCASTING GUIDE



YOU CAN ALWAYS ENJOY RADIO!

No matter where you are—at home, in an aeroplane at a picnic or on a train—you can always get entertainment from wireless.

The top photograph on this page shows a group of happy listeners dancing to radio music picked up on a Marconiphone set.

Just above you see an enthusiast receiving television from America on an ultra short-wave set. Many long-distance broadcasts can be received on wavelengths below 100 *metres.*

On the left is a photograph showing a McMichael portable being used for reception on an aeroplane.

This broadcasting guide is intended to help you to get the very best results from your set under all conditions.

Exclusive to WIRELESS MAGAZINE

AN INTERNATIONAL SURVEY

How the World's Broadcasting Is Organised :: Recent Developments Disclosed :: All About the Services Available to Radio Listeners in Forty Different Countries

ARGENTINA

Radio is controlled by the government through the Chief of Naval Communications. Broadcasting is permitted freely, permits costing only one peso stamp tax on the application. Receiving sets may be installed by anyone, the only requirement being that the Chief of Naval Communications be advised of the installation.

AUSTRALIA

Broadcasting is under the control of the Postmaster-General. Stations are divided into two categories, those of high and those of low power. There is no restriction as to the number or location of low-power stations, but high power is permitted to only one station in each of the states, except Victoria and New South Wales, each of which may have two.

These stations are more strictly administered than those of low power and participate in the proceeds from receiving licence fees. Arrangements have been made for these stations to be taken over by the Federal Government.

Metres	*Call*	*Station and State*
350	2BL	Sydney, New South Wales
375	3LO	Melbourne, Victoria
394.5	4QG	Brisbane, Queensland
412	5GL	Adelaide, South Australia
435	6WF	Perth, West Australia
451	2FC	Sydney, New South Wales
484	3AR	Melbourne, Victoria
516	7ZL	Hobart, Tasmania

AUSTRIA

In Austria one company, Ravag (Radio-Vekehrs, A.G.; that is, Radio, Ltd.), has a monopoly on all radio broadcasting rights; 55 per cent. of the shares of this limited liability company is in private hands (a syndicate of bankers), and 44 per cent. is held equally (22 per cent. each) by the National Government of Austria and the Vienna municipal government. Before the profits are divided, however, certain "licence fees" are paid to the municipal governments of Graz and Innsbruck for concessions to operate in each of these two cities auxiliary and relay stations.

The 45 per cent. share participation of the national and Vienna municipal governments was accepted in lieu of taxation.

Ravag's programmes are entirely cultural, no advertising of either a commercial or a political nature being tolerated. If such were attempted, the public would go on strike and parliamentary deputies would take the matter up immediately.

Included in the programmes are music, drama, travel, lectures, news, police notices of persons who have disappeared or who are wanted urgently by their families, opera-house relays, the weather, crops, shipping, stock exchange (when it is active), and markets.

General news is broadcast at regular intervals twice daily, once at midday and once in the early evening—and sporadically at other hours if something outstanding has happened anywhere in the world. All news is provided by and credited to the Austrian official news agencies (Reuter's, Wolff, Havas, or Stefani of Austria).

This news is in theory copyrighted but no special emphasis is placed on this fact and no prosecution for publication has ever been instituted — probably because the news is given out in a very abbreviated and incomplete form, is usually old, and is always closed with the words "further details will be found in the afternoon (or morning) newspapers."

To possess a receiving set in Austria the owner must become a "programme subscriber" and pay to Ravag from two to seven Austrian schillings per month, according to one's income. In practice, however, everyone pays only the minimum because if one's income makes him or her liable for the higher rates he or she simply registers his or her servant as the owner. Thus the gross income of Ravag at present is approximately £300,000 annually, there being slightly more than 400,000 subscribers.

BOLIVIA

Radio broadcasting is under the control of the Ministry of Communications, Director General of Telegraphs. Licences are granted, without any monopoly, only for the gratuitous broadcasting of entertainment. Five minutes of each hour may be employed for the broadcasting of advertising matter. Stations are licensed to operate during certain hours daily.

BULGARIA

Radio has been discouraged in Bulgaria to the point that there is practically no development. There is yet no indication of any appreciable advancement during the next few years. All the means of communication, such as railways, telephones, telegraphs, and wireless stations, are monopolies of the government, which will not permit the private construction or operation of radio broadcasting or receiving stations.

CANADA

There are no exceptional regulations governing broadcasting or reception, except the requirement of an annual licence for receivers costing a dollar per year. Legislation is proposed for governmental operation of chain stations. Radio stations are now independently owned, with many of the powerful stations in possession of railway companies. Broadcasting at present is under supervision of the Ministry of Marine and Fisheries.

CANARY ISLANDS

Radio is controlled through the Director General of Communications. Broadcasting is permitted to Spanish citizens, and licences are issued on the payment of licence fee.

CHILE

Radio is controlled by the Ministry of Marine. The only regulations affecting broadcasting are those requiring registration and the ordinary precautions for the safety of the State and the protection of public morals. Registration of receiving sets is required.

COSTA RICA

The only properly called broadcasting station in the country is the station Tic of the Department of National Radios, operated by the government of Costa Rica, which controls all radio communications. This station operates on a 360-metre wave and is on the air every night from 8.30 to 11 p.m. except Sundays, when it transmits the results of the local lottery from 12 noon to 12.30 p.m.

The station may not properly be classified as commercial, and there is being prepared a two-kilowatt station for the use of the department and for radio broadcasting.

There are other 5-watt

(Continued on Page Four)

WAVELENGTHS OF THE WORLD'S BROADCASTERS

Wave-length	Name of Station	Dial Readings		Country
206	Antwerp...			Belgium
	Verviers			Belgium
209	Budapest			Hungary
216	Chatelineau			Belgium
216.3	Konigsberg			Germany
218	Flensburg			Germany
	Salzburg			Austria
221	Helsinki			Finland
223	Fecamp			France
224.5	Cork (IFS)			Irish Free State
227	Cologne			Germany
	Münster			Germany
	Aachen			Germany
230	Malmö			Sweden
232	Kiel			Germany
234	Lodz			Poland
235	Nimes			France
237.2	Bordeaux-Sud-Ouest ...			France
239	Kristianssand			Norway
	Nürnberg			Germany
240	Beziers			France
241	Stavanger			Norway
	Oporto			Portugal
242	Belfast (2BE)			Ireland
243	Courtrai			France
244	Basle			Switzerland
244	Cracow			Poland
244.7	Ghent			Belgium
246	Cassel			Germany
	Linz			Austria
249	Juan-les-Pins			France
249.6	Schaerbeek			Belgium
251	Barcelona			Spain
253	Gleiwitz			Germany
256	Toulouse (PTT) ...			France
257	Hörby			Sweden
259	Leipzig			Germany
261.3	London National ...			Great Britain
263	Moravska-Ostrava ...			Czecho-Slovakia
265	Lille (PTT)			France
268.7	Barcelona (EAJ13) ...			Spain
209.8	Bremen			Germany
272	Rennes			France
276	Heilsberg			Germany
279	Bratislava			Czecho-slovakia
281	Copenhagen			Denmark
	Magdeburg			Germany
283	Stettin			Germany
	Berlin			Germany
284.7	Innsbruck			Austria
286	Radio Lyons			France
	Montpellier			France
	Swansea (5SX) ...			Great Britain
	Stoke-on-Trent (6ST) ...			" "
	Sheffield (6LF) ...			" "
	Plymouth (5PY) ...			" "
	Liverpool (6LV) ...			" "
288.5	Hull (6KH)			" "
	Edinburgh (2EH) ...			" "
	Dundee (2DE) ...			" "
	Bournemouth (6BM) ...			" "
	Bradford			" "
	Newcastle (5NO) ...			" "
291	Vilpuri			Finland
294	Kosice			Czecho-Slovakia
	Liége			Belgium
295	Limoges			France
296	Turin			Italy
299	Huizen			Holland
	Radio Idzerda			Holland
301	Aberdeen (2BD) ...			Great Britain
302	Falun			Sweden
304	Bordeaux (PTT) ...			France
306	Zagreb (Agram) ...			Jugoslavia
310	Cardiff (5WA) ...			Great Britain
313.2	Genoa			Italy
312.8	Wilno			Poland
315	Natan-Vitus			France
316	Bremen			Germany
317.3	Marseilles (PTT) ...			France
318	Dresden			Germany
319	Sofia (Rodno Radio) ...			Bulgaria
320	Lisbon			Portugal
322	Göteborg			Sweden
323	Breslau			Germany
328	Grenoble			France
329	Poste Parisien			France
332	Naples			Italy

Wave-length	Name of Station	Dial Readings		Country
338	Poznan			Poland
	Velthem (Louvain) ...			Belgium
342	Brunn			Czecho-Slovakia
345.2	Strasbourg			France
349	Barcelona (EAJ1) ...			Spain
352	Graz			Austria
356.3	London Regional ...			Great Britain
360	Mühlacker			Germany
363.4	Algiers			North Africa
364	Bergen			Norway
367	Frederikstad			Norway
368	Seville (EAJ5) ...			Spain
370	Radio LL (Paris) ...			France
372	Hamburg			Germany
376.4	Manchester (2ZY) ...			Great Britain
381	Lvov			Poland
385	Radio Toulouse ...			France
390	Frankfurt			Germany
394	Bucharest			Roumania
399	Glasgow (5SC) ...			Great Britain
401	Reval (Tallinn)... ...			Estonia
402	Tartu			Estonia
403	Berne			Switzerland
409	Katowice			Poland
413	Dublin (2RN)			Irish Free State
416	Radio Maroc			North Africa
418	Berlin			Germany
425.7	Madrid (EAJ7) ...			Spain
427	Kharkov			Russia
432.1	Belgrade			Jugoslavia
436	Stockholm			Sweden
441	Rome			Italy
447	Paris (Ecole Sup. PTT)			France
452	Danzig			Germany
453	Bolzano (1BZ)			Italy
	Klagenfurt			Austria
453.2	Porsgrund			Norway
453.7	San Sebastian			Spain
459	Zurich			Switzerland
466	Lyon-la-Doua			France
473	Langenberg			Germany
479	Midland Regional ...			Great Britain
487	Prague			Czecho-Slovakia
494	Nidaros			Norway
501	Milan			Italy
509	Brussels (No. 1) ...			Belgium
517	Vienna			Austria
525	Riga			Latvia
533	Munich			Germany
542	Sundsvall			Sweden
550	Budapest			Hungary
559.7	Kaiserlautern			Germany
	Augsberg			Germany
566	Hanover...			Germany
570	Freiburg			Germany
574	Ljubijana			Yugoslavia
584	Hamar			Norway
678.7	Lausanne			Switzerland
720	Moscow			Russia
760	Geneva			Switzerland
770	Ostersund			Sweden
800	Kiev			Russia
824	Sverdlovsk			Russia
937.5	Kharkov			Russia
1,000	Leningrad			Russia
1,077	Oslo			Norway
1,071	Scheveningen-Haven ...			Holland
1,103	Moscow Popoff ...			Russia
1,153	Kalundborg			Denmark
1,200	Reykjavik			Iceland
1,228	Istanbul...			Turkey
1,242	Boden			Sweden
1,250	Tunis Kasbah			North Africa
1,304	Moscow			Russia
1,348	Motala			Sweden
1,380	Bakou			Russia
1,411	Warsaw			Poland
1,446	Eiffel Tower, Paris ...			France
1,481	Moscow (Kom)			Russia
1,542	Ankara			Turkey
1,554	Daventry (National)			Great Britain
1,635	Norddeich			Germany
	Zeesen			Germany
1,725	Radio Paris			France
1,796	Lahti			Finland
1,875	Hilversum			Holland
1,935	Kaunas!...			Lithuania

AN INTERNATIONAL SURVEY—

Continued from Page Two

stations operated by amateurs in San Jose with permits, which operate on short and long waves, but more as a means of personal propaganda.

The commercial feature of radio, in so far as it refers to receiving apparatus, is still in a rudimentary stage, but has greatly increased since the establishment of the broadcasting station Tic. It may be stated that the number of receivers has trebled in the last three months, but much must be done before there will be a receiver for every hundred inhabitants, which should be the normal number in 1931; with the possibility of one for every twenty inhabitants in 1932.

Mr. Adrian Collado (San Jose, Costa Rica) has imported a 500-watt transmitter for short and long waves, which is not yet in operation because the valves have not yet arrived. If this station works successfully, and permission of the government is received, it will be the most powerful set in the country. He intends it for commercial purposes, as he is the agent of an American automobile and other foreign manufacturers.

CUBA

Cuba has sixty-seven licensed broadcasting stations. Station CMK in Havana, with 4,000 watts, is the most powerful, and all of the stations are privately-owned and are uncensored. The Cuban Telephone Company and some of the larger hotels and department stores are owners of the larger stations.

CZECHOSLOVAKIA

Radio broadcasting is under the Ministry of Posts and Telegraphs, which controls the monopoly having the broadcasting concession. Broadcasting is supported by subscription collected from receiving set owners. This subscription is ten crowns per month. Licences are granted to Czechoslovakian citizens and to the nationals of other countries which grant the same or greater privileges to Czechoslovakian citizens.

DANZIG

Broadcasting is forbidden by law.

DENMARK

Radio is governed by the State Radio Council. Broadcasting is supported by the proceeds from licence fees.

ECUADOR

Broadcasting has been declared a monopoly. The concession was granted in 1925. Stations in Guayaquil and Quito were planned, but these have not yet been built. No restrictions on the ownership of receiving sets have been reported, but it is apparent that a licence fee is to be charged to support broadcasting.

FRANCE

Broadcasting is permitted by French citizens only. Permits are granted sparingly, apparently to prevent congestion and to guarantee the placing of permits in the hands of organisations qualified to present the best programmes.

Broadcasting is supported by the organisations operating the stations. While there is no monopoly, the majority of the stations are owned by the government through the Ministry of Posts, Telegraphs and Telephones. There are twenty-eight broadcasting stations well distributed over France. Various areas receive broadcasts from all parts of Europe.

A receiving licence fee of 1 franc per year is charged French citizens. Regulations stipulate that foreigners shall pay 10 francs per year, but this requirement is often passed in particular cases. A luxury tax of 12 per cent. on sets consisting more than 500 francs and on parts costing more than 50 francs was instituted in January, 1926. Each licensed station must pay an annual tax of 200 francs.

The law of December, 1926, controlling wireless, charged the Ministry of Posts, Telegraphs and Telephones and the Surete Generale (Secret Police) with surveillance of broadcasting and finding of clandestine broadcasting posts. Both the Ministry of Posts, Telegraphs and Telephones and the Surete Generale have listening stations which are constantly listening-in on all wavelengths broadcasting.

The Surete Generale is concerned chiefly with censoring programmes. It seeks to prevent such things as the boosting of stocks (fake or otherwise), *risque* stories, communist or anti-military propaganda, speeches which the government might consider hostile for domestic reasons, etc. The Ministry of Posts, Telegraphs and Telephones uses sensitive receiving sets to lay triangles around clandestine stations, tracks them down, and causes the arrests of the unlicensed broadcasters.

The government now has eleven official broadcasting posts:—Eiffel Tower, Lille, Rennes, Limoges, Bordeaux, Toulouse - Pyrenees, Montpellier, Marseilles, Superior School of Ministry of Posts, Telegraphs and Telephones in Paris, Grenoble, Lyons.

Two stations are nearing completion, at Strasbourg and Nice.

The Compagnie Generale T.S.F. operates two subsidiaries: Cie. Francaise de Radiophonie (broadcasting of music and commercial programmes), and Radio France (transmission of telegrams). The latter works especially with London, also with Austria, Roumania, Norway, Czechoslovakia, and occasionally South America.

GERMANY

The German Postal Service enjoys a broadcasting monopoly for the entire Reich. A few years ago, together with concerns publishing various radio magazines, the postal department organized a corporation called the Reichsfunk-Gesellschaft; the Government postal administration controls the share majority of this concern.

The concern itself has its main office in Berlin and its central broadcasting station is also situated in the capital, but it also has broadcasting stations at Berlin-Königswusterhausen (also used for transatlantic transmission), Aix-la-Chapelle (relaying from Langenberg), Augsburg (relay from Munich), Bremen, Breslau, Dresden, Flensburg, Frankfurt-Main, Freiburg (relay from Stuttgart), Glewitz (relay from Breslau), Hamburg, Hanover, Kaiserslauten (relay from Munich), Cassel (relay from Frankfurt), Kiel, Cologne, Königsberg, Langenberg (powerful station for Rhineland), Leipzig, Munich, Münster in Westphalia (relay from Langenberg), Nurnberg (relay from Munich), and Stuttgart.

There is a loose censorship in so far as lectures have to be submitted to the so-called programme councils. These boards—when they are trusted with passing on cultural or artistic programmes—are composed of artists, musicians, writers, etc. But political talks must be submitted to the authorities and each speaker is obliged to present his manuscript for approval and it is returned to him just before he steps up to the microphone. During his address, a professional "listener" stands next to him, prepared to switch off the current if he deems it necessary.

News items are broadcast on the average three times a day, and are issued by the Drahtloser Dienst, Inc.; just before the announcer broadcasts news he gives a warning against the dissemination of this news by newspapers or news agencies. But a few weeks ago the German courts ruled that this prohibition is illegal. The news consists of political information, domestic and foreign, "spot" news, and a special sport service.

GREAT BRITAIN AND WALES

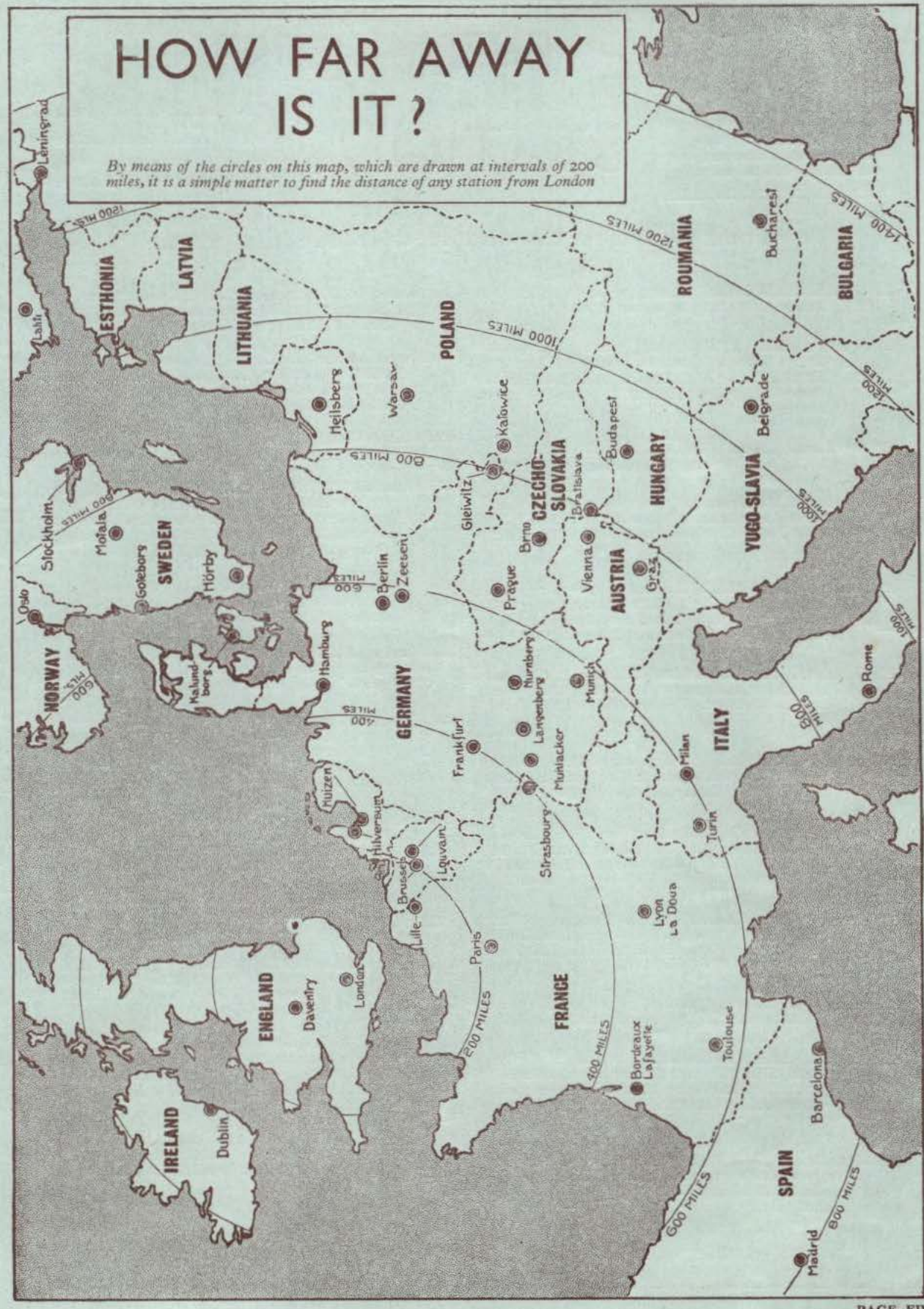
The British Broadcasting Corporation was constituted by royal charter as a corporation in January, 1927. Previously it was a "company" with a capital of £100,000, of which £60,000 was contributed in equal parts by six great wireless firms all of whom were represented on the board.

From the first it was decided that the revenue should be derived not from the advertiser, but from the listener. Therefore a fee of ten shillings is charged for every radio licence to all persons owning a set, and this licence must be renewed yearly. From this ten shillings the Broadcasting Corporation gets a sum equivalent to half. The money is spent in salaries, upkeep, and paying for entertainment.

The Broadcasting Corporation must broadcast all information that the government desires put on the air. An executive of the Corporation, however, states that the government, at least the Foreign Office, never has "ordered" any material broadcast.

The British Broadcasting Corporation is on the mailing list of the Foreign Office. Material that is sent to newspapers and press associations likewise is sent to the Broadcasting Corporation, with the exception of the

(*Continued on Page Twelve*)


HOW FAR AWAY IS IT?
By means of the circles on this map, which are drawn at intervals of 200 miles, it is a simple matter to find the distance of any station from London
Leningrad
Lahti
ESTHONIA
LATVIA
LITHUANIA
POLAND
ROUMANIA
BULGARIA
Bucharest
Warsaw
Heilsberg
Kattowice
Budapest
Belgrade
CZECHO-SLOVAKIA
Bratislava
HUNGARY
YUGO-SLAVIA
Brno
Vienna
Gleiwitz
Prague
Berlin
Zeesen
AUSTRIA
Graz
Stockholm
Motala
Goteborg
SWEDEN
Hörby
Oslo
NORWAY
Kalundborg
Hamburg
Nurnberg
Langenberg
Munich
GERMANY
Frankfurt
Munlacker
Milan
ITALY
Rome
Huizen
Hilversum
Louvain
Brussels
Lille
Strasbourg
Turin
Lyon La Doua
Paris
FRANCE
ENGLAND
Daventry
London
IRELAND
Dublin
Bordeaux Lafayette
Toulouse
Barcelona
SPAIN
Madrid
200 MILES
400 MILES
600 MILES
800 MILES
1000 MILES
1200 MILES
1400 MILES

THE FIFTY BEST STATIONS

Specially compiled for WIRELESS MAGAZINE *by* J. GODCHAUX ABRAHAMS, *the well-known broadcasting authority.*

The numbers in brackets correspond with those on the log-map on Pages Eight and Nine.

Their Wavelengths and How to Identify Them

238.9 metres, NURNBERG (Germany); 1,256 kc; 2.3 kw.
(37) Relays Munich, 532.9 metres (q.v.).

253.4 metres, GLEIWITZ (Germany) ; 1,104 kc.; 5.6 kw. Relays Breslau. Man announcer. Call: *Achtung! hier Schlesische Funkstunde Breslau und Gleiwitz.*
(40) Interval signal:- Metronome (one beat per second).

257.3 metres, HORBY (Sweden) ; 1,166 kc.; 15 kw.
(48) Relays Stockholm, 436 metres (q.v.).

265.4 metres, LILLE (France) ; 1,130 kc.; 15 kw. Man announcer. Call: *Allo! Allo! Ici Radio Lille PTT du Nord.*
(10) Opens and closes with musical-box melody.

276.5 metres, HEILSBERG (Germany) ; 1,085 kc.; 75 kw. Relays Königsberg. Man announcer. Call:
(30) *Achtung! Hier Ostmarken Rundfunksender.* Interval signal: Two notes (D flat, A flat).

278.8 metres, BRATISLAVA (Czechoslovakia) ; 1,076 kc.; 14 kw. Woman announcer. Call: *Halo! radio journal Bratislava.*
(36) Opening and interval signal: Four notes (C, E, G, G.).

296 metres, TURIN (Italy) ; 1,013 kc.; 8.5 kw. Woman announcer. Call (phon.): *Ay-yah* (E.I.A.R.)
(25) *Radio Torino.* Interval signal: Nightingale.

298.8 metres, HUIZEN (Holland) ; 1,004 kc.; 8.5 kw. Man announcer only. Call (phon.): *Hier Hoyzen,*
(3) followed by initials of society giving broadcast. Time signals hourly on Westminster chimes.

304 metres, BORDEAUX-LAFAYETTE (France) ; 986 kc.; 35 kw. Man announcer. Call: *Ici la station du*
(11) *reseau d'Etat Francais de radio diffusion des PTT de Bordeaux-Lafayette.*

322 metres, GOTEBORG (Sweden) ; 932 kc.; 15 kw.
(39) Relays Stockholm, 436 metres (q.v.).

338.2 metres, VELTHEM-LOUVAIN (Belgium) ; 887 kc.; 12 kw. Man and woman announcer. Call: *Hier*
(8) *Velthem de Katholieke Vlaamsche Radio Omroep* or *Hier Radio S.A.R.O.V.* Occasional interval signal: Gong.

345.2 metres, STRASBOURG PTT (France) ; 869 kc.; 15 kw. Man and woman announcers. Call: *Allo!*
(15) *Ici radio Strasbourg PTT.* Interval signal: Deep-toned gong.

342 metres, BRNO (Czechoslovakia) ; 878 kc.; 3 kw. (provisionally. Relays Prague. Call: *Allo! Radio*
(17) *Journal Brno* (phon. *Broono*).

348.8 metres, BARCELONA (EAJ1, Spain) ; 860 kc.; 8 kw. Man announcer. Call (phon.): *Akky Esta-see-*
(21) *own Ay-ah-chota oono oonee-owe-n rah-dee-oh Barthel-own-ah.*

352 metres, GRAZ (Austria) ; 851 kc.; 9.5 kw. Relays
(24) Vienna, 516.4 metres (q.v.).

356.3 metres, LONDON REGIONAL (England); 842 kc.; 45 kw., and **261.3 metres, LONDON NATIONAL**;
(7) 1,148 kc.; 68 kw. Respective calls: *This is the London Regional* and *This is the National programme.* Interval signal: Ticking of clock.

360.1 metres, MUHLACKER (Germany) ; 833 kc.; 75 kw. Man announcer. Call: *Achtung! Suedfunk.*
(16) Interval signal: Three notes (C, D, G.).

363.6 metres, ALGIERS (Algeria, North Africa) ; 825 kc.; 13 kw. Man announcer. Call: *Ici Radio Alger*
(23) (phon.) *Aljay.* Interval signal: Gong.

372.2 metres, HAMBURG (Germany) ; 806 kc.; 1.7 kw. Man announcer. Opening and interval signal:
(2) H A (morse: four dots, dash), also gong and metronome between items. Call: *Hier Norag* or *Hier die Norag sender.*

385.1 metres, RADIO TOULOUSE (France) ; 779 kc.; 8 kw. Man announcer only. Call: *Ici Radio*
(20) *Toulouse (emissions de la radiophonie du midi).* Interval signal: Gong.

389.6 metres, FRANKFURT-ON-MAIN (Germany) ; 770 kc.; 1.7 kw. Man announcer. Call: *Achtung!*
(12) *Hier Sudwestfunk.* Interval signal: Metronome.

394.2 metres, BUCHAREST (Roumania) ; 761 kc.; 16 kw. Woman announcer. Call (phon.): *At-tent-see-*
(33) *oon-aye! Ah-eetch, radio Bou-koo-recht.* Interval signal: Metronome.

408.7 metres, KATOWICE (Poland) ; 734 kc.; 16 kw. Woman announcer. Call (phon.): *Har-low!*
(39) *Polskey rah-dee-owe Kat-owe-vee-tsee.* Also in French: *Allo Radio Pologne Katowice.* Interval signal: Metronome.

413.8 metres, DUBLIN (Irish Free State) ; 75 kc.; 1.5 kw. Opens with a tuning note. Male announcer only.
(5) Call: *Radio Ath Cliath e seo* (This is Dublin calling). Relays Cork on Sundays.

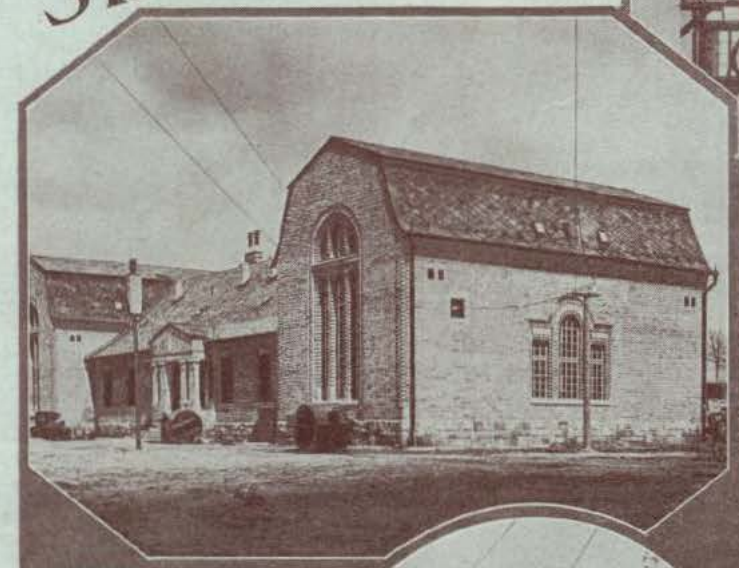
(Continued on Page Ten.)

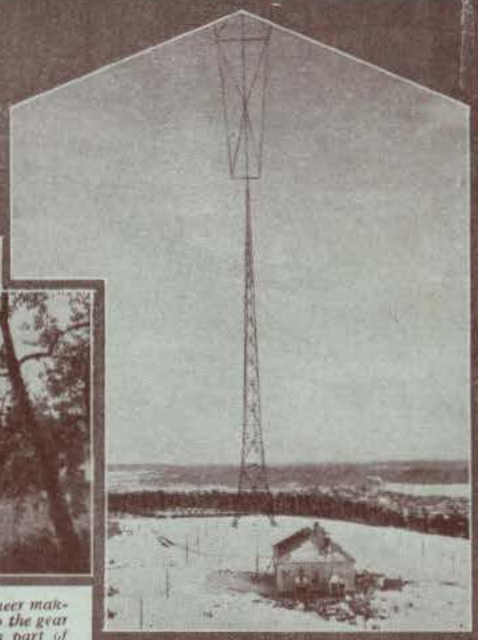
Log These Stations on the Map on Pages Eight and Nine

STATIONS YOU HAVE HEARD!

(Above).—A corner of the high-power broadcasting station at Rome.

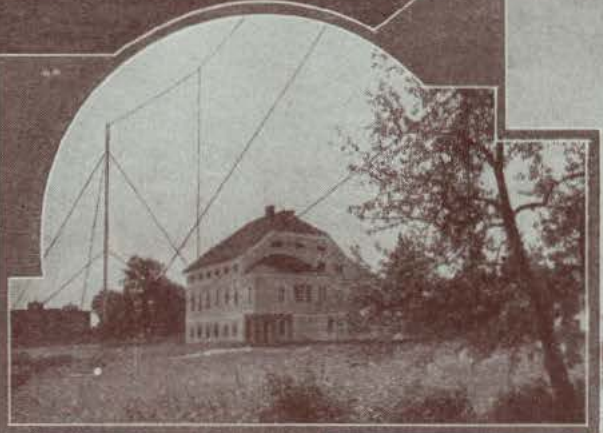
(Below) —Now you know why Lahti is received so well; here is one of the fine aerial masts.



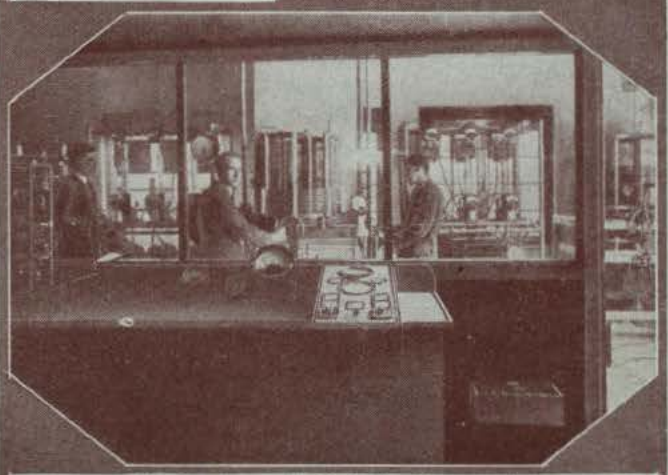


(Above).—This is not a Continental railway station, but the Budapest broadcasting station. You can hear this station on most good sets; it works on 550 metres and is in Hungary.

(Right).—Linz looks as if it is in the middle of a country estate.

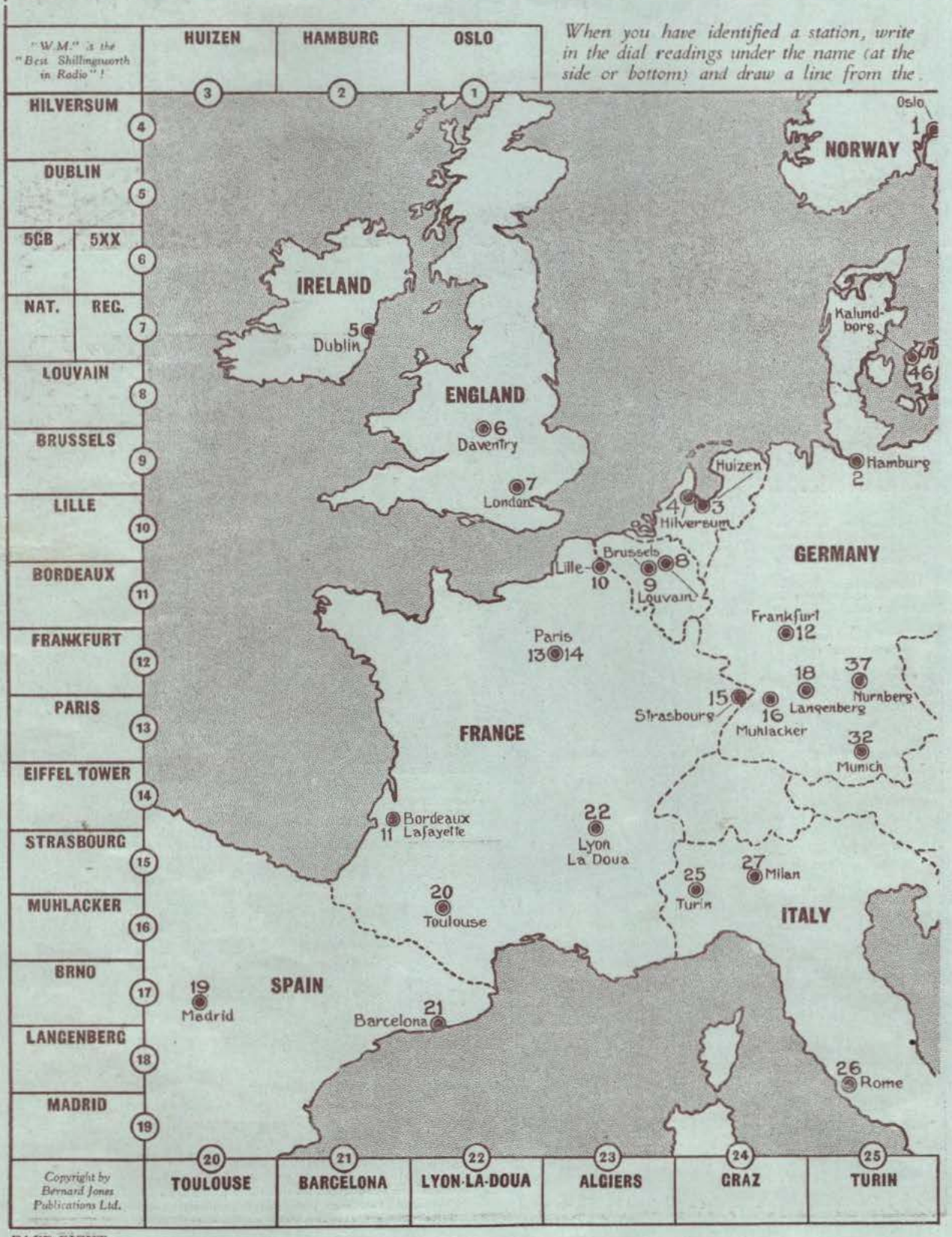


(Left).—An engineer making an adjustment to the gear at Daventry; this is part of the long-wave transmitter.

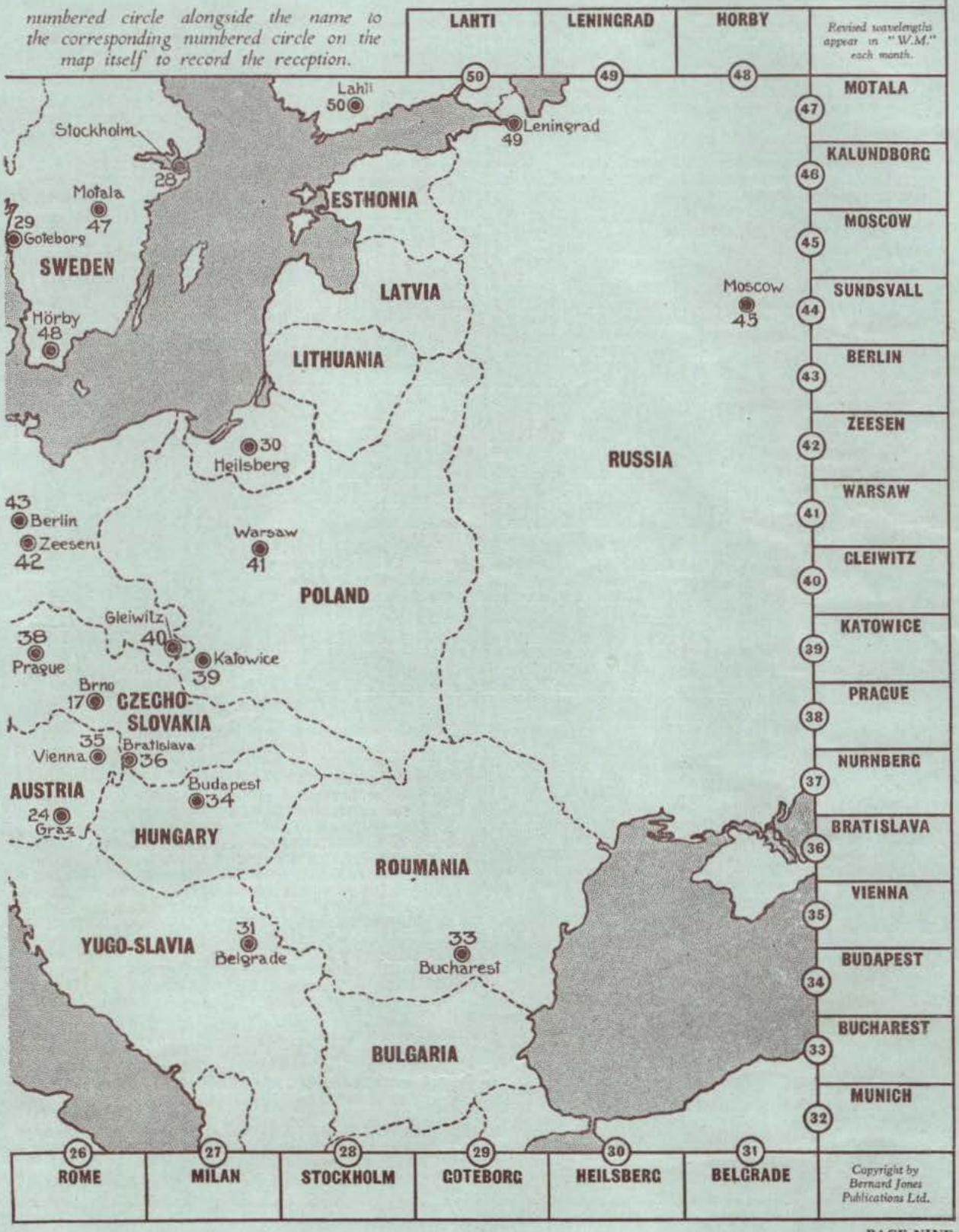


(Above).—A view of the Huizen broadcasting station.

BROADCAST LOG



MAP OF EUROPE



THE FIFTY BEST STATIONS—Continued

418 metres, BERLIN (Germany) ; 716 kc.; 1.7 kw. Man announcers. Call: *Achtung ! Achtung ! Hier* **(43)** *Berlin Stettin und Magdeburg.* Interval signal: Metronome (four beats per second). Closes down with German National Anthem.

424.3 metres, MADRID (Spain) ; 707 kc.; 2 kw. Man announcer. Opening signal: *Siegfried* (Wagner) **(19)** aria played on piano. Call (phon.): *Ay-ah-chota-see-yay-tay Union Radio Madrid.*

432.3 metres, BELGRADE (Yugoslavia) ; 694 kc.; 3 kw. Woman announcer. Call (phon.): *Hallo ! Radio* **(31)** *Bay-owe-grad.* Interval signal: Metronome (one beat per second).

436 metres, STOCKHOLM (Sweden) ; 689 kc.; 75 kw. **(28)** Man announcer. Call: *Stockholm-Motala.*

441.2 metres, ROME (Italy) ; 680 kc.; 75 kw. Woman announcer only. Call (phon.): *Radio Roma*; if **(26)** with Naples: *Radio Roma e Napoli.* Opening signal: Chimes, etc. Interval (if relaying Naples): Flute-like notes repeated *ad. lib.*

465.8 metres, LYON LA DOUA (France); 644 kc.; 2.3 kw. **(22)** Man announcer. Call: *Allo! Ici la poste des PTT de Lyon-la-Doua.*

472.4 metres, LANGENBERG (Germany); 635 kc.; 17 kw. **(18)** Man announcer. Opening and interval signal: Chimes Call: *Achtung! Coeln*, or *Hier Westdeutschen Rundfunk.* Relays Cologne.

486.2 metres, PRAGUE (Czechoslovakia) ; 617 kc.; 5 kw. Man and woman announcers. Call: *Allo !* **(38)** *Praha*, or with names of relays, for example, Brno, etc.

500.8 metres, MILAN (Italy) ; 599 kc.; 8.5 kw. Woman announcer. Call (phon.): *Ay-yah rahdee-owe* **(27)** *Mee-larn-owe.* Interval signal: Flute-like morse note (T. dash).

508.5 metres, BRUSSELS (Belgium) ; 590 kc.; 15 kw. Man announcer. Call: *Allo ! Ici Radio Belgique.* **(9)** Tuning note. No interval signal.

516.4 metres, VIENNA (Austria) ; 581 kc.; 20 kw. Man announcer. Call (phon.): *Hallo ! Rah-dee-owe-* **(35)** *Veen.* Interval signal: Fast-ticking metronome.

532.9 metres, MUNICH (Germany) ; 563 kc.; 1.7 kw. Man announcer. Call: *Hier Bayrische Rundfunk.* **(32)** Interval signal: Chimes (E, F, G, A, B, C).

542 metres, SUNDSVALL (Sweden) ; 554 kc.; 15 kw. **(44)** Relays Stockholm, 436 metres (q.v.).

550.5 metres, BUDAPEST (Hungary) ; 545 kc.; 23 kw. **(34)** Man announcer. Call (phon.): *Hallo ! itt Booda-pescht.* Interval signal: Musical box (chords).

1,000 metres, LENINGRAD (Russia) ; 300 kc.; 20 kw. Man and woman announcers. Call: *Hallo* **(49)** *govorit Leningrad* or *Leningradski Radio Central.* Interval signal: Cuckoo call.

1,071 metres, OSLO (Norway) ; 280 kc.; 75 kw. Man announcer. Call: *Hallo Oslo Her.* Opening and **(1)** closing signal: Musical box.

1,153.8 metres, KALUNDBORG (Denmark) ; 260 kc.; 10 kw. Relays Copenhagen. Male announcers **(46)** only. Call: *Kalundborg-Kjobenhavn.* Opens and closes down with three strokes on a gong.

1,304 metres, MOSCOW (Russia) ; 230 kc.; 165 kw. Man and woman announcers. Call: *Moskwa* **(45)** *Radio Central.*

1,348.3 metres, MOTALA (Sweden); 222.5 kc.; 40 kw. Relays Stockholm. Male announcer. Call: *Stock-* **(47)** *holm-Motala.* Occasional interval signal. A small bell struck eighty times per minute.

STATION TIMES

Algeria, Morocco, Spain: Greenwich Mean Time.

France, Belgium: British Summer Time (B.S.T.) or G.M.T.

Holland: B.S.T. or G.M.T. plus 20 minutes.

Denmark, Germany, Italy, Norway, Sweden, Austria, Switzerland, Czechoslovakia, Jugo Slavia, Hungary, Switzerland, Poland, Lithuania: Central European Time (G.M.T. plus 1 hour), that is, coincides with B.S.T.

Roumania, Russia, Finland, Latvia, Turkey, Estonia: Eastern European Time (G.M.T. plus 2 hours).

1,411.8 metres, WARSAW (Poland); 212.5 kc.; 14 kw. Man and **(41)** woman announcers. Call (phon.): *Hallo! Hallo! Polskey raadjo Vaarschavva.* Interval signal: Morse letter W (dot, two dashes).

1,445.7 metres, EIFFEL TOWER (Paris, France); 207.5 **(14)** kc.; 15 kw. Man announcer. Call: *Ici le poste national de la Tour Eiffel* (phon. *Ay-fell*). Interval and time signal: Imitation Big Ben chimes, followed by bugle call.

1,554.4 metres, DAVENTRY NATIONAL ; 193 kc.; 35 kw. **(6)** Relays London Regional or National (q.v.). **479.2 metres, MIDLAND REGIONAL**; 626 kc.; 38 kw.

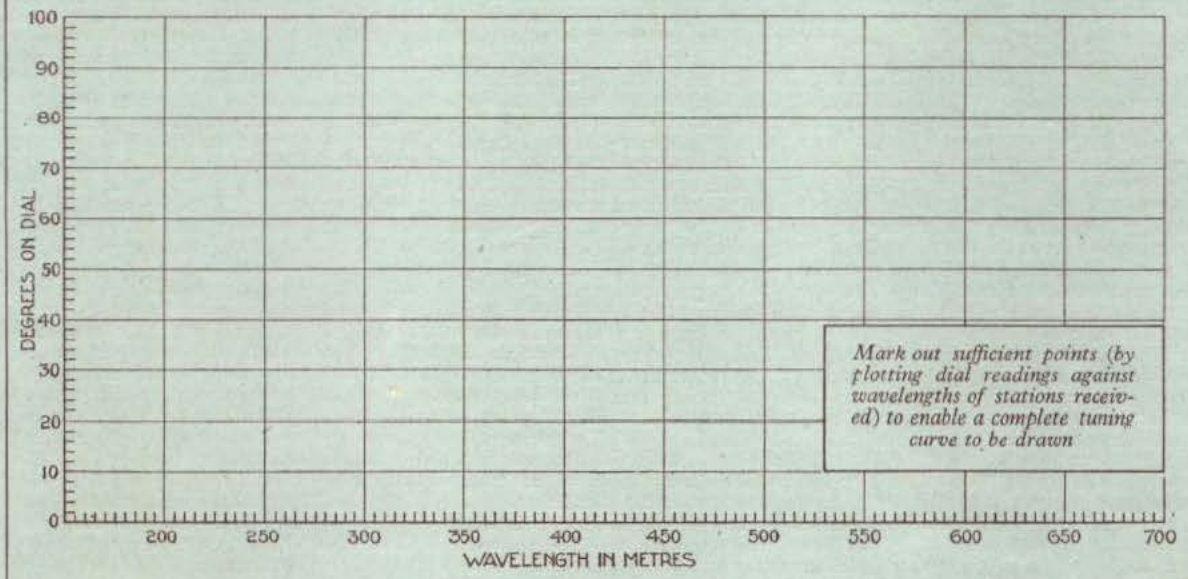
1,634.9 metres, KONIGSWUSTERHAUSEN-ZEESEN (Germany) ; 183.5 kc ; 35 kw. Male announcers only. Relays Berlin (q.v.); also alternative evening **(42)** programme. Call: *Achtung ! Hier Deutschland-sender Konigswusterhausen und der Weltrundfunk sender auf welle . . .*

1,724.1 metres, RADIO PARIS (France) ; 174 kc.; 17 kw. Male announcers only. Call: *Allo ! Allo ! Ici* **(13)** *emissions Radio Paris de la Compagnie Francaise de Radiophonie.* Opening signal: Gong.

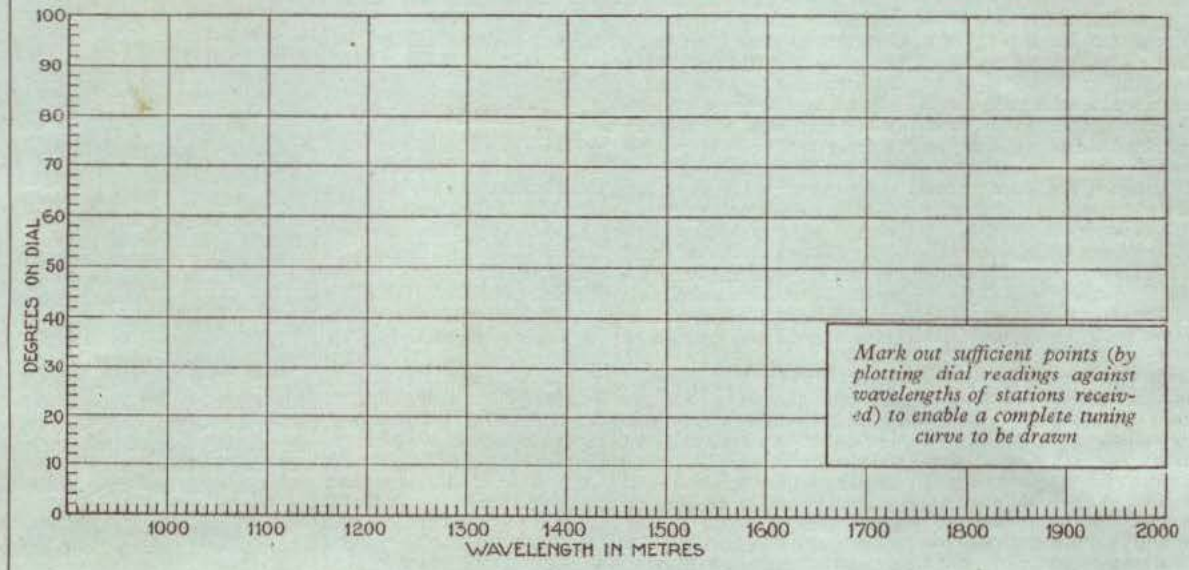
1,796.4 metres, LAHTI (Finland) ; 167 kc.; 54 kw. Woman announcer. Call: *Huomio !* (twice) *taala* **(50)** *Suomen yleisradio Helsinki-Lahti.* Relays Helsinki (Helsingfors). Announcements in Finnish and Swedish.

1,875 metres, HILVERSUM (Holland) ; 160 kc.; 8 kw. **(4)** Man announcer. Call: *Hier Hilversum* (*de A.V.R.O.* or *de V.A.R.A.*).

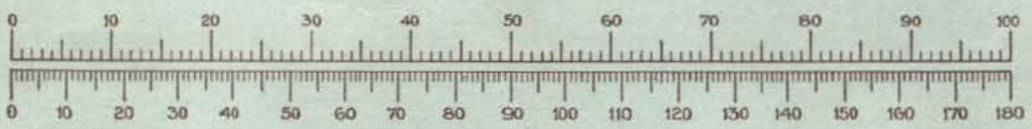
THE "W.M." MEDIUM-WAVE TUNING CHART



THE "W.M." LONG-WAVE TUNING CHART



DIAL-CONVERSION SCALE



This scale enables readings on a 100-degree dial to be converted to a 180-degree scale, or vice versa, at a glance, and will be of considerable convenience to those with 180-degree dials on their sets who want to make use of the tuning charts printed above.

AN INTERNATIONAL SURVEY—

Continued from Page Four

"hold for release" matter, which the Foreign Office feels might in some way be released ahead of time by the radio, thus making it difficult for the newspapers.

Under the constitution the corporation is allowed to broadcast news only between the hours of 6 p.m. and 2 a.m. The British Broadcasting Corporation gets its news from the tickers of the Reuters, Central News, Exchange and Press Association agencies which are installed in their offices. Reuters is used exclusively for foreign news. The report of the Press Association, leading British domestic news service, comprises most of the Broadcasting Corporation's "home" news. Exchange and Central News are used occasionally to supplement dispatches the corporation already has at hand.

Approximately 4,000 words a day of news dispatches are broadcast. They go over the long wavelength of 1,554 metres and the short wave of 261 metres.

Accidents in which several persons are killed are kept off the air, the theory being that the report frightens persons when it comes on the air more than the same report would if read in the newspapers. The theory behind keeping sensational news off the air is that it competes with newspapers.

The corporation's "censorship and common sense policy" as set out by its handbook in 1928, and which is observed to-day, reads in part:—" . . . policy is to give clear, accurate, brief and impartial news of what is going on in the great world, in a form that will not pander to sensation and will arouse a continuing interest, to which end the bare facts are (*a*) vitalised by 'running commentaries' on events, such as ceremonies and matches, and 'topical' talks in which either the man of the moment or an expert in the subject of the moment speaks to the people, and (*b*) rationalised by balanced discussion before the microphone."

Everything of interest pertaining to the government of the day is published whether favourable or critical, if the news editors feel the public is sufficiently interested.

All the news broadcast is copyrighted. Whether any legal action could be taken against anyone "lifting" it is problematical. Especially is this true in view of the recent court decision in Germany in which it was ruled that it is impossible to copyright matter sent over the ether! However, there have been no instances of any "lifting" of this news, and therefore no court action on the legality of the copyright is being contemplated at present.

The corporation pays no dividends and has no capital stock.

GREECE

Broadcasting is prohibited, but the government has indicated its intention of creating a broadcasting monopoly as soon as the necessary arrangements can be made. Reception is permitted under certain restrictions to Greek citizens, but is prohibited to foreigners. Licences are required.

GUATEMALA

There is no broadcasting in Guatemala at present. Contracts were recently negotiated (July, 1930) with the government by a Philadelphia firm for the erection and operation of a station in Guatemala City.

HAITI

Broadcasting is a government monopoly. One station is installed at Port Au Prince for educational purposes. There is no restriction on the ownership or operation of receiving sets.

HOLLAND

The broadcasting situation in Holland is peculiar and is the object of continual controversy between the non-partisan association of listeners (Avro), which has about ten thousand paying members, the socialist organisation (Vara), and the Catholic Broadcasting Association.

There are two Dutch broadcasting stations, one at Hilversum, the other at Huizen. The Hilversum station broadcasts the programmes of Avro and Vara, while Huizen broadcasts the Catholic programmes. The time allotted to each organisation is computed on the basis of the number of members belonging to each. Thus Avro and Vara agree as to the allotment of time at the Hilversum station and then come to terms with Huizen as to the apportionment of time between the two stations.

The authority which ultimately allots the time and adjusts any disputes is the Radioraad, presided over by a high government postal official. There is a third station, privately owned by the Philips radio factory in Eindhoven (the Dutch "General Electric"). This station broadcasts to the Dutch East Indies about three times a week.

News broadcast by the Hilversum and Huizen stations is supplied by the Vaz Diaz agency in Amsterdam. The newspapers make very little use of this broadcast news, as most of them subscribe to the Vaz Diaz service direct.

The listeners-in have not paid any tax to date, but it is feared that the political parties will press the government to impose taxes as the political broadcasting organisations need money. The general association for broadcasting receives enough money from listeners voluntarily to sustain its programmes.

HUNGARY

Radio is under the control of the postal administration, which holds a monopoly on broadcasting. Stations are supported by proceeds from licence fees. Licences for receiving are issued to all applicants and cost two and a half pengos per year when the set is to be used only for amateur receiving. Higher fees are charged for sets to be used for business purposes. Government inspection and supervision of all sets is required.

Manufacturing, importing and merchandising of radio apparatus are subject to permits issued by the Ministry of Commerce and are under the supervision of the postal authorities.

INDIA

Radio is under the control of the Director General of Posts and Telegraphs.

IRISH FREE STATE

Broadcasting is a government monopoly and is supported by licences. The receiving regulations are very moderate. Licences are required, however, these costing 10 shillings a year, as in the United Kingdom.

ITALY

Radio broadcasting is under the control of the Ministry of Communication. A monopoly for broadcasting has been granted to the Unione Radiofonica Italiana, a corporation organised for that purpose. Licences costing 3 lire per year are required for the operating of receiving sets, the proceeds accruing to the National Treasury.

Subscriptions to broadcasting service are compulsory, the funds received being used for the purpose of supporting broadcasting stations and providing programmes. Amateurs are required to pay 96 lire per annum for this service. Receivers employed for commercial purposes are assessed at varying rates, sometimes as high as two thousand lire per annum.

JAPAN

Radio broadcasting is controlled by the Bureau of Communications, broadcasting permits being issued only to Japanese citizens. Each station licensed has a partial monopoly within certain bounds. Stations are divided into two groups according to their power.

LATVIA

The Post and Telegraph Administration controls radio broadcasting through a monopoly. Receiving licences are required; an initial payment of from 10 to 40 lats is collected, the annual fee being 24 lats.

MALTA

Broadcasting is prohibited. Reception is subject to permit from the Lieutenant-Governor and to the payment of a licence fee of 21 shillings for the first year and 10 shillings each subsequent year.

MEXICO

Broadcasting is administered through the Department of Communications and Public Works. Permits to broadcast are required, and the government reserves the right of censorship. Broadcasting is supported by the owners and operators of the stations. There is no monopoly. Many of the stations are operated by government departments but the majority are privately owned. Licences are required for receiving sets.

There are thirty important stations in Mexico, fourteen

(*Continued on Page Fourteen*)

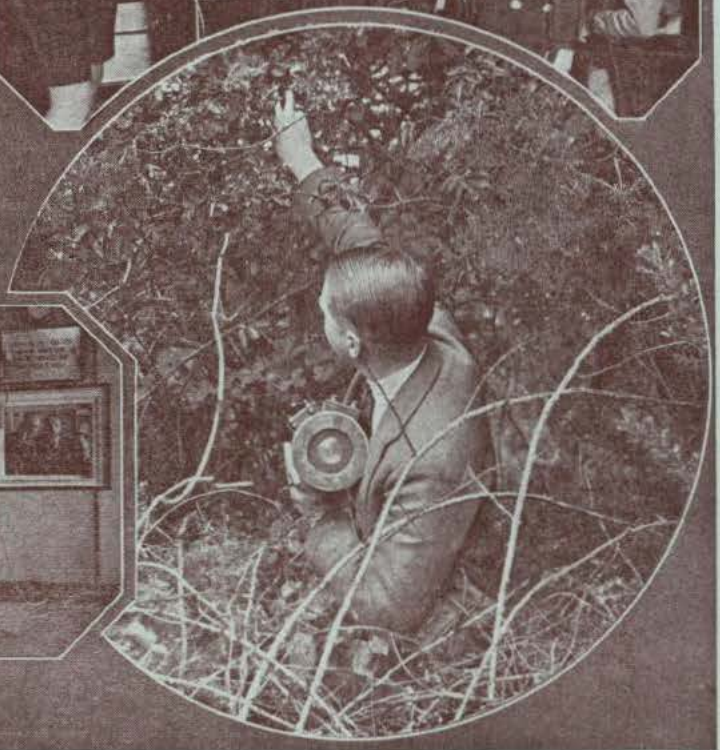
WHAT RADIO BRINGS YOU!

(Above).—English players broadcasting a play from Munich. Their choice was Shaw's "The Dark Lady."

(Left).—A typical outside broadcast—a dinner to celebrate the draw of the last Irish Hospitals Sweepstake, in Dublin.

(Right).—Negro children taking part in a broadcast from Berlin during the children's hour.

(Below).—Einstein, the scientist, broadcasting a speech at the opening of the Berlin Radio Exhibition.



(Right).—Part of a studio used for broadcasting in Belgrade. Note the engineers looking through the glass panel of the control room in the back-ground.

(Extreme Right).—Getting ready for a nightingale broadcast; an engineer fitting up a microphone in a Berkshire wood. The B.B.C.'s nightingale broadcasts are popular all over the world.

AN INTERNATIONAL SURVEY—

Continued from Page Twelve

of which are in Mexico City, and the remainder in Guadalajara, Saltillo, Monterey, Vera Cruz, Tampico, Chihuahua, etc.; nine of these stations are "official" and governmentally operated. The stations range from 50 to 2,000 watts in power, there being three 2,000-watt stations, four 1,000-watt stations and nine ranging from 250 to 500 watts.

Station XEN, named Radio Mundial, and operated by Felix Palavicini, a well-known Mexican newspaper man, distributes an original news service of its own. La Prensa, a progressive Mexico City newspaper, is building a new station which, it is reported, will be the most powerful in Mexico. Station XEB is owned by "Excelsior," a Mexico City morning newspaper.

Owners of stations are not seriously interfered with in the operation of their stations on the part of the government. At the same time, station owners generally see to it that attacks on the government or discussions on very active controversial subjects are not permitted. Questions like the religious issues, for instance, that are freely discussed in the newspapers, are rarely touched on by radio speakers. The stations must send the Department of Commerce daily reports, complete in the case of speeches, of their programmes, but frequently these are not sent until after the programme has been broadcast.

A number of stations broadcast résumés of the day's news, particularly broadcasts of news sent out by American stations, picked up and rebroadcast, a form of news piracy that should be subject to some form of international action.

NEW ZEALAND

Broadcasting is closely supervised by the government.

NICARAGUA

No broadcasting is carried on in Nicaragua. The government does not own a radio installation of any kind.

PERU

A monopoly was granted which reserved to the grantee the sole right to broadcast and to deal in radio apparatus. This firm collected licence fees from the owners of receiving sets. Later the government revoked the concession and in its stead placed the concessionnaire in charge of broadcasting, which became a function of the government.

OAX is the only station in Lima used for general broadcasting. OAX operates on a wavelength of 380 metres and for only three hours a day, one hour at midday and two at night. All listeners are required to have a licence. The programme consists almost entirely of music and short news broadcasts.

RUSSIA (U.S.S.R.)

There is no private radio broadcasting in the Soviet Union! Every broadcasting station belongs to the Commissariat of Posts and Telegraphs directly or to some other social organisation, such as the trade unions. In the latter event the station, nevertheless, is under the supervision of the radio department of the Commissariat.

In every large city there is a special radio centre where programmes for the region are made and affirmed. These programmes, however, are subject to ratification and co-ordination by the radio department of the Commissariat of Posts and Telegraphs.

The radio department, under control of the highest government and Communist party organs, works out plans for radio educational and entertainment programmes on a national scale and controls the carrying out of these plans. Everything put on the air is thus subjected to direct or indirect censorship through the approval of the central authorities.

The radio is used very widely for the dissemination of news. Tass, the official news agency, sends out its news report several times daily for the use of provincial newspapers all over the country. In addition the general radio public listens-in to résumés of the news several times daily.

These so-called "radio papers," of which there is a whole series, are arranged to reach special audiences. Thus, there is a radio paper for peasants, with special emphasis on farm problems, weather, etc.; a radio paper for Pioneers (Communist children, equivalent to boy or girl scouts), for workmen, young Communists, members of collective farms, etc. This material is useful not only as information for the general public, but it is picked up by newspapers in those special fields and published.

At present there are forty-eight stations in Russia actively engaged in the daily broadcast of programmes. Five of these are in Moscow; the balance are widely distributed from Leningrad to Vladivostok.

SALVADOR

Broadcasting is a monopoly of the government. Receiving is permitted only to Salvadorians. Foreigners are issued permits if they renounce their right to present claims through diplomatic channels.

SPAIN

The Spanish radio broadcasting companies now operating are the Union Radio, Radio Iberica, and Radio Espana.

The situation in Spain is in a state of flux, however, as the government seems interested in awarding an exclusive contract for all Spain to one company. Various sections of the press are condemning what they call an attempt to create radio monopoly.

Broadcasting is, of course, censored to the same degree as are newspapers, newspaper placards, etc. The amount of news announced is small—a little at 2 p.m., and some more at 10 p.m.—which is for public use.

SWEDEN

Radio is under the control of the telegraphic administration. A broadcasting monopoly has been granted to a corporation known as Radiojans, but transmitting licences are freely issued to amateurs, and the monopoly has provided facilities for the re-broadcasting of the programmes of its stations by amateurs and radio clubs. Sweden has now thirty-one broadcasting stations scattered throughout the country. Broadcasts from neighbouring countries are received readily, but are not as popular as the Swedish programmes

SWITZERLAND

Radio is under the administration of the Central Telegraph Office of the Postal Department. Broadcasting by other than Swiss citizens is prohibited. Stations are supported by the proceeds from the licence fees after the government has deducted 25 per cent.

UNION OF SOUTH AFRICA

The Postmaster General has supervision over radio matters. Broadcasting is a regional monopoly, each station being licensed to operate exclusively within a certain territory for a period of five years.

UNITED STATES

Radio broadcasting is under the control of the Federal Radio Commission, which allocates the wavelengths, regulates power, and in general "polices" the air. Wavelengths can be changed, transferred, or cancelled upon the order of the Federal Radio Commission, subject only to the Courts. Radio stations are privately owned, a number of the most powerful stations being operated by the General Electric Company and other important electrical interests.

There is no censorship or control over programmes on the part of the Radio Commission. No licence is necessary, nor is any tax imposed on receiving sets. There are about six hundred stations in the United States.

VENEZUELA

Radio is regulated by the Ministry of the Interior. A monopoly was granted which gave the concessionnaire the sole right to broadcast and to manufacture, import and sell radio apparatus, but this was recently revoked and the importation of radio apparatus temporarily prohibited. Receiving licences cost five dollars per month, proceeds going to the support of broadcasting. About two thousand receiving installations have been made. Nearly all of these are of American origin.

YUGOSLAVIA

Permits are required for broadcasting stations. Nothing except music may be broadcast. Private persons may not install broadcasting stations or other sending sets. The permission of the Ministry of Posts and Telegraphs is required before a receiving set may be installed.

SHORT-WAVE BROADCASTERS

Wave'lths in Metres	Frequency in Kilocycles	Call Sign	Station and Country of Origin	Dial Readings on Your Set
15.93	18,830	PLE	Bandoeng (Java), 80 kw.	
16.8	17,850	PLF	Malabar (Java)	
16.9	17,750	HSP	Bangkok (Siam), 20 kw.	
18.8	15.957	PLG	Bandoeng (Java)	
19.56	15.337	W2XAD	Schenectady, N.Y. (United States), relays WGY	
19.72	15.210	W8XF	East Pittsburgh, Pa. (United States) relays KDKA	
19.83	15.130	W3XAL	Boundbrook, N.Y. (United States)	
19.84	15.121	——	Rome, Vatican station (Italy)	
21.5	13.950	——	Bucharest (Roumania), 150 watts	
21.91	13,690	W2XO	Schenectady, N.Y. (United States), relays WGY	
22.07	13,630	W2XO	Schenectady, N.Y. (United States), relays WGY	
23.28	13,020	——	Rabat (Morocco), day transmissions	
25.27	11,870	——	Calcutta (India), testing	
25.4	11,810	3RO	Rome (Italy), 9 kw.	
25.42	11,800	W2XAL	Coytesville, N.J. (United States), relays WRNY	
25.53	11,751	G5SW	Chelmsford (England), 15 kw.	
28	10,710	CT1BO	Lisbon (Portugal)	
28.2	10,634	PLR	Malabar (Java), 40 kw.	
28.8	10,410	VK2ME	Sydney (Australia), 20 kw.	
28.98	10,350	LSX	Buenos Aires (Argentine)	
29.5	10,167	HS2PJ	Bangkok (Siam), .5 kw.	
30.5	9,836	——	Poznan (Poland), 300 watts.	
31.1	9,677	——	Bombay Experimental (India)	
31.28	9,500	PCJ	Eindhoven (Holland), 25 kw.	
31.38	9,560	——	Zeesen (Germany), 8 kw., relays Berlin	
31.48	9,530	W2XAF	Schenectady, N.Y. (United States), relays WGY	
31.6	9,494	OXY	Lyngby (Denmark)	
32.26	9,270	——	Rabat (Morocco), evening transmissions	
33	9,090	——	Radio Vitus, Paris (France)	
34.68	8,650	W6XN	Oakland, Cal. (United States), 5 kw., relays KGO	
37	8,108	HS4PJ	Bangkok (Siam), 200 watts	
40	7,500	DUA	Doeberitz (Germany)	
41.6	7,211	——	Las Palmas (Canary Islands)	
42.9	6,992	CT1AA	Lisbon (Portugal)	
43.75	6,857	——	Radio Vitus, Paris (France)	
43.86	6,840	VRY	Georgetown (British Guiana)	
44	6,818	XDA	Mexico City	
46.6	6,440	REN	Moscow (Russia)	
47	6,383	CT3AG	Funchal (Madiera Islands), .3 kw.	
48.86	6,140	W8XK	East Pittsburgh, Pa. (United States), relays KDKA	
49.1	6,122	——	Chi-Ha, Saigon (Indo-China)	
49.02	6,120	W2XE	Richmond Hill, N.Y. (United States), relays WABC	
49.18	6,108	W3XAL	Boundbrook, N.J. (United States), 12 kw.	
49.22	6,094	VE9GW	Toronto (Canada)	
49.34	6,080	WQXAA	Chicago, Ill. (United States)	
49.5	6,060	W3XAU	Philadelphia, Pa. (United States)	
49.67	6,040	W2XAL	Coytesville, N.J. (United States), relays WRNY	
49.83	6,020	W9XF	Downer's Grove, Ill. (United States), 5 kw., relays WENR, Chicago	
50	6,000	7LO	Nairobi (Kenya)	
50.25	5,980	——	Rome, Vatican station (Italy)	
58	5,172	OVJMPT	Prague (Czechoslovakia)	
62.5	4,800	W8XK	East Pittsburgh, Pa. (United States), 40 kw., relays KDKA	
62.56	4,795	W9XAM	Elgin National Watch Co., Ill. (United States), time signal	
80	3,750	3RO	Rome (Italy), 9 kw.	

MEDIUM-WAVE AMERICAN STATIONS

Wave'lths in Metres	Frequency in Kilocycles	Call Sign	Station and State	Dial Readings on Your Set
230.6	1,303	WIOD	Miami Beach (Fla.)	
261	1,150	WHAM	Rochester (New York)	
272.6	1,100	WPG	Atlantic City (New Jersey)	
275.2	1,091	KMOX	St. Louis (Cin.)	
280	1,071	WTAM	Cleveland (Ohio)	
283	1,060	WTIC	Mt. Avon, Hartford (Conn.)	
303	990	WBZ	Springfield (Mass.)	
306	980	KDKA	East Pittsburgh (Pa.)	
345	870	WENR	Chicago (Ill.)	
349	860	WABC	Essex County (New Jersey)	
370.4	810	WCCO	Minneapolis (Minn.)	
375	800	WBAP	Fort Worth (Texas)	
380	790	WGY	Schenectady (New York)	
389	770	WBBM	Chicago (Ill.)	
395	760	WJZ	Boundbrook (New Jersey)	
416.6	720	WGN	Chicago (Ill.)	
422	710	WOR	Newark (New Jersey)	
428.5	700	WLW	Cincinnati (Ohio)	
441	680	KPO	San Francisco (Cal.)	
454	662.1	WEAF	New York	

SOME "EYE-OPENERS" for the FAN

By JAY COOTE

DON'T idly twiddle your condenser dials; try for a definite transmission. If your set possesses one dial only, work up slowly from some wavelength already logged; if it has two condensers you will find that they run more or less in tune.

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Should you happen to hear the call *Radio Marelli* on the Milan wavelength still log it as Milan. This call is given out for a sponsored concert every Monday evening at 8 p.m., G.M.T.

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Gleiwitz and Leipzig have exchanged wavelengths, much to the satisfaction of listeners to the London National programme, for the 6-kilowatt Silesian transmitter is now operating on 253 metres.

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When you pick up a new transmission carefully log the dial readings. Don't use an odd slip of paper or the back of an envelope, but get a small notebook for this special purpose. It will spell "tuning without tears" when you wish to hear the same station at a future date.

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Some stations are on the air late—Madrid, Barcelona and San Sebastian are among the night owls, other stations start up in the early morning. Berlin, Hamburg, Mühlacker, Frankfurt-am-Main and Langenberg can be relied upon for concerts before 7 a.m., G.M.T.

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If you wish to hear broadcasts from Spain, try for them towards 10 p.m.; it is seldom that the main evening entertainment starts before that hour.

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Although a "graph" is useful, for practical purposes you will find it easier to make up a list of the broadcasting stations, in sequence of wavelengths or to use the table published in each issue of WIRELESS MAGAZINE. Note the dial readings of each transmission as you log it. By this means you will secure a number of landmarks to assist you in identifying new captures.

◆ ◆ ◆

When demonstrating the capabilities of your receiver to friends, don't pass from one transmission to another after every few bars of music or speech; you could invent nothing more irritating to listeners or more calculated to turn them against broadcasting. If music is picked up, hold the item until the end and let your friends hear the call; it will impress them much more than a rapid flitting from place to place.

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All Italian stations open up in the same manner, namely, by playing a gramophone record of a carillon of bells to the accompaniment of organ and orchestra, but each studio retains its individual interval signal.

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Remember that—barring France, Belgium and Spain—the Continental countries do not work to Greenwich Mean Time. Most of the main programmes begin towards 7 p.m. by our clocks. In the case of operatic relays, in Germany it is wise to tune in half an hour earlier.

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Don't oscillate; it irritates listeners in your neighbourhood and also spoils your own reception. Never tune-in a station on a "howl"; if you use reaction, throw it back and find the silent point of the wave.

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Reykjavik (Iceland), on 1,200 metres, is now completing its tests; try for it on any evening, just above Kalundborg, at about 7.30 p.m. You will hear the call *Utvarysstaed Islands* (phon.: *Iss*-lands). A few degrees above on your condenser you may hear Istanbul (Turkey); you will recognise it by its tinkly oriental music and chanting.

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Many U.S.A. broadcasting stations can be heard well between 1 and 3 a.m., G.M.T. Most nights until the end of March will be found favourable for their reception. Try for WGY, Schenectady, N.J. (380 metres); WEAF, New York, (454 metres); WJZ, Boundbrook, N.J. (395 metres); KDKA, East Pittsburg, Pa. (306 metres); and WTIC, Hartford, Conn., on 283 metres. All of these relay the National Broadcasting Company's programme and are powerful transmitters.

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Bear in mind that the Dutch transmitters exchange wavelengths every three months; until the end of March Hilversum will work on 1,875 metres, and Huizen on 298.8 metres. The Dutch broadcast you hear during the day on 1,071 metres emanates from a commercial station at Scheveningen-Haven. It only radiates weather reports, stock exchange quotations and news bulletins. It is of no use hanging on in the hope of hearing music; *there ain't going to be none*!

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Wilno, Ljubljana and Leningrad give out the call of the cuckoo as an interval signal; fortunately, their wavelengths lie in totally different parts of the broadcast band

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Keep a small diary near your wireless receiver. When you have heard a transmission which has pleased you, make a note of its character, name of station, time and date. On those days when the home programmes do not give you the entertainment desired, you will know to which foreign stations to turn.

◆ ◆ ◆

Barring the Moscow and Leningrad early-morning physical exercises, Posen, (Poland), claims to be the station which rises with the lark; you may hear its first broadcast at 4.15 a.m., G.M.T.

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Should your wireless receiver possess two or more stages of high-frequency amplification try using it with a frame aerial; its directional properties will assist in separating two stations working on neighbouring wavelengths. Moreover, in most instances you will succeed in cutting down morse interference.

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Should you pick up the call *Rodno Radio*, you need not look out the name on any map; it is not there. The call is that of the new Sofia (Bulgaria) transmitter on 319 metres.

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All French stations do not close down by playing *La Marseillaise*; Radio Toulouse signs off with a local march, *La Toulousaine*; and Radio Normandie (Fécamp) with a vocal record of a patriotic song, *Ma Normandie*.

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Do not neglect the relay stations; in some instances you may secure better reception of the programme than direct from the main transmitter. Nürnberg is often more get-at-able than Munich and when Milan is spoilt by morse Turin will prove a clearer channel.

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The chimes heard through Langenberg are not relayed from Cologne Cathedral; they are produced automatically (and mechanically!) in the studio by small hammers striking brass tubes. The notes are: F sharp, D sharp, A sharp, F sharp, E, F sharp, in the order stated.

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Few of the French stations utilise an abbreviated call; one you will frequently hear is that of Bordeaux-Lafayette. It runs: *Allo! Allo! Ici la station du reseau Francais de radio-diffusion des Postes et Telegraphes de Bordeaux-Lafayette.*

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The new Strasbourg (France) studio announces in two languages. You will first hear a woman's voice giving out the call in French and, later, announcements made by a man in German.

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Many listeners are puzzled by the powerful morse signals heard on about 1,000 metres, just below Leningrad; they emanate from wireless fog beacons and direction-finders, some of which are off the coast of the British Isles.

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On the evenings on which the Copenhagen station broadcasts dance music at 11 p.m. the music will fade out for a relay of chimes and time signal from the town hall, after which dancing is usually resumed for about fifteen minutes. The station invariably closes down with three strokes on a gong.

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The time signal heard from the Polish stations is given by a short fanfare of trumpets from the Tower of St. Mary's Church at Cracow; the melody is unfinished, as it commemorates an historical incident relating to a sentry who was killed whilst giving the alarm.

A RADIO FAN'S CAUSERIE

A Peculiar Experience

WHAT would you think if anybody told you that they had assembled a three-valve kit set and could not get a sound out of it until they put their hand round one of the tuning coils—and then heard the previous night's programme?

This is not as silly as it sounds, and actually occurred with one of the valve manufacturer's kit sets.

The explanation is that one end of the coil was disconnected and when the hand was placed round it sufficient capacity was provided to complete the circuit electrically.

That is reasonable enough, isn't it, but what of the previous night's programme?

The night the listener built the set he looked up the programme and expected to hear a particular item. He did not get a sound, but the following night heard this item, in the way I have explained, broadcast *from the alternative station* !

What is your most peculiar wireless experience?

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Short Waves for Safety

I have just come across two interesting pieces of short-wave news.

The first item is that ultra short waves, from 1 to 6 metres in length, are destined to play an important part in "safety" services, such as directional beacons, messages to and from trains, and for sounding apparatus.

Next comes a report that the police in St. Paul (Min., U.S.A.) have forbidden the installation of short-wave receiving gear on private cars because they discovered that some gangsters had evaded capture for some time by tapping short-wave police communications with a Philips short-wave set hidden under the seat !

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Screened-grid Amplification

I have been taken to task by Mr. G. W. Part, of Tunbridge Wells, for my remarks on screened-grid valves last month. He quotes various published amplificaton figures and says "with perfectly ordinary coils and average precautions in design a stage gain of over 200 can reasonably be expected."

This is all very interesting, but I still have my doubts.

There is always a lot of argument among experts about high-frequency measurements, for one thing. Secondly, my experience is that a set with a screened-grid stage is not tremendously more powerful than a receiver with a well-designed neutralised three-electrode valve.

A friend of mine is using a Lodestone Four and can get a good bag of stations every night. I do not think that the substitution of a screened-grid valve would result in any very startling improvement in performance.

What do you think of the neutralised triode versus screened-grid problem?

The Opera Fire

In the middle of a relay from a Prague opera house listeners heard the cry of "Fire !" followed by the sounds of a man trying to calm the audience. Sounds of a stampede came across; burning wood crackled, and women shrieked in terror. Rafters fell with a crash—and then an uncanny silence.

Urgent telephone calls came from as far away as Berlin but there was really no need for any anxiety—all the sounds were part of a Czech radio play called *The Opera Fire*.

Remembering the famous Knox fake news bulletin, I cannot help wondering what would happen if the B.B.C. were to broadcast such a play. I think they had better not risk it !

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Revolutionary

I cannot refrain from saying something about Mr. W. James' new super-het, which you will find described elsewhere in this issue. I was privileged to try one of these sets out for an evening and was, to put it mildly, absolutely astonished at its performance.

Mr. James is himself surprised at its good results, I think, for at lunch he told me he had never in his life handled a set like it.

So loud and so numerous are the stations received that it took me nearly ten minutes to pick out the London Regional station !

Do not suppose from this, however, that the operation is tricky. It is not.

RADIO MEDLEY—Continued

But the selectivity is so good and the volume is so great that one is completely lost at first in a gamut of stations.

Losing Count

I do not know how many stations it is possible to receive with this set. I started to count them, but soon gave it up. There were too many.

My intention now is to run one of these sets from D.C. mains (for high tension only) and add a push-pull output stage.

I do not want the push-pull for radio—the volume is enough without it—but shall need it for gramophone work. Once you have used a radio gramophone you will not want to be without one.

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Panel Controls

"I am glad that you are pegging away with the question of knobs," writes Mr. J. W. Bament, of Cricklewood.

"For years I tried to find firms who used hexagonal nuts, which are much better, but gave it up. The wireless trade only do business because it runs after them; they do not try for it."

As regards this question of matched knobs, I certainly agree that radio manufacturers deserve all the kicks they get—but, unfortunately, they do not receive half enough.

Many constructors take great pride in making their sets neat inside, but as far as the outsides are concerned, they are in the component makers' hands.

We must insist that all the firms making parts for panel mounting get together and produce a range of knobs that match up properly. If this was done it would be possible to build a set that looked as good as a commercial job.

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Those Electric Mains

My request for post cards from readers telling whether they use mains- or battery-operated sets when they have electric light in the house has met with a pleasing response. Some correspondents raise interesting points.

From the information I have received it appears that 43 per cent. of WIRELESS MAGAZINE readers who have electric mains fail to make use of them; 20 per cent. use mains sets, while 37 per cent. use battery sets with high-tension supply taken from the mains.

Battery Users

I can understand that certain people continue to use batteries because they do not like the comparatively high initial cost of mains units, but I do not agree that battery reproduction is better than good mains reproduction.

For instance, a reader at Romsey says, "Battery always; NO hum," while Mr. J. C. Palmer, of King's Norton (Birmingham), says that he has gone back to accumulator high-tension batteries, after trying several all-mains sets.

Superior Results

This correspondent says that his dealer demonstrated several of the best-known mains sets and a well-known battery four-valver supplied with high tension from mains units. The last was the best of the lot, both for quality and power.

He adds: "We tried this set with several of the best makes of eliminators, but the results were not quite satisfactory and batteries were superior in every way to the high-tension units. Our mains are D.C., 220 volts."

Perhaps the D.C. mains are the trouble. Is it possible that commercial D.C. units are not as satisfactory as A.C. units?

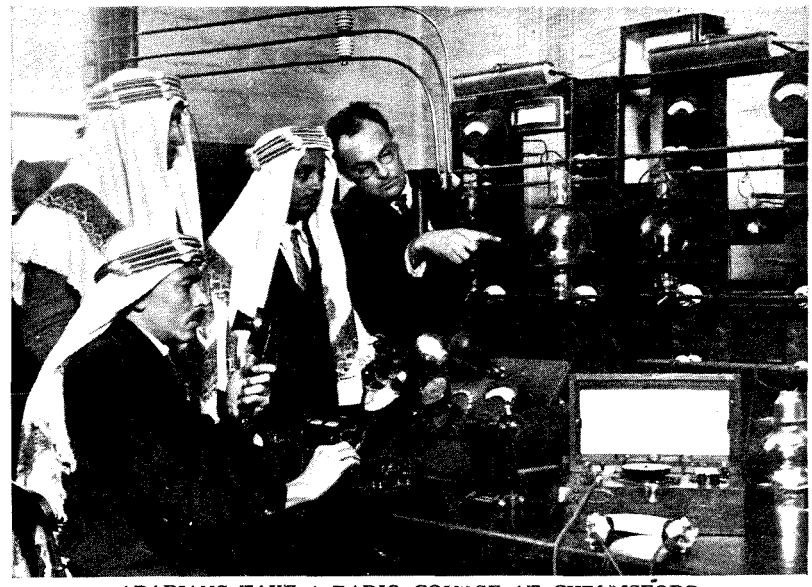
All-mains Users

One of the most interesting post cards from the all-mains brigade comes from Mr. T. O. Clements, of Norbury, who has used mains sets for two years past.

During this period Mr. Clements has had four commercial sets and he is now using a home-built receiver with two high-frequency stages, detector, and a power stage.

I am certain there must be an interesting story to account for this change from manufactured sets to a home-constructed job, and I hope Mr. Clements will tell us in what respects the former fell short of his requirements.

A reader at Cricklewood uses a Brookman's A.C. Three and says " it has to be heard to realise the difference between A.C.- and battery-driven three-valvers." Mr. M. Farwell, of Chichester, is scrapping an old battery set, so "doing away with the bother of batteries."



ARABIANS TAKE A RADIO COURSE AT CHELMSFORD

Here you see Arabian students at the Marconi school at Chelmsford. They were sent over by King Ibn Saud so that they will be able to look after the chain of stations to be erected in the Kingdoms of Hedjaz and Nejd

High-tension Units

I can sympathise with Mr. D. H. Sclater, of Crieff, who says "I find L.T. from D.C. mains very inconvenient for frequent changing of valves, etc., and general experimenting." He uses a high-tension unit only, as I am forced to do myself.

Another northern reader, Mr. M. Tracey, of Cupar (Fife), also uses an

A RADIO FAN'S CAUSERIE

eliminator for high tension only, but has a mains-driven B.T.H. moving-coil loud-speaker and gramophone motor.

From Manchester comes a letter with the comment: "As a radio enthusiast of several years' standing, I would not be bothered with an all-mains set, with its additional wiring and more expensive valves." This reader uses a mains unit for high tension only.

My Own View

One reader asks for my own views on the battery versus mains set question, so here goes.

After ten years' experience of "home-constructed radio," I would vote for high tension from the mains every time. I have a more open mind on the question of filament supply. After all, the latter is not much of a problem if you use large accumulators that will give service for a fortnight or three weeks after each charge.

I am definitely against the use of D.C. mains for filament supply as far as home-constructed sets are concerned. The running costs are comparatively high and it is very difficult to make alterations to the set.

But I should like to have more views from WIRELESS MAGAZINE readers, so if you have a minute to spare, send a post card to "BM/PRESS, London, W.C.1."

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In the East

Mecca's radio might have proved Marconi's Waterloo were not this company's resources so great.

I refer to the fact that only those who are of the Mahommedan faith are allowed to enter the Holy City, and therefore Marconi's have to supply a Mahommedan engineer to install radio equipment in Mecca.

The King of Hedjaz and Nejd is having fifteen stations erected to provide Arabia with a complete system of radio communication. King Ibn Saud has sent four of his subjects over here to take a course of instruction at the Marconi works at Chelmsford.

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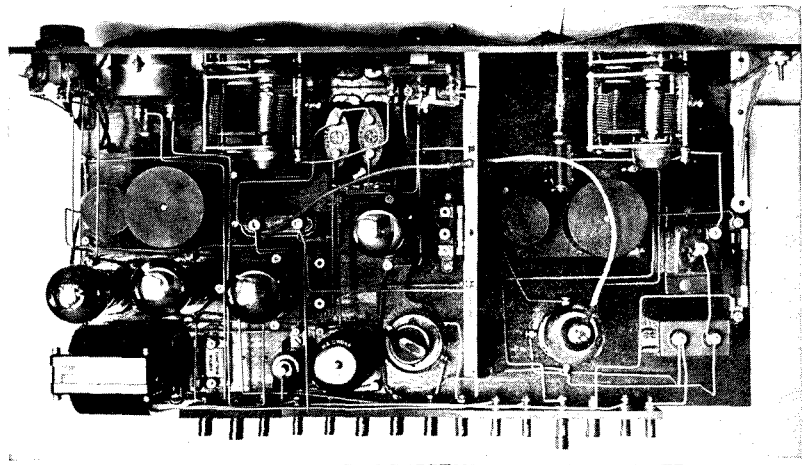
A Wonderful Place

Twice have I been to Chelmsford. The first time was on the occasion of Clara Butt's broadcast from the long-wave transmitter that resulted in the regular working of 5XX.

More recently I went to see the short-wave transmitter 5SW, used by the B.B.C. for Empire broadcasting.

Many important radio developments have had their origin in the experimental department of these Marconi works.



AN AMBITIOUS JOB SUCCESSFULLY ACCOMPLISHED

This is a Brookman's Three with a push-pull output stage, constructed by Mr. W. Gordon Gould, of Muswell Hill, who is personally responsible for more than six "Brookman's" sets in North London

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An Enthusiast

If ever there was a radio enthusiast he must be Mr. W. Gordon Gould, of Muswell Hill; he has sent me a long letter and four fine photographs of his set and mains unit. I am reproducing one of them here.

The set is a five-valver, based on the Brookman's Three, and Mr. Gould is very enthusiastic about it. The two extra valves are for push-pull output.

"I would like you to thank Mr. James on my behalf for his wonderful circuit," writes this enthusiast. "It is the best thing I have struck since I became interested in wireless some five years ago.

"I am personally responsible for more than six 'Brookman's' sets in the north of London."

Excellent. More stations to your log, Mr. Gould!

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Fog Voices

One of the most interesting pieces of radio apparatus yet developed is the talking beacon at Cumbrae, conceived by Mr. Charles A. Stevenson, of the Clyde Lighthouse Trust.

This gear makes good use of the difference in the speed of radio and sound waves. In a fog the mariner listens on a simple set to signals transmitted automatically from the lighthouse, which is also provided with the usual hooter.

The radio signal is made by a special H.M.V. record that bears the name of the lighthouse and a series of figures representing cable lengths and miles.

By listening to the radio signal and noting at what figure the hooter is heard across the water an observer is able to calculate at once his distance from the shore.

Relative Speeds

This is possible because the radio waves travel so very much quicker than the sound waves produced by the hooter.

As you know, wireless signals are practically instantaneous—they travel at the incredible speed of 186,000 miles a second—but sound waves are tortoises by comparison; their speed is only 1,132 feet a second. It is therefore easy to make an aural comparison in the way explained.

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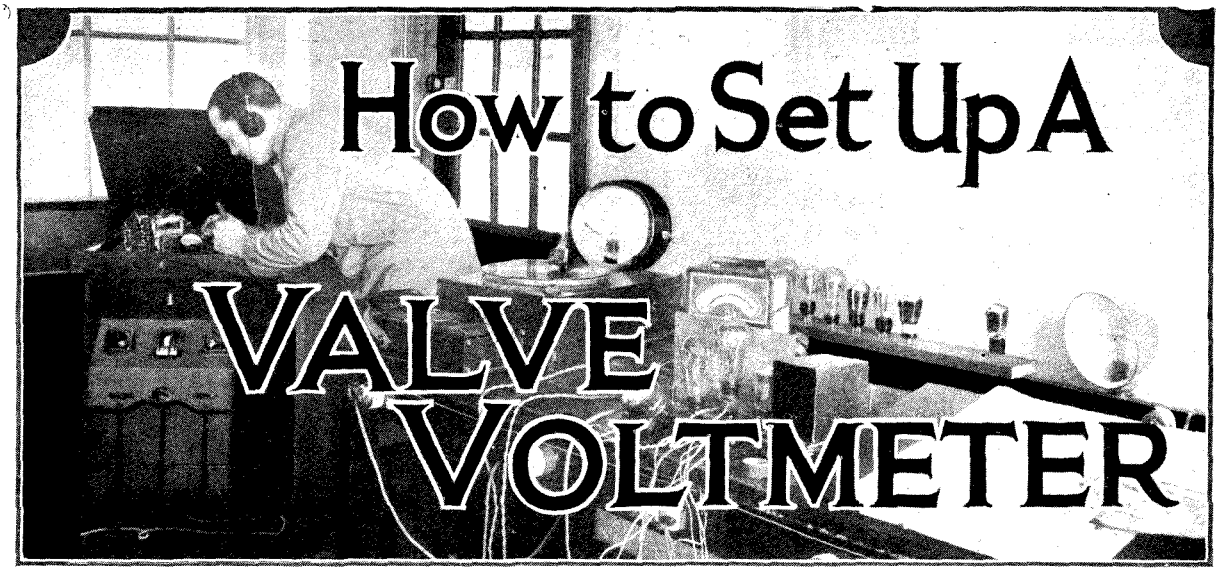
This Month's Teaser

Walking into the WIRELESS MAGAZINE offices the other day I saw on the counter a couple of wrongly delivered letters for the postman to take away. A glance showed that one was intended for me, although nobody else had spotted what it was.

The address that had so puzzled the staff was "The Bee/Empress, c/o WIRELESS MAGAZINE . . ." etc. And inside was the postscript: "I trust that the hive is thriving and that the honey business is good!"

BM/PRESS



How to Set Up A VALVE VOLTMETER

Testing a radio gramophone in the H.M.V. dealers' mechanics training school at Hayes, Middlesex.

By W. JAMES

A VALVE voltmeter is essentially only a calibrated rectifying valve. There are, generally speaking, only the two types One type has an anode-bend rectifier and the other a grid-circuit rectifier.

An essential difference between the two types, therefore, is that one, the anode-bend type, hardly loads the circuit to which it is connected, while the other type does load the circuit.

An anode-bend valve voltmeter

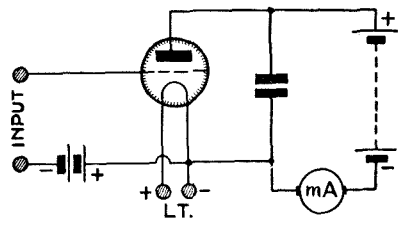


Fig. 1.—Essentials of an anode-bend type of valve voltmeter

consists essentially of the parts shown in Fig. 1. We have in the grid circuit a biasing battery. Between anode and filament is a fixed condenser and in series with the anode circuit is a milliammeter.

Value of Anode Current

When the filament of the valve is heated, and the terminals to the grid circuit are connected, a current will flow in the anode circuit. The value of the current will depend upon the valve and the values of the anode and grid circuit voltages.

If we increase the grid bias the anode current will fall off and may be reduced to about zero by applying sufficient grid bias.

A curve may be drawn showing the variation of the anode current with the grid bias (Fig. 2); over the range shown there is no grid current. If the grid bias is made positive, however, grid current will flow.

It follows from this description that if we fix the grid bias at a point such as A (Fig. 3) and apply to the grid circuit high- or low-frequency voltages, then the anode current will increase. If we measure the current we shall obtain an idea of the strength of the signals applied to the grid circuit, for the milliammeter will indicate a current according to the strength of the signals.

When the signals have less than a certain strength there will be no grid current and you might think that connecting the arrangement to a circuit would not disturb it.

This is not quite true. In the first place the connecting wires to the grid, the valve holder and the valve itself have capacity.

The tuning is therefore altered in the case of a high-frequency circuit, and the total capacity of the circuit is increased in other circuits, such as the low-frequency parts of a set.

Now the condenser formed between the grid-input circuit of the valve voltmeter is not a perfect one by any means, with the result that power is lost.

A little damping effect does, therefore, occur and whether it is serious or not depends upon the nature of the circuit to which the instrument is connected. If the instrument is connected across a really low-loss tuned circuit, for example, the loading effect may be quite serious and it will lower the voltage.

A valve voltmeter should, therefore, be arranged with this point in mind. Use a good valve holder, that is, one having low losses and do not fit the terminals in a field of poor insulating material. Owing to the capacity of the grid-to-anode circuit of the valve it is quite essential to place a condenser between the anode and filament terminals of the valve.

Condenser Capacity

The condenser ought to have a large capacity, such as 1 or 2 microfarads. So large a capacity is not essential when the instrument is to be used for high-frequency work only, but may as well be fitted.

I have used a valve of the tubular type, the DEV, without a holder, in a valve voltmeter and obtained fine results. The valve, which has the filament contacts at the ends and the

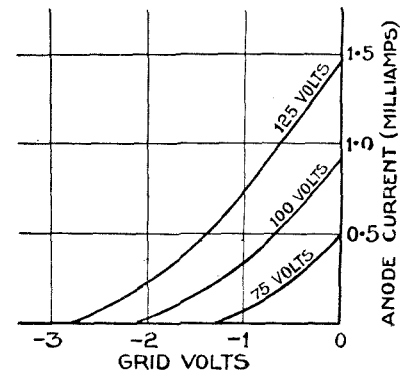


Fig. 2.—Variation of valve anode current with grid bias applied

grid and plate contacts at the sides, was supported by the wiring.

It introduced negligible losses into high-frequency circuits having really low-loss components and was a valuable instrument

The anode-bend type of valve voltmeter has an awkward calibration curve, with volts plotted against the usual evenly-spaced scale. It is therefore worth while choosing a valve with a short curved part.

Anode Resistance

Sometimes better results are obtained when a resistance is included in the anode circuit, the effect being to make the voltage scale rather more uniform

A milliammeter reading to 1 or 2 milliamperes is useful, depending upon the valve and the voltages used. For small input voltages a really sensitive meter is needed.

To set up the voltmeter it is necessary only to connect the input terminals together for the purpose of applying the grid bias to the valve and to adjust the high tension to provide a reading of a few divisions of the meter.

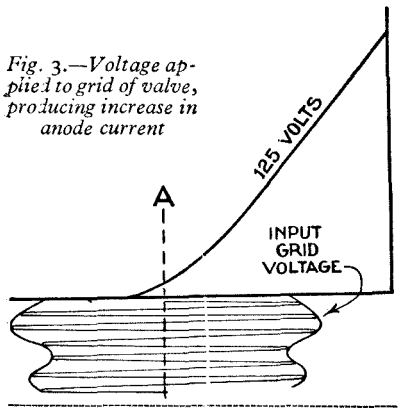


Fig. 3.—Voltage applied to grid of valve, producing increase in anode current

When a signal is applied to the voltmeter the anode current will increase according to its strength. Speaking generally, the anode-bend type of instrument is not sensitive to small inputs, but given signals of the order of a few volts good results are easily obtained.

The shape of the anode-current curve shows that the sensitivity to small voltages is not great, but for many tests this instrument is to be preferred to the grid-leak type.

The grid-leak type, shown in Fig. 4, consists of a valve having a condenser and leak connected in its grid circuit, with a meter, condenser and battery joined in the anode circuit.

This type passes grid current, as an ordinary grid-circuit rectifier Thus it is necessary to use the meter with care as the load imposed may affect very materially the results. If the meter is connected to a tuned circuit, for instance, which has a volt across its tuning condenser, then when this

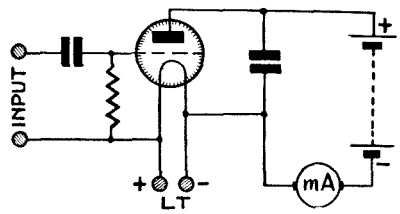


Fig. 4.—Grid-leak type of valve voltmeter

meter is connected the reading may be only three-quarters of a volt.

The fact is that the voltage across the circuit when the meter is connected is less than when the meter is not joined to the circuit. Further, no allowance can be made, as the effect of the instrument is dependent upon the characteristics of the circuit.

Small voltages can be measured with the leaky-grid type of valve voltmeter, but for ordinary purposes I recommend the anode-bend type.

The fact that the instrument is not calibrated need not worry us for many purposes. We can tune circuits for the maximum signal strength, make comparisons, and so on. With the anode-bend type we do know that, apart from the tuning, but little effect is produced and it is this which makes the instrument so valuable.

A point to note is that the anode-bend type of instrument must be connected across a circuit which will allow the grid bias to reach the grid of the valve. That is, the instrument should not be connected across a condenser only.

High Resistances

It may be connected across a coil, transformer or resistance. You should be careful of high resistances, such as grid leaks of, say, 1 megohm or more, for the reason that if grid current flows the readings will be upset. With a resistance of 1 megohm and a current of 1 microampere, the voltage drop is 1 volt and the grid bias is altered from the normal by this amount. This will alter the normal reading of the instrument.

One soon becomes used to instruments of this type and makes the necessary allowances.

When the voltmeter is used in low-frequency circuits, be sure to connect it across the apparatus, such as a transformer (Fig 5), and not to forget the grid bias.

The needle of the meter will normally swing to and fro if the broadcast is being received, but you might be testing with a pick-up and frequency records, when steady readings will be obtained.

A great deal of care is necessary when dealing with high-frequency circuits. When testing a set having ganged tuning, for example, do not forget that the act of connecting the instrument will alter the tuning of the particular circuit to which the instrument is joined. This must be retuned or false conclusions may be reached.

Another point is that the wires to the grid circuit of the voltmeter may be in such a position with respect to other parts that instability or loss of amplification is caused.

Effects Produced

In fact, too much care cannot be taken, but if you always remember how the valve voltmeter works and consider the effect it is likely to produce then results will be worth while. You may have to re-tune a circuit when the voltmeter is connected or to make some other adjustment for the purpose of restoring it to what it was before the instrument was connected.

As the leaky-grid type passes a fair anode current, a meter reading from 2 to 5 milliamperes, according to the valve and battery voltage used, ought to be included in the circuit. When measuring signals the current decreases, as in the case of the ordinary grid-leak detector.

This may at first appear rather confusing as the reading of the anode

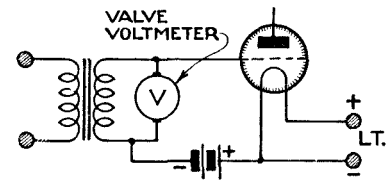


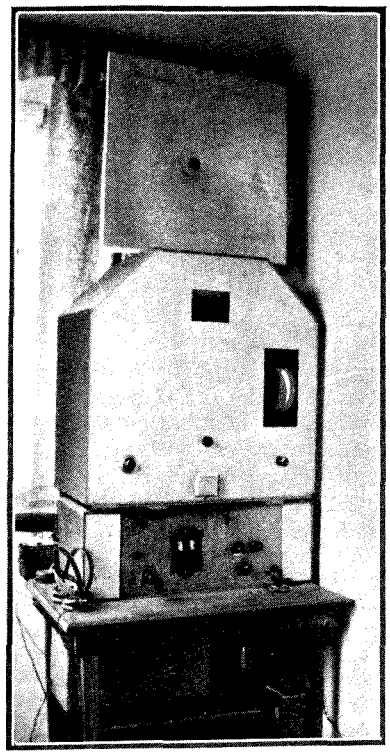
Fig. 5.—Using valve voltmeter in low-frequency circuit

circuit meter decreases as the signal increases.

The load imposed upon the circuit to which the instrument is connected varies all the time, of course, which makes this type not so suitable as the anode-bend method in spite of its greater sensitivity.

READERS TEST THE BROOKMAN'S THREE

W. James' Screened-grid Set Holds Its Own



USED FOR TELEVISION

A reader at Gartocharn uses a Brookman's Three, with an additional L.F. stage, for receiving television

AN enthusiastic reader at Gartocharn uses a Brookman's Three as a basis for television reception :

The enclosed photograph may interest you. It includes the first "A.W." linen-diaphragm loud-speaker, a home-made televisor, the Brookman's Three and the Chapman Reinartz Two (the last is under the table to the left). The apparatus is used to receive the night television transmissions from the two London stations.

The Brookman's Three has an extra L.F. stage added. Since only 120 volts are given by low-capacity H.T. accumulators and another 70 by a dry battery, the televisor can only be used with a commercial 110-volt lamp, which has not very good characteristics for television, nor is there enough power to work synchronising coils.

All the Main Stations

The Brookman's Three, using 120 volts only for broadcast reception, brings in all the main European stations, a number of which are received without reaction. A long aerial can be used here and I have three alternative ways of connecting it to the set.

The panel layout in both sets is different from the originals since different components were used.

The loud-speaker uses a Blue Spot unit and was doped with collodion.

I thought it a good idea to send this in, as I have not seen anything of such apparatus in your magazine as yet.

FIFTY-SEVEN stations is the record of a Hastings reader with his Brookman's Three, which he has altered for anode-bend in place of leaky-grid detection :

Your Brookman's Three, which came out some time ago, is a positively wonderful little set. Tuning in with the loud-speaker I have got fifty-seven stations; of these twenty-two are fair loud-speaker strength and twenty-four are really good loud-speaker strength.

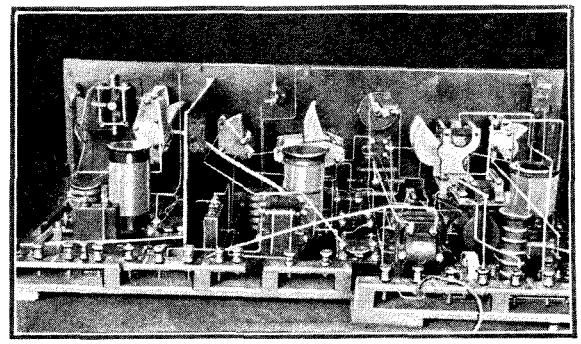
I altered the circuit slightly by incorporating anode-bend detection, an anti-mobo on the detector valve and an output filter.

I have tried various circuits but not one of them has come up to this and I hope others have been as lucky as I have in choosing the same circuit.

THIRTY-FIVE to forty stations are picked up by a reader at Chepstow, who also has a Q-coil Two in the same cabinet for headphone reception :

I do not think it is a common practice for people to fit two receivers up on one panel, so perhaps these rough photos and details may interest you.

The circuits are the Brookman's Three with second L.F. added at will, together with the Q-coil Two (with slight alterations). This latter is for headphone work when I wish to listen and the other fellow does not.



TWO SETS ON ONE BASEBOARD

On the left is the Brookman's Three and on the right the Q-coil Two (see letter from Chepstow reader above)

I have built some eighty sets since I bought the first number of WIRELESS MAGAZINE, but the Cataract Five with Marconi moving-coil loud-speaker and the Brookman's Three are quite the best in my hands.

The Brookman's Three can pick up with ease some thirty-five to forty stations, and this in a spot very badly screened by a close and high hill, which cuts off all reception from S.E. to N.W.

AT South Shields a constructor gets thirty-nine stations on the loud-speaker. At least ten are too loud for an ordinary room :

I have been a reader of your two periodicals, WIRELESS MAGAZINE and *Amateur Wireless*, for the past eighteen months, and I must congratulate you for such fine papers. I began wireless with the WIRELESS MAGAZINE and I am rapidly gaining knowledge of the subject.

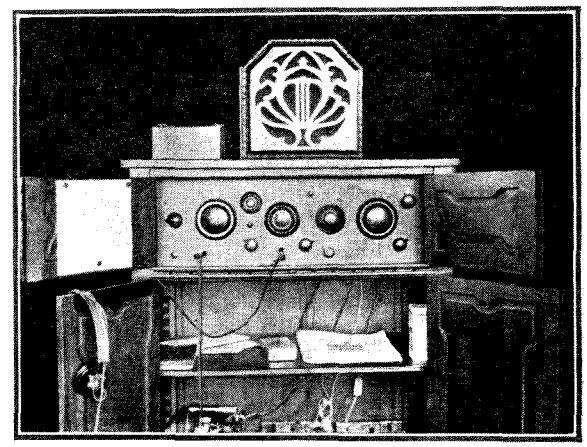
I built the ABC Two last Christmas (1929), and could get ten or twelve stations on the loud-speaker. I have since dismantled the set so I am not sure of the number. I had no trouble whatever, the set working first try.

Later I built the now famous Brookman's Three and I am extremely pleased with it. I can receive twenty-eight stations on the medium waves, ten of them at least too loud for an ordinary room, and eleven on the long waves. The above results are all on the speaker.

I would back my set against many of the four-, never mind three-valve sets in this district. The only drawback to the set is the controls. The "old folks" don't like the two condensers on the panel.

I find wireless a most interesting hobby, so much so that when boasting of my Brookman's Three, one of my pals would not believe me. Since hearing it I got the job of making him a set.

Thanking you for the way in which your papers cater for all classes, especially novices like myself.



PLENTY OF KNOBS TO TURN!

All these controls do not belong to one set—there is a Brookman's Three and a Q-coil Two mounted on a single panel and baseboard

FORTY stations on the loud-speaker is the record of a reader in Cornwall, who says that "the selectivity is wonderful":

One can always rely upon having something worth while, or which should be worth while, if one constructs one of the WIRELESS MAGAZINE sets. We are told that this or that set can be easily put together by any reader who can handle a few simple tools, and, with the excellent blueprints and careful instructions, this is perfectly true.

May I recommend to my Cornish friends (Cornwall is not a wireless El Dorado) just one set which, in the three-valve class, is "the goods"? It is the Brookman's Three.

These letters from readers all over the country show what can be done with an efficient three-valve set—even if it is sixteen months old! The original Brookman's Three was described by W. James in WIRELESS MAGAZINE *for October, 1929.*

A revised version, called the New Brookman's Three, was published in November last. Full-size blueprints can be obtained for 1s., post free.

The Brookman's Three with an aerial only about 20 feet high does the following:

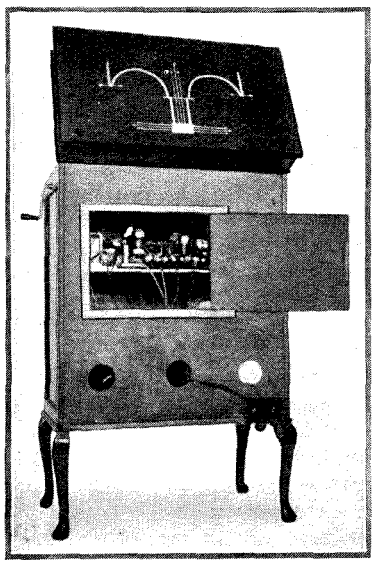
1.—Daventry 5XX. Volume too great unless reaction is at zero and the aerial is slightly detuned.

2.—Huizen, Motala, Zeesen, Eiffel Tower, Radio Paris, at full loud-speaker.

3.—Forty stations have been tuned in on the loud-speaker in one evening ("referee" sitting some distance from loud-speaker and "thumbs down"-ing any signal not really audible)

Valves used: Lissen SG, Lissen HL210, Lissen P (2 volts). High tension, about 110 volts

Both Brookman's Park transmissions come in, but naturally are liable to fading. The same remarks apply to 5GB. Selectivity is wonderful. Langenberg and 5GB quite clear of one another within one degree on the dial.



ACCESSIBLE DESIGN

Back view of the cabinet used by a Leyton reader for his Brookman's Three

A READER at Stirling has added a fourth valve to his Brookman's Three and can drive a large moving-coil loud-speaker:

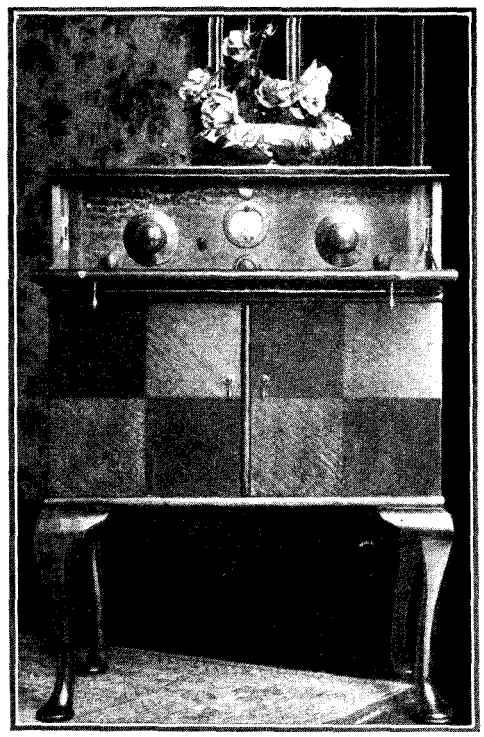
The accompanying photograph shows my latest endeavour, built up to 1930 standards. The set is built largely from information received from your valuable magazine.

The circuit is essentially a Brookman's Three with an additional L.F. valve, the first L.F. valve being converted to R.C. coupling. The panel and baseboard layout was suggested after reading Mr. James' description of the Brookman's A.C. Three.

I have incorporated a Ferranti meter in the circuit and this occupies a central place on the panel, being illuminated by a small pilot light. The reading is taken from the anode of the last valve and this acts as a valuable guide to output distortion. De-coupling resistances are fitted to all the stages where indicated and a choke output is also employed.

The set is housed in a Pickett's oak cabinet, which is in itself a fine piece of craftsmanship.

The results are all that could be desired and there is ample power to operate a B.T.H. senior model Rice-Kellog loud-speaker.



A HANDSOME RECEIVER

This fine set is a Brookman's Three with an additional low-frequency stage, made by a Stirling reader

The cabinet is bottomless so as not to hinder the loud-speaker, and the mains unit and grid-bias are on small brackets. I have also incorporated a switch to cut out the amplifier when I do not wish to use it. I have enclosed photos to give a general aspect of the job.

A GOOD COMBINATION

From Leyton comes this photograph of a Brookman's Three combined with the Universal Push-pull Amplifier (see letter below)

"A SET worthy of my labours" is how a Leyton reader describes his Brookman's Three, which is built up in conjunction with the Universal Push-pull Amplifier:

I herewith wish to thank you and forward you details of my attempt at the Brookman's Three, followed by the Universal Push-pull Amplifier described by you a few weeks ago. It is now a set worthy of my labours.

FROM St. Albans comes the following report on the New Brookman's Three (WIRELESS MAGAZINE, *November*, 1930), *a revised and cheaper edition of the original set:—*

I have just constructed the New Brookman's Three; please accept hearty congratulations on a wonderful set.

At present I have logged about a dozen stations on the loud-speaker and I don't doubt that when I am used to a set having two tuning controls. I shall do even better.

Biggest Surprise

So far my biggest surprise has been Leeds, at 5 degrees on the right-hand dial, which comes in at weak loud-speaker strength, but is, unfortunately, quite useless, as it suffers badly from fading—each cycle occupies less than ten seconds and the station is barely audible when at its weakest!

I have always been under the impression that the smaller B.B.C. stations have had a bad name for being received at any great distance.

Reaction "overlaps" somewhat, particularly over the lower half of the tuning scale, and although I am told that this overlapping—which is accompanied by a "flop"—is a feature of screened-grid sets I don't believe it. I rather think I have not got the high-tension voltages correctly adjusted.

Wireless Magazine, March, 1931

CONTROLLING CLOCKS BY RADIO

By Dr. ALFRED GRADENWITZ,
the "Wireless Magazine" German Correspondent

A NEW SYSTEM OF CONTROLLING ELECTRIC CLOCKS BY WIRELESS
This photograph shows Ferdinand Schneider, the inventor, in his laboratory

ATTEMPTS to utilise the constant speed of wireless waves for an accurate transmission of time have been made ever since the invention of wireless telegraphy and an international time service which, from the Eiffel Tower and the Nauen radio stations, twice daily marks the exact time acoustically by wireless morse signals has been in existence for several years.

Insufficient Selectivity

All endeavours to use electric waves directly in operating electric clocks have, however, proved a failure, mainly because of the insufficient selectivity of receiver clocks, which not only would respond to all waves of a given wavelength, but be unavoidably disturbed by atmospherics.

A German engineer, Ferdinand Schneider, of Fulda, has been successful in devising the first perfect solution of the problem, his "wireless time exchanges" enabling the exact time to be broadcast over any desired area within the range of a transmitting station.

One central transmitting station is provided in each country, from which are sent out trains of wireless waves controlling any number of receiving clocks. A number of separate inventions were, of course, required to carry out this idea in actual practice, and many years' tests had to be made to bring out the practicability of the whole scheme, which is briefly outlined in the following :

An astronomical clock will once each minute make contact, thus controlling from a distance a high-frequency transmitter. The duration of each current closure—as well as of each wave emission—is about one second.

In each given town or city, at each railway station or industrial works, there is installed a master clock thus controlled by waves from an astronomical clock and which, as usual, is connected to any number of secondary clocks or minute dials. While being of a high workmanship, this can be manufactured by pressing and stamping at any existing factory and should not be more expensive than any mechanical timepiece.

Where there already is an electric time service, the wave-controlled clock would be substituted for the elaborate and expensive master clock so far required, which is in constant need of expert supervision, whereas with the Schneider scheme there is no superintendence, no winding up, etc.

The detector used by the inventor is a highly improved type of coherer which, however, has little in common with the primitive form of apparatus employed in the early stages of wireless telegraphy, namely, the small glass tube containing metal filings which, upon the impact of waves of proper length, would be "glued" together, thus becoming temporarily conductive of electricity.

Stabilised Detector

In fact, the detector devised by Schneider, when once under current, is not cut out by any jerks, nor does it undergo any alteration by the continued passage of electric currents. This is why it is, on the one hand, entirely resistant to atmospheric discharges and, on the other, highly

sensitive to the receipt of electric waves of proper length.

Moreover, it affords the particular advantage of dispensing with any relay and amplifier valve as otherwise required in wireless practice.

Schneider's coherer, then, is made up of large metal electrodes, approached towards one another to a fraction of a millimetre and having a mica plate 0.1 millimetre in thickness between them.

Ionised Conductor

These large electrodes are covered with numerous minute metal films, taking the place of the metal grains used in the primitive coherer, and which, on the impact of electric waves, do not cohere, that is to say, are not "glued" together, but the air between them is ionised, thus providing a large-surface conductive bridge for the passage of electric currents, which, moreover, thanks to the minute electrode gap, is of a high sensitiveness to waves.

In fact, even strong currents will pass through this detector, actuating without any relay the electromagnetic switches connected up to it.

Another invention incorporated in Schneider's scheme and which ensures absolute safety of operation is what he calls the "spark extinguisher," a small tube likewise filled with minute metal films, which for the first time enables any disturbing sparking at points of contact, collector brushes, etc., to be put out effectively, thus doing away with any local disturbance.

In fact, those contacts no longer require any protective lining of precious metal. The physical process this device is based upon may be described as follows:

No Current Can Pass

When applying a considerable potential to electrodes having a large surface upon which large amounts of metal films are accumulated, no current will be allowed to pass, nor will the metal films undergo any heating, even in the case of a permanent load, the air between the films being an insulator of electricity.

If, however, the films be loaded mechanically or pressed against the electrodes, the air between the films will be expelled, thus converting the films into a compact mass traversed by the current.

Under the mechanical pressure the total volume of the mass is temporarily reduced, in order, however, as soon as the pressure is relieved, to resume its former figure, the atmospheric air penetrating once more into the interstices between the films.

If, on the other hand, the same resisting mass be acted upon by electric waves, or by extra or induction currents, its total volume will remain unaltered, though the air between the films be ionised to such a degree that any sparking is done away with by the resulting resistance.

As this occurs a certain part of the working current will pass through the resisting film mass, whereas any electric waves or induction or extra currents are absorbed in the resistance circuit, thus counteracting any disturbing effect.

At the *transmitting station* the following arrangement has been provided: Three astronomical clocks kept under control by checking from the observatory are used as transmitting clocks, two of them taking charge of the continual switching service which controls the electric wave impulses and thus synchronising all the receiving (master) clocks installed in the country.

Electric Waves

Each of the two standard clocks transmits with a high-frequency energy of its own, electric waves being generated, for example, by two high-frequency machines mounted upon a common base, each with its own continuous current motor and coupled together.

Accumulator batteries periodically charged by continuous current sets or permanently recharged from the mains are used to operate the electromotors, the generated high-frequency current being supplied to the corresponding high-frequency transformers through capacities and inductances.

The emanating waves are free from any upper harmonics and are supplied, through a mercury switch, each minute with absolute accuracy to the aerial destined to broadcast them. A number of these mercury switches is always connected up in parallel, any failure to work of any one of them being noticed immediately.

The central station or exchange, as Schneider terms it, is, of course, entrusted to the care of expert superintendents, who at any time are prepared to make any corrections or insert any stand-by sets required to ensure an always faultless service.

The *receiving (master) clock* each sixtieth second of a minute gets the detector above described into preparedness to receive electric waves. The detector, then, for a fraction of a second, remains in this "receiving position," controlling the clockwork with the incoming wave from the transmitting station, whereas the whole system during the rest of the time is locked to any wireless influence.

If, however, during a fraction of the sixtieth second, a current impulse arrives, this will excite the receiver and release the minute jumper.

Extraneous Wave

If, now, any extraneous wave should be disturbing reception, it will only assert itself during one-tenth of a second at the end of each minute, namely, during the period of preparedness of the receiver and clock control.

If it should happen to arrive during this short interval, its effect will either be added to the effect of the normal wave, or else excite the detector before or after the normal wave, thus actuating the minute jumper before or after time. The latter alternative is of no importance, the hands of the clock having already jumped, so that the receiver current has been locked.

The possibility of a premature operation thus is limited to a fraction of one-tenth of a second, which, according to actual experience, is never in excess of one-fifth of that interval, that is, one-fiftieth of a second.

This very small difference in time, however, which is not noticed visibly, is, already in the sixtieth second of the next minute, put right by the normal current impulse then arriving from the time exchange.

Absolute Protection

This arrangement ensures absolute protection against any disturbance by extraneous waves and has been found fully effective in the course of many years' practical tests. Moreover, inasmuch as the detector receiving the waves from the transmitting station can be tuned very accurately, even the possibility above discussed will hardly ever occur.

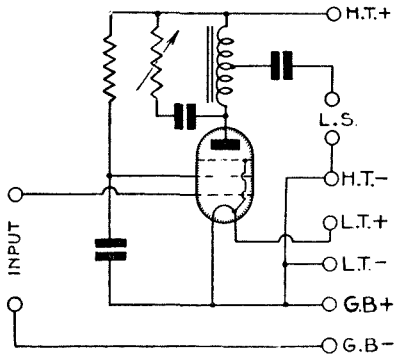
Schneider's stopping and releasing device engages immediately with the escapement of the clock, thus reducing the path of the armature of the electromagnet and enabling this to be

(*Continued in third column of next page*)

GETTING THE BEST FROM A PENTODE

THE best cannot be obtained from a pentode unless a suitable output circuit is used. Many prefer a choke-condenser output instead of a transformer, but a plain circuit is not always the best.

In fact, it is usually better to tap the choke at about its centre and to



Arrangement of output circuit for pentode valve

connect the loud-speaker as indicated in the diagram. The choke is actually serving as an auto-transformer having a 2-to-1 ratio; and this is found a good arrangement for cone loud-speakers of usual types.

Needless to say the condenser must be of a pattern capable of withstanding the load voltages. It is not safe to run a pentode without a load connected to its anode circuit.

The loud-speaker must therefore not be removed while the circuit is on, or signals will possibly set up such large voltages that the valve or one of the circuits is damaged.

To help in this matter a high-note filter is often included. This comprises a condenser of about .01 microfarad and a resistance adjustable for preference from about 50,000 ohms.

When a low value of resistance is in circuit the higher notes are reduced in strength by the maximum amount. As the resistance is increased the higher notes come up in strength, so that here we have a good tone control as well as a safety device.

The normal reproduction from a cone loud-speaker connected to a pentode is usually too high-pitched and this circuit enables the user to correct this. Some volume is lost, but as a matter of fact it is hardly noticeable.

It is important to include the resistance feed to the screen of the pentode and the fixed condenser, shown in the diagram. The resistance may have such a value that the normal voltage of the screen is correct and the condenser may be of 2 microfarads.

As the resistance is increased in value the anode current falls off, and this in turn is accompanied by a lowering of the power output which can be obtained without much distortion.

From these remarks it will no doubt be understood that the pentode valve is an interesting type having characteristics quite different from those of ordinary power valves. This is quite true, and a pentode valve, properly used, is valuable.

W. JAMES.

BY-PASSING H.F. CURRENTS

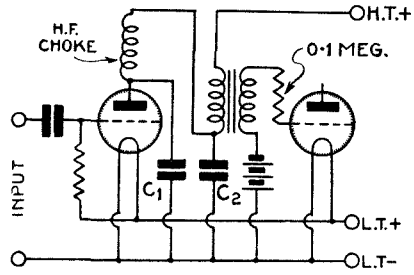
ONE of the chief difficulties with which we are faced when dealing with a set having a powerful high-frequency amplifier is of keeping high-frequency currents out of the low-frequency amplifier.

Too much care cannot be taken to reduce the currents to the minimum value and for this reason a high-frequency choke, two condensers, and a grid leak are often necessary.

In the diagram the parts are shown in a typical detector circuit. The first condenser C1 not only passes the greater part of the high-frequency currents to the filament, but greatly helps the detector action.

Condenser C2 is a further by-pass, and the grid leak practically stops high frequencies from reaching the power valve.

W. JAMES.



Position of high-frequency by-pass condensers

CONTROLLING CLOCKS BY RADIO (Continued from page 185)

operated by an extremely small amount of electrical energy. This is how the switches are actuated by a minimum effort.

Provision has also been made for the possibility of the wave from the central station failing to arrive. Two standard clocks are used, each working with its own transmitting energy, though the same wavelength is emitted by both. Clock 1 is sending out its controlling wave each minute, while Clock 2 sends out its own one second afterwards.

When A Clock Fails

If, now, Clock 1 should fail to emit its wave, either temporarily or for any length of time, the switches of the receiving clocks will get out of reach of the waves coming from master or standard Clock 1 and be controlled by those emitted from standard Clock 2.

Inasmuch as Clock 2 is just one second behind astronomical time, all the receiving clocks will then be one second slow, which is readily noticed at the time exchange from an inspection of the checking clocks controlled by the same waves, which are installed there.

Into Action Again

Clock 1, which had temporarily ceased transmitting, is now again put into working order, thus re-establishing the former transmitting conditions. In order, however, to bring the receiving clocks from the range of standard Clock 2 back into the controlling range of Clock 1, the pendulum of Clock 2 is loaded with additional weights or by any other means, caused gradually to accelerate its oscillations, until the wave transmissions from both clocks are found to coincide, after which Clock 2 is reduced to its previous mode of working.

One given central station or time exchange will control practically any number of receiving clocks, for example, the well-known minute jumpers. Any existing secondary clocks can readily be connected up to the system, the expensive and complicated master clock mechanisms so far required being done away with.

THE MONTH'S BROADCAST MUSIC

PROGRAMMES during the last month do not appear to show any marked change, either for better or worse. Items themselves are varied, but there is always that stereotyped monotony at which everybody appears to take offence.

Gustave Ferrari, a Continental tenor, recently gave an excellent recital

There is no doubt that there is room for at least some variation in the type of programme matter and it is up to our friends at Savoy Hill to get down to real business, study the needs of the listeners from every angle, and then they will be able to turn out a good all-round programme service.

Evening Organ Recitals

We were beginning to compliment ourselves last month that organ recitals had again started in the main evening programme, but unfortunately, after two, our hopes were dashed to the ground and the recitals stopped.

However, these two were excellent; Walter S. Vale and Quentin MacLean, the popular cinema organist, both played well at All Saints Church, Margaret Street.

Continental programmes always contain a fair percentage of recitals relayed from churches. Stockholm gave a programme recently which the B.B.C. might well look to as an ideal type of its kind, which it is certain would have the approval of the majority of listeners.

The programme opened with the Fantasie in G major by Bach, and then followed several tenor and 'cello solos with organ accompaniment, concluding with the Pastorale for organ by Cesar Franck.

Do you think a programme of this type would be appreciated?

Light music has become far more general, the B.B.C. Orchestra having

Sumner Austin, baritone, heard during the "Foundations" series

given us some popular items that certainly brightened up things a little, although not before it was time.

The English listener is a difficult person to please, for it is safe to say that England cannot claim any musical fashion of her own. Austria with her tzigane orchestras and Viennese melodies, Spain with tango bands, and Italy with grand opera are but a few examples showing

Glyn Eastman, baritone, broadcasts from provincial stations

clearly that the broadcasting authorities of other countries find very little difficulty in providing for the needs of their listeners.

If we were to ask ourselves what we call our national music, it would be a difficult question to answer. Probably the answer would be that our younger folk would prefer dance music and the older members would have no particular preference. Such is the problem that programme compilers have to solve.

Favouritism

Nevertheless there is no excuse for the favouring of one type of entertainment and leaving another out altogether.

The Queen's Hall concerts have started the second half of the season with some good and intelligent renderings of works by the old masters, together with many works by modern composers.

Ernest Ansermet, the famous Continental conductor, was the conductor at the first three, and by his readings

Elsie Boardman, contralto, is heard from northern stations

A popular soprano, Marjorie Parry, has sung recently

THE MONTH'S BROADCAST MUSIC—Cont.

A famous player of the harpsichord, Wanda Landowska has broadcast several times

of both old and new compositions showed, besides his great genius, that he is essentially a better conductor of the modern than of the old.

He has a masterly method of handling an orchestra and this method, combined with the performance of the B.B.C. Symphony Orchestra, resulted in renderings at a standard seldom heard in this country.

A Good Rendering

The performance of Debussy's "Iberia" (Images No. 2), the last piece of orchestral music that this composer wrote, was good. The orchestra played well, and the meaning that Debussy intended to convey, the Spain he dreamt of and not as he saw it, was clearly at the fore.

On January 21 the concert was, without a doubt, one of the few in which the playing was at its best. Cesar Franck's one and only symphony was almost the last word in perfection. Perfect rhythm and keen attention to the conductor on the part of the orchestra produced one of the best performances of this work that has been heard in England.

This symphony, which is in three movements, did not meet with any acclamation when it was first produced at the Paris Conservatoire in 1899. Gounod described it as "the affirmation of incompetence pushed to dogmatic lengths." Those listeners who heard it will surely agree that this is hardly a true description of this beautiful piece of music.

Those who missed this concert should make a note in their musical diaries not to miss this symphony next time it is played.

Wanda Landowska, who is famous for her playing of the harpsichord, was a solo artiste at this concert. She played a new work, "Concert Champêtre," for harpsichord and orchestra by the French composer, Poulenec.

Although containing several tuneful melodies, the performance on the whole was not pleasing and was rather unsuitable for a harpsichord concerto. Nevertheless, it certainly provided an interlude during the evening.

The Stravinsky concert on January 28 was a red-letter day for many hundreds of his admirers, but there must have been thousands of ordinary listeners who, although they tried hard to tolerate it, switched over to the studio vaudeville programme on the Regional wavelength, where Clapham and Dwyer and Jack Payne's Band were engaged in a fine entertainment.

There are many of Stravinsky's admirers who would entirely disagree with Sacheverell Sitwell, who recently said of the "Sacre du Printemps" ("Rite of Spring") that it "makes all other music seem absurd."

Although many of us appreciate his music to a great extent, such a statement as this is more foolish than bold. Nevertheless Stravinsky is the greatest of our modern composers and probably in time to come his works will receive the credit and praise they deserve.

Jan Wien, a clever banjoist, is a popular broadcast artiste

An artiste known for his popular songs, Gilbert Bailey

Of the concerts in March there is one outstanding event which will be looked forward to by all music lovers. This will be the concerto for 'cello and orchestra in B minor by Dvořák, in which the solo part will be played by Pablo Casals, the great Spanish 'cellist and conductor.

Listen This Time!

He is one of the very few 'cellists eligible to be described as great. Making his dêbut in this country at the Crystal Palace, in 1908, Casals has steadily mounted the ladder to fame. Even if you don't listen to this type of music as a rule, break your habit this time; you certainly won't regret it.

Robert Lindholm, one of the famous pair of "twin" pianists (see also page 190)

Oscar Fried, the German conductor, is conducting on March 11 and 18. His interpretation of Beethoven, essentially of the best, should make these concerts, which consist primarily of Beethoven's work, well worth your attention. The National Chorus are taking part in the Symphony No. 9 (the Choral) on March 18.

Cinema Organs

There is one notable change in the cinema organ recitals. Reginald Foort, who only recently became organist at the New Victoria Cinema, has now replaced Quentin MacLean at the Regal, Marble Arch. His

(*Continued on page* 190)

THE MONTH'S BROADCAST MUSIC—Cont.

clever performances at the organ of the Regal have been broadcast and are well up to standard.

This organ, by the way, is a British Christie unit type, which many think are even better than the Wurlitzer. Reginald New is still giving some broadcasts from Birmingham, which are always well worth hearing.

Light Orchestra

Among the light orchestral music we have had some good items played by the J. H. Squire Celeste Octet, Reginald King and Orchestra, and Gershom Parkington and his Quintet. The last, however, broadcasts perhaps too frequently and is inclined to be on the tiring side.

Here is the other "twin" pianist, Edgar Fairchild (*see also page* 188)

Brass bands have always been a popular musical pastime, for miners especially, in the north of England, and the standard of performance that has been reached is very high, as shown by the broadcasts of these bands, usually from Manchester.

Amongst those which have given good performances are the Horwich R.M.I. Band, Glazebury Prize Band, and the Durham Shakespeare Temperance Silver Prize Band.

From Birmingham we have had concerts given by the City of Birmingham Police Band, under Richard Wassell, who is also a clever organist. Broadcasts by these types of bands are always pleasing in character, and although no disparagement is meant to the Wireless Military Band, these brass band concerts are always more satisfying to hear than the B.B.C. band.

In the lighter vein vaudeville programmes have improved a good deal.

The programme presented by Flotsam and Jetsam was an innovation which proved a great success. More programmes of this type would certainly add a little of the tonic that is required to keep radio up to date. Clapham and Dwyer, in "Spots of Bother," have put life into vaudeville, and it is interesting to note that Jack Payne and his band are beginning again to take their place in these programmes.

That band certainly makes these entertainments first rate and it is to be hoped that they will not drop out again.

One of the best burlesques heard recently was *B.B.C., B.C.* This, featuring Leonard Henry in his usual frivolous manner, provided a good hour's laughter.

Such an interlude is by no means a common occurrence and the producer is to be congratulated on the novelty of the performance.

Isaac Losowsky, a violinist well known to northern listeners

It is by no means easy to be really funny at the best of times, and if an artiste is not funny before the microphone he certainly is tragic in the loud-speaker. Don't let us have any semi-humorous people—they spoil any vaudeville programme.

Listeners will be glad to hear that *The Ridgeway Parade* is being revived on March 2 and 3, with new artistes and new ideas.

A popular vaudeville artiste, Charles Hayes is a real humorist

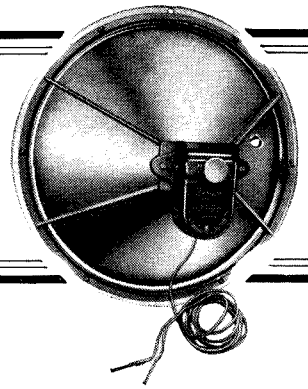
Philip Ridgeway has experienced difficulty in finding a girl with a "personality" voice able to appeal by its freshness and freedom from all undesirable accents. Auditions have been given to more than a hundred girls.

Further Rehearsals

At the time of going to press the B.B.C. has informed us that the first performance of Arthur Bliss's new Work, *Morning Heroes*, has, on account of further rehearsals being desirable, been postponed until March 25.

T. F. HENN.

A German pianist and composer, Erwin Sculhoff, broadcast recently



Brown "Vee" Unit and Chassis.

The Brown No. 4 Pick-up and Tone Arm. Price complete **£3.3.0.**

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No matter how modest its price, no matter what it is, every **Brown** instrument is the best of its kind. Each product is manufactured and tested with meticulous care. Price for price, quality for quality, **Brown** instruments offer the greatest value in radio. And every **Brown** product worthily upholds the enviable reputation of its sponsor and maker.

The Brown "Vee" Unit *cannot* chatter or distort. It is so sensitive that all the high notes are heard with amazing clearness and purity. Single screw adjustment. Nothing to get out of order. The **Brown** Chassis was specially designed for the "Vee" Unit. Fitted with a 12 in. cone. The Unit and Chassis can be easily assembled in a few minutes. "Vee" Unit **25/-.** Cone and Chassis **15/-.**

The Brown Duplex Loud Speaker. Its tone and powers of reproduction are amazing. Hear it and prove this for yourself. You'll agree, too, that its handsome appearance foreshadows its performance. V.10, Oak, **£5.0.0**; Mahogany, **£5.10.0**; V.12, Oak, **£7.0.0**; Mahogany, **£7.10.0**; V.15 (fitted with pitch control), **£12.10.0.**

The Brown No. 4 Pick-up and Tone Arm is a great advance on former pick-ups. It gives greater volume (with an even quality of response)—sufficient to fill a ballroom when used in place of an orchestra. And the Tone Arm is specially designed to minimise wear on records. Provision is made to facilitate changing needles. Price complete **£3.3.0.**

The Brown "B" Type Receiver. You cannot possibly buy better value than the **Brown** "B" type Kit. Its modest price includes all the necessary parts and handsome Cabinet (in which space is provided for housing the batteries) for building a powerful Screened Grid Receiver.

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Kit of parts	**£6.10.0**	**£7. 0.0**
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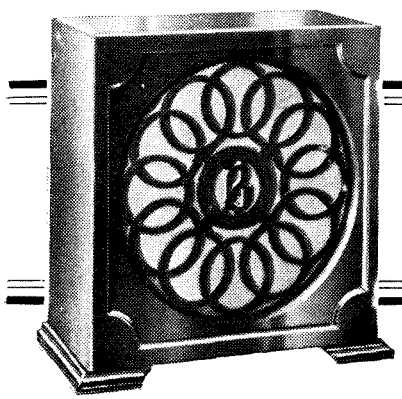
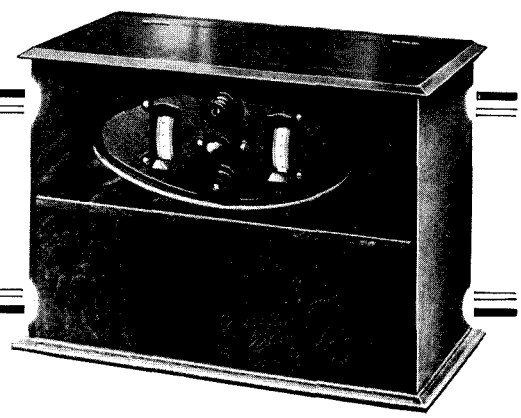


The Brown Duplex Loud Speaker.

Brown Types B. and B.M. Screened Grid Receiver.



762.

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

WHEN YOUR VALVES "RING"

A POINT which must occur to those about to build a set is whether sprung-type valve holders are really worth having.

Thanks largely, I am sure, to the popularity of portable sets a couple of seasons ago, valves which do not "pong" readily are the rule rather than the exception.

Of course, it is true to state that some of the special holders issued used not to help matters, with the result that the valve makers had to do something to help. And a difficult matter it was, too, to remove the trouble.

Detector Holders

But now it is fairly safe to use practically any valve for detection, although some of the "high mu" valves are a little troublesome, especially if the sound waves from the loud-speaker are allowed to reach this particularly sensitive stage.

I believe, as a matter of fact, that some of the valve makers dodged rather than eliminated the trouble by reducing the amplification factor of detector valves.

At the same time, it is as well to remember that certain sets are more difficult to deal with than others.

I know, for example, that if a particular detector valve is tried in say half a dozen different makes of sets, a howl may be heard from one or two of them.

In other words, you might suspect the valve of being faulty if tried in just these one or two sets. But as the results are satisfactory when the valve is used in the others, it is probably not correct to blame the valve alone.

"Ringing" is sometimes the result of feedback in the set which produces oscillations having the frequency to which the circuit responds most easily. A poor transformer often has a peak in its frequency curve, and if there are two similar stages, then you may expect trouble.

The cure is to fit different transformers, to replace one of the transformer couplings with a resistance-capacity coupling, or so to modify the circuit that the peaks are reduced, if not removed.

By fitting valves of lower impedance the characteristics will be changed, and probably in such a way as to improve the results.

A grid leak across the secondary winding of a transformer will also flatten the frequency response curve of the stage. Naturally the magnification is reduced by doing this.

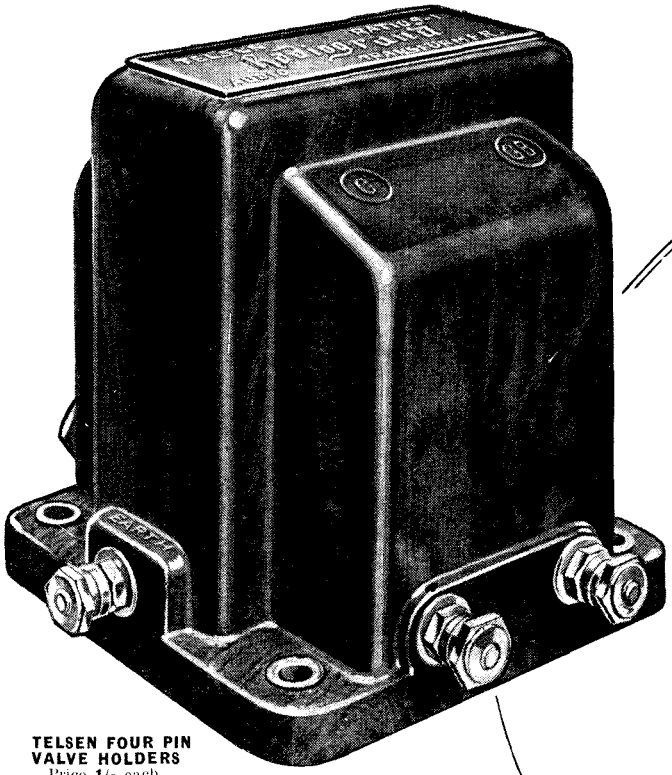
In particular, the peak is removed, and this in itself will result in the volume being brought down. Better quality of reproduction will be obtained though.

Spring Holders

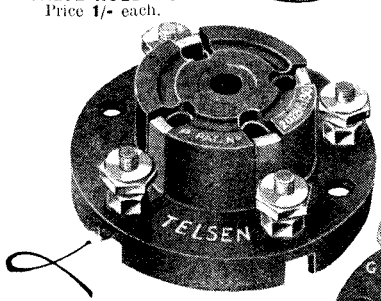
With a microphonic valve little can be effected, as the least vibration will cause the valve to create the noises which you hear from the loud-speaker. A good sprung valve holder may help with a valve of this description, but it is just as likely to make matters worse.

It depends upon the form of suspension actually used. A rubber suspension is good—while it lasts. Some spring arrangements are not very useful and others, again, make matters worse and are, therefore, to be avoided.

W. JAMES.



TELSEN FOUR PIN VALVE HOLDERS Price **1/-** each.



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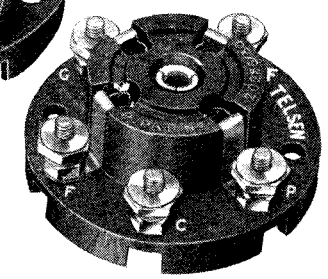
TELSEN VALVE HOLDERS. Pro. Pat. No. 20286/30. An entirely new design in Valve Holders, embodying patent metal spring contacts, which are designed to provide the most efficient contact with the valve legs, whether split or non-split. Low capacity, self locating. Supplied with patent soldering tags and hexagon terminal nuts.



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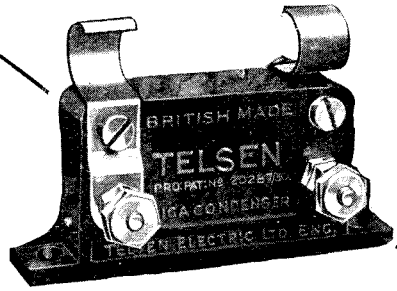
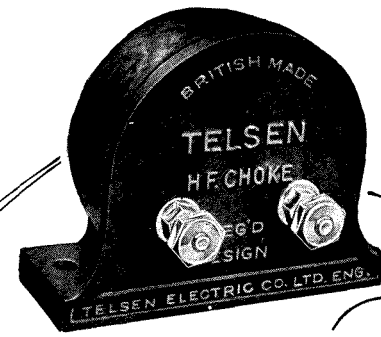
TELSEN FIXED (MICA) CONDENSERS. Shrouded in genuine bakelite, made in capacities up to .002 mfd. Pro. Pat. No. 20287/30. .0003 supplied complete with patent grid leak clips, to facilitate series or parallel connection. Can be mounted upright or flat. Tested on 500 volts. Price **1/-** each.





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HEILSBERG—WITH GIANT POWER!

Read This Article and Then Listen for It

In the development of its regional scheme, Germany is building many new high-power stations and is also increasing the power of several existing stations. Heilsberg, the new high-power station, is here described by KENNETH ULLYETT

HEILSBERG began working some two months ago and very probably by the time this appears in print will have increased its power from the original 75 kilowatts in the aerial to the full 120 kilowatts with which, under international ruling, it is allowed to operate.

Mühlacker, which causes so much bother on account of the jamming experienced by British listeners between this station and the London Regional, was the first of these new German giants and Heilsberg is the second.

Crystal Control

Heilsberg is notable because it is the first large-power crystal-controlled station to be used for broadcasting in Germany.

The station itself is just outside the town of Heilsberg, in East Prussia. There are approximately 6,000 inhabitants in Heilsberg and undoubtedly they will have a pretty poor chance of getting anything but the local station. Local field strength with the full 120 kilowatts in the aerial must be terrific.

The nearest town of any real importance is Königsberg; the Heilsberg transmitter replaced that at Königsberg, which was probably better known to the majority of British listeners.

The station is a large brick-faced T-shaped building some little distance out of the town and, although it is by no means beautiful, its chances of ever having any architectural fascination are doomed by an ugly water tower at the back of the building, but efficiency must be sacrificed to architectural beauty and the water tower is essential for the cooling water of the 120-kilowatt valve banks.

The front part of the building consists of the living quarters of the station personnel, the engineers' offices and a number of metal-lined testing rooms. The actual transmitter is in the centre of the building and the transmitting room is separated by a wall which is practically sound proof from the machine-room.

Wooden Aerial Masts

At some considerable distance from the station building is the aerial, which is hung up on huge towers made of pine wood. The use of wood for the aerial masts prevents any distortion of the transmitting field and results in being fairly well heard in all directions.

The aerial is about a couple of

(*Continued on page* 196)

33 stations on the loud speaker

overwhelming proof of the outstanding performance of the Cossor Empire Melody Maker

Read these remarkable letters:

—then examine one of these remarkable Receivers at any Wireless Shop—see how simply it can be assembled even if you know nothing about Wireless—hear its full-toned volume—appreciate its range—try it for yourself—go to your Dealer's to-day or use the coupon below.

BIRMINGHAM
"The number of stations received at full volume appears to be unlimited. Let me congratulate you on a Rolls Royce Set at a Ford price."—
W. Haines, Jnr.

DARTMOUTH, S. Devon
"I have given your Empire Set a good test alongside more costly Receivers and it has proved to be far ahead of them. Well done Cossor!"—*L. R. Shapley.*

FARNHAM, Surrey
"I must confess that your Empire model at £6.17.6 is the best I have ever heard or wish to hear for I honestly believe it is impossible to improve upon."—
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"On an indifferent aerial I have had splendid results tuning in many home and foreign stations."—
C. F. Ireland.

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"I have heard up here many sets by different makers but I think this is the best yet."—*D. Lower.*

Messrs. A. C. Cossor Ltd.,
Highbury Grove,
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Bath.
14th September, 1930.

Gentlemen,

I feel I must not let another day go by without informing you of the wonderful results I have obtained with your "Cossor Empire Melody Maker".

I purchased a kit of parts on Tuesday last, commenced assembling the set at 6 p.m. At 10.45 p.m. everything was completed, and you can imagine my delight when strains of Dance music came through the loud speaker with great clarity and volume.

The following day, I commenced calibrating in real earnest, and below is a list of stations that I received on the loud-speaker. Up to the present, I have not even attempted to use Headphones.

Huizen; Moscow; Katowice;
Radio Paris; Hilversum; Toulouse;
Konigs- Croydon; Prague; Algiers;
wusterhausen; London (Nat.) Mid.Regional; London Regional:
Daventry Budapest; Langenberg; Cardiff;
(National); Munich; Ecole Bratislava;
Eiffel Tower; Riga; Superieure; Turin;
Motala; Vienna; Rome; Barcelona;
Kalundborg; Milan; Cologne; Hamburg.
Stockholm;
Madrid;

This makes a total of thirty-three stations, all of which are strong, and require little or no reaction. The set is wonderfully selective, and on the Short Waves, stations which are within one or two degrees of each other are easily separated by the use of the rheostat and reaction control.

I received about ten other stations at loud-speaker strength, but I cannot identify them. I am, however, more than satisfied with the variety of programme which is afforded me by the above stations. I consider the 'variable' fixed condenser in the aerial circuit a very great asset to the set. I may say, that I have never come across a set which pleases me so much as the Cossor Melody Maker, and in which the tuning is so excellent.

I wish your firm all the success it deserves.

Very truly yours,
Victor J. C. Berman

Cossor Empire Melody Maker

£6.17.6

The Originals of these letters may be inspected at our Head Office.

We have just issued a novel, circular Station Chart, which gives identification details of nearly 50 stations, with space for entering your own dial readings. Ask your dealer for a copy, price 2d. or send 2d. stamp to us and head your letter "Station Chart W.M."

16-page catalogue of Radio Sets now available.

To A. C. Cossor, Ltd. Melody Dept., Highbury Grove, N.5

Please send me free of charge Constructional Chart which shows me how to assemble the Cossor Empire Melody Maker.

Name.....

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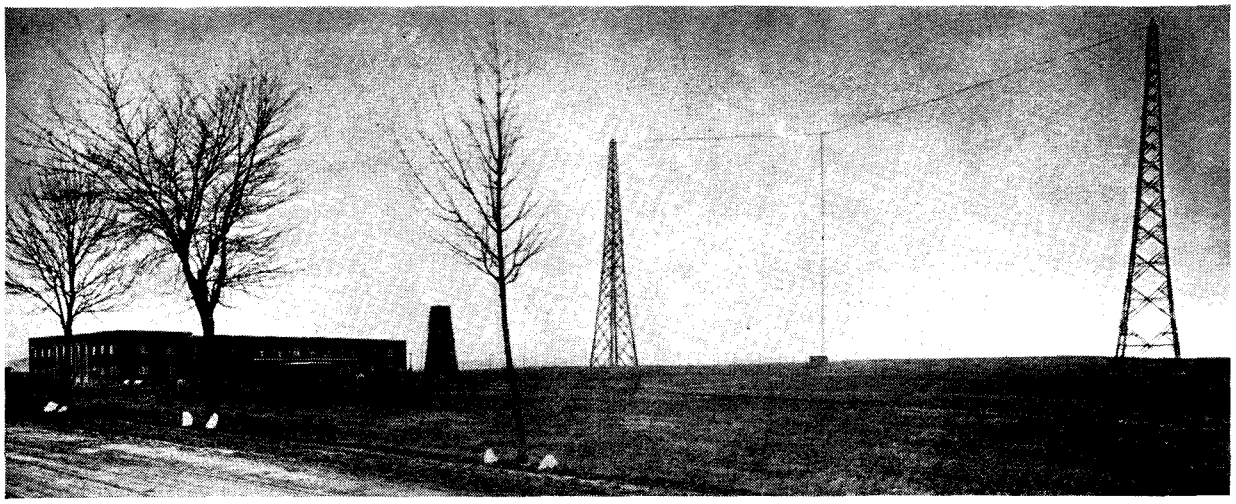
W.M. 3/31

HEILSBERG—WITH GIANT POWER !—Cont.



HAVE YOU HEARD THIS NEW GERMAN GIANT YET?

Wooden masts are used at this station, which is near Königsberg. In the left background can be seen the water-cooling tower

hundred yards from the transmitter itself. There is a high-frequency coupling circuit contained in a small shed below the electrical centre of the aerial and feeder wires connect this to the output stage of the transmitter. To reduce the lightning risk the aerial can be earthed by remote control at the control desk in the transmitting room

Eight Different Stages

There are actually eight stages in the transmitter, the first being, of course, the crystal control The crystal is connected across an ordinary receiver type power valve working with 200 volts anode potential. There are then successive stages for amplifying and for frequency doubling. At the sixth stage, which is a bank of valves working with 4,000 volts high-tension modulation, is introduced a special modulation developed by the Lorenz engineers. This is claimed to give practically 100 per cent. modulation without distortion.

The seventh stage is a 10-kilowatt bank, while the eighth stage can be changed to deal with either 75 kilowatts or the full 120 kilowatts, with special generators.

Large water-cooled valves are used in the last three stages and elaborate cooling arrangements are necessary. Down in the basement of the station are miles of copper tubing, making up the water-cooling system. The water is periodically tested for the presence of acids and salts, and is regularly changed, distilled water only being used.

The water-cooling system is self-contained and the water which actually circulates round the anodes of the valves is in turn cooled by the water running through the water tower of the station. This is similar to the cooling system that is used on Brookman's Park.

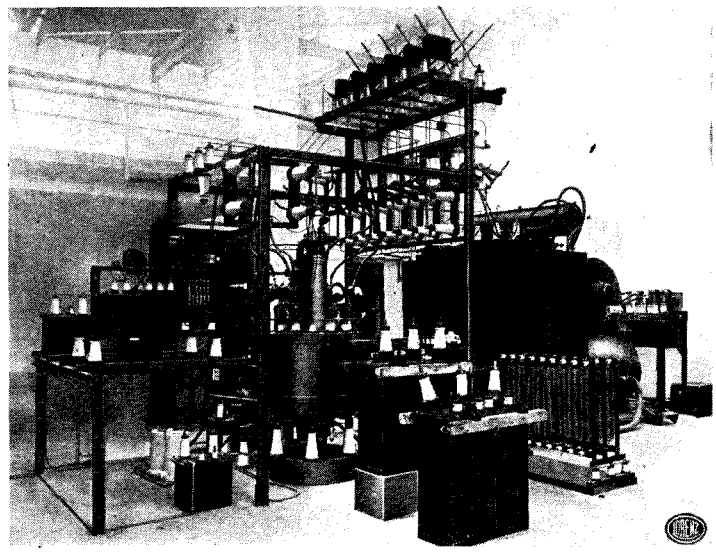
At the end of the machine-room there is a big Diesel engine coupled up to a 640-kilowatt generator. A second Diesel engine is being installed as a reserve. Rotary convertors are provided for the 10,000-volt supply, for filament current, and grid bias, and there is also a bank of accumulators at one end of the main transmitting hall.

Remote Control

Practically all the generator-room apparatus is remote controlled from the desk in the centre of the transmitting hall. On the desk are coloured indicator lights and interlocked switches which control the water-cooling arrangements of the current-supply sources.

There is a "side-band" receiver for checking up the quality of the transmissions and near the control desk is a pilot speaker.

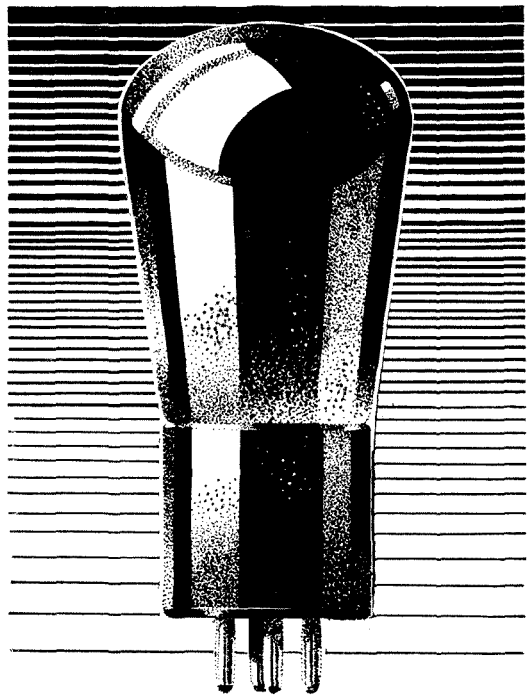
Programmes are supplied by an external studio connected up to the Heilsberg transmitter by land line. By means of comprehensive land lines now covering practically the whole of Germany, Heilsberg can also take its programmes from one or other of several other big studios.



PART OF THE GIANT'S "LUNGS"

Here you see some of the transmitting gear, the power of which can be pushed up to 120 kilowatts if desired

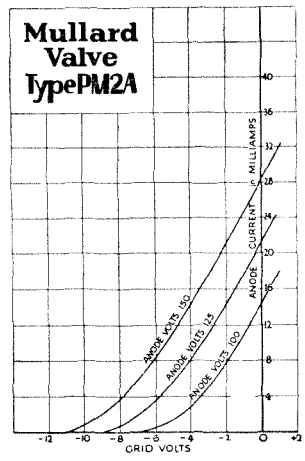
MULLARD INTRODUCES A NEW 2-VOLT OUTPUT VALVE



LIBERAL UNDISTORTED OUTPUT

P.M.2 A

Here is a valve suitable or many modern receivers where something bigger than a small output valve is required. Prominent features of the Mullard P.M.2A are its liberal undistorted output for a comparatively small grid signal, combined with really exceptional economy in both low and high tension current consumption.



OPERATING DATA OF P.M.2A.

Maximum Filament Voltage	2.0 volts
Filament Current	0.2 amp.
Maximum Anode Voltage	150 volts
*Anode Impedance	3,600 ohms
*Amplification Factor	12.5
*Mutual Conductance	3.5 mA/volt

*At Anode Volt 100; Grid Volts zero.

PRICE 10/6

Mullard

THE·MASTER·VALVE

WHAT DO WE OWE TO THE NEW VALVES?

Here J. H. Reyner, B.Sc., A.M.I.E.E., discusses the merits of the new screened-grid valves that have recently become available. He makes some interesting prophecies regarding the types of coils that will be used in receivers of the future.

THIS article is intended to be written mainly around an improvement in high-frequency valves. Some manufacturers have not altered their types for this season, whereas others have introduced either new samples or a completely new range, and it is interesting to consider in what respect we are better off as a result of these improvements.

Let us review first of all the battery valve. Here the anode impedance has remained much about the same, lying between 200,000 and 300,000 ohms, but the amplification factor has in most cases been increased to a figure round about 300.

The valve, therefore, is inherently better than the earlier type, and if we use it correctly we obtain more from it.

Tuned-anode Circuits

As far as the anode impedance is concerned we are used to the relatively high figure of a quarter of a megohm now, and indeed this has several advantages. The most important thing is that a simple tuned-anode circuit may be used with quite good selectivity, which was never possible with the old triode.

The improvement in the amplification factor to 300 would be of little use in itself. Even with the earlier forms of valve with a "mu" of 200, it was not possible to obtain an amplification of more than 80 to 100 per stage before self-oscillation set in, due to feedback through the internal capacity of the valve.

Although neutralising is not usually resorted to with screened-grid circuits, owing to the fact that the internal anode-to-grid capacity which causes instability is very small, nevertheless such capacity does exist and a limit is reached at which the feedback is sufficient to cause instability.

The maximum amplification with an ordinary unneutralised triode is about 2 or 3. When we neutralise the valve capacity, however, we are able to increase the amplification considerably and in the limit it is not the valve capacity but the stray circuit couplings which limit the stage gain to about 40.

In the case of a screened-grid valve, even of the older type, the theoretical stage gain is in the neighbourhood of 100 or more, but we cannot attain this in everyday use.

Stray circuit capacities are much greater than the internal valve capacity so that we are still left with a limiting amplification of about 40 per stage. Are we any better off, therefore? The answer is in the affirmative, because the cases when we require a large amplification per stage are limited.

It is of more practical value to obtain a smaller amplification per stage, and use more stages with a consequent increase in selectivity, always provided that we can do this cheaply. Perhaps the most useful aspect of the increased goodness of the modern screened-grid valve is the fact that cheap coils can be used with satisfactory results.

It is not necessary to use Litz wire, for example, nor is it necessary to employ special low-loss formers. Again the coils may be made smaller, and may be enclosed in screening boxes of reasonable dimensions, thereby assisting in minimising all stray coupling.

The net result is that with simpler and cheaper apparatus, we are able to obtain as good results as before, that is, right up to the limit of amplification where the stray capacities in the circuit begin to cause feedback and instability.

Screened Coils

In consequence of this we begin to find a reversion to the form of receiver which was considered obsolete some time ago. The screened coil has made its reappearance, and I would prophesy that next season the majority of the coils we use will be of the screened type. The only difference between these modern screened coils and the older ones will be that they will be dual-range, and will probably be smaller.

Totally screened condensers are already on the market. It is not necessary to enclose the condenser completely, except in special cases. Partition screens between each condenser are sufficient to avoid capacity coupling between the successive circuits and, of course, inductive coupling does not arise with condensers, except on the very short wavelengths, where the framework of the condenser may possibly form a closed loop and so have a certain amount of inductance.

Valve Screens

Screens for the valves themselves are rather the rage at the moment, and it seems that this practice will probably stay. It is often not quite clear why a screen over a valve should be of any assistance.

There are, of course, two forms of valve screen. One is the type which extends half way up the valve, thereby screening the grid wires from the anode lead. This precaution is not really necessary, except in

(*Continued on page* 200)

HAIRBREADTH ADJUSTMENT

that links two Continents

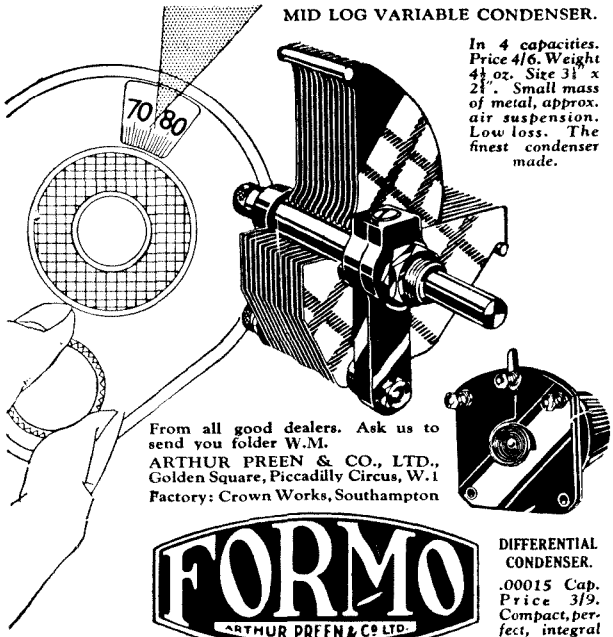
Wonderful selectivity and fractional movement –

The wonderfully smooth action and fractional accuracy of the Formo Vernier Dial used in conjunction with Formo variable condensers makes tuning of close stations a simple operation with the certainty of clear-cut reception.

The scientific thoroughness of Formo condenser construction is your assurance of the best possible results from any set. High performance is further assisted by the enclosed and protected pigtail within the shaft and minimum eddy current losses.

MID LOG VARIABLE CONDENSER.

In 4 capacities. Price 4/6. Weight 4½ oz. Size 3¼" x 2¼". Small mass of metal, approx. air suspension. Low loss. The finest condenser made.



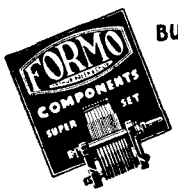
From all good dealers. Ask us to send you folder W.M.
ARTHUR PREEN & CO., LTD.,
Golden Square, Piccadilly Circus, W.1
Factory: Crown Works, Southampton

FORMO
ARTHUR PREEN & Co LTD.

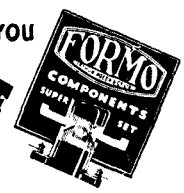
DIFFERENTIAL CONDENSER.
.00015 Cap. Price 3/9. Compact, perfect, integral pointer.

CONDENSERS

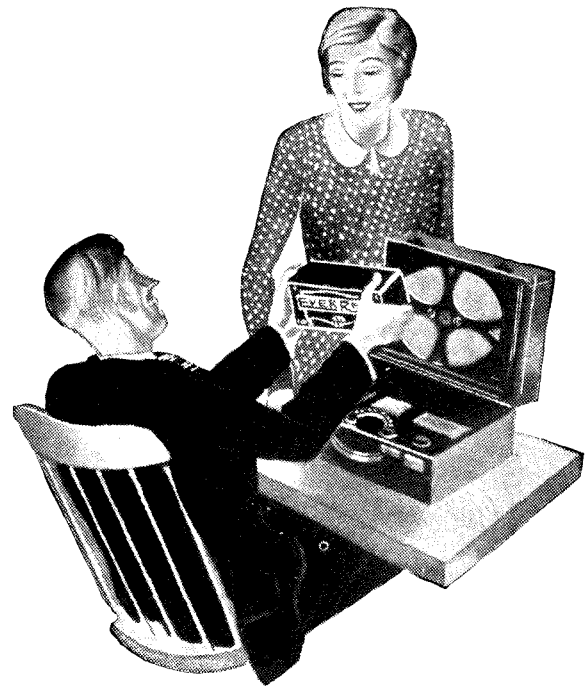
BUY YOUR RADIO WHERE YOU



SEE THESE FORMO Displays



The Sign of the Best Dealers Everywhere



MAKING IT CERTAIN

Not once did the set fail them again after they had installed an Ever Ready Battery. The exclusive process by which the Ever Ready is made gives it not only a long life but a *powerful* life. The prime of its life is practically the whole of its life. That is why the tone of the loud speaker remains constantly pure and clear. That is why there is no crackle or fading or distortion. Month after month the Ever Ready discharges a strong even flow of current and, indeed, a wireless set with an Ever Ready Battery is as certain as a numbered and reserved seat.

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.

EVER READY

BRITISH MADE HIGH TENSION BATTERIES

The batteries that give unwavering power

The Ever Ready Co. (Gt. Britain) Ltd., Hercules Place, Holloway, London, N.7

THE NEW VALVES—Continued from page 198

isolated instances, where a very efficient circuit is being constructed, and in such cases it is better to push the valve through the screen, as is often done in practice.

The other form of screen makes no attempt to partition off the valve in the middle as it were, but simply covers the whole valve. The purpose of this screen is to avoid the slight amount of coupling which is often experienced inside the valves themselves, due to the spreading of the silvering or gettering inside the glass.

Magnesium Deposit

This is a deposit of metallic magnesium which occurs as a result of the cleaning-up process when the valve is first made. The magnesium has a strong affinity for hydrogen and oxygen, both of which gases are bad for the valve if they are left inside the bulb, that is, if the valve is not completely evacuated.

The valve is connected to a pump during manufacture to exhaust all gas, but the process is assisted by introducing a small amount of metallic magnesium, which is subsequently volatilised, thereby "cleaning up" the valve.

When this takes place some of the magnesium deposits itself on the inside of the glass, and this may creep round the screen which is placed across the middle of the valve, and so provide a small capacity coupling through which a leakage of energy can take place.

This coupling can be neutralised if a small can is placed over the valve itself, and it is for this reason that we find these cans so popular to-day.

While the valves were not particularly good in themselves, and had an appreciable internal capacity, the leakage due to gettering was not troublesome, but now that the performance has been improved very considerably, this additional source of leakage becomes a nuisance.

One final point in which the improvement in valve technique has helped us is in ganging. We have seen that much simpler coils can be used. Now the simpler a coil the more easy it is to make a number of coils exactly alike without using special precautions.

The result is that we can now obtain standard coils in a shop without having to buy specially matched pairs or sets, and they can be relied upon to be accurately matched within the tolerances required.

This again is a development which will be seen more in the future. In time all coils which are supplied as components will be made up to a standard so that any two coils, whenever or wherever bought, will be of similar inductance and can be ganged together with every satisfaction.

Summary of Position

We may summarise the high-frequency position, therefore, by saying that the improvement in valve technique has not enabled us to obtain any larger amplification per stage, because this is limited by external considerations. It has, however, enabled us to obtain the same (limiting) amplification as we could before, with cheaper and simpler tuning circuits.

This means that we can gang our circuits much more simply, and that we can afford to use more of them.

A STRAIGHT LINE

SILENT . . . NON-CORRODIBLE . . . LONG-LIVED . . . Pertrix Non-Sal-ammoniac Dry Batteries positively do improve radio reception.

Every Pertrix Dry Battery that leaves our factory at Redditch tells us that somebody is going to get better radio. Why shouldn't it be you ?

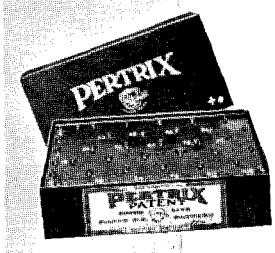
You have only to fit a Pertrix Dry Battery to your set . . . plug in . . . and listen, and we ***know*** that you will say, "That's something like radio."

Ask your dealer to-day—he will tell you the most suitable type for ***your*** set.

Did you know that you can get Pertrix Batteries for your flash-lamp? They are 6d. each, with an unlimited guarantee.

100 volt Standard Capacity H.T. Battery - - 13/-

100 volt Super Capacity H.T. Battery - 21/-



108 volt Standard Capacity H.T. Battery for Portable Sets - 14/-

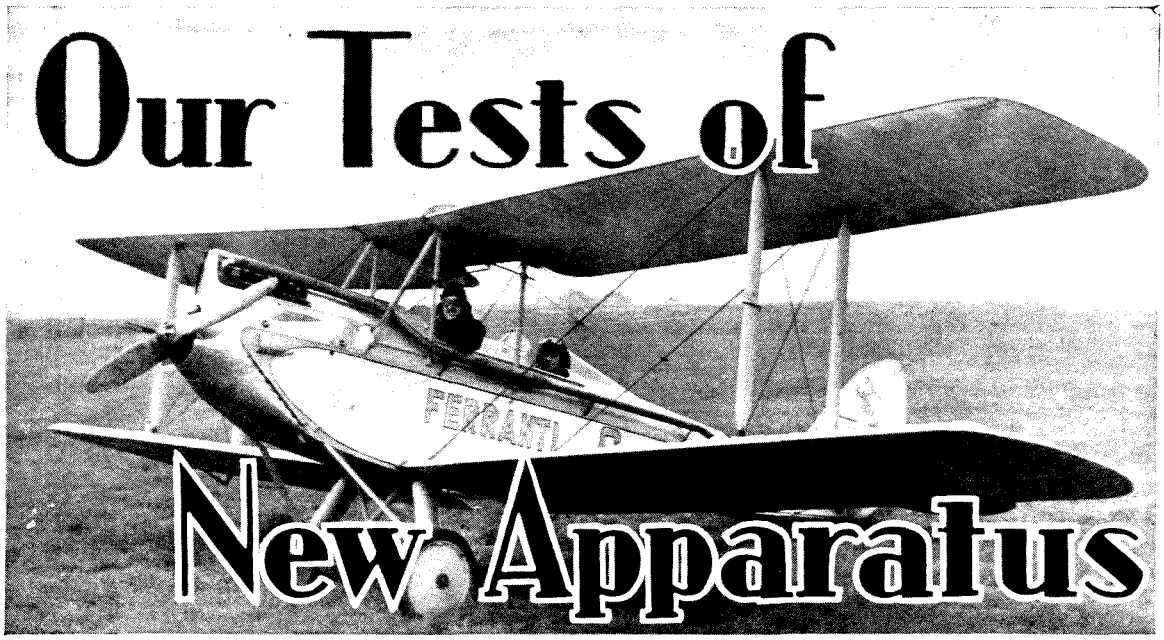
TO BETTER RADIO RECEPTION

PERTRIX

NON-SAL-AMMONIAC DRY BATTERIES

"The Samson of Radio"

Our Tests of New Apparatus



AN AEROPLANE USED FOR RADIO RESEARCH WORK

This aeroplane is used by Ferranti, Ltd., in connection with their radio research work. In it is Mr. Vincent Z. de Ferranti, chairman of the Ferranti company.

PIFCO METER

THE Pifco All-in-One Radiometer is an instrument which should carry out any test required by the average amateur, for it reads high tension up to 150 volts, low tension up to 80 volts, and current consumption up to 40 milliamperes.

Use for Circuit Testing

Further, by the incorporation of a dry cell inside the meter, it may also be used as a circuit tester, and will give a reading, when connected between two parts of a circuit, provided that the circuit is complete. It is even possible to make a continuity test between the primary terminals of a low-frequency transformer.

The meter itself is of the moving-iron variety and has a resistance of 25 ohms per volt. We checked its accuracy against our standards and found that this was sufficiently good for an instrument of this type, varying between 2 per cent. and 7 per cent., according to the range. One may thus reasonably assume that the average sample, as purchased, is accurate to about 5 per cent.

The price of 12s. 6d. is reasonable for a meter of such utility.

◆ ◆ ◆

FERRANTI TRANSFORMER

THERE are many people who consider that for adequate reproduction one must go to Ferranti. There is the noble range of AF transformers, headed by the AF5, at a price of 30s.

Perhaps the biggest drawback to the Ferranti transformers hitherto marketed has been their price, but this is now overcome by the introduction of the AF8 transformer, which sells at the low figure of 11s. 6d.

The general construction has not been altered; the well-known Ferranti sectionalised windings are still employed and ordinary transformer iron is used—not the high-permeability nickel-steel which is so often employed to-day.

The outward appearance and size has naturally been somewhat altered. The instrument is now housed in a black bakelite case of more or less conventional form, and the appearance is decidedly neat. The base measurements are 2¼ in. by 3⅛ in., the height being 2¾ in.

It was naturally with some interest that we tested this later brother and found him quite worthy of the family. The inductance ranged from 42 henries, with no D.C., to 19 henries, with 5 milliamperes D.C. As the transformer will be used after medium-impedance valves, taking a current of 3 or 4 milliamperes only, this inductance range is quite satisfactory and should result in adequate reproduction.

Rising Characteristic

This was found to be the case by an actual test, the bass being particularly in evidence, and the treble being well reproduced, due to a rising characteristic.

Incidentally, the usual fixed condenser across the primary has been omitted in this instrument and, therefore, adequate precaution should be taken to by-pass the high-frequency current from the detector valve, either by a differential reaction condenser or by connecting a fixed condenser of, say, .0002 microfarad capacity from anode to low-tension negative.

◆ ◆ ◆

TUNGSRAM POWER VALVE

NOW that it is realised that a loudspeaker is an instrument requiring power to drive it, we have quite a number of valves available capable of delivering undistorted power output in substantial quantities.

The old idea of putting in an L.F. valve in the last stage is recognised as obsolete, and we are getting resigned to the fact that a power output valve requires power, in the shape of high-tension current from the battery, to drive it.

Output of 1,500 Milliwatts

We have recently tested a Tungsram P430 valve. This is quite a useful commodity. It has an internal resistance of 2,000 ohms, with an amplification factor of 5. It will handle a grid swing of 30 to 32 volts, with 250 volts on the anode, and is claimed to give an undistorted output in the neighbourhood of 1,500 milliwatts when the anode circuit is correctly matched.

The filament of the valve is a 4-volt one, taking 0.3 ampere only, so that these figures are particularly good. The valve is intended for use as an A.C. valve and works directly off a 4-volt winding, but in view of the low filament consumption any reader who has a 4-volt accumulator supply would find this valve particularly suitable.

The price of this valve is below the usual prices prevailing in this country, being 11s. only. The valve is certainly worth its cost and behaved quite satisfactorily in our tests.

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EDDYSTONE SHORT-WAVE COILS

THE increase in internal capacity of modern screened-grid valves makes the amplification of very high frequencies more practicable. Even if one can only obtain an amplification of two or three, the tuning-in of distant short-wave stations is simplified, while the use of a high-frequency stage before the detector

(*Continued on page 204*)

OUR TESTS OF NEW APPARATUS—Cont.

avoids dead spots due to aerial resonances and facilitates the production of smooth and fairly constant reaction, which is a great asset in obtaining long-distance reception.

We have tested this month a pair of Eddystone short-wave coils. This firm are well known for their short-wave activities, and the present coils are well turned out, as one would expect.

The windings are placed on a skeleton former brought out to a six-pin base, so that the coils may be interchangeable. The first (aerial) coil is a straightforward inductance without any coupling windings whatever, while the second coil, in addition to a similar secondary winding, contains a primary and a reaction winding.

Avoiding Capacity Effects

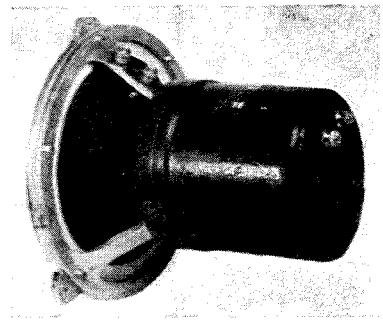
The primary winding is wound in the spaces between the secondary turns and is of relatively thin wire, thereby avoiding capacity coupling to a large extent.

We checked up the range of the coils in a receiver, and found that they handled very nicely. The range was 27 to 80 metres, with a .0003-microfarad condenser and, of course, coils for a lower wavelength may be obtained and interchanged with the first ones when it is desired to obtain reception on the range from 19 to 30 metres.

The reaction control was quite adequate over the whole scale, and was smooth in operation.

VOX VERITAS LOUD-SPEAKER

THE relatively high price of moving-coil loud-speakers has often discouraged would-be users. Periodic attempts are made to produce low-priced instruments with varying degrees of success. It was with interest, therefore, that we tried out the Vox Veritas loud-speaker, which sells at £3 15s.



A GOOD MOVING-COIL LOUD-SPEAKER

This Vox Veritas loud-speaker costs £3 15s. It is well made and gives good results.

This has an electromagnetic field system of reasonable dimensions, the diaphragm being held in a cast frame, which is bolted on to the magnet. A simple celluloid centring device keeps the coil floating in the gap, and the diaphragm appears to be reasonably dead in character.

The coil on the sample tested was a high-resistance one, the actual resistance being 3,000 ohms.

We tested the loud-speaker on two or three amplifiers, and found that it has a good sensitivity and satisfactory quality. Used with a good baffle, the bass was well in evidence, and there did not seem to be any undue harshness in the upper registers.

It is essential, however, that the full field voltage should be put on the loud-speaker. If the field strength is below par, we found that the quality became thin and reedy.

◆ ◆ ◆

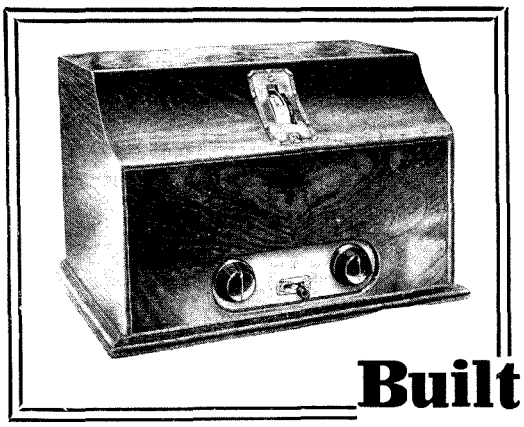
LISSEN TRANSFORMER

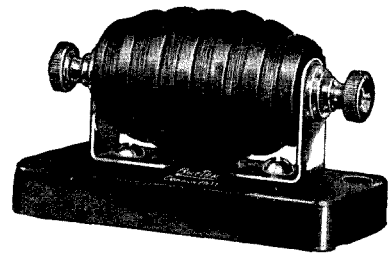
MANY readers will have seen the Lissen Torex transformers, selling at 5s. 6d. It was with no little interest that we tested one of these transformers recently. The instrument is a little larger than one is led to expect from the advertisements, so that one is obtaining even more for the money than is anticipated. The actual size is 3½ in. by 2 in. by 2 in. high.

Ordinary transformer steel is used for the core; the instrument appears to be quite adequately designed for its purpose.

The primary inductance fell from just under 11 henries, with no D.C., to 7.8 henries with 9 milliamperes. Thus

(*Continued on page 206*)





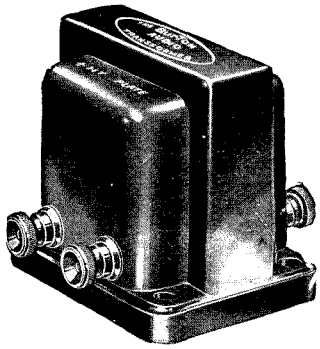
THE BURTON H.F. CHOKE

A highly efficient Choke covering a waveband of 20-2,000 metres. The self-capacity is extremely low, which, coupled with high inductance, makes it ideal for any set.

Price **3/9 each**

Also specify BURTON Condensers, Valve Holders, Changeover Switches, etc. Illustrated list free on request.

Built with the same parts as you can buy



BURTON AUDIO TRANSFORMER

An instrument of highest efficiency, carefully wound to give correct ratios.
Type B/3, Ratio 3-1, **10/6 each**
Type B/5, " 5-1 **10/6 each**

Independent tests of the BURTON SCREENED-GRID THREE referred to in the editorial columns of this journal prove it to be a most efficient and desirable set in every way. If you do not buy a BURTON RECEIVER, build one with BURTON COMPONENTS. *Obtainable from all leading Radio Dealers* **C. F. & H. BURTON, Progress Works, WALSALL**

BURTON COMPONENTS

THE BASIS OF BEST RECEPTION

Make your own records

THINK of the fun and the thrills of making your own records, and recording your friends' and children's voices, too. This entirely new and unique instrument is the only complete Home Recording Apparatus combined with a first-class portable Gramophone on the market.

It is particularly attractive in appearance, fitted with a powerful double-spring silent motor, a sound box and acoustic chamber which give delightful beauty of tone and volume.

In addition, it can be converted in a moment into a complete apparatus with which you can make your own records.

The recording apparatus is particularly simple—as simple as playing the instrument in the usual way. No elaborate equipment of any kind. The gramophone is prepared for recording as easily as if you were simply going to play one of your records. Then set the turntable in motion and speak or sing into the horn provided and the record will be made. You can stop it or start it when you like. The records can be reproduced on any gramophone, clear, distinct, lasting. Record blanks cost only 6d. each yet they will contain the same amount of recording as a normal 10" record.

WRITE FOR FULL PARTICULARS

A PORTABLE GRAMOPHONE COMBINED WITH A HOME RECORDING INSTRUMENT

FOREMOST NAME IN SOUND REPRODUCTION

CELESTION

The Very Soul of Music

HOME RECORDING GRAMOPHONE

As a Portable Gramophone alone it is wonderful value for money. A demonstration will immediately convince you of its merit both as a portable gramophone and as a Home Recording Apparatus. £10-10-0 complete.

CELESTION LTD., Kingston-on-Thames. London Showrooms: 106 Victoria St., S.W.1

OUR TESTS OF NEW APPARATUS—Cont.

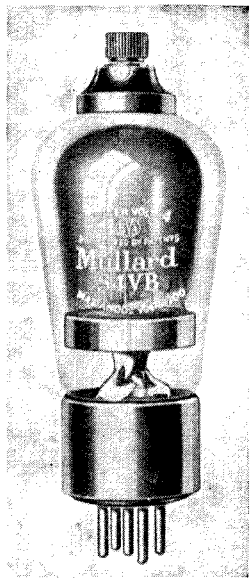
the saturation with a small current is not marked and is not likely to cause any difficulty in practice

As to whether 10 henries is too low an inductance for practical conditions depends entirely upon the use to which the instrument is put. It is, of course, quite uneconomical to use a super transformer with a loudspeaker which will not give adequate bass reproduction, and in many cases one desires an instrument capable of giving a pleasing response with existing apparatus which is known to have its limitations.

Important Point

Such a point is quite an important consideration, and we feel that in the Torex transformer readers will have an instrument which will meet their requirements.

We tested it on signals and found it behaved well. It was tested up against other transformers which could reasonably be considered in the same class, and the quality and signal strength seemed to be rather bet e



S.G. MAINS VALVE

This Mullard S4VB screened-grid valve has a relatively low impedance

MULLARD SCREENED-GRID VALVE

SOME designers do not like working with the very high impedances of modern A.C. screen-grid valves. The valves started off with impedances in the neighbourhood of a megohm, and although they have been somewhat reduced since, the value is normally around 500,000 ohms even now

A special valve produced by the Mullard Co. to overcome this difficulty has recently been forwarded to us for test. This type is known as the S4VB and, as far as its ordinary characteristics are concerned, it is interchangeable with the usual valves.

It is an independently-heated valve, having a heater taking 1 ampere at 4 volts. The maximum anode voltage is 200 and the screen voltage is 75 to 100 volts.

The rated characteristics of the valve are: anode impedance, 260,000 ohms; amplification factor, 900. We found on test that the behaviour of the valve depended very considerably upon the bias placed on the control grid. The valve is intended for use with 1½ volts negative bias, and under these conditions we found that the impedance was 260,000 ohms, as rated. The amplification factor was only 525, somewhat lower than the rated value

We examined the matter further, therefore, and found that the mutual conductance, or goodness factor, of the valve is dependent to a marked extent on the control grid potential With 1½ volts, that is the figure just quoted, the mutual conductance is 2 1 milliamperes per volt. At .2 volt on the grid the figure falls to 1 4, whereas with .1 volt the figure rises to 2 5, which is the value claimed by the makers.

Reduction of Impedance

As the negative bias on the control grid is reduced the anode impedance is also considerably reduced, and in fact, with no voltage on the grid we found that the impedance had dropped to as little as 60,000 ohms.

It appears, therefore, that this valve is one which can be adapted to suit circuit requirements by the very simple expedient of varying the bias on the control grid At the same time this variation is somewhat critical, and it appears that the value should not exceed 1½ volts if the best results are to be obtained, and a value of around 1 volt seems to be the most suitable.

AROUND AND ABOUT

THE technical committee of the Union Internationale de Radiodiffusion is shortly meeting in Paris to discuss the interference problem caused by the Mühlacker and London Regional stations. It is almost certain that one must change its wavelength or both must decrease their power.

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A proposal to establish an international radio advertising station is under discussion in Germany. Announcements would be made in several languages. The promoters are hoping to use the new 100-kilowatt transmitter which is to be built at Luxemburg

◆ ◆ ◆

Short Wave and Long Distances, an interesting publication for ultra short-wave enthusiasts, is obtainable free on request from Philips Lamps, Ltd., of 145 Charing Cross Road, W.1 Listeners who are interested should make early application for copies.

◆ ◆ ◆

The rectifying valve listed in the components required for the Brookman's A.C Two should be a UU30/250, not a U30/250 as stated. The latter valve is a half-wave rectifier, but it will be clearly understood when reading the article that a full-wave valve is recommended.

◆ ◆ ◆

Reductions in the prices of many of their well-known Wates products have been made by the Standard Battery Company, of Shaftesbury Avenue, W.C.2 The Wates Star pick-up is now 16s. and the valve tester is 1s. 9d

◆ ◆ ◆

Two new valves have been issued by the Six-Sixty Radio Co., Ltd The SS4SGAC completes a range of three screened-grid A.C valves and is priced at £1 5s., and a new two-volt power-valve, the SS220PA, is 10s. 6d. Full details can be obtained from the makers.

◆ ◆ ◆

Have you heard the mystery short-wave signal "2802"? An amateur who regularly listens on the ultra-short waves has for a long time been puzzled by these mysterious signals on a wavelength of approximately 10 metres. The mystery station has not yet been identified. Can you solve the problem?

◆ ◆ ◆

The accumulator specified for the Supertone Four in the February issue of WIRELESS MAGAZINE was of the two-volt type, this was an error. The accumulator should be of the six-volt type if the valves specified are used.

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The Chloride Electrical Storage Co., Ltd, makers of Exide accumulators, have now produced a range of Drydex dry batteries for supplying anode current. Manufactured in three series to suit the current consumption of different types of receivers, these batteries range from the modest Red Triangle, 60-volt type, at 7s., to the triple-capacity Orange Triangle, 120-volt type, at £1 7s. Full details are available on application to the manufacturers at Clifton Junction, Nr. Manchester, Lancs.

◆ ◆ ◆

The United States army is conducting experiments with a view to abolishing the military band. Instead of the band preceding a regiment, a loud-speaker car is being used as a substitute. We cannot imagine the British army following suit!

◆ ◆ ◆

Wingrove and Rogers, Ltd., announce that they are now marketing their differential reaction condensers with a capacity of .0002 microfarad and a pre-set condenser of .0001 microfarad capacity. These are in addition to their present range.

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The usual running commentary on the Oxford and Cambridge boat race will be broadcast on March 21.

◆ ◆ ◆

Mr. Gordon Parker, of Stoke Ferry, Kings Lynn, Norfolk, wishes to correspond with readers who are using the Touchstone Four and Lodestone Five.

RADIO DRAMA AND SOME COPYRIGHT DIFFICULTIES

By Our Special Commissioner

ONE of the fields of activity in which a number of critics are not disposed to concede the B.B.C. any credit for its efforts to "get across" is that of radio drama. The charge against Mr. Val Gielgud and his assistants in the Productions Department is that they are giving the listener too many plays of a morbid type and too little comedy.

Frivolous Criticism

Unfortunately, the criticism is mainly frivolous and not constructive; and that is the point about most criticism received at Savoy Hill nowadays; it aims to be destructive and that is all.

There is no point in writing to the B.B.C. and demanding that items to which objection is taken should be omitted from future programmes, unless practical alternatives are suggested.

The B.B.C. had a case the other day where a listener used quite violent language about "the trashy half-dozen players in a hotel orchestra," which was broadcasting on a Sunday evening, when "the B.B.C. had a magnificent orchestra of its own which was allowed to remain silent."

This listener wrote from an address about twenty miles from Brookmans' Park and with a simple turn of the knob would no doubt have been able to bring in the Regional in place of the National programme.

But not a bit of it; to have listened to the B.B.C. orchestra playing in Number Ten Studio would have robbed him of a grouse against the hotel orchestra.

However, the theme is radio drama. In the present stage of development the tragic play seems to possess more grip for the unfamiliar medium which is used and certainly it must have a greater appeal to the dramatist; for in the past two years over a thousand plays have been submitted for possible broadcast and only two of them were comedies suitable for broadcasting.

This is not as the Productions Director would have it. No one would be more gratified than he if a larger proportion of the more purely light-hearted and comic elements of drama could be found for radio dramatic presentation; but comedy cannot be presented out of nothing and good writers of comedy for the microphone are yet to be found.

As regards the charge of morbidity, it might be pointed out that not more than fifty plays were broadcast in the course of last year. In only two of these, *The First Second* and possibly *The Crossing*, was the idea of death the dominant note of the play.

Restoring the Balance

If even this limited use of the morbid idea is unwelcome, let it be remembered that the Productions Department restores the balance by giving as an antidote on the alternative wavelength a variety or vaudeville programme.

If this is still considered an unsatisfactory solution for the dearth of the comic element in radio plays, let

(*Continued on page* 210)

H & B

GUARANTEED KIT FOR THE SUPER 60

	£	s.	d.
1 Set of Wearite Coils (1 02, 2 T1, and 1 T2)	2	10	0
1 Formo Fixed Condenser, .0002 mfd.			6
2 T.C.C. .001 Fixed Condensers, upright type		3	8
5 T.C.C. 1-mfd. Fixed Condensers, type 50		14	2
2 Ormond Variable Condensers, .005 mfd., type R/426, with slow-motion dials		12	0
1 Trelleborg Ebonite Panel, 12 by 7½ in.		4	3
1 Lissen Grid-leak Holder			6
9 Telsen 4-pin Valve Holders ...		9	0
7 Belling-Lee Wander Plugs, marked: H.T.+3, H.T.+2, H.T.+1, H.T.—, G.B.+, G.B.—1, G.B.—2		1	9
2 Belling-Lee Spade Terminals, marked: L.T.+ and L.T.— ...			8
1 Magnum 15,000-ohm Fixed Resistance, spaghetti type ...		1	6
1 Magnum 20,000-ohm Fixed Resistance, spaghetti type ...		1	6
1 Telsen 1-meg. Grid Leak		1	0
1 Rotorohm 50,000-ohm Potentiometer		6	0
Tinned Copper Wire for connecting			6
5 Lengths of Sistoflex Sleeving ...		1	3
1 Set of Cortabs de Luxe (Money Hicks)			9
1 W.B. Three-point Switch ...		1	6
1 Ferranti L.F. Transformer, type A.F.8		11	6
1 Terminal Strip, 2½ by ⅝ in. ...			6
3 Small Terminals			6
CASH PRICE	**£6**	**3**	**0**

Any part sold separately.

All purchasers of above kit at full cash price can, if they wish, have the receiver constructed free of charge.

TRADE SUPPLIED

SUGGESTED ACCESSORIES

Peto Scott Frame Aerial and Cabinet combined (as illustrated in editorial pages) ...	£2	5	0
Six Marconi or Mullard Valves	£3	16	0
Two 60-volt Siemens "Power" Super H.T. Batteries	£1	7	0
One Exide 2-v. 100		13	6

■ ■ ■

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

The Ideal Set

NO OUTDOOR AERIAL NO EARTH REQUIRED

Perfect results anywhere on only a Small Loop Aerial

AMAZING SELECTIVITY

60 Stations Guaranteed by "W.M."

ONLY 2 TUNING CONTROLS
SMALL H.T. CONSUMPTION

The "Super 60" can be inspected in our Showrooms 9 a.m.-6.30 p.m. Feb. 23 to March 25

H & B KIT FOR THE ALADDIN TWO

	s.	d.
1 Telsen H.F. Choke	2	6
4 Lewcos Coils	19	3
1 Telsen .0001-mfd. Fixed Condenser	1	0
1 Telsen .0002-mfd. Fixed Condenser	1	0
1 Lissen .0005-mfd. Variable Condenser	6	6
1 Formo .0002-mfd. Midget type Variable Condenser	2	9
1 Igranic Preset .00015-mfd. max. Variable Condenser	2	0
1 Trelleborg Ebonite Panel, 12 by 8 in.	4	6
3 Junit Terminal Blocks	2	0
1 Lewcos Twin Two-pin Base Coil Holder	12	6
1 Lissen Grid-leak Holder		6
2 Telsen Rigid type Valve Holders	2	0
3 Belling-Lee Wander Plugs, marked: G.B.+, G.B.—1, G.B.—2 ...		9
6 Belling-Lee Terminals, marked: A, E, L S.+, L.S.—, Pick-up (2)	2	3
1 Telsen 3-meg. Fixed Resistance	1	0
Glazite Insulated Wire for connecting	1	0
1 British General 5-way Battery Cord	5	6
1 Pair of Bulgin Grid-bias Battery Clips		6
1 Bulgin Rotary On-off Switch	1	9
1 Bulgin Gram-radio Rotary Change-over Switch	2	0
1 Telsen Radiogrand L.F. Transformer, ratio 1-3	12	6
CASH PRICE	**£4**	**3**	**9**

2 Cossor or Mullard Valves, **19/-** extra. Oak Cabinet, **15/-** extra.

ANY PARTS SOLD SEPARATELY

All purchasers of above kit at full cash price can, if they wish, have the receiver constructed free of charge.

H & B RADIO CO.

Gerrard 2834

34, 36, 38 BEAK STREET, REGENT STREET, LONDON, W.1

RADIO DRAMA—Continued

listeners respond to the Production Director's recent microphone appeal for original dramatic work with a special eye to its comic possibilities.

◆ ◆ ◆

With the growing number of international relays a considerable amount of clerical work is involved in keeping a check on the financial and other obligations involved; this work, in fact, will in time become a most important branch of Savoy Hill's activity.

Certain Obligations

The present arrangements are that no payment is made by the broadcasting authority to the country of origin for the privilege of relaying a programme; but certain other obligations ensue. If, for example, the persons taking part in a broadcast raise objections to the relay, then the latter is prohibited.

A case of the kind arose in connection with a talk by a prominent person in the unemployment series early in the year, when the question of an American relay arose. The broadcaster indicated that he would regard this as a separate broadcast, requiring an additional fee, and so the question of a relay was dropped.

Another matter that has to be watched is that of copyright. The country originating a broadcast is not responsible in any way for copyright claims that may arise out of a relay. Thus a relay by Great Britain of a programme originating in America might lead to several unforeseen claims from third parties for copyright fees, unless the British end has taken the prior precaution of settling doubtful points.

Work for the B.B.C.

It has been a frequent custom for speeches and events to be relayed from London to America, which have not been broadcast by the B.B.C. The latter, however, has to make all the necessary arrangements, including the provision of operating staff, apparatus and studio facilities and even the ordering of whatever local telephone lines, sound-proof cabinets, etc., may be needed.

The country requiring the relay settles the bill every quarter and includes in it fees and out-of-pocket expenses for announcers and engineers who had to deal with the transmission at the point of origin.

The American broadcasting companies have to show themselves "quick on the drop" when they are studying the advance programmes of the B.B.C.; for whichever gets in first with a notification that it wishes to broadcast a British item has a monopoly in the relay and its consent must be obtained before a competitive company can give the same item.

In order that everyone concerned shall start from scratch, however, no application for permission to relay is considered by the B.B.C. earlier than three weeks prior to the broadcast.

◆ ◆ ◆

Matters of copyright are not peculiar to international relays. They constitute also a very vital problem in domestic broadcasting and constant care must be exercised to guard against infringements. Often in the stress of programme compilation it is easy enough to be caught tripping unless the officials responsible for copyright questions are ever on the alert.

Forbidden Works

In general, works by Barrie, Kipling, Bernard Shaw, A. E. Housman and Harry Grattan, among others, may not be broadcast; but certain songs with words by Kipling are available.

Matters become more complicated when the details of musical works are under consideration. The items of some artistes have to be scrupulously avoided and not only vocal numbers from modern musical plays, but also gramophone records of them, may not be used other than as instrumental arrangements which have been issued by a publisher. In the case of some musical plays, broadcasting is limited to two numbers from the play.

Then the use of both Gilbert and Sullivan operas and Sullivan operas is restricted. A whole host of vocal numbers from Charlot's revues is on the list of prohibitions.

The position has to be watched still more closely in the case of world-famous composers' works. There are, for example, American and other editions of many great musical compositions which the B.B.C. might use, if they were not taboo.

One of the chief difficulties occurs when perhaps only two out of twenty or thirty compositions by a particular author are prohibited. It would be a serious offence on the part of the copyright officials to let one of the prohibitions slip by.

While press agencies, book and magazine publishers, the Society of Authors, the Performing Rights Society and other agencies all have claims on the B.B.C. for copyright fees running into many thousands of pounds a year—sufficient, indeed, to build several regional transmitters—it is some consolation to find that the Corporation is building up a stock of material of its own and thus relieving the financial strain entailed in meeting the enormous demands of outside organisations.

◆ ◆ ◆

School Broadcasts

A significant development of school broadcasting has apparently escaped the notice of the majority of listeners, although it was introduced as long ago as the latter part of last term and has continued regularly through the present term. It lies in the special steps taken by the Central Council for School Broadcasting to ensure that all schools are in future properly advised as to the initial choice of their receiving set and loud-speaker.

It is not intended that either the B.B.C. or the Council should select or indicate suitable apparatus, but that this should be determined by an independent testing body, working in co-operation with a technical sub-committee, appointed by the Council.

Reception Tests

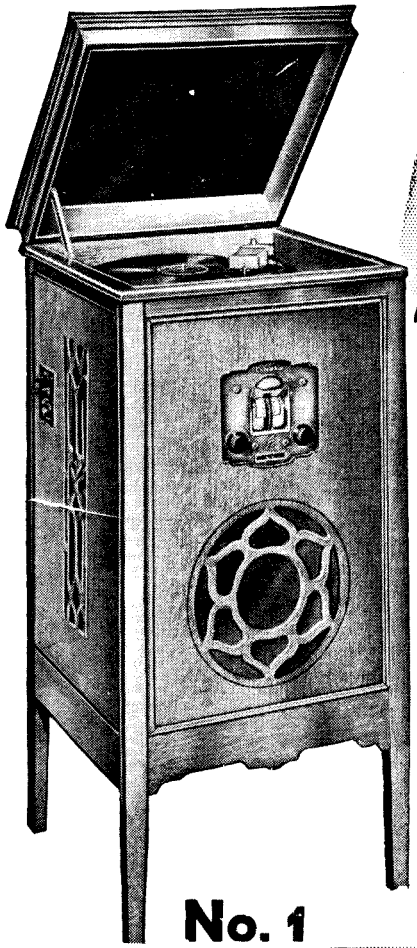
As a supplement to this scheme, and pending its completion, the Council's technical sub-committee has been experimenting with reception tests. In these tests a series of lists of words, which have been carefully selected in collaboration with the Post Office, are broadcast and the pupils asked to write down what they hear. The tests have been broadcast every day at 2.25 p.m.

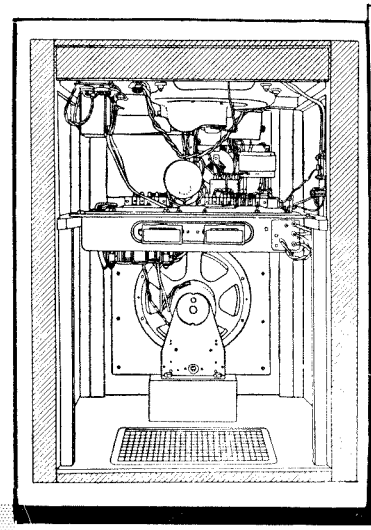
Certain selected schools make a return of the words recorded by groups of children and these returns are compared with the results submitted by other schools.

From the data obtained in this way, it is possible to tell many schools how their reception compares with that obtained in the selected schools where the standard of reception is considered adequate by the Council.

WHY YOU SHOULD HEAR

Columbia RADIO-GRAPHOPHONES





MODEL 310

Oak 40 gns.

Mahogany 43 gns.

for A.C. or D.C. mains

No. 1 TONE

Examine the accessibility of the layout. Adjustment or replacement is the work of a minute or two.

Nowadays when purchasing a Radio-Gramophone a far greater critical and artistic faculty is exercised than formerly. That is why Columbia Radio-Graphophone Model 310 occupies its unchallenged position: its tone satisfies and delights its owners.

The illustrations will show some of the refinements which contribute to this degree of excellence. Note the mains-excited Moving-Coil Speaker with its two-stage super-power amplifier. The "extra power" switch provides additional volume for dancing—still with unblemished tone. The Columbia pick-up ensures clarity at the outset and Radio reception is of equal merit. Ease of operation from single tuning, powerful range from a screen-grid circuit with assured selectivity. An aerial can be dispensed with if desired.

So there is an ever-growing demand for Columbia with its pure tone, free from all extraneous sounds.

* I should like to hear Model 310 playing in my home. Please arrange this is 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 ½d. stamp to:—

Columbia, 102, Clerkenwell Road, London, E.C.1.

NAME.....

ADDRESS.....

.....

W. M. MARCH

A RECORDING GRAMOPHONE

NEW HOME-RECORDING GRAMOPHONE

This photograph shows how the Kingston type of recorder is used on the Celestion gramophone. For transportation all the parts can be packed away in the cabinet.

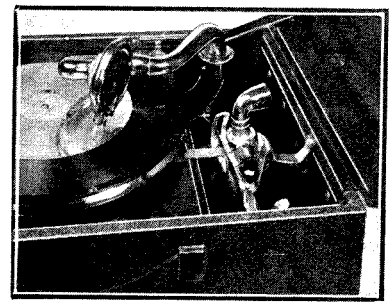
HOME-RECORDING enthusiasts will be interested in a special type of portable gramophone put on the market by the Celestion people; this instrument is quite new and will undoubtedly do much to popularise this intriguing pastime.

The actual recording system used is the Kingston method, fully described in the February WIRELESS MAGAZINE under the title "Making Records Without an Amplifier," by D. Sisson Relph.

As can be seen from the photographs, the Celestion instrument is very compact and is easily transportable. Special arrangements have been made to include blank recording discs, a master tracking disc and cutting needles., etc.

As fibre or cactus needles must be used for reproducing from the aluminium blanks, a special type of soundbox is incorporated; this can, however, be used with ordinary steel needles if desired.

The price of this gramophone is



READY FOR REPRODUCING

Any records can be played on the instrument, although the soundbox is specially designed for use with fibre or cactus needles.

10 guineas and it is provided with a good motor that allows of maximum weighting on the cutting needle when recording so that a deep groove is obtained.

THE CALL OF THE EAST

Every short-wave enthusiast will be interested in this account of short-wave experiences in the East by a professional operator stationed in China.

To us in Britain short waves are a source of interesting experiment, but in the East they are often a matter of life or death, as witness the typhoon reports referred to in this article.

TRANSPORT yourself to Shanghai for a few minutes! This cosmopolitan and ever-interesting settlement has a fascination of its own; even on short waves.

Can you visualise the atmosphere there during the critical period in 1927? It was terrific—and so was the short-wave traffic!

Not Devoid of Humour

The situation was not devoid of humour, as a radio message was sent out by one Chinese cruiser to another of rival faction offering to "come out and fight" at the entrance to the Whampoa, where it pours into the immense Yang-tse-kiang estuary.

Next morning the two were busily chasing each other round an anchored British man-o'-war, to the accompaniment of not too accurate gunfire.

My short-wave receiver Rufus (he *can* whistle!) unfortunately was incapable of picking up the remarks of the British sailors! It is possible, however, that they sounded just like real atmospherics.

Some Atmospherics!

Reference to atmospherics causes my stubbly hair (we keep ours fairly short for health and comfort in this oppressive heat with its perspiration) to rise rampant. In a technical book I once read of atmospherics being classified as either "sizzlers" or "grinders."

Our local breed are neither; they are "blinders," the persistency and severity of their attacks being equalled only by those of the wretched flies.

Whereas most of the atmospherics can be avoided by getting down on to the short waves (as distinct from the medium and long wavebands), the winged pest has no scientific conscience to limit its activities.

The too-enthusiastic amateur who renders night hideous with endless calls of CQ has his natural counterpart here in the cicala. A cross between the cockchafer and the English stag beetle, minus horns, this harmless little brown insect (or should one say beetle?) hides in any bush or tree and pronounces his love (and, I fear, hate) proclivities by an incessant and resonant buzz that would do justice to many a moving-coil loud-speaker.

Turning to seasonal difficulties other than provincial wars, we meet a common enemy, the typhoon. This whirling monster of a wind demands a high annual toll of life and damage to towns, villages and even floating craft.

Timely warning, permitting of arduous preparation with ropes, etc., does much to minimise danger, and short waves were of considerable assistance in collecting reports of the whereabouts, direction and speed of approaching typhoons.

Most of these reports were collated at and promulgated from Zikawei Observatory by the Jesuit Fathers, one of whom is a well-known astronomer and keen amateur transmitter.

It can easily be appreciated that the intermittent internal warfare to which this country seems peculiarly addicted does not permit of the intricate telegraph and postal systems to which Europe is accustomed, and consequently much commercial use is made of wireless.

Under such conditions, with so much shipping and naval activity, it is not surprising that there is some interference from these sources, but here again the use of short waves offers a solution to most of the difficulties.

Although daintily poised rickshaws and sedan chairs are as common here as taxicabs in London, we have the most up-to-date electric appliances, even to trackless tramcars.

Although the last are almost noiseless in running one must confess to a lurking regard for the nimble rickshaw—it cannot create commutation noises to disturb poor radio fans. At least, it has never been the writer's fortune to see sparks flying out from the wheels of his rickshaw when late for an appointment.

On the other hand, there is little difficulty in procuring standard components or accumulators, etc., the latter demanding very careful attention to maintain them in a state of real efficiency under the severe climatic conditions prevalent.

After all, it isn't really fair to half bake an accumulator by day and then at night subject it to a thoroughly moist, clammy atmosphere. How would you like it? I don't!

It may be gratifying to know that, although American radio gear is, on the whole, the cheapest available here, it is the writer's experience that British valves more than justify their extra cost.

Unequalled Zest

The choice of programmes is not so wide as in Europe, but the alluring attraction of English-speaking voices provides a zest possibly unequalled in England.

The principal short-wave sources are as follows:—Sydney, whose transmissions are received with comparative ease and subject to little or no fading; the reliable broadcasts of Manila (Philippine Islands); San Francisco, with slight difficulty; and G5SW, who unfortunately seems to fade severely and can be received only with difficulty.

Perhaps a brief consideration of the direct distances involved may prove of interest. From Shanghai to G5SW is nearly 6,000 statute miles, almost due east and west, with a consequent difference of about eight hours in time. The normal English broadcasting hours of from 4 p.m. to 11 p.m. G.M.T. comprise the period midnight to 7 a.m. here.

Early Morning

As the intervening distance can, in general terms, only be successfully bridged in hours permitting of a maximum of darkness between the two places, our best time for the reception of G5SW is in the early morning here, say 3 a.m. to 6 a.m.

It is therefore a difficult task to set G5SW to cater successfully for the Far East, and it would seem that not only would an increase of radiated power be desirable, but even a possible change of wavelength according to the hour of the day.

Sydney, although 4,800 miles distant, has the great advantage of

(*Continued on page 216*)

THE CALL OF THE EAST—Continued

lying on a more or less north and south line with us, so that the difference in local times is only two hours and the number of hours of mutual darkness is greatly increased. Blessings on Captain Cook for finding Australia where it is !

Just 2,500 miles south, the Dutch station in Java enjoys very much the same conditions.

All-sea Route

San Francisco is distant 6,000 miles east with a time difference of eight hours, but this is an all-sea route, whereas G5SW is overland; a much different problem.

The American station at Manila, being only 1,100 miles away and with almost the same local time, offers much, besides supplying a programme on the medium waveband if atmospherics are not in a particularly venomous mood—which they very often are.

To spare my sometimes ruffled patience I make use of a very small single-plate vernier condenser as well as an ordinary slow-motion dial, so that I may avoid that "finicky" touch and leisurely take a hefty grab at the vernier handle when an apparent creeping of wavelength occurs.

The vernier is truly economical in that it has more than repaid itself by the number of small coins which otherwise might have gone into the swear-box !

The growing popularity of short waves and the increased power of many of the short-wave broadcasting stations is being keenly followed out here, where the range possibilities and immunity from X's of such communication are greatly appreciated

As a digression I may add that this interest even extends to Chinese servants. Seeing my "boy" (I should estimate his age as 45) taking a lively interest in my efforts to temporarily rig some old aerial wire as a balanced aerial, and being also rewarded with some success in its operation, it seemed permissible to rely upon the undoubted ability of the Celestial to copy accurately an article he has once seen made by somebody else.

Indicating a reel of new wire I asked: "You makee, Ah Sing? Allee same?" Came the comprehensive reply: "Allee same—me savvy—can do."

He did. Even to the hastily twisted connections between pieces of new aerial wire joined in series (to make the total length of 50 feet) at intervals identical to those in my hurried lash-up. Ah !—no, it wasn't "Sing !"

A Thin Falsetto

We have no local short-wave broadcast station, but one operates on the medium waveband with the Herculean task of pandering to a hopelessly cosmopolitan taste. You may find yourself listening to a somewhat thin falsetto voice singing notes which to the European ear are weird (the Chinese use a quite different musical scale) and remark on the qualities of her voice, only to hear the pitying explanation of your Chinese friend that "her" voice is a man's !

No wonder I seek solace in Rufus and diligently search for the call from the West !

Get the best from your Set by putting the best into it

PARMEKO APPARATUS is made for the man who knows that it is the attention to every detail that makes all the difference between good and poor reception. We have tried to make it "the best—regardless." All PARMEKO transformers, chokes, eliminators, etc., are designed in our works and made from the finest materials by skilled British workmen. Before passing from our works, every piece of apparatus has to pass the most stringent tests. Ask for PARMEKO and get the best.

Large Output Eliminator

PARMEKO

Particulars post free from

PARTRIDGE AND MEE LTD.,

26 Dover Street, LEICESTER 'PHONE: LEICESTER 22276.

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LIMIT'S NEWEST SOUNDBOX

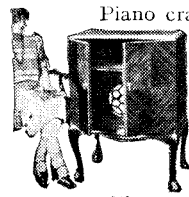
Try the new Limit EXCELSIS, the blue riband of soundboxes, against any other make. You will be astounded at the marvellous improvement in reproduction. In fact it is better than many soundboxes sold at double the price. Fit one to your own gramophone— you can get one to fit it. Any good dealer can supply.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

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

LIMIT Engineering Co., Ltd.

Albion Street, King's Cross, N.1

Piano craftsmanship—for YOUR SET—or RADIO-GRAM.



PIANO-TONE

(acoustic chamber)

"bound to improve results"— Wireless Magazine

The sort people desire to possess and keep.

Ask users and there are many more every day.

PIANO TONE Baffle and acoustic chamber—yields an amazing body of tone—with that golden mellowness that music lovers desire.

(No dull drumming—no thin cabinet erection.)

De Luxe models (Pianocraft) from £5-5-0 to £15 (cash or deferred), sent to EXACT size of YOUR set ON APPROVAL—you may return at OUR expense.

Photographs and lists free from actual makers.

PICKETTS. Radio Furniture Specialists, ALBION ROAD, BEXLEYHEATH.

(Over 3,000 delighted clients)

EELEX

T.14 PLUGS AND SOCKETS

Socket 1d. Plugs 3d. 6 colours. Name plates, 40 kinds, 1d. Write for list P83.

J. J. Eastick & Sons

Plug in parts 118 Bunhill Row, London, E.C.1

Buy "A.W." - - 3d. Weekly

LET RADIO EXPERTS BUILD YOUR SET

Sets described by WIRELESS MAGAZINE and other receivers are scientifically constructed to specification without delay. Accuracy in every detail is a great point of our service and another great point to remember is that our prices are very moderate considering the high standard of craftsmanship. We will also modernise, repair or overhaul your present receiver. Scott Sessions and Company, the Leading Radio Doctors of Great Britain, will diagnose your most intricate radio trouble and offer you the simplest and most inexpensive solution.

Write for list giving price for building the following sets described in this issue:—

"The Aladdin 2"

"The Super-60"

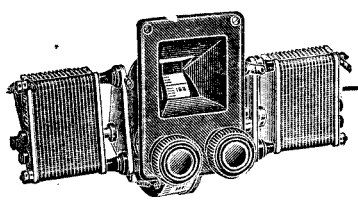
G. SCOTT SESSIONS & CO. Muswell Hill, London, N.10. (Phone: Tudor 5326)

ELECTRICAL CONTINUITY. INSULATION. REGULAR SPACING OF VANES. LOW LOSS CHARACTERISTICS. MOVEMENT FREE FROM BACKLASH AND NOISE.

The Points that matter when buying

CONDENSERS

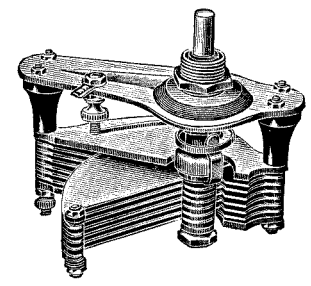
"Utility"



KNOB CONTROL DOUBLE CONDENSER W.296 2

A component of outstanding merit, design, and finish. Controlled by our new 3-in. Drum Dial —*the only Drum Dial that makes a complete revolution.* Left-hand condenser is fitted with a trimmer.

PRICE 27/6 EACH



STANDARD CONDENSERS No. W.160

A low-loss Condenser in every respect. Ball-bearing movement—no noise or backlash. Internal connection fitted in addition to customary pig-tail. PRICES

.0005	8/6 each
.0003	7/6 each
.0002	6/6 each
Vernier	6/6 extra

Condensers of "Utility" manufacture offer you perfection in design and finish and highest possible value. See that your set or kit of parts includes them and you'll be certain of satisfaction. Dealers everywhere stock "Utility" Instruments. Illustrated List may be had post free from the makers.

WILKINS & WRIGHT, LTD.,

"UTILITY" WORKS, HOLYHEAD ROAD, BIRMINGHAM

ADDING A PICK-UP

to the Regional A.C. Four and the Regional A.C. Five

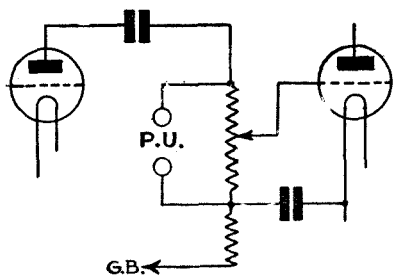
In these notes W. James discusses the use of a pick-up with two of his most recent designs. The Regional A.C. Four was described in WIRELESS MAGAZINE *for December and the Regional A.C. Five was described in January. Blueprints of both these sets are available at* 1s. 6d. *each, post free.*

IN the Regional A.C. Four are two terminals marked "Pick-up." They may be seen on page 477 of the issue for December, 1930.

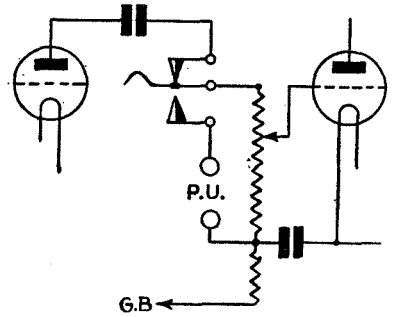
Two Stages Available

These two terminals are connected to the ends of the adjustable grid-leak resistance in the grid circuit of the third valve. Therefore, two stages of magnification are provided for the pick-up. Now the ends of the pick-up are taken across the grid leak, so it happens that the voltage actually applied to the valve depends upon the setting of the contact arm of the potentiometer.

This potentiometer grid leak is therefore a good volume control, owing to the fact that the pick-up when used is joined to the ends of the grid leak; the pick-up must be removed during the reception of wireless. If it is not disconnected the volume from radio will be poor, as the magnification of the resistance-capacity stage will be cut down. Further, the quality will not be good.



Original circuit of the Regional A.C. Four, without pick-up switch



How to add a pick-up switch to the Regional A.C. Four

When using the set as a magnifier for the currents produced by the pick-up, the high-frequency volume control must be set at zero, in order to cut off the wireless side. You might find that the aerial must also be disconnected.

With the simple arrangement used, in which the wireless side is not actually disconnected when the pick-up is joined, these further precautions are necessary.

If a switch is employed, the wireless side can be disconnected when the gramophone is used, and the connections are given in the figure. Those who are particularly keen on the gramophone side may well feel like adding the switch in order that the best possible results may be obtained.

Greater Volume

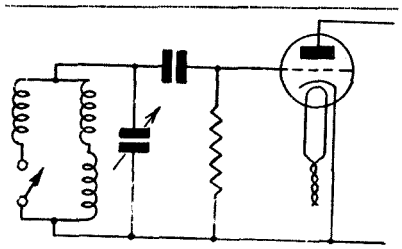
The volume will be greater owing to the complete removal of the detector and its anode circuit from across the pick-up. To connect the switch is easy enough. Two valves provide all the magnification needed as a rule.

With a pick-up producing very weak voltages and a particularly soft record the two stages may not provide a strong output. Normally, however, the volume control will have to be used for the purpose of avoiding overloading of the power valve.

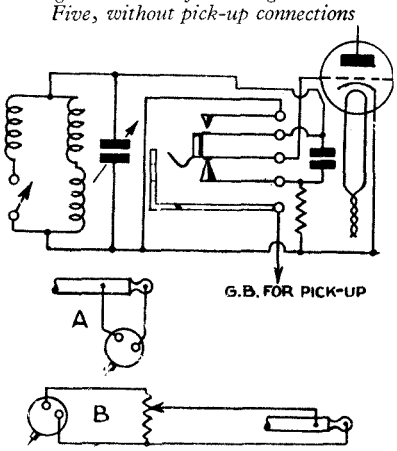
Some pick-ups provide a volt, others more, so that it is easy to see how overloading may occur. Keep the leads to the switch as short as possible and do not use an excessively long flex lead to the pick-up. Good quality will be obtained when a reasonable pick-up is used and overloading is avoided.

To add pick-up connections to the Regional A.C. Five is a straightforward matter. We must join the pick-up to the grid circuit of the detector, for then we shall have this valve working as a magnifier and the power valve as well.

If we joined the pick-up across the grid-leak of the detector we should obtain results, but not the best, for the reason that the valve would distort. Further, we should be troubled by wireless signals coming through with the gramophone reproduction.



Original circuit of the Regional A.C. Five, without pick-up connections



Method of adding pick-up jack to the Regional A.C. Five

It is the better plan to break the grid circuit, using a switch, for then the wireless side can be disconnected when the pick-up is joined. Grid bias can also be applied to the valve through the pick-up and grid battery. A bias of negative 1.5 or 3 volts will suffice.

Avoiding Hum

As the grid wire to the detector valve itself is being broken by the switch, the wires must be kept short or hum will be introduced.

The circuit shows a suitable switching arrangement and it will be noticed that the fourth tuning coil is short-circuited by a pair of contacts when the switch plug is in position. The pick-up is joined to the plug.

It will be noticed that the connections are so arranged that the

(*Continued on page* 220)

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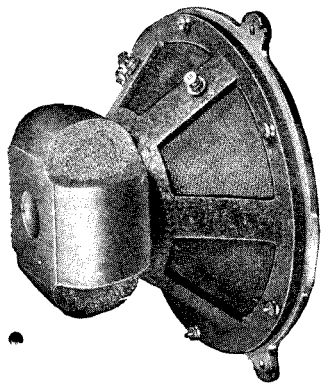

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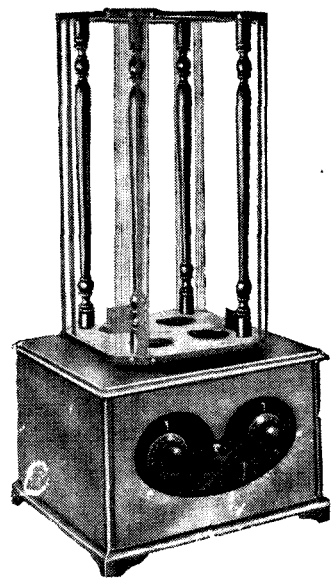

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N.B.—Kits "A," "B," and "C" include set of parts for frame aerial. If the assembled and wired frame is required, this can be supplied in mahogany. And 10/- extra to each cash price, or 11d. extra to each monthly instalment. If the frame is required in polished oak instead of the standard mahogany finish add a further 5/- to each cash price or 6d. to each monthly instalment.

The cabinet and frame specified by Mr. James are obtainable from us separately as follows:

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Frame assembled and wound .. **27/6**

All above prices are for Mahogany, and include lead from frame to set. If the frame aerial is required in Oak, 5/- extra.

Specified list of parts for the Sixty-Station Set:

	£	s.	d.
1 Polished Mahogany Cabinet		17	6
1 Complete set of parts for Frame Aerial, including necessary wire, polished mahogany spindles, top and base, all necessary fittings, and flex lead for connecting frame to set		17	6
1 "Red Triangle" Ebonite Panel, 12 in. by 7½ in.		3	9
1 Baseboard		1	6
1 Set of Super-het Coils, as specified	2	10	0
1 Formo .0002-mfd. Fixed Condenser			6
2 T.C.C. .001-mfd. Fixed Condensers, upright type		3	8
5 T.C.C. 1-mfd. Fixed Condensers, type 50 ...		14	2
2 Ormond .0005-mfd. Variable Condensers, type R.426, with S.M. dials		12	0
1 Bulgin Grid-leak Holder			6
9 Telsen 4-pin Valve Holders		9	0
7 Belling-Lee Wander Plugs and 2 Belling-Lee Spade Terminals		2	6
2 Keystone Spaghetti-type Resistances, 15,000 and 20,000 ohms		3	0
1 Lissen 1-meg. Grid Leak		1	0
1 Rotorohm 50,000-ohm Potentiometer		6	6
1 Ferranti A.F.5 L.F. Transformer...		11	6
1 W.B. Three-point Switch		1	6
Tinned Copper Wire for connecting; Terminal Strip, 2½ in. by in., with 3 small terminals; lengths of Systoflex Sleeving, and set of Cortabs de Luxe		4	5
6 Mullard Valves (1 PM1LF, 2 PM1HF, 2 PM12, and 1 PM2)	3	16	0
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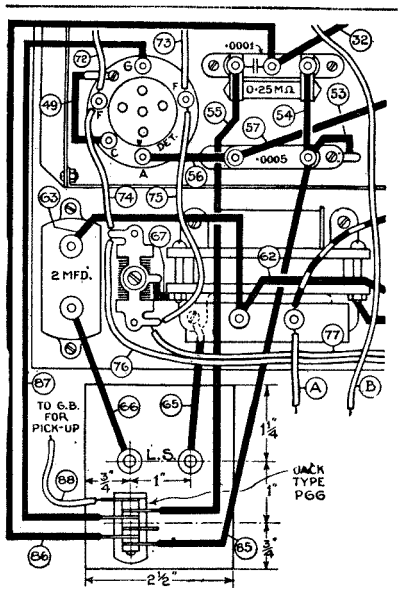
ADDING A PICK-UP—Continued



REGIONAL A.C. FIVE

This diagram shows clearly the wiring alterations that must be made to the Regional A.C. Five to incorporate a pick-up jack. The jack is mounted on an ebonite strip at the back of the baseboard. This strip replaces the block for the two loud-speaker terminals and is easily fitted.

detector valve is used as an amplifier when playing the gramophone and that good quality will therefore be obtained.

Fitting a Volume Control

There is no volume control and one will certainly be needed. This ought to be joined across the pick-up in the usual manner, but one might with advantage be fitted across the low-frequency transformer included in the anode circuit of the detector. An adjustable high resistance of, say, 75,000 ohms, joined across the primary coil, will form a good control, useful for wireless as well as gramophone work.

Some pick-up units have a volume control included in the carrying arm or support. A potentiometer type could be fitted to the motor board of the gramophone and be connected to the pick-up as shown in the diagram.

Probably the best place for the pick-up switch is on a piece of ebonite fitted at the back of the set. This place would be ideal were it quite as convenient for operating as one on the panel. With a switch fitted to the front panel, however, the wires would be fairly long and this is to be avoided.

EXTRA PARTS NEEDED

The following extra parts will be required for the Regional A.C. Four :—

1—*Lotus jack switch, type No. JS7, 3s. 3d.*

For the Regional A.C. Five you will need the following :—

1—*Igranic jack, type P66, 3s.*

1—*Igranic plug, type P40, 1s. 6d.*

1—*Ebonite strip, 3 in. square.*

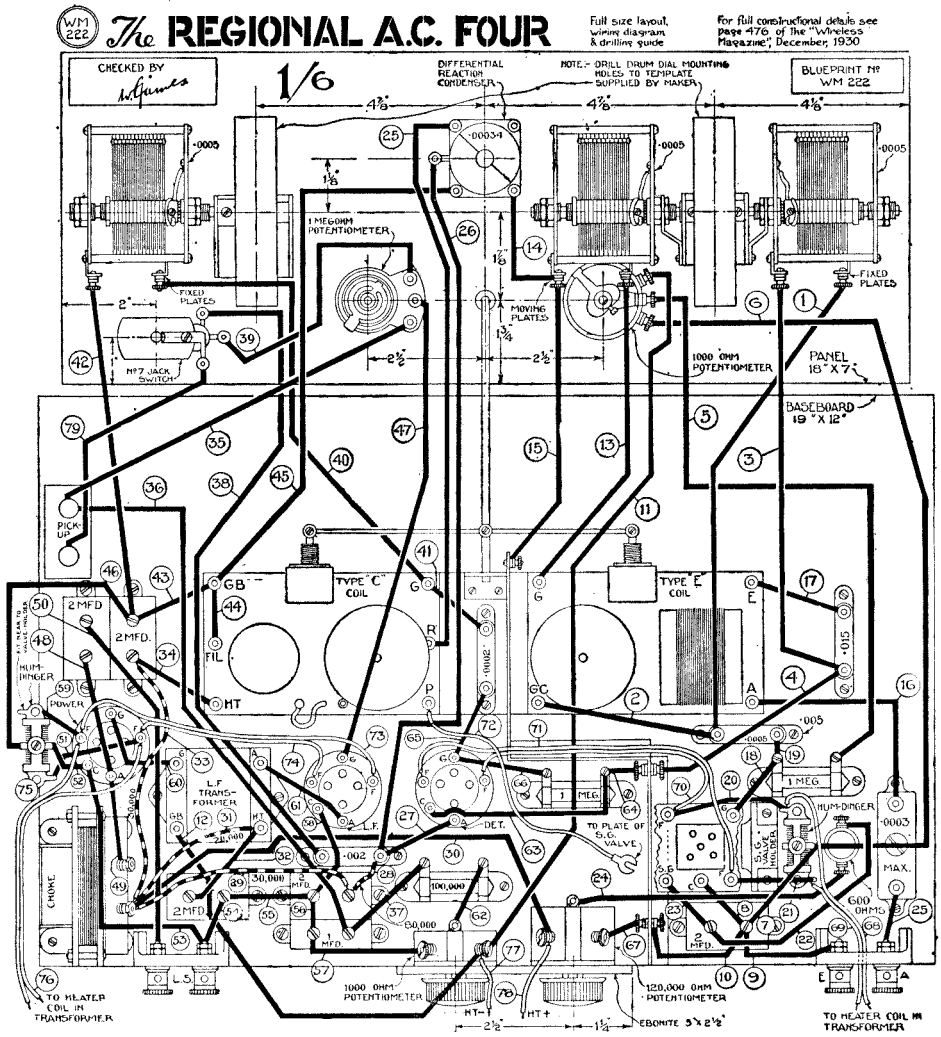
Proper Grid Bias

As a grid-bias battery is used there will be no difficulty in providing the right bias, and the high-tension arrangements do not need altering from those values satisfactory for wireless.

The addition of a gramophone switch is described for the benefit of

(Continued on page 222)

ADDING A PICK-UP—Continued



ADDING A PICK-UP SWITCH TO THE REGIONAL A.C. FOUR

From this wiring diagram it will be seen how to add a pick-up and jack-switch to the Regional A.C. Four. The circuit arrangement is shown on page 218

those readers who have asked how the circuit may be used for playing records. From the description it will be seen that there is little work to be carried out in order to provide a satisfactory job.

The mains transformer for the Regional A.C. Five, described in the January issue of WIRELESS MAGAZINE, *was by error specified as the Regentone type WR3. It should be a Regentone type WRM7, price £1 7s. 6d.*

Grid Emission

CARE should be taken not to overrun the filament of a mains-driven valve, particularly when a high plate voltage is being used, as in the new method of grid power detection. If the filament gets too hot, there is a possibility that some of the active thorium may be evaporated and reach the grid, causing the latter to emit a secondary stream of electrons.

The symptoms are that reception appears to be normal for the first few minutes and then falls off rapidly as the valve warms up, this sequence being repeated each time the set is switched on.

M. B.

GUARDING AGAINST TALKIE BREAKDOWNS

HAVE you ever had the opportunity of looking over the sound-reproducing apparatus in a cinema? Such an opportunity came to me yesterday morning, and I seized it eagerly. For the best part of an hour I was let loose, as it were, in a large cinema and I was allowed to examine every part of the sound-reproducing apparatus.

Familiar Appearance

The thing that struck me most, and I am sure the same thing would have struck you, was the familiar look of the apparatus. Indeed, I should not be far wrong if I described the whole apparatus as being an all-from-the-mains radio-gram set. There were the familiar electric pick-up, a mains-fed valve amplifier, and a moving-coil loud-speaker. I paid little attention to the synchronising machinery; that was outside my province.

It will come as a surprise to many readers to learn that some talkie gear is well within the capabilities of the home-constructor, but such is the case.

Probably the first question you would ask if you were put before the sound-reproducing apparatus in a cinema would be as to what safeguards there were against breakdown. I had no need to ask this question, for I saw at once that there were two valve amplifiers, with a simple switch to change from one to the other.

So if an amplifying valve burns out, the operator switches over to the other amplifier and replaces the burnt-out valve in the first amplifier.

Not At All Elaborate

I had the idea that the talking apparatus in a cinema was an elaborate and complicated affair. This may be so in the large cinemas in our big cities, but the apparatus I saw yesterday was well within the scope of the experienced home-constructor.

E. H. C.

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Gleaner Two (D, Trans)	WM201
Music Monitor (D, Trans)	WM208
Merlin Two (AC Set) (D, Trans)	WM213
Five-Point Two (D, Trans)	WM220
Brookman's A.C. Two (D, Trans)	WM225
★Aladdin Two (D, Trans)	**WM231**
Talisman Two (D, Trans)	AW194
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Searcher Short-wave 2 (D, Trans)	AW259
Challenge Two (D, Trans)	AW261
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Celerity Three (SG, D, Trans)	WM173
All-nations Three (D, 2 Trans)	WM178
Inceptordyne (SG, D, Pen.)	WM179
Brookman's A.C.3 (SG, D, Trans) 1/6	WM184
Music Marshal (D, 2 Trans)	WM190
Gramo-Radio D.C.Three (SG, D,Trans)	WM196
Concert Three (D, 2 Trans)	WM199
New Lodestone Three (HF, D, Trans)	WM205
De-Luxe Three (D, RC, Trans)	WM209
Five-Point Three (SG, D, Trans)	WM212
Falcon Three AC Set	WM217
New Brookman's Three (SG, D, Trans)	WM218
Five-Point Short-waver (D, 2 Trans)	WM223
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Everybody's Three (SG, D, Trans)	AW209
1930 Ether Searcher (SG, D, Trans)	AW211
New All-Britain Three (HF, D, Trans)	AW214
Best-by-Ballot Three (SG, D, Trans) Price 4d. free with copy of "AW"	AW217
Brookman's By-pass Three (D, 2 Trans)	AW220
Everybody's All-electric Three (SG, D, Trans)	AW221
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Auto-Coupler Three (D, 2 LF)	AW225
Beginner's Regional Three (D, RC,Trans)	AW233
Britain's Favourite Three 1930 (D, 2 Trans)	AW243
Car Three (D, RC, Trans)	AW244
"A.W." Exhibition 3 (SG, D, Trans)	AW247
"A.W." Challenge Kit 3 (SG, D, Trans)	AW256
Push-pull Two for D.C. Mains (D, Push-pull)	AW270
1931 Ether Searcher (SG, D, Trans)	AW271

FOUR-VALVE SETS

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Standard-coil Four (HF, D, 2RC)	WM122
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Arrow Four (SG, HF, D, Trans)	WM154
All-electric Four (SG, D, RC, Trans)	WM162
Outpost Four (SG, D, 2 Trans)	WM165
Brookman's Four (2SG, D, Trans)	WM174
Transportable Four (SG, D, 2RC)	WM180
Super Q (SG, D, 2 Trans)	WM189
Lodestone Four (HF, D, RC, Trans)	WM193
Searcher's Four (SG, D, RC, Trans)	WM194
Regional Band-pass Four (SG, D, RC, Trans)	WM211
Five-Point Four (SG, D, RC, Trans)	WM216
Regional A.C. Four (SG, D, RC, Trans)	WM222
Supertone Four (SG, D, Push-pull)	WM227
Broadcast Picture Four (HF, D, 2RC)	AW163
The Orchestra Four (D, RC, Push-pull)	AW167
All Europe Four (2HF, D, Trans)	AW173
Stability Four (HF, D, RC, Trans)	AW182
Music Lover's Gramo-Radio (SG, D, RC, Trans)	AW202A
Horizon Four (SG, D, 2 Trans)	AW237
Challenge Four (2SG, D, Trans) with copy of "A.W." 4d., post free.	AW251

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All-wave Lodestone Five (HF, D, Push-pull)	WM146
Dual-screen Five (2SG, D, RC, Trans)	WM185
Radio-Record Five (SG, D, Trans-Parrallel	WM188
Overseas Five (3SG, D, Trans)	WM191
Regional A.C. Five (3SG, D, Trans)	WM224
James Quality Five (2SG, D, RC, Trans)	AW227

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Hyperdyne	WM221
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Purity Amplifier	AW108
Screened-grid H.F. Amplifier	AW138
"A.W." Gramophone Amplifier	AW205
Beginner's Amplifier (9d.)	AW210
Brookman's Separator (HF Unit)	AW212
Two-valve Amplifier	AW219
"Mag" Gramo Unit	AW224

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Outspan Short-wave Adaptor	WM207	1/-
"W.M." Standard A.C. Unit	WM214	1/-
"W.M." Standard D.C. Unit	WM215	1/-
Falcon A.C. Unit	WM219	1/-
Hyperdyne S.W. Adaptor	WM228	1/-
★Big H.T. Unit for A.C. Mains	**WM230**	**1/-**
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"A.W." Paper Loud-speaker	AW231	1/-
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Simplest H.T. Eliminator for D.C. Mains	AW234	1/-
Simple Battery Eliminator for A.C. Mains	AW236	1/-
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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 to be found on page 224) 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.

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

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

BLUEPRINT COUPON

Valid only until March 31, 1931 (or until April 30 for overseas readers)

If you want a full-size blueprint for any one *of the sets constructionally described in this issue for half price, cut out the above coupon and send it, together with a postal order, to Blueprint Department, WIRELESS MAGAZINE, 58–61 Fetter Lane, London, E.C.4. All blueprints are supplied post free.*

This coupon is valid for a blueprint of any one *of the following at the prices indicated :—*

SUPER 60 *(page* 134*), No. W.M.* 229, *9d., post free.*

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MAINS UNITS FOR BIG SETS (page 173*), No. W.M.* 230, *6d., post free.*

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If you want to ask any questions cut out the above coupon and send it, together with a postal order for 1*s. and stamped addressed envelope, to the Information Bureau, WIRELESS MAGAZINE, 58–61 Fetter Lane, London, E.C.4.*

Note that not more than two questions may be asked at a time and that queries should be written on one side of the paper only.

Under no circumstances can questions be answered personally or by telephone. All inquiries must be made by letter so that every reader gets exactly the same treatment.

If you want advice on buying a set a stamped addressed envelope only (without coupon or fee) should be sent to Set Selection Bureau, WIRELESS MAGAZINE, 58–61 Fetter Lane, London, E.C.4.

ODD JOTTINGS

IF you are reading this on the day of publication (February 20) remember that you still have eight days in which to take advantage of the special half-price blueprint offer made last month.

By using the special coupon on page nine of "The Trusty Twelve" Supplement presented in the February issue you can get full-size blueprints of any of the following sets at half price :—New Brookman's Three, 6d.; Dual-screen Five, 9d.; Regional A.C. Four, 9d.; Five-point Two, 6d.; James Portable S.G.3, 6d.; "W.M." Standard A.C. Unit, 6d.; Falcon Three and Falcon A.C. Unit, 1s. the two; Five-point Short-waver, 6d.; Regional Band-pass Four, 9d.; Five-point Three, 6d.; and "W.M." Standard D.C. Unit, 6d.

It should be clearly understood that none of these blueprints can be obtained with the coupon in the adjoining column.

We are unable to supply any copies of the February issue—it was completely out of print within a week of publication—but if you are quick you may be able to get an odd copy from your newsagent.

Remember that the February half-price blueprint offer was the most generous made to home-constructors. Already we have supplied thousands of blueprints to readers—and we are prepared to go on supplying them until February 28.

◆ ◆ ◆

A man in front of a microphone in New York recently decided to go on making a speech until he could not utter another sound. In this way he hoped to become the world's champion talker. Unfortunately, the studio officials did not share his enthusiasm and asked him to stop. He refused. The microphone was then cut off, but still the man persisted. In the end the police were called in to eject him.

HOW MANY OHMS?

THERE is nothing so bad in a set as a dud resistance. After all is said and done, faulty batteries and valves can easily be tested and it is easy to trace a "dis" or a "dud" in either of these components. But with resistances it is different.

A grid leak, for instance, may be marked 2 megohms on the outside, but its actual value may be quite different. It may still be a resistance of a kind, but its actual value may be 1 megohm instead of 2, or it may be practically infinity in a poor specimen.

The obvious remedy is to buy guaranteed leaks and resistances such as the new Rotor Gas-Ohm resistances. These are a new type of gass-filled resistance housed in a glass tube and obtainable in values from 1,000 ohms to 10 megohms.

The normal load of standard types is .25 watts, while a power type is to be had which can be loaded up with 1.5 watts of power. These resistances are fully described in literature published by Rotor Electric, Ltd.

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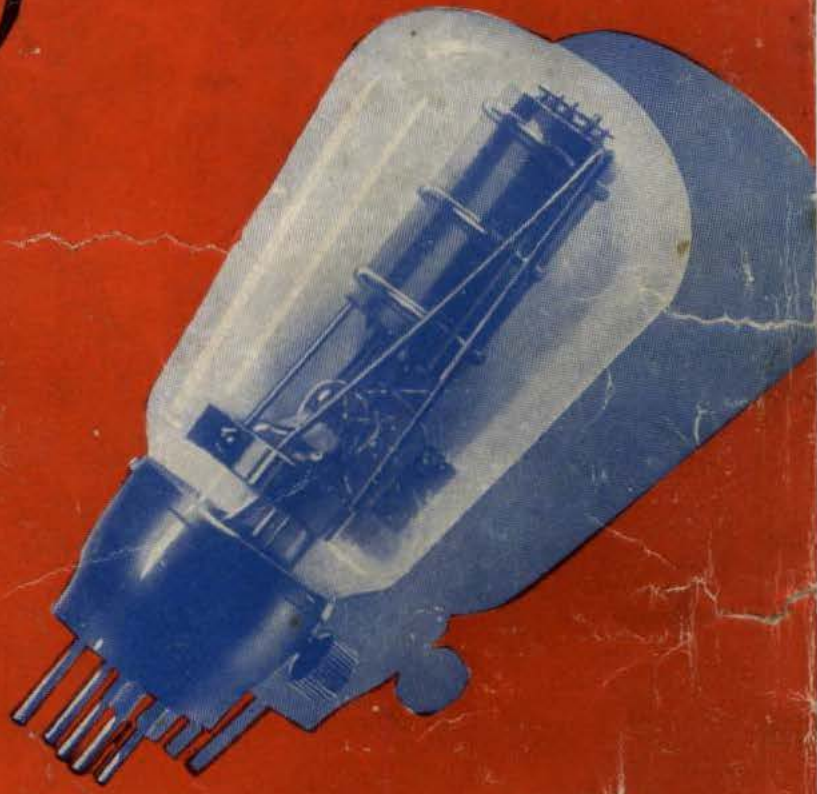
Get that Amazing Performance

The amazingly high efficiency achieved by the Mazda A.C. Series is a topic of conversation where radio enthusiasts forgather. You have only to glance at the characteristics to know the reason.

The narrow limits to which Mazda valves are tested and the long production experience of our engineers ensure that with Mazda valves in all positions in your set you will get better results than ever before.



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A.C. VALVES

	AC/SG	AC/HL	AC/P	AC/PI	AC/PEN
Fil. Volts	4	4	4	4	4
Fil. Amps.	1	1	1	1	1
H.T. Volts	200	200	200	200	250
Aux. Grid Volts	80	—	—	—	200
Magnification	1,200	35	10	5	—
Impedance	—	11,700	2,650	2,000	—
Mutual Conductance	3	3	3.75	2.5	2.2
PRICE	25/-	15/-	17/6	17/6	27/6

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