32 PRACTICAL ARTICLES BY EXPERTS TO HELP YOU

Wireless Magazine

Nº 77 JUNE, 1931

1/-

STILL ANOTHER SUPER 60!

BY W. JAMES

Reports from 67 Districts in this issue Prove

The Triumph of the Super 60

HAVE A LOOK OVER "NORTH REGIONAL" :: THE CONSTRUCTOR INTERVIEWS THE SET MANUFACTURER :: TWO-MINUTE ADAPTOR FOR SHORT WAVES

THE MENACE OF THE HIGH-POWER STATION :: EVER-TUNED REGIONAL TWO :: CAPT. ROUND TURNS TO TALKIES :: CHOOSING MOVING-COIL SPEAKERS

RANGE THE WORLD with The LEWCOS (Regd)

THIS new LEWCOS achievement—the Super-Het Coil Kit—which has a nine Kilo-Cycle Wave-band separation and consists of one triple wave-band oscillator Coil, two I.F. Coils with "Pigtails" and one I.F. Coil without "Pigtails," marks a new epoch in Radio reception.

Primarily constructed for incorporation in the "Super 60," this Kit can, of course, be fitted with extraordinary ease in any set of similar design and the results will be truly astounding!

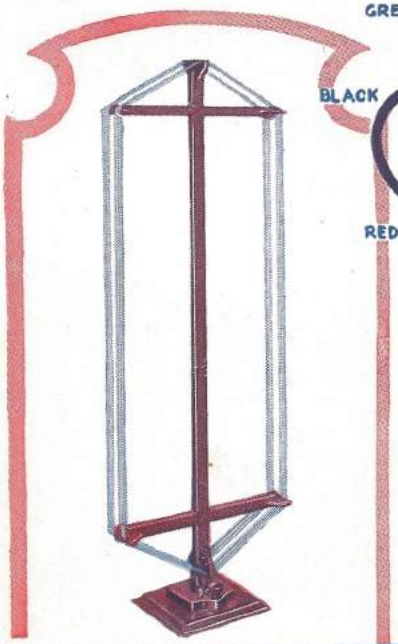
This small space is completely inadequate to give even a short description of these wonderful new LEWCOS Coils, but you are invited to write for an illustrated explanatory leaflet R 71.

Protected by Provisional Patent

SUPER-HET COIL KIT For the "SUPER 60"

Price 50/-

(British Throughout)



The illustration on the left shows a LEWCOS Dual-Wave Aerial which is specified for the "Super 60."

Approved and specified by Mr. W. James for the "A.C. Super 60" described in this issue.

LEWCOS SPAGHETTI RESISTANCES Regd. are specified for the "Super 60" Receiver.

LEWCOS RADIO PRODUCTS—BETTER RECEPTION

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED CHURCH ROAD, LEYTON, LONDON E.10

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NEITHER you nor I can get away from the Super 60. I have lived with it, or rather done my best to work with it, for months past, and as for you—well, I am providing you this month with quite a lot of Super 60 material. Seventy-four readers from sixty-seven districts speak of the triumph of the Super 60. Then Mr. James answers a number of Super 60 questions and deals with points of importance to builders.

NEW VERSION

Constructors themselves contribute experiences with the set. But perhaps the most important of all is the new version of the Super 60 which Mr. James gives this month in response to literally many hundreds of requests.

Mains users have insisted that they be given an A.C. Super 60 and this month Mr. James gives it. It is a Super 60 de luxe, complete with radio-gramo, a set that will do not only as well as the original set did but, by reason of the "punch" in the power supply, even better.

By the way, Mr. James does not know at the moment of my writing these words that his photograph adorns our front cover. We are giving his portrait the place of honour, but he is essentially a shy man and will be none too pleased when he sees it there.

SUMMER RADIO

What an ideal set is the Super 60 for summer radio! We want something just a little bit better in summer than in winter and the Super 60 is undoubtedly that "something." Whether it is the original battery-operated frame-aerial set or the portable set described last month, it is an ideal set for making the very best of summer conditions.

How glad I am to see that we are beginning to talk common sense about summer radio. For years we have (quite falsely) supposed that summer radio meant simply the use of a portable. Actually it has never meant anything of the sort.

The radio public has never had the habit of taking the portable about with it on its summer travels and outings. The great majority of portables are used at home. Just here and there you meet one out of doors, but almost the only portables I have seen at picnics have been those I took myself into the woodlands and hillsides.

A NEW IDEA

There is a new idea coming over us with regard to summer radio. It seems ridiculous that just because the days are longer we need wireless the less. The great mass of the people live in towns—not in the country, or even in country suburbs, where country pursuits can be followed until the coming of night—and must get their enjoyment from things that are possible in town life.

This summer, young as it is, is already seeing a big campaign for the popularising of summer wireless. One of the great radio firms (Pye, to be exact) is putting energy into educating the wireless trade in a matter in which the trade more than anyone else has been at fault. The lack of understanding and the short-sighted policy of the trade itself has been an underlying cause of summer apathy in things wireless.

DISCRIMINATION

I note with great interest that Pye is putting forward a number of reasons why people should buy radio in the summer and not wait until the autumn, such, for example, as that the autumn buyer is frequently interested in a mass-production set, whereas he who buys in the summer is more of an individual, a discriminating, leisurely, thoughtful buyer, who is looking round for something to suit his own individual taste.

It was of a summer night, filled with the music of broadcast, that the poet was thinking when he wrote :—

"The night shall be filled with music,
And the cares that infest the day,
Shall fold their tents like the Arabs
And as silently steal away."

B. E. J.

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Next issue published on Wednesday, June 24.

NEXT MONTH: A MAINS UNIT FOR THE ORIGINAL SUPER 60

Registered at the General Post Office for Transmission by Canadian Magazine Post

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								
Mazda ..	H210	59,000	47	.1	.8	.5	.5	1.0
Lissen ..	H210	58,000	35	.1	.6	1.1	—	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
Six-Sixty	210RC	45,400	50	.1	1.1	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	1.5	—	—
Eta ..	BY2023	23,000	20	.12	.85	1.5	—	—
Tungsram	H210	25,000	25	.1	1.0	2.0	—	—
Mullard	PM1HF	22,500	18	.1	.8	1.0	3.0	4.5
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	1.5	—	—
Osram ..	HL2/c	20,000	22	.1	1.1	1.5	—	—
Mullard	PM1HL	18,500	28	.1	1.5	1.2	1.5	3.0
Marconi	HL2	18,000	27	.1	1.5	—	—	—
Osram ..	HL2	18,000	27	.1	1.5	—	—	—
Six-Sixty	210HL	17,200	26	.1	1.5	2.0	—	1.5
Eta ..	BY1814	14,000	18	.12	1.3	3.0	—	—
Cossor ..	210Dct.	13,000	15	.1	1.15	2.5	—	—
Six-Sixty	210LF	12,500	10.6	.1	.85	3.0	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
Mullard	PM2DX	10,700	13.5	.2	1.25	3.0	3.0	6.0
Six-Sixty	210D	10,600	13.1	.1	1.6	4.0	3.0	4.5
Eta ..	BY2010	10,000	20	.12	2.0	4.0	1.5	3.0
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	—	—
Six-Sixty	220P	4,800	7.2	.2	1.5	5.0	7.5	12.0
Lissen ..	P220	4,700	7	.2	1.5	5.0	9.0	15.0
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	7.5	3.0	7.5
Eta ..	BW1304	4,000	13	.2	3.2	6.0	1.5	4.5
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
Six-Sixty	220PA	3,700	13	.2	3.5	10.0	3.0	6.0
Mullard	PM2A	3,600	12.5	.2	3.5	12.0	1.5	4.5
Tungsram	P215	3,300	5	.2	1.5	12.0	—	—
Six-Sixty	230SP	2,750	5.5	3	2.0	13.0	9.0	15.0
Eta ..	BW303	2,700	3	.32	1.1	11.0	15.0	25.0
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
Eta ..	BW602	1,900	6.5	.32	3.4	12.0	4.5	12.0
Mazda ..	P240	1,900	7	.4	3.7	18.0	6.0	13.5
Six-Sixty	240SP	1,900	6.6	.4	3.5	16.0	4.5	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 Screen-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	—	—	—
Eta ..	BY6	300,000	300	.15	1.0	2.5	—	—
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	10.0	6.0	12.0
Mullard	PM22	62,500	82	.3	1.3	10.0	6.0	12.0
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
Marconi	H410	60,000	40	.1	.67	.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
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	3.0	3.0	4.5
Cossor ..	410LF	8,500	15	.1	1.76	3.2	3.0	6.0
Lissen ..	L410	8,500	15	.1	1.8	3.5	1.5	4.5
Marconi	L410	8,500	15	.1	1.76	3.0	2.0	4.5
Osram ..	L410	8,500	15	.1	1.77	3.5	3.0	4.5

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
Six-Sixty	410D	7,250	14.5	.1	2.0	4.0	3.0	6.0
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
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	4,100	7.8	.1	1.9	7.5	7.5	12.0
Cossor ..	410P	4,000	8	.1	2.0	17.5	4.5	9.0
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	18.0	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	2,150	6.5	.2	3.0	15.0	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	20.0	15.0	30.0
Marconi	PX4	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 Screen-grid Valves								
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								
Six-Sixty	SS4Pent.	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	.35	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 ..	LHD610	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	2.0	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	3.0	3.0	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	15.0
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	8.0	6.0	9.0
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	1,780	5.8	.25	3.25	—	—	15.0
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	13.5	24.0
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	25.0	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	—	—	—

(*Continued on page 454*)

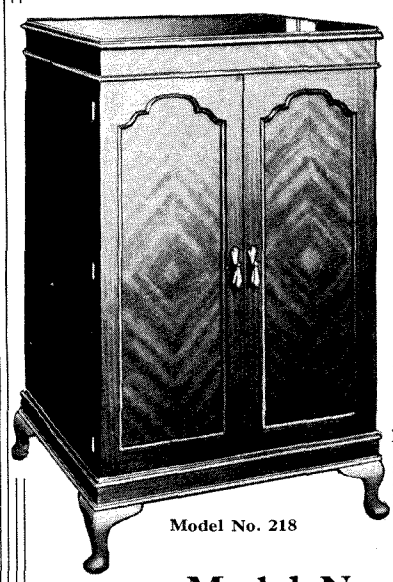
VALVES TO USE IN YOUR SET—*Continued*

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 Screen-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 250..
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. Screen-grid 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	—	—	—
Eta ..	DW6	800,000	1,000	1.0	—	—	—	—
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	—	—
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
Eta ..	DW2	200,000	240	1.0	—	2.5	—	—
A.C. Three-electrode Mains Valves								
Eta ..	DW4230	23,000	40	1.0	1.75	2.5	—	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	—	—

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. Three-electrode Mains Valves—Continued								
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	AR4110	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
Eta ..	DW1508	7,500	15	1.0	2.0	5.0	3.0	6.0
Six-Sixty	SS4Det. 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
Eta ..	DW704	4,500	7	1.0	1.5	10.0	6.0	13.5
Tungsram	L190	4,200	10	.9	2.4	8.0	12.0	16 5
Eta ..	DW1003	3,300	10	1.0	3.3	12.5	7.5	13.5
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	—	—	10.0
Mazda ..	AC/P1	2,650	10	1.0	3.75	14.0	6.0	12.0
Tungsram	P190	2,500	6	.9	2.4	8.0	—	—
Eta ..	DW702	2,250	7	.23	3.2	18.0	10.0	17.0
Eta ..	DX502	2,100	5	.15	2.4	12.0	4.5	15.0
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
Eta ..	DW302	1,800	3.5	1.07	1.95	33.0	—	20 0
Mullard	AC044	1,150	3.4	.7	3.5	17.0	16.5	28.0

TWO GREAT OSBORN SUCCESSES!

Model No. 218. RADIO CABINET SPECIFIED IN THIS ISSUE FOR THE A.C. SUPER 60



Model No. 218

MODEL No. 218

A Queen Anne Radio or Radio Gramophone Cabinet, 3 ft. 10 ins. high, 2 ft 2 ins. wide, 1 ft. 6 ins. deep. Size of baffle board behind fret, 24 ins. × 24 ins. Metallic fabric for fret front included. Opening at top and back. Cabinet takes panel 2 ft. × 9 ins., or smaller.

PRICES:

Machined ready to Assemble: Oak £3.10.0, Mahogany £3.15.0. **Assembled ready to polish:** Oak £4.10.0, Mahogany £4.15.0. **Assembled and polished:** Oak £5.10.0, Mahogany £6.5.0.

All Models Carriage Paid.

Model No. 176 SPEAKER CABINET SPECIFIED IN THIS ISSUE FOR THE "EVER-TUNED REGIONAL TWO"

Model No. 176. A Loud-speaker Cabinet of neat design, with richly embossed mouldings in two sizes: 16 in. x 16 in., 7½ in. deep; 24 in. x 24 in., 9½ in. deep. A piece of metallic fabric for fret front is included FREE. Obtainable in Figured Oak or Mahogany.

PRICES

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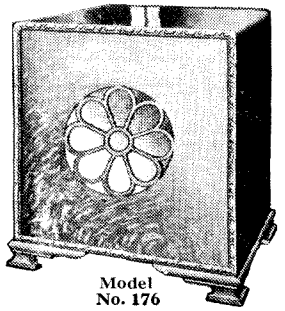
All Models Carriage Paid.



Model No. 176

Other models of various designs are obtainable for the above sets. Send Coupon and 3d. in stamps for 56-page illustrated catalogue.

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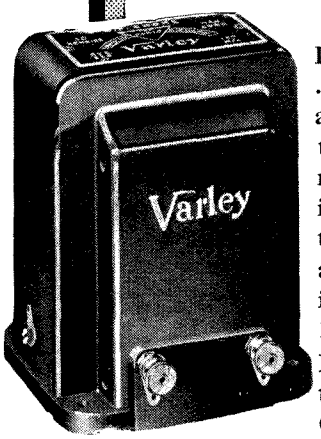
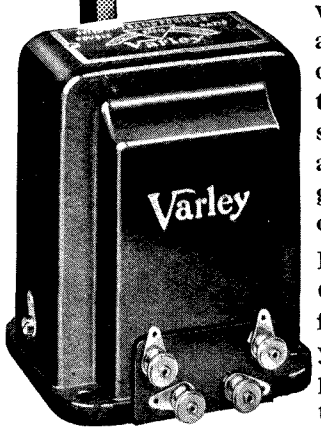


Varley Standard L.F. Choke, £1 : 0 : 0



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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.

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Write for Section D of Varley Catalogue

Varley

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

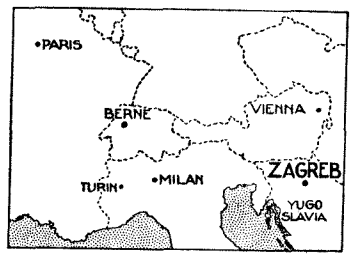
Broadcast Identification Sheets

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.



307m.

(977 *kc.*)

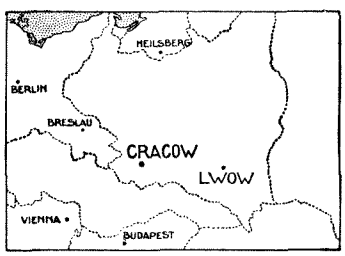
Power: 0.7 *kw.* (*temp.*)

ZAGREB

(*Jugoslavia*)

830 *miles from London.*

Standard Time: Central European (coincides with B.S.T.).
Announcer: Woman.
Call: *Radio Zagreb.*
Opening Signal: Hooter.
Interval Signal: Low toned metronome somewhat similar to B.B.C. signal; 100 beats per minute.
Main Programme: B.S.T. 11.30, concert (Sun.); 12.00, carillon from St. Mark's Church (Sun.); 12.30 gramophone records; 20.30, main concert; 21.50, news; 22.00, dance music (Sun., Tues., Fri.); 22.10, relay of "talkie" film (Wed.); 22.40, relay of foreign stations (Mon., Thurs.).
Exchanges programmes regularly with Belgrade and Ljubljana, and also relays international concerts from Berlin, Budapest, Prague Vienna and Warsaw.
Closes down with the words: *Radio Zagreb zelisvima lakhu noc* (Radio Zagreb wishes everybody good-night) and Croatian anthem (*Lijepa nasa*).
•Note: Zagreb will be found in pre-war maps under *Agram* (Hungary).



312.8m.

(959 *kc.*)

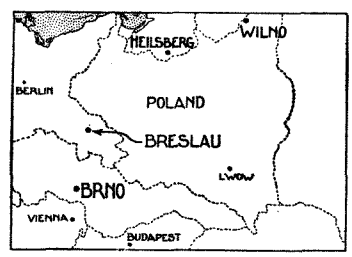
Power: 1.5 *kw.*

CRACOW

(*Poland*)

878 *miles from London.*

Standard Time: Central European (coincides with B.S.T.).
Announcers: Man and woman.
Call: *Hallo! Hallo! Polskie Radjo Cracow* (phon.: *Krarkoof*).
Interval Signal: Three notes.
Main Programmes: Most entertainments are relayed from Katowice, Warsaw and Wilno, but exchanges are also made with Poznan.
Closes down with the words: *Dobra Noc panstvom* (Good night, everybody), followed by Polish national anthem (*Dombrovski mazurka*).



325m.

(923 *kc.*)

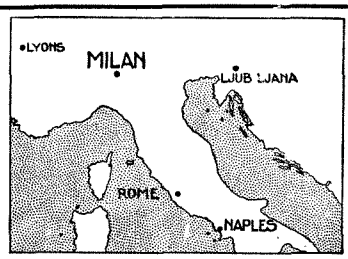
Power: 1.7 *kw.*

BRESLAU

(*Germany*)

743 *miles from London.*

Standard Time: Central European (coincides with B.S.T.).
Announcer: Man.
Call: *Achtung! Achtung! Hier Schlesische Funkstunde Breslau und Gleiwitz.*
Interval Signal: Metronome (200 beats per minute).
Main Programmes: B.S.T. 06.30, physical exercises and gramophone records; 08.00, gramophone records (Sun.); carillon from the St. Christus Church (Sun.); 10.00, sacred service (Sun.); then continuous transmission until 19.00, news and gramophone records; 20.00, main evening entertainment; 22.10, weather, news, followed by dance music until 00.30 (Sun., Thurs., Sat.); 23.00, relay of "talkie" film (Fri.); 23.30, morse telegraphy lesson (Tues.). Breslau frequently relays Berlin and other German programmes.
Closes down as other German stations with National Anthem (*Deutschland ueber Alles*).
Relay: Gleiwitz: 253 metres (1,184 kilocycles), 5.6 kilowatts.



332m.

(905 *kc.*)

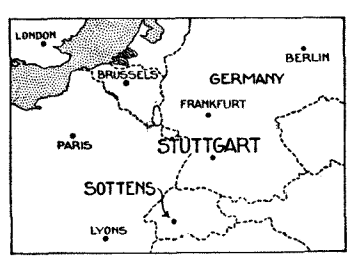
Power: 1.7 *kw.* (*temp.*)

NAPLES

(*Italy*)

1,003 *miles from London.*

Standard Time: Central European (coincides with B.S.T.).
Announcer: Woman.
Call: E.I.A.R. (phon. *Eh-yar*) *Signori, Buon Giorno* (good-day, ladies and gentlemen) *Radio Napoli*; when working with Rome: *Radio Roma Napoli* (phon.: *Nar-polly*).
Opening and Interval Signal: Short melody in several keys played on Pan pipes.
Main Programmes: B.S.T. 08.15, weather and news; 10.00, sacred service and music (Sun.); 12.45, concert; 13.30, news (Sun.); 17.00. concert (Sun.); 17.30 (weekdays); 19.50, gramophone records; 20.30, time signal, news, weather; 20.55, main evening entertainment (concert or operatic relay), news.
Closes down as other Italian stations (q.v.): *Fine della transmissione, Buona notte a tutti*, followed by Fascist hymn and Italian National Anthem.
Exchanges programmes daily with Rome.



403m.

(743 *kc.*)

Power: 25 *kw.*

SOTTENS

(*Switzerland*)

465 *miles from London.*

Standard Time: Central European (coincides with B.S.T.).
Call: *Allo! Allo! Ici Radio Suisse Romande, Studio de Lausanne* or *Studio de Genève.*
Announcers: Lausanne (man and woman); Geneva (man).
Main Programmes: B.S.T. 10.00, sacred service; concert (Sun).; 14.30, concert (Sun.); 20.00, main evening transmission; 22.00, news; dance music (Sat.)
Sottens acts as high-power transmitter for the Geneva and Lausanne studios. Geneva transmissions are also broadcast by the Poste de Lancy on 760 metres (395 kilocycles), 1.5 kilowatts; the Lausanne relay works on 680 metres (442 kilocycles), 0.6 kilowatts.
The station closes down with the usual French formula: ***Bon soir mesdames, bon soir, mesdemoiselles, bon soir messieurs.***

WAVELENGTHS OF THE WORLD'S BROADCASTERS

Wave-length	Name of Station	Dial Readings		Country
200	Leeds			Great Britain
206	Antwerp			Belgium
214.2	Warsaw			Poland
216	Radio Conférence Brussels			Belgium
216	Chatelineau			Belgium
216.3	Königsberg			Germany
218	Salzburg			Austria
219	Flensburg			Germany
219.3	Beziers			France
221	Helsinki			Finland
223	Fécamp			France
224.5	Cork (IFS)			Irish Free State
225	Strasbourg			France
227	Cologne			Germany
227	Münster			Germany
227	Aachen			Germany
230	Malmö			Sweden
232	Kiel			Germany
234	Lodz			Poland
235	Kristianssand			Norway
235	Nimes			France
237.2	Bordeaux-Sud-Ouest			France
239	Nürnberg			Germany
240	Oporto			Portugal
240	Stavanger			Norway
242	Belfast (2BE)			Ireland
244	Basle			Switzerland
244.7	Ghent			Belgium
245.1	Schaerbeek			Belgium
246	Cassel			Germany
246	Linz			Austria
249	Juan-les-Pins			France
250	Prague			Czechoslovakia
252	Barcelona			Spain
253.4	Gleiwitz			Germany
256	Toulouse (PTT)			France
257	Hörby			Sweden
259	Leipzig			Germany
261.3	London National			Great Britain
263.8	Moravska-Ostrava			Czechoslovakia
265	Lille (PTT)			France
268	Valencia (EAJ13)			Spain
269.8	Bremen			Germany
272	Rennes			France
276.5	Heilsberg			Germany
279	Bratislava			Czechoslovakia
281	Copenhagen			Denmark
283.6	Magdeburg			Germany
283.6	Stettin			Germany
283.6	Berlin			Germany
283.9	Innsbruck			Austria
284.7	Lisbon			Portugal
285.4	Montpellier			France
287.1	Radio Lyons			France
288.5	Swansea (5SX)			Great Britain
288.5	Stoke-on-Trent (6ST)			" "
288.5	Sheffield (6LF)			" "
288.5	Plymouth (5PY)			" "
288.5	Liverpool (6LV)			" "
288.5	Hull (6KH)			" "
288.5	Edinburgh (2EH)			" "
288.5	Dundee (2DE)			" "
288.5	Bournemouth (6BM)			" "
288.5	Bradford			" "
288.5	Newcastle (5NO)			" "
291	Tampere			Finland
291	Vöpuri			Finland
293	Kosice			Czechoslovakia
294.1	Limoges			France
296	Tallinn			Estonia
296	Turin			Italy
299	Hilversum			Holland
299	Radio Idzerda			Holland
301	Aberdeen (2BD)			Great Britain
306	Zagreb (Agram)			Yugoslavia
307.6	Bordeaux (PTT)			France
309.9	Cardiff (5WA)			Great Britain
312.2	Genoa			Italy
312.8	Cracow			Poland
314	Natan-Vitus			France
317.3	Marseilles (PTT)			France
318.8	Dresden			Germany
318.8	Sofia (Rodno Radio)			Bulgaria
322	Göteborg			Sweden
325	Breslau			Germany
327.5	Grenoble			France
327.5	Poste Parisien			France
332	Naples			Italy
335	Poznan			Poland
338	Brussels (No. 2)			Belgium
342	Brunn			Czechoslovakia
345.2	Strasbourg			France
349	Barcelona (EAJ1)			Spain
351.7	Graz			Austria
356.3	London Regional			Great Britain
360	Mühlacker			Germany
363.4	Algiers			North Africa
364	Bergen			Norway
366.1	Frederiksstad			Norway
366.9	Seville (EAJ5)			Spain
368.1	Wilno			Poland
370	Radio LL (Paris)			France
372	Hamburg			Germany
376.4	Glasgow			Great Britain
381	Lvov			Poland
385	Radio Toulouse			France
390	Frankfurt			Germany
394	Bucharest			Roumania
398.9	Midland Regional			Great Britain
403.5	Sottens			Switzerland
408	Katowice			Poland
413	Dublin (2RN)			Irish Free State
416	Radio Maroc			North Africa
418	Berlin			Germany
424	Madrid (EAJ7)			Spain
426.3	Kharkov			Russia
430.5	Belgrade			Yugoslavia
436	Stockholm			Sweden
441	Rome			Italy
447	Paris (Ecole Sup. PTT)			France
452	Danzig			Danzig
453	Bolzano (1BZ)			Italy
453	Klagenfurt			Austria
453	San Sebastian			Spain
453.2	Porsgrund			Norway
459	Beromvuenster (testing)			Switzerland
465.8	Tartu			Estonia
466	Lyon-la-Doua			France
473	Langenberg			Germany
479.2	Manchester			Great Britain
479.2	North Regional (testing)			Great Britain
487	Prague			Czechoslovakia
487	Ceoky Brod(t'st'gshortly)			Czechoslovakia
493	Trondheim			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	Kaiserslautern			Germany
559.7	Augsberg			Germany
566	Hanover			Germany
570	Freiburg			Germany
574.7	Ljubljana			Yugoslavia
587	Hamar			Norway
680	Lausanne			Switzerland
690	Pori			Finland
720	Moscow			Russia
760	Geneva			Switzerland
770	Ostersund			Sweden
800	Kiev			Russia
824	Sverdlovsk			Russia
937.5	Kharkov			Russia
1,000	Leningrad			Russia
1,060	Scheveningen-Haven			Holland
1,071	Oslo			Norway
1,103	Moscow Popoff			Russia
1,153	Kalundborg			Denmark
1,200	Reykjavik			Iceland
1,216	Istanbul			Turkey
1,229	Boden			Sweden
1,250	Tunis Kasbah			North Africa
1,304	Moscow			Russia
1,352	Motala			Sweden
1,380	Bakou			Russia
1,411	Warsaw			Poland
1,445.7	Eiffel Tower, Paris			France
1,481	Moscow (Kom)			Russia
1,538	Ankara			Turkey
1,554.4	Daventry (National)			Great Britain
1,635	Norddeich			Germany
1,635	Zeesen			Germany
1,725	Radio Paris			France
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1,875	Huizen			Holland
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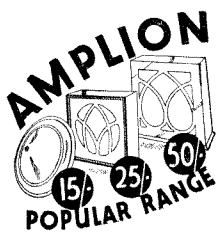
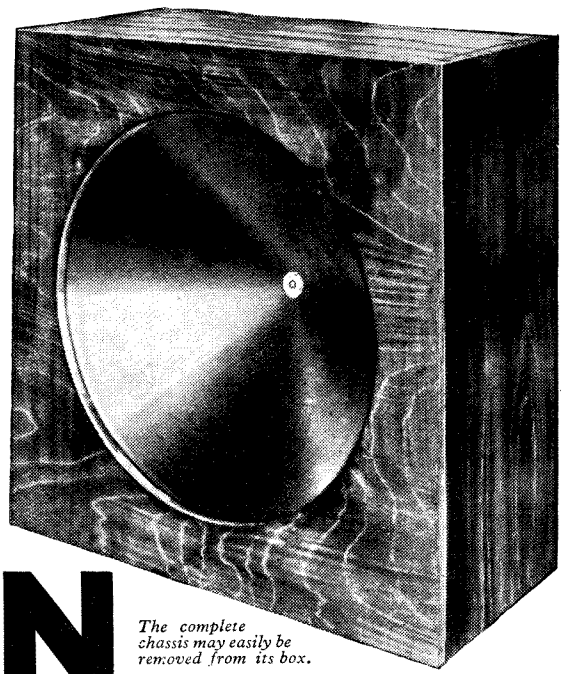
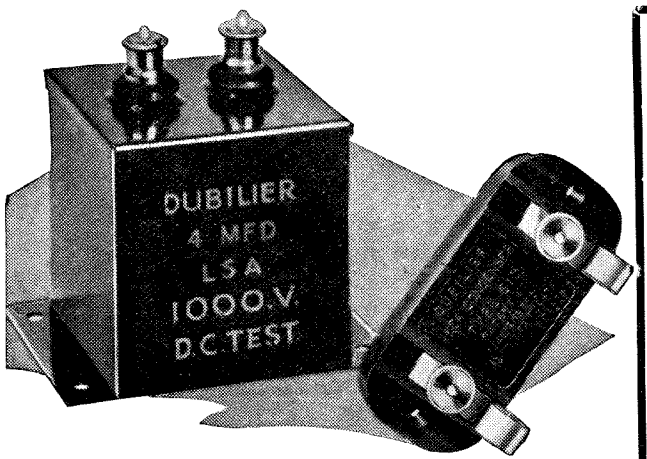




The complete chassis may easily be removed from its box.

AMPLION



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IN TUNE WITH THE TRADE

FETTER LANE'S Review of Catalogues and Pamphlets

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Here we review the newest booklets and folders issued by three 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 June 30.*

CHANGING YOUR TONE

I HAVE just received a new Gambrell folder, which bears the slogan "Tone Variation at Will." It applies particularly to the new Vario-Chromatic moving-coil speaker, the latest product of Gambrell. It is a fine idea, and as we are all of us on the lookout for something better in the way of speakers I thoroughly recommend this new folder to your attention.

The new Vario-Chromatic speaker is of the permanent-magnet type and there is a massive magnet weighing 11 lbs. or so, and if magnetism is measurable by the amount of steel in the magnets then the Vario-Chromatic certainly justifies its title of "permanent."

The tone control is very cute, and the result of it is that if your reproduction is harsh it can be made smooth and sweet; if you cannot hear the bass notes as you should an adjustment of the knob makes them full-bodied; if the violin and piccolos lack brilliance they can be made crystal clear.

The tone control is obtainable for a few shillings as a separate unit. Both the tone control and the cabinet and chassis models of the Vario-Chromatic speaker are described in this new folder.

◆ ◆ ◆ **194**

GROSVENOR H.T. BATTERIES

GENERALLY speaking, there is nothing very inspiring in the contents of a price list, but nevertheless I do feel somewhat inspired by a lengthy list received describing the new Grosvenor high-test batteries.

The reason for my inspiration is that in every case prices are absurdly low, and technical people in the WIRELESS MAGAZINE laboratories, who have tested some of the Grosvenor range, testify to their high performance.

There is another point, too. This lengthy price list gives recommended batteries for all popular portable and transportable sets on the market. The ordinary high-tension batteries are made in various ranges; for instance, there is the Red Line (standard capacity), the Triple Red Line (popular power), and grid-bias batteries in the same ranges.

There are literally dozens of other cells and batteries for torches and so on, and I think that anybody who uses a dry battery of any kind will find this Grosvenor price list a help. **195**

◆ ◆ ◆

NEW CABINET STYLES

THE cabinet people have been busy this month and have produced a number of new patterns for radio cabinets, especially those of the big console type. From the well-known firm of Osborn comes a nicely-got-up catalogue of cabinets of all types, from simple loud-speaker boxes up to elaborate American-style consoles.

The advantage of these Osborn cabinets is that they can be obtained either as a kit of parts ready to assemble, assembled ready to polish, or else completely assembled and polished. The simple constructional work involved in making up a cabinet from a kit of these parts is so small that many home-constructor enthusiasts will probably care to avail themselves of this opportunity of purchasing a soundly-built cabinet for slightly less money than is normally possible. **196**

Technical Talks

No. 1. Types of Electricity Supply.

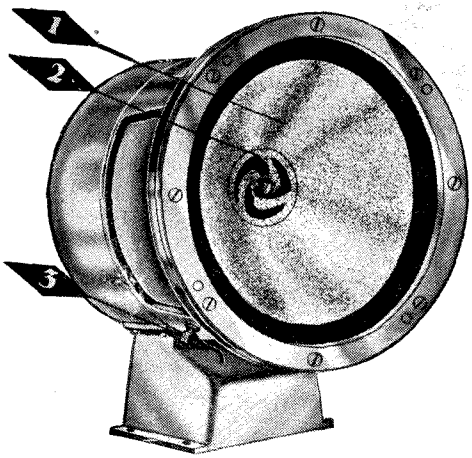
When building a mains radio receiver, the first difficulty that confronts the amateur constructor is the fact that electricity supplies are by no means standardised. These supplies may, however, be simply classified as either alternating current or direct current, and the voltage may be from 100 to 120, or from 200 to 250. The nature of the supply available can, of course, be ascertained by studying the label on the electric-light meter or by inquiry at the office of the supply company.

The term "A.C." is a short way of expressing alternating current, i.e., a current which is not continuous in one direction, but alternates or pulsates, the voltage of one terminal continually changing from positive through zero to negative, and back again, alternating with the voltage on the other terminal.

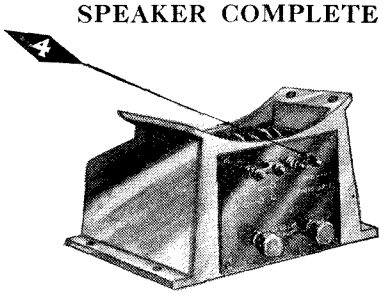
The frequency at which this takes place is not standardised, but may be anything between 25 and 100 times a second, and such a supply connected to any apparatus which changes electrical energy into sound energy produces a steady noise, comparatively low in the musical scale, and generally described as "hum."

The first step towards rendering an A.C. supply suitable for use in wireless sets is known by the technical term "rectification."

Most of the radio dealers stock the Westinghouse Metal Rectifiers and are pleased to give advice as to the most suitable unit for any particular purpose. If any difficulty is met with, however, write to us and we will give you the name of your nearest stockists.



SPEAKER COMPLETE



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3 CONSTRUCTION Robust Diecast Aluminium housing makes this a most workmanlike job, and every detail has the honest finish associated with all PARMEKO apparatus.

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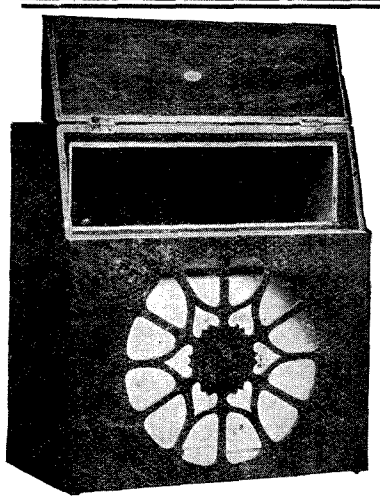

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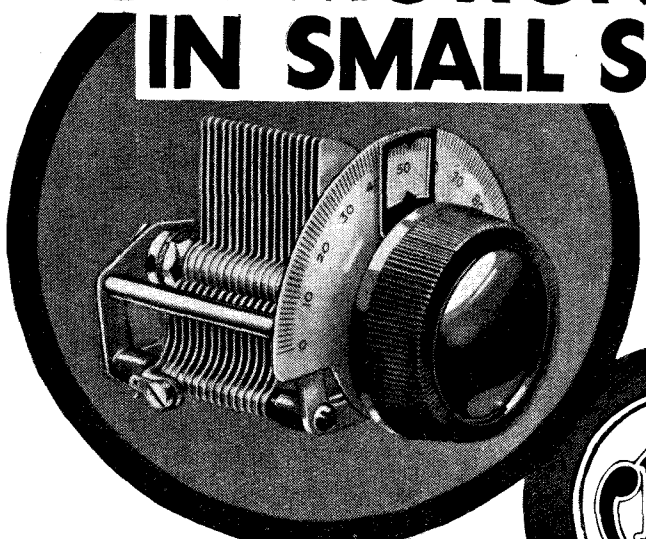

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The slow-motion mechanism is housed in the bottom bearing *and takes no extra space.*

One hole fixing. Ballbearing centre spindle. Pigtail to rotor.

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Advertisement of Jackson Bros., 72 St. Thomas' Street, London, S.E.1 *Telephone Hop 1837*

Mention of the "Wireless Magazine" will ensure prompt attention

DEBATES AND DISCUSSIONS

You hear natural voices over the radio when you use the pure current of the Lissen battery for your H.T. It is the power that keeps speech so clear and natural that you never have to strain to catch words and meaning in a speech or football or sports broadcast.

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60 volt (reads 66) ..	7/11
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4½ volt Pocket Battery, each (4/6 a doz.)	5d.
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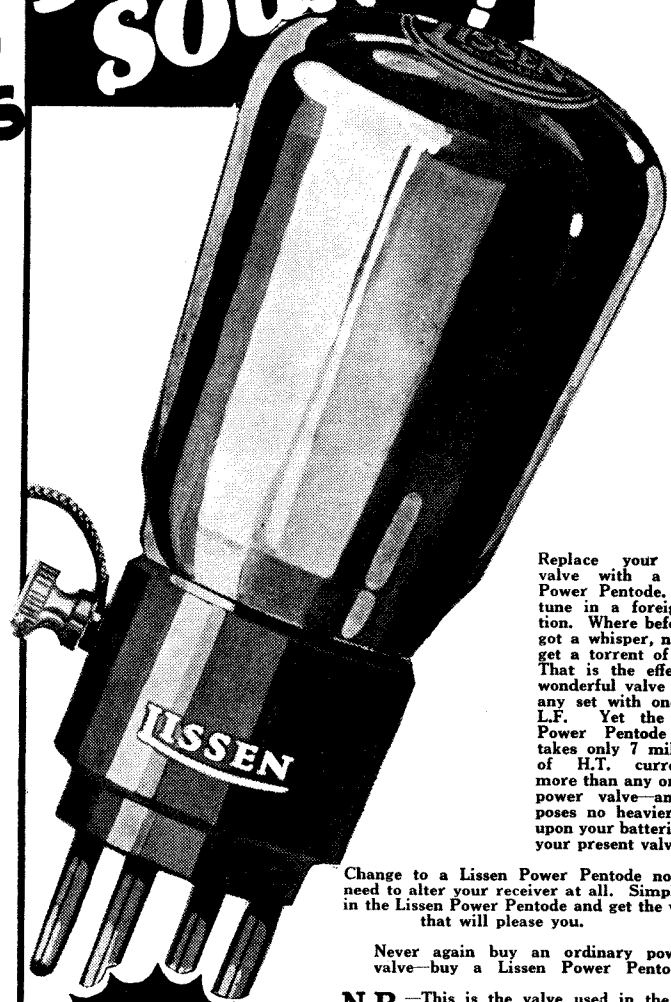

Replace your power valve with a Lissen Power Pentode. Then tune in a foreign station. Where before you got a whisper, now you get a torrent of sound. That is the effect this wonderful valve has on any set with one stage L.F. Yet the Lissen Power Pentode Valve takes only 7 milliamps of H.T. current—no more than any ordinary power valve—and imposes no heavier drain upon your batteries than your present valve does.

Change to a Lissen Power Pentode now. No need to alter your receiver at all. Simply plug in the Lissen Power Pentode and get the volume that will please you.

Never again buy an ordinary power valve—buy a Lissen Power Pentode.

N.B.—This is the valve used in the Commercial Lissen 2-valve Receiver and largely accounts for its amazing volume. It gives amazing volume there, and it will do the same for you.

12/6

LISSEN POWER PENTODE

OTHER TYPES AND PRICES:

H.210 R.C. and H.F. ..	5/6	P.220 Power Valve	7/8
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4 and 6 volt types also available.

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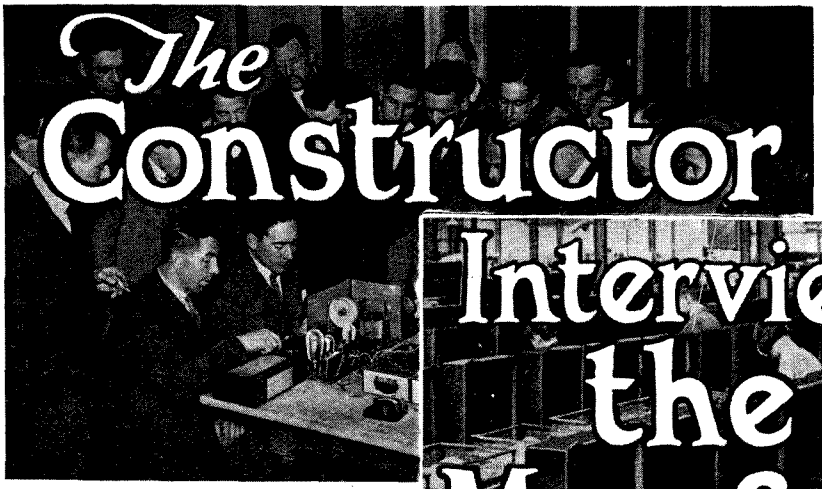


The Constructor Interviews the Manufacturer

THE CONSTRUCTOR
Represented by
D. SISSON RELPH

THE MANUFACTURER
Represented by
ALAN HUNTER

D.S.R. : The first thing I should like to know is whether the circuits used for manufactured sets are radically different from those employed by the home constructor?

A.S.H. : No, you can take it from me that the manufacturer keeps to the straight circuit.

D.S.R. : These are the most successful?

A.S.H. : Yes, undoubtedly.

D.S.R. : Surely, though, in factory-built sets there are more refinements in circuit design than in the average amateur-built set?

A.S.H. : That is true of mains-operated sets, and possibly of portable sets. In both these types the manufacturer resorts to circuit additions, such as decoupling devices, that the amateur does not worry about.

D.S.R. : Is this only true of the better-class sets, or would you say that refinements abound even in very cheap sets, such as £8 A.C. two-valvers?

A.S.H. : The answer to that question needs thought. I think that in general the manufacturer does not indulge in circuit stripping. Why should he, when he can save so much by stripping his components of their bakelite cases and bright polished parts?

D.S.R. : I see; but are manufacturers' circuits, on the whole, following the amateur trend, or would you suggest that the manufacturer is leading the amateur in circuit development?

A.S.H. : I am rather inclined to think the amateur is ahead of the manufacturer, but then you must remember that he has not to worry about a season's production, but only of the set of the moment. Your question is, perhaps, best answered when I tell you that so far as I know there are no commercial sets marketed this season with either band-pass aerial tuning or super-het high-frequency amplification.

D.S.R. : Would you say that this backwardness is due to difficulties in coil and condenser matching?

A.S.H. : Most decidedly not; you have only to try some of the better-class sets embodying two or three stages of tuning, operated by a single control knob, to realise that ganging offers no particular snag in manufacture.

D.S.R. : Are you suggesting that manufactured sets have better condensers and coils than those available to the amateur, and that they make ganging easy?

A.S.H. : Well, that is more or less what I imply.

D.S.R. : Then I don't agree. Manufacturers often use the same components as used by constructors. In many sets the only difference in the actual condensers

This feature—which is, we believe, something new in radio journalism—will interest everybody who owns a radio set, whether bought from a shop or built at home. Many interesting sidelights on the "build or buy" question are brought out in this conversation, which was quite spontaneous in character

CONSTRUCTOR AND MANUFACTURER—Cont.

and coils is in some special form of dial or coil-switch mechanism.

A.S.H.: Perhaps it would be more true to say, then, that the manufacturer is able to make more certain of his ganging than the amateur.

D.S.R.: So we agree there is no fundamental difference in the materials available. But perhaps you would say that those responsible for commercial set tests are more likely to gang the tuning circuits accurately than is the amateur?

A.S.H.: I would certainly say that.

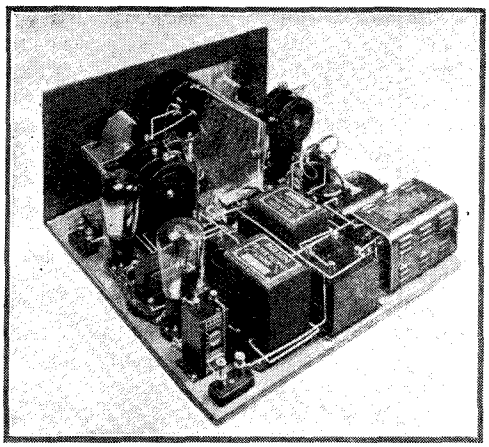
D.S.R.: From your experience of commercial sets have you found that sets with several ganged tuned circuits remain in gang over a long period of time?

A.S.H.: Well, I have now had several of the best commercial sets in use since last September, and in no case have I noted any deterioration in ganging. But I must confess that this may be due to the fact that I have refrained from meddling with the interior of the sets. I have not had to change even a valve.

D.S.R.: Ah, that is a point. If the amateur tries out different stunts with his set, such as changing valves, he must expect to have to re-adjust his ganging.

A.S.H.: Without labouring the point, I think it is obvious that the manufacturer has an advantage in making his ganged circuits accurate in a way that the amateur cannot.

D.S.R.: I agree; I have never favoured ganged sets for the home constructor, because I do not think the average amateur can get the best from such an arrangement.



THE CONSTRUCTOR AND—

A typical home-constructor's three-valve A.C. mains set, with a metal rectifier for high-tension supply. Plug-in coils are used

A.S.H.: Don't you think your last remark implies a big difference between amateur and commercial radio technique?

D.S.R.: In what respect exactly?

A.S.H.: I mean this: the commercial set maker starts from scratch, so to speak, gathering materials to serve his ends, whereas the amateur has to start with the finished products of the component manufacturers. The amateur must, therefore, make his set suit the characteristics of these parts.

D.S.R.: True enough, but I should like to turn to another point. One of the most striking things about factory sets is their good external appearance. Tell me, are the insides as good?

A.S.H.: Not superficially. The factory set's inside does not look as good as the inside of the amateur's set, as a rule, because the parts of the factory set are usually stripped of unnecessary mouldings.

D.S.R.: What I am trying to get at is the efficiency, from the electrical point of view, of the internal arrangement of a factory-built set. Do manufacturers pack components up in small spaces for electrical efficiency or simply for convenience?

A.S.H.: I suppose you are referring now to the wiring. Certainly the manufactured set has a rather higgledy-piggledy appearance as regards wiring. Often one finds many of the leads bunched together.

D.S.R.: Is this less efficient than the home constructor's careful right-angle bend wiring?

A.S.H.: That is rather difficult to say off-hand. I can only tell you that a three-valve factory-built set is not appreciably less efficient than a three-valve amateur-built set.

D.S.R.: Are you suggesting that amateurs are too particular about their layout and wiring?

A.S.H.: Yes, it appears so.

D.S.R.: Now in the Super 60 set, for example, Mr. James expressly put constructors off the idea of using a pick-up switch because to do so meant a long grid lead between the panel switch and the second detector.

A.S.H.: I don't think this would have worried the manufacturer. To overcome the bad effects of a long grid lead he would probably have added a decoupling device.

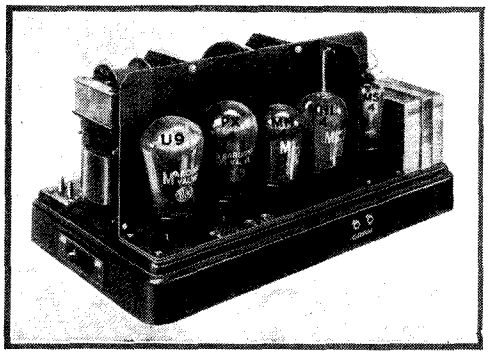
D.S.R.: It would be interesting to know whether a manufacturer would have introduced this gadget or laid out the set in another way simply to keep the grid wire short.

A.S.H: He would certainly have introduced a gadget if the only other way out had been a complication of the layout.

D.S.R.: That rather looks as though constructors and manufacturers both have to strive for a simple layout.

A.S.H.: Yes, because the sets made in the factory are wired up by comparatively non-technical workers who are likely to be most productive when the wiring is most simple and accessible.

D.S.R.: Reverting again to the question of ganging; is there any sign that manufacturers are still trying to make one-knob sets?



—THE MANUFACTURER

The good use of a metal chassis is evident from this photograph of a commercial four-valve A.C. mains set, with valve rectifier. Note the simple valve screening and the compact assembly

A.S.H.: Trying? Why, my dear Relph, they are not merely trying, they are succeeding! The one-knob control is quite a fetish; and rightly so, I think.

D.S.R.: Why?

A.S.H.: Ah, now we are coming to it. The ideal

By D. SISSON RELPH and ALAN HUNTER

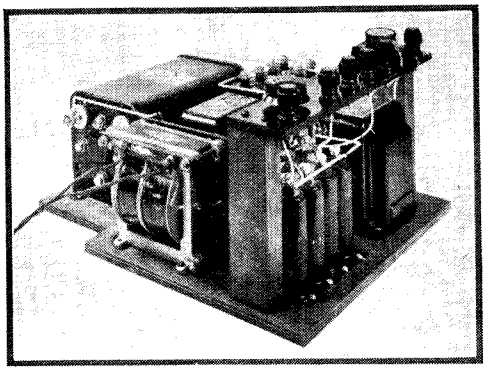
layout of controls for the non-technical set user, by which I mean the set buyer, is one knob for selecting a station and one more for altering the volume of the station selected. That's all. But I can quite understand that the amateur who knows enough to build a set with eight knobs on the panel is probably sufficiently well versed in technicalities to know how to operate them.

D.S.R.: Do you think constructors should emulate this one-knob ideal?

A.S.H.: Yes, but I cannot see any evidence that they attempt to do so. Why?

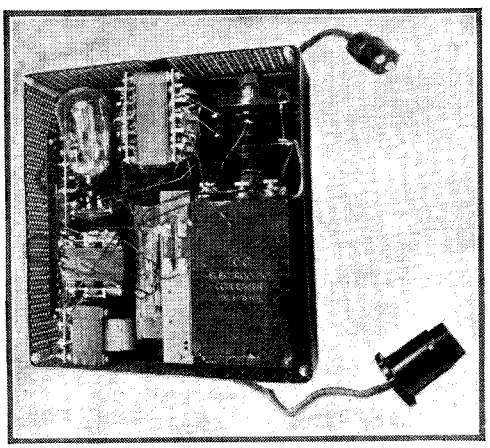
D.S.R.: They don't because they can't, owing to the ganging difficulties we have already discussed.

A.S.H.: I had not thought of that, but I see your point and I suppose it is a big point.



BUILT AT HOME AND—
A constructor's A.C. unit for running a big set. It uses a metal rectifier

D.S.R.: Now I have the chance, I really must ask you to explain a state of affairs I never have been able to understand: why do manufacturers in this country go all out on mains-operated sets? Why do they neglect battery-operated sets?



—BUILT IN A FACTORY
This commercial A.C. unit uses a valve rectifier for high tension

A.S.H.: I think the answer is obvious. The set maker is catering for a fairly prosperous market, composed of people with enough money to insist upon the convenience of an electric-light supply.

D.S.R.: On the other hand I should say that 90 per cent. of home-constructor sets in use to-day are battery sets. It is undeniable that the majority of sets in use are battery sets. I cannot understand why set makers are ignoring what must be a very big potential market.

A.S.H.: I suggest that perhaps the home constructor fills this market. Then you must remember that a manufacturer planning his season's campaign will obviously be tempted to satisfy a ready-made market rather than one that may or may not exist. Supply in radio has always followed demand.

D.S.R.: Henry Ford disproved that argument long ago. It is up to the manufacturer to create a market. If his goods are right, and the price of the goods is right, he will be able to sell them quickly enough. Set makers should introduce something new and not stick to existing ideas.

A.S.H.: But are battery sets something new? Are they not old and, indeed, obsolescent? After all, mains sets are new and were popularised by manufacturers, many of whom used to make battery sets.

D.S.R.: Without going into economic discussions, it seems to me that, with one or two notable exceptions, the only battery sets turned out by the set makers are those in what I may call the "junk" market. This seems all wrong to me.

A.S.H.: Are you not forgetting portables? These self-contained sets are produced in a wide variety for battery operation.

D.S.R.: No, I have not forgotten portables, but you must admit that this type of set is well known for its low efficiency, due to the need for small loud-speakers and small batteries accommodated in the portable cabinet. What we need are battery-operated sets with large batteries and suitable loud-speakers. Of course, this would mean larger cabinets. What is the objection to the table-cabinet type of battery-operated set?

A.S.H.: I suppose price is the main objection

D.S.R.: You mean that a table or pedestal cabinet is very much more expensive than a portable cabinet?

A.S.H.: No, but the extra-capacity batteries and the large loud-speaker would cost a good deal more and because of that set makers would be unable to produce a battery-operated job at a price below mains-operated standards.

D.S.R.: Well, I cannot help thinking that manufacturers are underestimating the market for battery sets. Look at the enormous number of batteries that are sold. If people are buying all these batteries they must be using battery sets. I am convinced that set manufacturers are losing the technique of battery-set design.

A.S.H.: Well, they must leave something for the constructor.

D.S.R.: That is very kind of them. Now, tell me, is there a tendency to use combined control components in the latest sets?

A.S.H.: As a matter of fact, there is. I notice a very definite move towards simplifying control by making one knob serve to operate two different components. This applies especially to volume and reaction controls. In fact, you may take it that the factory-built set is getting more and more simple to operate.

D.S.R.: With a corresponding decrease in cost?

A.S.H.: No; but obviously there is a value in simplified control not to be measured by the non-technical set user in so many pounds, shillings, and pence.

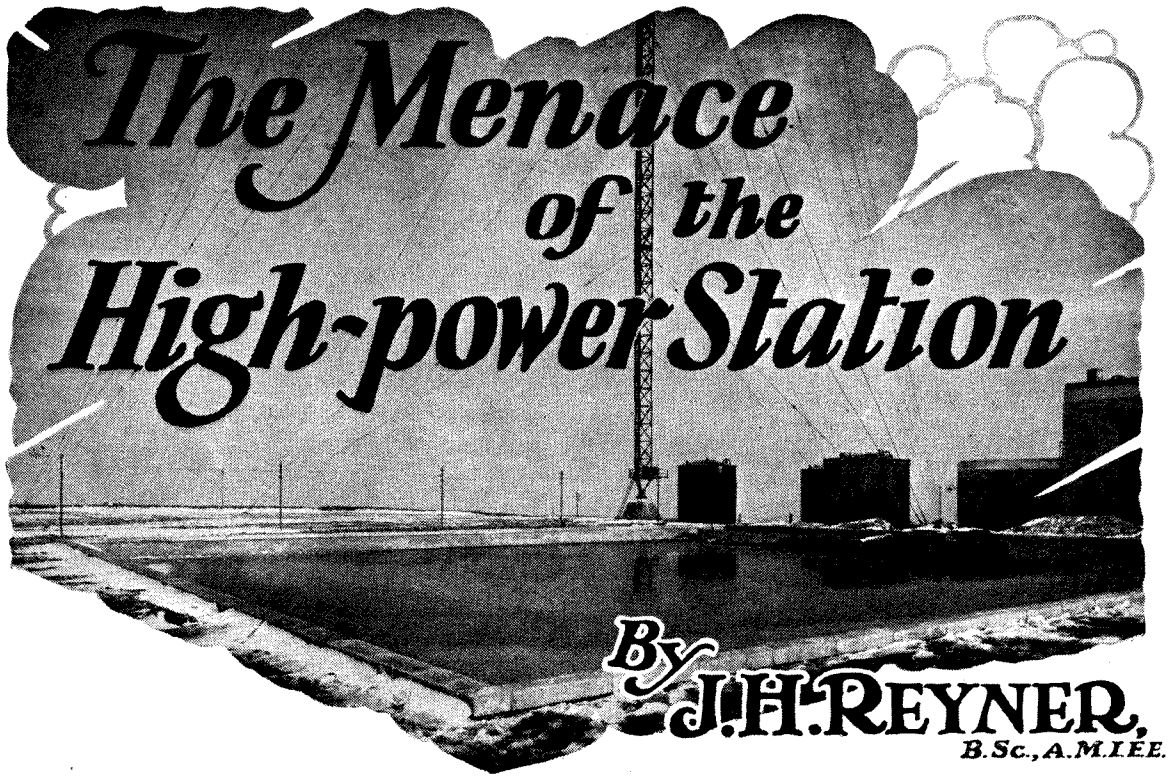
D.S.R.: Well, we have now been talking for twenty minutes and I see it is lunch time.

A.S.H.: Good; please allow a humble representative of the set manufacturers to offer lunch to a very enlightened representative of the home constructor.

D.S.R.: Thank you. But one parting shot: I think all manufacturers of mains sets who omit a mains switch ought to be electrocuted!

The Menace of the High-power Station

By J. H. REYNER, B.Sc., A.M.I.E.E.



THE B.B.C.'s NEW HIGH-POWER STATION AT SLAITHWAITE—CALLED "NORTH REGIONAL"

Water storage and valve-cooling tank with base of 500-ft. mast and fuel-oil storage tanks in background. (Other photographs will be found on pages 492 and 493)

ANOTHER regional station has just been brought into operation, and the problems which confronted Londoners will now have to be faced by those living in the north of England. Indeed, in many cases the difficulties will be increased.

The time is opportune, therefore, to consider the real magnitude of the effects which are produced, since knowledge of this kind is an essential preliminary to the production of a satisfactory remedy.

Detector Input

The average detector valve will handle an input of 2 or 3 volts, or if one is using 100 volts actually applied to the detector anode, the permissible input will probably rise to 5 or 6 volts. The input which can safely be handled by a screened-grid valve is much less, usually something between 1 and 2 volts only. A triode high-frequency valve will handle rather more, but certainly not in excess of 5 volts.

Apart from any other consideration, therefore, the input to our receiver must not exceed 5 volts, and if we are using a high-frequency valve of the screened-grid type, as is very common to-day, the limit is somewhat less than half this figure. "Surely," you will say, "this is very theoretical talk. Under what circumstances can the voltage ever rise to a value of this order?" Under the old régime this would have been the case. The signal strength received was of the order of a few millivolts only, and the voltage input to the first valve was a mere fraction of a volt.

The advent of the regional stations has entirely altered the conditions, and it is quite easy to obtain voltages on one's valve greatly in excess of the figures quoted. My laboratories are situated a little more than five miles in a direct line from Brookman's Park, and as a matter of interest I measured the other day the peak voltage received on an ordinary tuning circuit consisting of a plug-in coil and variable condenser.

The coil was of the X-tapped variety and a full 100-ft. aerial was taken to the tapping. On the National programme the peak voltage was 9, and on the Regional programme 18 volts.

These values appear almost incredible, yet they are in satisfactory accordance with theory, and relatively huge voltages of this order are to be expected anywhere within reasonable distance of a powerful modern transmitter. The overall magnification of the circuit which I used in my measurements was of the order of 50. This means that the voltage developed across the condenser (and consequently applied to the grid of the valve) was fifty times as much as the voltage actually induced in the aerial circuit. This figure includes the effective height of the aerial and is a low value due to the aerial resistance and detector damping.

In the diagram, I have prepared a curve showing the field strength in millivolts per metre which is to be expected at various distances from a regional transmitter, on the assumption of a radiated power of 50 kilowatts.

Uninterrupted Service

It will be observed, in passing, that a field strength of 5 millivolts per metre, which is reckoned to be the minimum signal necessary for an uninterrupted service free from interference, is obtained at a distance of one hundred miles. In the present instance, however, we are more concerned with the other end of the scale and distances of less than

twenty miles from the station.

The actual voltage induced in the circuit depends upon the height of the aerial and constants of the tuning circuit adopted. But, as a rough approximation to average conditions, it may be taken that the voltage applied across the grid of the first valve using an outside aerial and an average coil will be not less than fifty times the field strength.

Screened-grid Overloading

Thus, we see that even at twenty miles distance the voltage actually applied to the valve is of the order of 2½ volts, a figure which can be satisfactorily handled by a detector or a triode high-frequency amplifier, but which will overload a screened-grid valve. Moreover the signal strength rises very rapidly as we go nearer to the transmitter, so that it is reasonably safe to say that precautions against overloading must be taken by anyone living within twenty miles of a regional station.

Why should we trouble about this overloading? What harm is it going to do, and how shall we be able to observe its effect in actual reception?

Consider first the case of a simple detector. If this receives more than about 5 volts input the rectified current will no longer be proportional to the input, and the peak values of the signal strength will be cut off. This will give "hissy" speech and high-pitched music usually accompanied by choking sounds. Moreover, the signal will often be found to tune in two places with a slight dip in between. These effects have all been discussed before, and need not be dwelt on further in the present article.

More Difficult Problem

Where we use a stage of high-frequency amplification the problem becomes still more difficult. Even granted that the incoming signal does not overload the high-frequency valve, we are then going to apply anything from 20 to 40 times as large a voltage to the detector valve. Even assuming the input to be only 1 volt on the high-frequency valve this means the voltage of the order of 20 to 40 volts applied to the detector which will simply paralyse it, and give the most execrable quality.

In point of fact, limiting consideration would come into play long before a voltage of this order was actually applied to the detector, but the valve would nevertheless be very seriously overloaded.

The final consideration is one of selectivity. If a signal of more than 1 volt is applied to the average screened grid valve a paralysing effect known as cross-modulation occurs. Explained briefly, this means that the signal produces a wipe-out effect, which entirely prevents the reception of any other stations. As one tunes one's receiver away from a local station, the signal strength received naturally falls off until a point is reached where the valve is not overloaded. At this point, circumstances become normal and other stations can be received.

Unfortunately, if one lives anywhere within ten miles of a regional station these normal conditions are not restored until twenty or thirty degrees on either side of the actual tuning point, so that when two alternative programmes are in progress together, there is very little of the dial left.

I had an example of this only the other day, when testing a receiver incorporating one screen-grid high-frequency valve followed by a detector and low-frequency stage. Little but the two London stations could be heard under normal conditions. On making arrangements to cut down the strength of the London programme to a suitable value, however, some fifteen or twenty other stations suddenly sprung up, one of which in particular was of overpowering strength, far louder than would be required in a normal room.

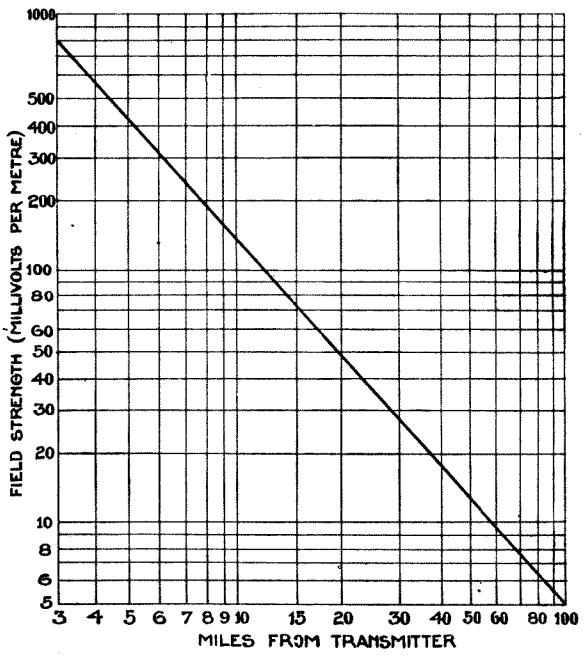
Yet, the London transmissions at normal strength completely swamped this powerful station owing to the wipe-out effect just mentioned.

How is one to reduce the signal strength from the local station to a satisfactory value? Where one is designing a receiver from the start, one has a choice of several methods. One is the use of a band-pass filter in the aerial circuit, and this is, to my mind, the most practical solution.

The second is the use of a frame aerial which automatically limits the voltage picked up, but at the same time also limits that received from distant stations, and therefore must be followed by a powerful receiver, preferably a super-het.

Use of Wavetrap

The third remedy, and the only one which is really applicable to those who do not wish to modify their receiver, is the use of a wavetrap. This consists of a circuit tuned to the local transmission, and introduced into the aerial circuit in such a manner as to absorb energy from the local station. With careful design it can be made to absorb the greater part of the energy received, leaving only a normal signal to be applied to the grid of the first valve in the receiver.



FIELD STRENGTH OF A REGIONAL STATION

This curve shows the field strength in millivolts per metre at various distances for a regional transmitter, on the assumption of a radiated power of 50 kilowatts

Up-to-date Methods

The wavetrap is a perfectly practical and very satisfactory solution to the problem of selectivity, and the figures which have already been adduced will serve to show the complete paralysis which can result from the proximity of a high-power station unless one uses up-to-date methods to combat the trouble.

THE A.C. SUPER 60

Performance even better than with the battery model is assured with this modern receiver, which has been specially designed for "Wireless Magazine" by W. JAMES. Full constructional details are presented in the following pages. Start building this set now—nothing better could be wished for!

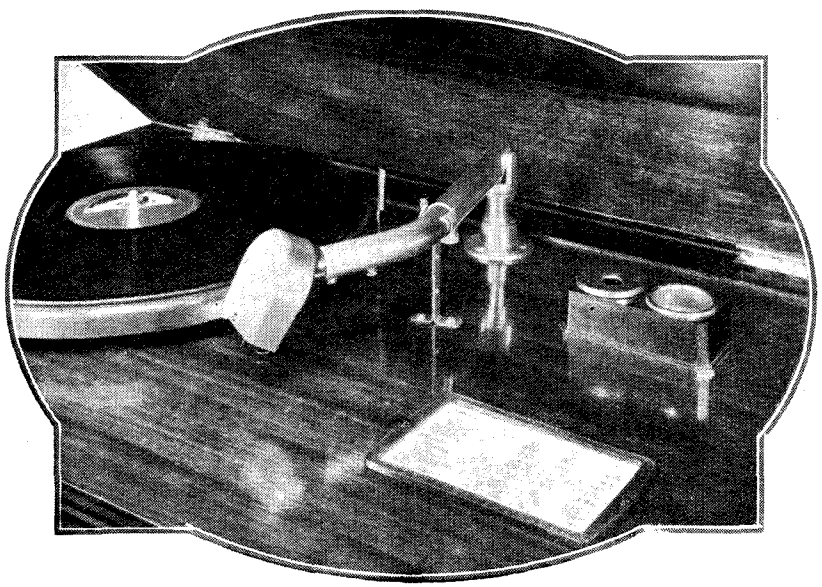
THE SET THAT W. JAMES USES AT HOME!

THIS A.C. Super 60 is not just the battery model with A.C. valves and a mains unit. It is something better.

You see there is all the high tension within reason available, although I have used no more than necessary. But I have used 200 volts, and to start with, therefore, the power valve is of reasonable size.

It is a Mullard directly-heated valve, type AC064. This passes about 20 milliamperes when suitably biased, and being directly heated, passes anode current almost at the moment of switching on. As you know, the voltage across the output terminals of a mains unit having a metal rectifier type HT7 is about 340 at no load, 300 at 10 milliamperes, and 200 at about 30 milliamperes.

By using the directly-heated type power valve, the voltage does not stay at a high value for a long period. The condensers are therefore not strained. With this valve fully loaded, signals of good strength are obtained, suitable for a moving-coil loud-speaker, for example, on both radio and the gramophone.



NEAT LAYOUT OF MOTOR BOARD

On the left is the bakelite turntable of the Diehl induction motor, and B.T.H. pick-up and tonearm. On the right are the needle cups and a station log for recording a few of the principal dial readings

Screened-grid Detector

The second point is that a screened-grid valve is used as a first detector. A rather neat scheme is adopted to obtain effective anode-bend detection. The full high-tension voltage is applied to the anode through a resistance-condenser filter and a fixed grid bias of, say, 3 volts negative is applied to the grid circuit.

We alter the characteristic of the valve, however, by adjusting the voltage on the screen, and in doing so obtain the most effective rectification.

When the voltage on the screen is increased the anode-current/grid-bias curve moves farther over to the negative side. Reducing the screen voltage has the opposite effect and so we are able to fix the working point accurately. The potentiometer is fastened on a little bracket to the baseboard near the first detector.

Limiting Resistance

In series with the potentiometer is a fixed resistance for the purpose of preventing us from applying more than 100 volts to the screen of the valve. With a potentiometer of

50,000 ohms, a fixed resistance of 50,000 ohms is used, so that with a total voltage of 200, the maximum voltage that can be applied to the screen is 100.

The anode current passed by the valve is very small, being about half a milliampere under working conditions. The potentiometer and series resistance are clearly indicated in the circuit diagram. There is the usual by-pass condenser.

Centre-tapped Frame

A centre-tapped frame aerial is used, as before, and the oscillator is connected to the tap. The oscillator is as before, also, an indirectly-heated valve naturally being used.

In the detector circuit you will see there is a throw-over switch. One set of contacts joins the last beat-frequency transformer to the leaky-grid detector and on the other side a pick-up is connected. The pick-up is actually joined across a grid leak of about 100,000 ohms and when in circuit the detector valve becomes a low-frequency amplifier, one side of the pick-up going to the grid and the other to the bias battery.

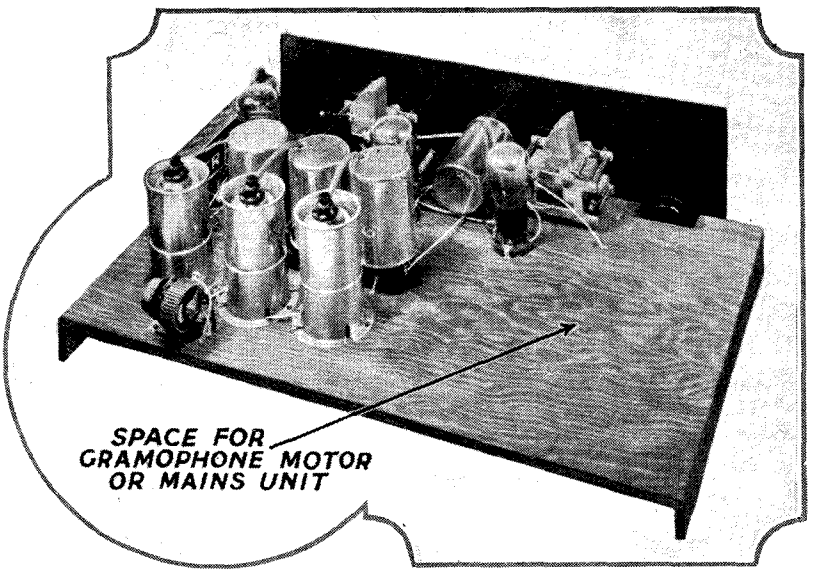
High-tension Switching

There is a further set of contacts. These are in the high-tension circuit of the valves and potentiometers before the detector and power valve. When the gramophone is being used, therefore, the high tension is applied only to the last two valves, but all heaters are connected. The advantage of disconnecting the valves and circuits not used in gramophone playing is obvious and we have a circuit that is perfectly stable.

Actually the voltage across the power valve rises a few volts when switched from wireless to the gramophone, but not enough to warrant increasing the grid bias.

A volume control is included in the set for wireless and records, taking the form of an adjustable high resistance connected across the primary of the transformer connected to the anode of the detector. A graded resistance ought to be used here, but the one shown is quite nice.

The volume control is usually, I know, put across the pick-up, but it serves a dual purpose when fitted as indicated.



COMPACT BUT SIMPLE RECEIVER LAYOUT

Here is the receiver completed, with valves and coils in position. The space on the right is for the electric motor, which hangs over the baseboard. If the set is not used as a radio gramophone the mains unit can be placed here

It was found necessary to use a very good de-coupling circuit in the detector high-tension feed. There are two resistances and two condensers of 2 microfarads each. With only one, motor-boating occurred at times, and this was avoided by fitting the two resistances and condensers indicated.

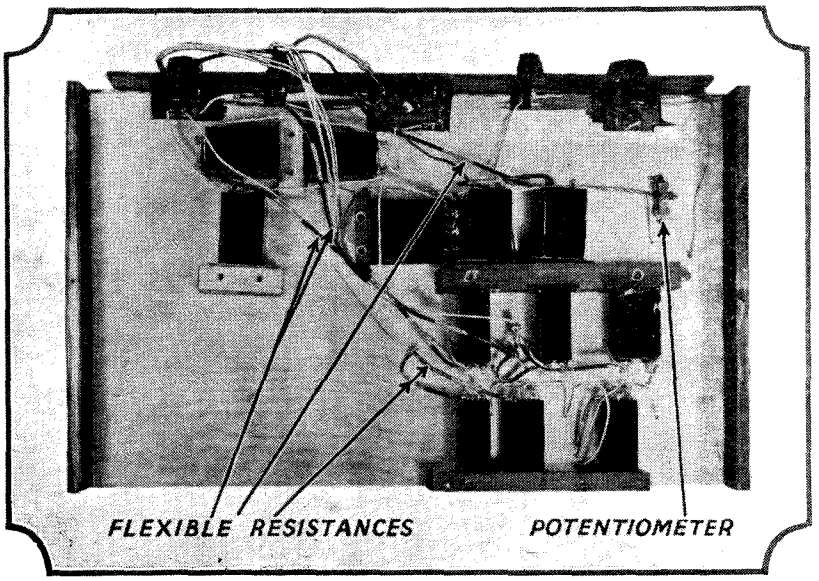
H.F. Precautions

A condenser of .001 microfarad is joined between the anode of the detector and the cathode and there is a 100,000-ohm resistance in the grid lead to the power valve. Between the anode of the power valve and the centre-tapped heater resistance is a further condenser of .001 microfarad.

You will see, therefore, that an effort has been made to stop high-frequency currents from entering the output circuit. With mains valves we have a little more magnification than with battery valves and so more precautions are necessary.

Moving Coil Loud-speaker

My loud-speaker is a permanent-magnet moving-coil, having a low-resistance coil. A step-down transformer is therefore used. The transformer is fitted by the side of the



SUB-BASEBOARD COMPONENTS AND WIRING

This photograph shows the components on the under side of the baseboard. Most of the by-pass condensers are fixed underneath, as are the flexible resistances

COMPONENTS NEEDED FOR THE A.C. SUPER 60

CHOKE, LOW-FREQUENCY
1—Varley, type DP12, £1 1s. (or R.I., Regentone).

COILS
1—Set of 4 Lewcos super-het coils, £2 10s. (or Wearite).

CONDENSERS, FIXED
1—T.C.C. .0001-microfarad, upright type, 1s. 6d. (or Magnum, Dubilier).
1—T.C.C. .001-microfarad, upright type, 1s. 10d. (or Magnum, Dubilier).
1—T.C.C. .002-microfarad, upright type, 1s. 10d. (or Magnum, Dubilier).
1—Ferranti 1+1-microfarad, type C2c, 4s. 6d.
5—Formo 1-microfarad, 12s. 6d. (or T.C.C., Dubilier).
6—Formo 2-microfarad, 19s. 6d. (or Ferranti, T.C.C.).
4—Formo 4-microfarad, £1 2s. (or T.C.C., Dubilier).

CONDENSERS, VARIABLE
2—Cyldon .0005-microfarad, log mid-line type, £1 (or Astra, Igranic).

DIALS, SLOW-MOTION
2—Astra, type 2, 10s.

EBONITE
1—Becol, 21 in. by 7 in. panel, 8s. 11d. (or Red Triangle, Lissen).

HOLDER, COIL
1—Peto-Scott triple coil base, 2s. 9d. (or Wearite, Readi-Rad).

HOLDERS, GRID-LEAK
3—Readi-Rad, 1s. 6d. (or Bulgin, Lissen).

HOLDERS, VALVE
6—Telsen 5-pin, 7s. 6d. (or W.B., Lotus).

METAL RECTIFIER
1—Westinghouse, type HT7, £1 1s.

PLUGS
5—Belling-Lee wander plugs, marked: G.B.+, G.B.—1, G.B.—2, G.B.—3, G.B.—4, 1s. 3d. (or Clix, Eelex).

RESISTANCES, FIXED
6—Lewcos 5,000-ohm flexible type, 6s. (or Magnum, Bulgin, Readi-Rad).
2—Lewcos 15,000-ohm, flexible type, 3s. (or Magnum, Bulgin, Readi-Rad).
3—Lewcos 50,000-ohm, flexible type, 4s. 6d. (or Magnum, Bulgin, Readi-Rad).
1—Lissen .5-megohm grid leak, 1s.
2—Lissen 100,000-ohm grid leaks, 2s.

RESISTANCES VARIABLE
1—Clarostat 30-ohm baseboard potentiometer, 2s. 9d.
2—Magnum 50,000-ohm potentiometers, 15s. (or Sovereign, Rotorohm.)
1—Regentstat 50,000-ohm potentiometer, 9s. 6d. (or Sovereign, Rotorohm).

SUNDRIES
Tinned-copper wire for connecting.
1—Bulgin twin fuse, 2s. 6d.
Lengths of Sistoflex sleeving.
1—Ever-Ready 16-volt grid-bias battery, 2s. (or Lissen Drydex).
1—Ever-Ready 9-volt grid-bias battery, 1s. 3d. (or Lissen, Drydex).
2—Pieces of wood, 15 in. by 1¾ in.
2—Pairs Bulgin grid-bias battery clips, 1s. 6d.
3—H. & B. valve screens, 8s. 3d. (or Peto-Scott).
Length of rubber-covered wire.
1—Bulgin needlecup, type NC1, 2s. 6d.
1—Bulgin station log, 1s. 6d.

SWITCH
1—Bulgin double-pole double-throw, type S62, 4s. 9d.

TRANSFORMER, L.F.
1—Ferranti, type AF5, £1 10s. (or R.I., Varley).

TRANSFORMER, MAINS
1—R.I. type EY19, £1 17s. 6d. (or Wearite, Regentone, Lang and Squire).

TRANSFORMER, OUTPUT
1—Ferranti, type OPM3, £1 2s. 6d.

ACCESSORIES

CABINET
1—Osborn radio gramophone, No. 218 in mahogany, £6 6s.

ELECTRIC MOTOR
1—Diehl induction for A.C. mains, £4 4s. (or Paillard, Garrard).

FRAME AERIAL
1—Dual-range frame aerial (Lewcos, Peto-Scott or Wearite).

LOUD-SPEAKER
1—W.B. permanent-magnet moving-coil, £6 6s. (or Edison Bell, Parmko).

PICK-UP
1—B.T.H. with tone arm, £2 5s. (or Edison Bell, Limit).

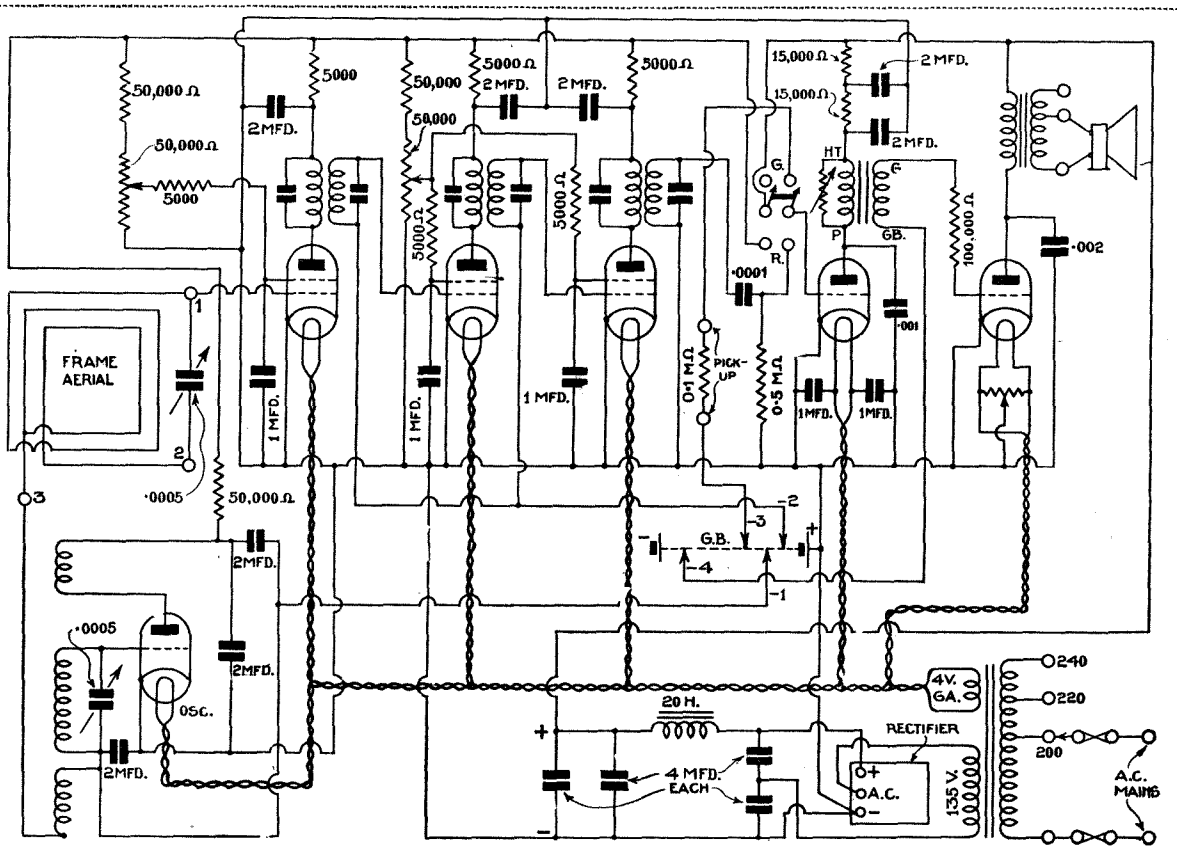
VALVES
2—Mullard S4V, £2 10s.
1—Mullard S4VA, £1 5s.
2—Mullard 354V, £1 10s.
1—Mullard AC064, 16s.

Those who do not wish to build up their own mains unit can use the special Regentone model illustrated on page 477. This unit has been specially designed for the A.C. Super 60 and costs £4 10s. (see notes on page 476)

loud-speaker in order that the low-resistance winding and coil shall be joined by the shortest wires.

It is necessary to decouple the circuits properly. Less decoupling than that used is satisfactory up to a point, but more amplification, with stability, is obtained by the complete decoupling used. There is a 5,000-ohm resistance in each screened-grid anode and grid circuit. These resistances are marked in the circuit diagram and there are six in all, of the flexible type.

Associated with them are the by-pass condensers shown. These circuits stabilise the set.



This circuit is similar in arrangement to that of the original battery model, but A.C. valves are employed and the high-tension supply is taken from a Westinghouse metal rectifier

A SPECIAL MAINS DESIGN BY W. JAMES

For controlling the amount of the high-frequency amplification, a potentiometer, joined to the screens of the screened-grid valves, is used as before. It has a resistance of 50,000 ohms and a further resistance of 50,000 ohms is included between the potentiometer and the high-tension in order to limit the amount of the voltage that may be applied to the screens.

Oscillator Circuit

In the oscillator circuit is the usual anode-feed resistance and various by-pass condensers. I have found that with a resistance of 30,000 ohms, good strong oscillations are obtained. The current is too great, however, being about 8 milliamperes with a Mullard 354 valve. With a resistance of 50,000 ohms, better results are obtained and with two 30,000-ohm resistances the oscillations produced are quite strong enough and the current is smaller, being about 3 milliamperes.

I emphasise this in order to show that the value of the resistance is not critical in any way, but the larger it is the less is the current taken. If the oscillations are too weak the signals are not as strong as they might be, but as the oscillations are increased in strength beyond a certain point the hiss becomes stronger.

With a value of 50,000 ohms I obtained the best all-round results.

You will notice that a pair of 1-microfarad condensers is used across the heater and cathode circuits. These condensers stabilise the circuit and must be used.

There is absolutely no hum from the set. All the heaters are connected together, taking 6 amperes in all at 4 volts. The transformer winding has a centre tap which can be used, or a resistance having a centre tap may be joined across the heater circuit as indicated.

A voltage-doubler rectifying circuit is employed in the usual way with a pair of 4-microfarad condensers. Then there is the choke and an 8-microfarad output condenser. The mains part is arranged on a base which is afterwards screwed to a convenient part of the loud-speaker portion of the cabinet. Being self-contained, the mains apparatus is easily built and wired.

It was necessary to arrange the set to one side of the base in order to avoid the electric gramophone motor, and, in order to make the various connecting wires to the by-pass condensers and resistances as short as possible, these have been placed below the base. Thus the set is to be divided into four parts.

First is the gramophone motor board, upon which is fitted the motor and pick-up.

Fixing Motor and Pick-up

Below comes the set itself. The third part is the mains unit and then we have the moving-coil loud-speaker with its input transformer. The motor and pick-up are best fitted according to the makers' instructions in the positions indicated. Care must, of course, be taken to see that the turntable is level and that the pick-up tracks correctly.

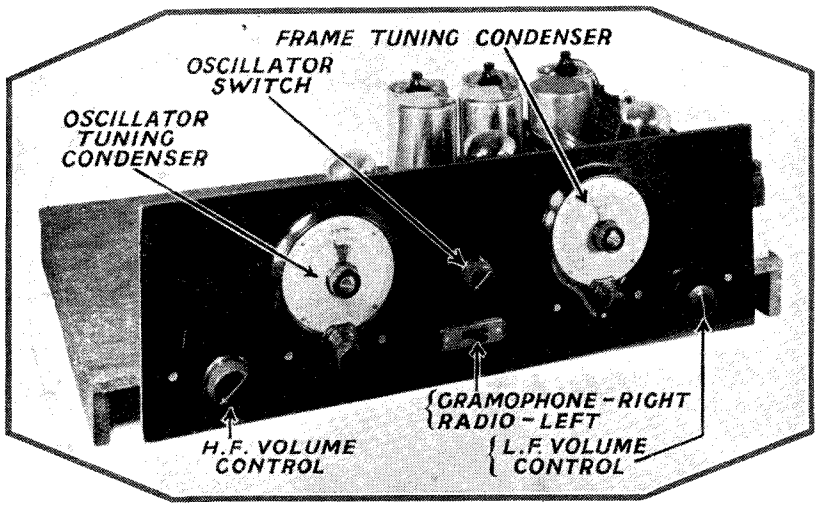
It is easy enough to fit the loud-speaker and also the mains unit.

Look out for a further article on this set by W. James in the next issue of "W.M."—it will be out on June 24

HANDSOME PIECE OF FURNITURE

This photograph shows the complete A.C. Super 60, the radio gramophone that W. James uses at home. Note the fine appearance of the Osborn "Queen Anne" cabinet. The frame aerial is placed on a small bracket on the outside of the case

THE A.C. SUPER 60—Continued



SIMPLE AND ACCESSIBLE CONTROLS

Nobody will have any difficulty in operating the set after a glance at this photograph of the front panel. A mains switch is inserted in the lead to the power socket

The set itself is a little more difficult to construct, as there are a number of holes in the base through which the connecting wires pass.

Laying Out the Panel

To begin the work, lay out the panel. There are the two tuning condensers to be fitted, two potentiometers (one being connected as an adjustable resistance), the oscillator coil unit and the radio-gramophone switch. With these parts arranged, fit the baseboard, cutting it away when necessary to clear the potentiometer and other parts on the panel.

On top of the baseboard fit the valve holders, coil holder, transformer, grid leaks and other parts, including the frame-aerial connecting strip.

Having completed this, drill a number of holes through the baseboard for the various connecting wires. There are holes for the heater wires and for the cathodes.

Fixing By-pass Condensers

Then turn the baseboard over and fit the condensers in position, using small blocks of wood or brackets if desired. Notice when you fit the condensers that no holes are covered.

The wiring of the set is easy enough. I have used No. 22 tinned-copper wire, with Sistoflex for most connections and No. 18 tinned-copper wire for the heaters. The heater wires are twisted below the baseboard.

It was convenient to connect one end of the wires going to the switch and the potentiometers on the panel before fitting the panel to the baseboard.

Note that the valve covers are connected to the cathode circuit.

Flexible resistances joined below the baseboard must be taken, where necessary, to a bolt and have a connecting wire, as they are not long enough to reach between the terminals. Afterwards the bare points should be covered with tape in order to insulate the joints from the cases of the condensers and other parts.

There are a number of grid-bias wires which can be cut to the right length and have plugs fitted at the battery ends and there are other flexible wires for the power circuits. Use a pair of heavy flex wires for the heater circuits, as these wires carry 6 amperes. There are three other flexible wires, one for the high-tension negative, another for the positive wire to the switch, and the third goes from the anode terminal of the power valve.

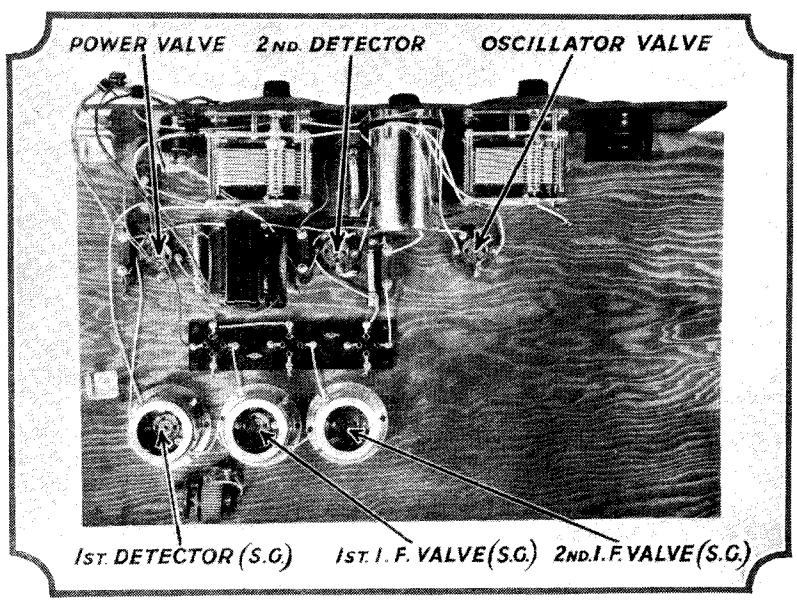
Additional Wires

These wires will have to be passed through holes made in the bottom of the receiver portion of the cabinet. Then there are three wires for the frame aerial, which is fitted to the side of the cabinet, and two more for the pick-up. You will see that the pair of pick-up wires go to a 100,000-ohm grid leak.

It is necessary to use the right valves in this set, or you may find the magnification is too great.

For the first detector I use a Mullard S4VA, a screened-grid valve of 430,000 ohms, with a slope of 3.5. In the two beat-frequency stages are two S4V valves of 900,000 ohms and a slope of 1.1. The second detector is a 354V, and a valve of this type is also used in the oscillator. In the power stage fit an AC064.

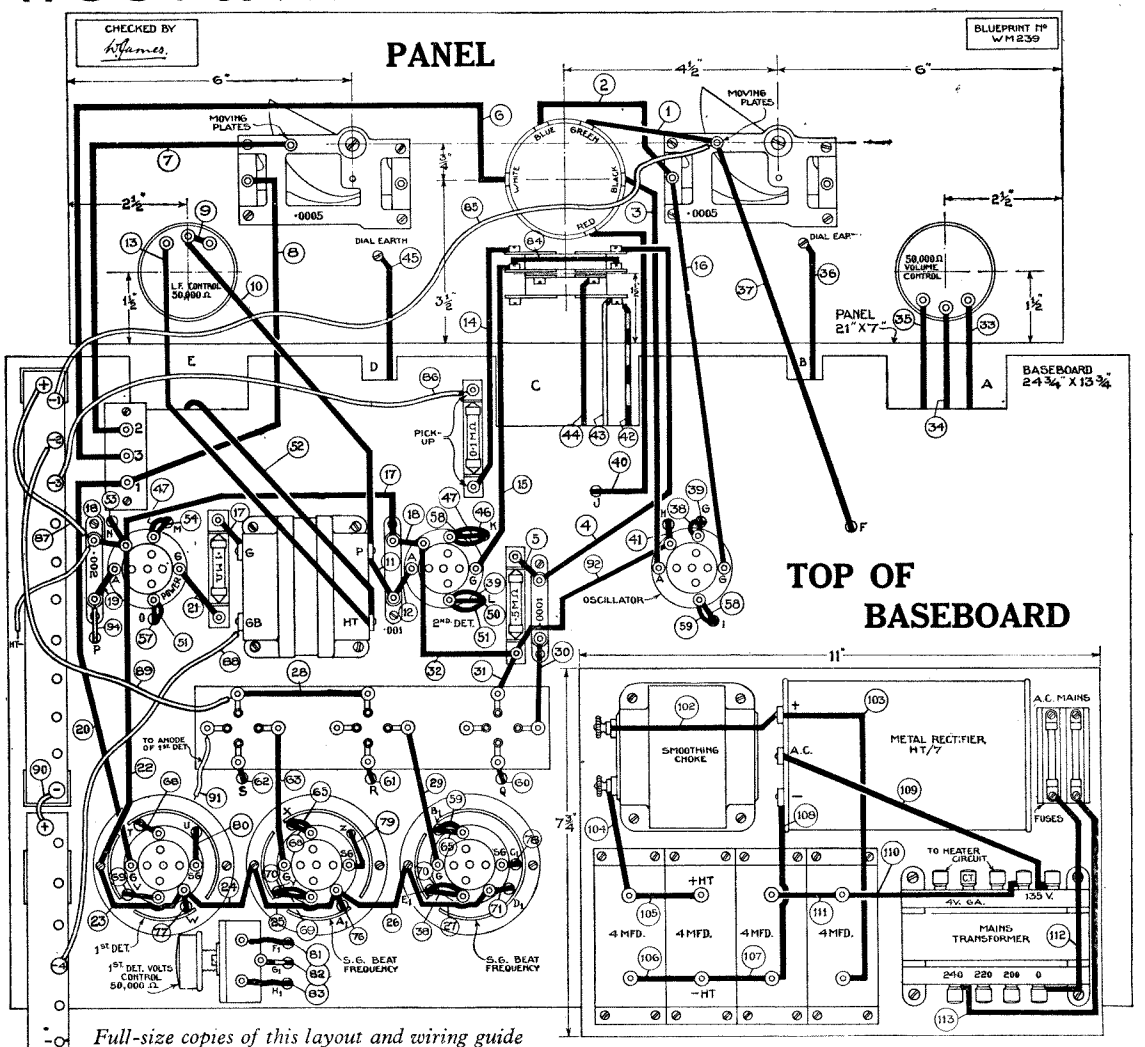
The grid bias for the first detector



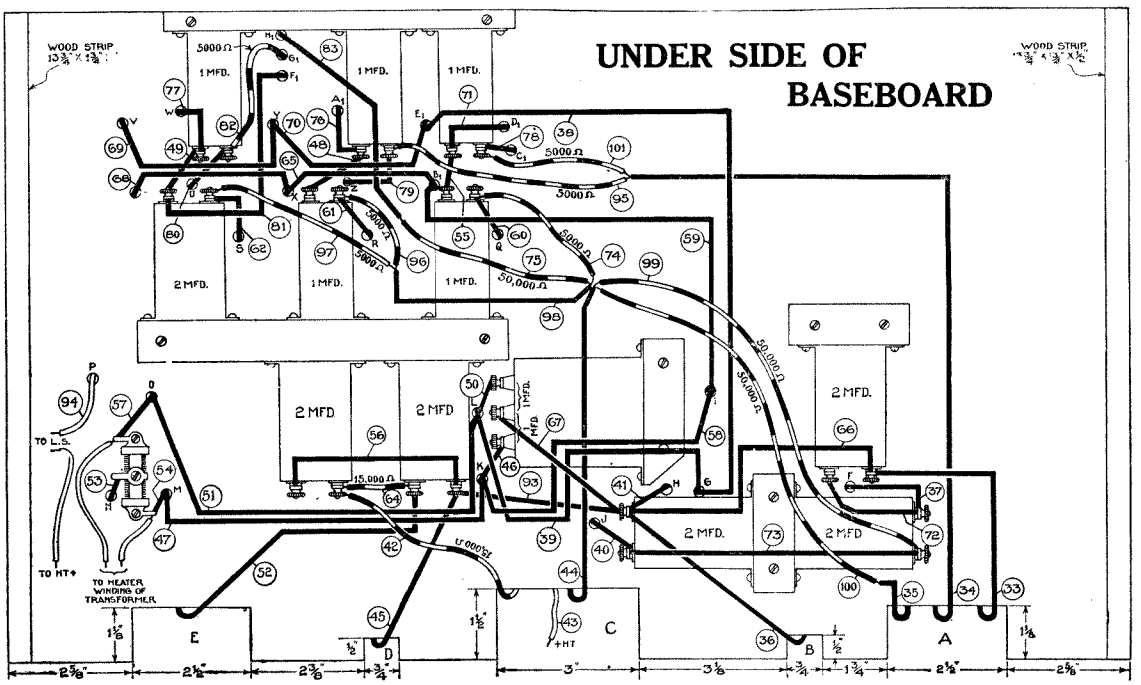
TOP-OF-BASEBOARD LAYOUT

Here you see the positions of the various parts mounted on the top of the baseboard. The space on the right is for the gramophone motor or mains unit

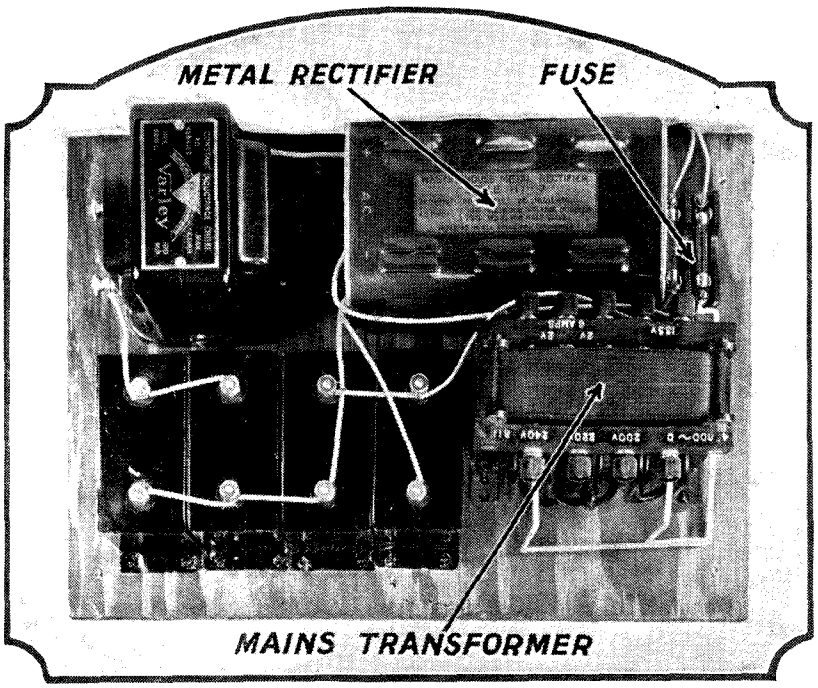
LAYOUT & WIRING GUIDE OF A.C. SUPER 60



Full-size copies of this layout and wiring guide can be obtained for half price, that is, 9d. post free, if the coupon on page 552 is used by June 30. Ask for No. WM239. Each wire is numbered separately and wiring holes in the baseboard are indicated by means of small letters



THE A.C. SUPER 60—Continued



PLAN VIEW OF THE MAINS UNIT

This photographic plan view shows the simple construction of the A.C. mains unit. If desired the complete Regentone unit illustrated on page 477 can be used

(S4VA) can be either 1.5 or 3 volts negative, preferably the latter va'ue, with the screened-grid potentiometer adjusted to suit. It is about full on when the bias is —3 volts and half on for —1.5 volts bias.

Other Bias Values

For the two beat-frequency stages (S4V valves) use a bias of —1.5 volts. Use —3 volts for the oscillator and also the pick-up, although a separate wander plug is fitted so that 4.5 volts can be tried. A bias of —21 volts or a little more is needed for the power stage.

When you first switch on you can try the gramophone in order to see that the last two valves are working properly. Note the volume control joined across the transformer and fitted on the right-hand side of the panel. This may be used to adjust the volume.

Operating the Set

When tuning wireless signals proceed exactly as for the Super 60.

It is necessary to adjust the potentiometer connected to the first detector, and so the set must be tested before it is fitted to the cabinet. The control is not critical and when it is set there is no need to alter it.

The use of S4V valves may occasion surprise. You can use S4VB valves, but the amplification is greater and reception is not so quiet. The bias for the two valves would have to be —3 volts.

I have tried the S4VB valves and went back to the S4V type, as the reception is quiet with the S4V valves, the volume is more easily controlled, and the selectivity is better.

In comparing the results obtained from this set and the Super 60, I find the selectivity appears to be definitely better, more stations are received, and the quality is better as well. Naturally the volume is much greater.

No Hiss or Hum

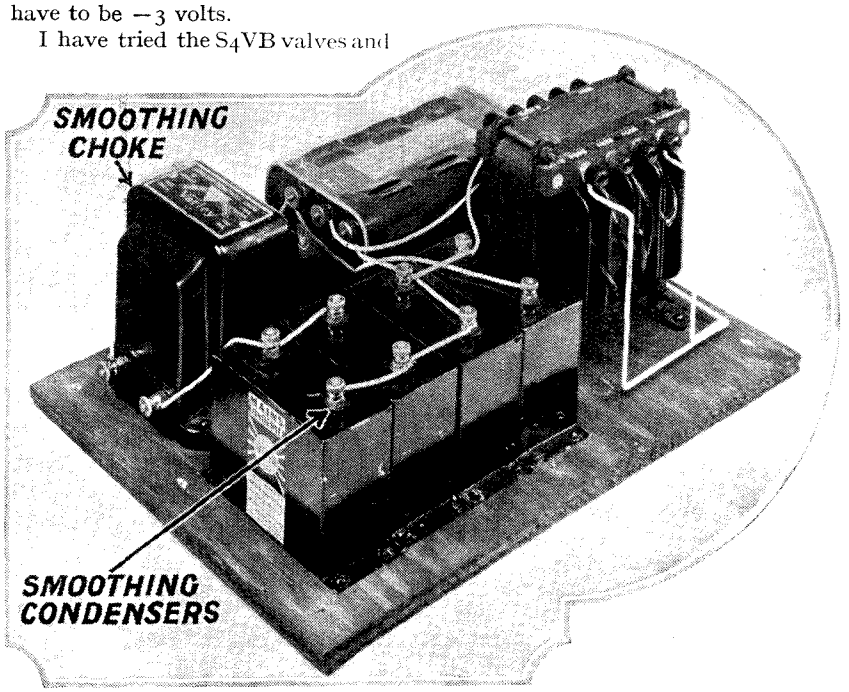
The two sets are equally easy to handle and the A.C. model is perfectly quiet when no signals are being received. There is not a trace of hum and hiss is absent.

This receiver is a very fine one : so many stations can be received, with good quality, and the gramophone part will appeal to many. It may be built by anyone, there being no snags and no difficult constructional work or adjustments.

SPECIAL NOTES

THIS article has been read by a number of friends and I have had a few questions put to me which I will deal with here.

The first is about the mains part. This has been made up as a separate unit. It can, therefore, be placed in a



ANOTHER VIEW OF THE MAINS UNIT

The unit comprises a mains transformer, metal rectifier, smoothing choke and four 4-microfarad fixed condensers

THE SET W. JAMES USES AT HOME!

convenient position in the loud-speaker compartment in the set described, or those who build the set without the gramophone motor will be able to place it in the space on the left-hand side of the baseboard of the set.

The unit comprises the mains transformer, rectifier and smoothing choke and condensers. Instead of making this unit a manufactured one may be obtained from the Regentone Co.

Mains Components Not Needed

The following parts will then not be needed: Mains transformer; Westinghouse HT7 rectifier; low-frequency choke; four 4-microfarad condensers; and fuses.

The Regentone unit is connected exactly as the unit described, there being only the heater wires and the high-tension supply wires to be taken to the set. All the voltage-dividing resistances and de-coupling circuits are included in the set itself so that the mains unit is called upon to supply 4 volts 6 amperes for the heaters of the valves and 200 volts at about 30 milliamperes of smoothed high-tension for the anode circuits.

Other Valves to Use in the Set

A further question was about the valves used. I have now several makes and am choosing the most suitable types for the set. These will be given in the next number. Any valves cannot be used, but only those having satisfactory characteristics for the set. Those recommended in this issue are the most suitable, but it should be possible to choose equally good sets from other makes.

The arrangement of the frame aerial is largely a matter for the individual. Personally, I prefer to have the frame at the right-hand side mounted on a bracket. The leads are quite short and the frame is in a convenient position. Anyone could mount the frame at the back of the cabinet where it is out of sight and some may prefer to fit it in the loud-speaker compartment. A means for moving the frame could easily be fitted if desired. Holes must, of course, be provided in the side of the cabinet or where necessary for the three wires connecting the frame and set.

Do not forget to send us your report on this fine set as soon as you have built it—and look out for further notes by W. James next month

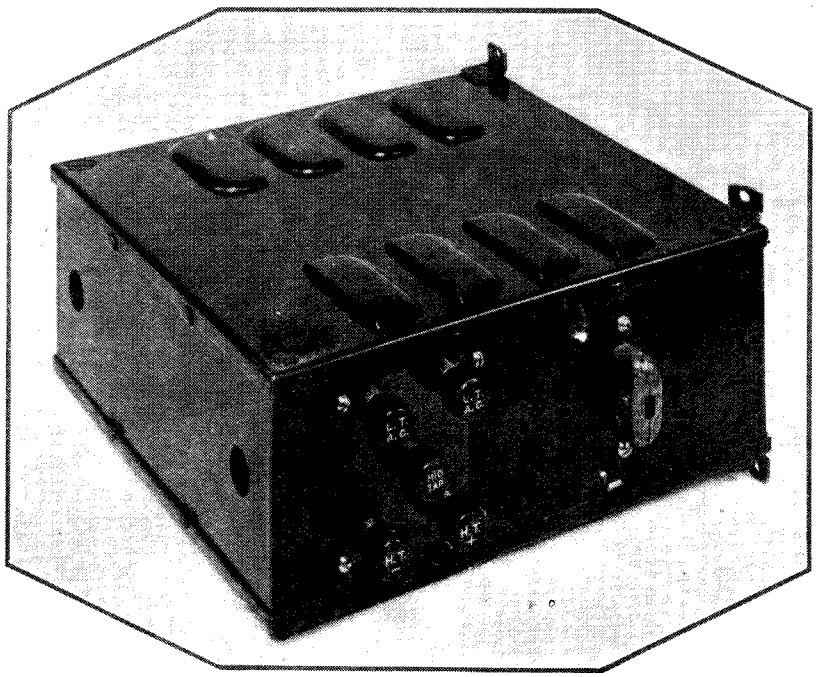
I have also been asked whether it is possible to provide grid bias in the set and to dispense with the grid batteries. It is, of course, possible, but I have avoided doing so in the interests of simplicity. A grid battery is good for at least six months and is therefore no great trouble.

To set up grid bias in the set would not be too easy for the less experienced builders of this set. As it stands the building is easy and there are no snags. With grid bias arranged in the circuits of the set there are more chances of failure.

Electric Motors

There is plenty of room in the set, I believe, for practically any type of electric motor. The makers' instructions regarding fixing should be carefully followed and this also applies to the pick-up. Having an automatic stop and start switch no further switching is necessary, but a separate switch would be necessary if a motor without these features was used.

W. JAMES.



COMPLETE MAINS UNIT READY FOR USE

This photograph shows the special Regentone mains unit designed for the A.C. Super 60. It costs £4 10s. and can be used in place of the home-built unit

TEN SUNDAYS WITHOUT BACH!

In these notes Our Special Commissioner reveals that from June 28 to August 30 there will be no broadcasts of Bach Cantatas. We believe that Whitaker-Wilson (the "W.M." Music Critic) is the only listener who will miss them!

THE Sunday programme malcontents will no doubt hail with delight the news that for a whole ten weeks—from June 28 to August 30, inclusive—they are to be relieved of the Bach cantata "infliction."

It is ironical that almost at the moment when Leipzig, which was so closely identified with Bach's life and labours, should at last decide to include a series of the great master's cantatas in its Sunday broadcast programmes and to relay them to other German stations, the B.B.C. should be giving them a long rest.

Beyond Controversy

When these cantatas were inaugurated by the B.B.C., in May, 1928, it was thought that the experiment would be beyond controversy; for the cantatas occupy a place that is quite unique in music.

It is believed that as a series they had never been publicly performed in their entirety in this country, or, indeed, anywhere since they were heard under Bach's own direction two centuries ago.

When the B.B.C. originated the series one cantata was given once a fortnight from London, under the direction of Mr. Stanford Robinson, and those on alternate Sundays were undertaken by the Birmingham station, under the direction of Mr. Joseph Lewis, and the Glasgow station under Mr. Carruthers.

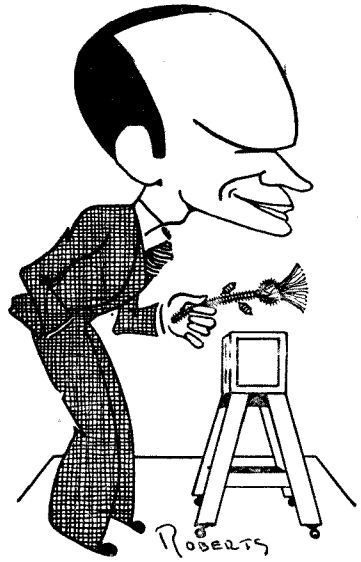
Varied Combinations

The orchestral combinations in the cantatas are so varied that these transmissions, judged as musical efforts, have been among the outstanding performances in broadcast programmes, although it is quite likely that their appeal, even in this direction, has not been fully comprehended by numerous listeners.

When, however, it is stated that some of the instruments are used in such a way that only the very best performers can do justice to them, it may be appreciated that the B.B.C. has expended a good deal of care on the presentation of the works.

Probably some people were unnerved at the thought that more than two hundred cantatas, given at the rate of one a week, with a pause of a few weeks each summer during the holiday season, would mean some five years of Bach cantatas; and in these days of constant change and almost frantic search after novelty, it may have been that the very title of cantata assumed a degree of monotony which accorded ill with the popular *penchant* for more superficial entertainment.

Be that as it may, whenever the critics have cavilled at Sunday programmes on the score of dullness, they have invariably headed their catalogue of complaints with a gibe at the Bach cantatas.



A COMEDIAN YOU KNOW
Neil McKay, the Scots comedian, is a frequent broadcaster

Meanwhile, the German broadcasting officials have been listening to Britain and, in spite of the views of British listeners, have seen fit to embark upon a similar enterprise to the B.B.C.'s.

German Experience

The latter body will follow with interest any reaction that may take place amongst the German listening public and while the present intention is to revive the performances in this country on September 6, Savoy Hill will be to some extent influenced by the German experience.

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Music is the common property and common enjoyment of mankind. When the Director-General of the B.B.C. made use of this phrase, he had in mind that through music we come nearer to the ideal of nation speaking peace unto nation than is possible by the transmission of multilingual speeches which are only understood by a minority of listeners.

But even in the expression of a universal sentiment through a common medium, care must be taken not to obtrude the narrow prejudices which might destroy any good that would otherwise accrue. Music can be made to reveal these prejudices just as much as the spoken word.

Improving the Mind

Broadcast music must cope effectively with the eternal problem of improving the mind of the hearer. Its progressiveness must be kept to the fore in broadcast policy. It is bound to follow a policy of collaboration, which must be accepted from foreigners equally with Britons.

It must neither seek to impose on listeners all-British nor all-foreign neither all-modern nor all-classical

programmes. Its objective must be the creative and not the academic. This is where the B.B.C.'s duty of providing efficient musical programmes should develop more fully and the academic interests should be opposed.

Impartiality

It is wrong to insist that there is no public for ultra-modern music, for it is no part of the B.B.C.'s work to din the product of any particular school into the ears of listeners. Stravinsky and Bax must be given a show, as well as Wagner and Beethoven. It is just as nonsensical to say that there are no first-class British composers of straight music and no modern music worth hearing as it is to assert that the best dance tunes and dance bands come from America.

In the music of all nations some-

A CHILD IMPERSONATOR
Melanie Castel's child studies are a popular variety feature

thing worth while exists and it is the task of the B.B.C. to unearth it for the benefit of all who listen.

This is a brief outline of the musical policy which the best musical minds of Savoy Hill are aiming to put into operation, in spite of the musical Chadbands who see nothing good in the modern or the British methods of expression; it is one of those little dissensions going on behind the scenes about which the general listener hears very little, although he is, in the result, either the victim or the beneficiary.

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On the subject of broadcast music, it must be said that the disciples of an academic policy, an opportunist policy, a subversive policy, or whatnot, obviously do not constitute the whole body of listeners.

Quite recently one listener addressed the B.B.C. in heroic language, urging the Corporation not to be afraid of the man who can't stand anything that hasn't a "tune" in it.

"Make it clear to him," admonished the writer, "that he has got to 'have it.' Don't placate him because you are afraid of losing his ten shillings a year. You have a monopoly and your word is law. And don't apologise if you broadcast an opera or a symphony. It is not a thing for which to apologise; it is a thing for which to slap yourselves on the back—good and hard."

All this sounds very like a policy of ruthlessness; but to follow the line suggested in the manner suggested would not be in very good taste. The B.B.C.'s mission, as the Music Department itself sees it, is to cover the widest field possible and to hold no restrictive views as to what makes a popular broadcast.

If at one time a symphony programme is the fare, the lover of jazz is remembered in another programme. Walton, Ireland, Longstaffe and Harry Pepper—with Elgar, of course, are accommodated, as well as Bach, Brahms and Beethoven. It would be a sorry day for broadcasting if any one of these were barred because of sectional feeling.

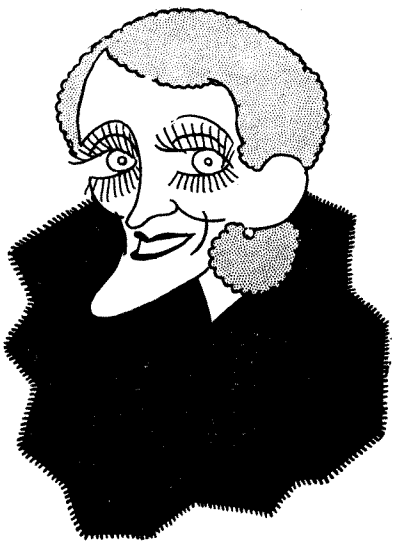
Another listener recently wrote a rather vague letter, in which he said: "I do not know whether it is so or not, but latterly there seems to be a growing amount of chamber music in the programmes."

He went on to indite a protest against something with which he would have disagreed had it existed in fact; and although he had merely persuaded himself to an impression, which may or may not have been a genuine impression, it was sufficient to prompt him to concentrate an attack on chamber music *in toto*.

What Editors Learn

Perhaps a ruthless reply might have been excused in such a case; but the B.B.C. is learning what all editors have learned long since, namely, that it takes all sorts to make a world. The programme official must be tolerant of public opinion, hoping by that means to encourage a tolerant public opinion towards himself.

Meanwhile Savoy Hill may be pardoned a little self-satisfaction over the



A POPULAR ACTRESS
Jeanne de Casalis broadcast recently in a vaudeville progamme

increasing demand among Continental broadcasting stations for British musical programmes.

These, as Mr. Arthur Burrows, Secretary-General of the Union Internationale de Radiodiffusion, pointed out when he was in London recently, are now being relayed for rebroadcasting by stations two-thirds of the way across Europe, and there is already on the Continent a greater general respect for British music and the standard of British musical performance than at any other time.

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Sir John in U.S.

Sir John Reith's visit to New York at the joint invitation of the Secretary for the Interior, Mr. Wilbur, the President of the Radio Corporation of America, Mr. Owen D. Young, and the National Council for Broadcasting and Education, is another sign that international attention is focused on the B.B.C.'s attempt to use its powers towards the improvement of listeners' outlook and training.

If the United States was the pioneer in broadcasting, Great Britain made the pioneer effort in establishing a definite educational policy in broadcasting.

The Director General of the B.B.C., in explaining precisely to the first National Assembly of the National Advisory Council on Radio and Education what has been so far achieved in Great Britain, avoided the temptation to persuade his American hearers to proceed along similar lines.

WE TEST BEFORE YOU BUY

A Feature for Set-buyers Conducted by the "Wireless Magazine" Set Selection Bureau

A DESCRIPTION of how we put factory-built sets through what might be termed "user" tests will undoubtedly assist readers to appreciate the reports in the following pages.

Here let us emphasise the fact that, apart from certain laboratory tests to elucidate information for our own use, the more important tests relate to how the set behaves under normal domestic conditions.

Listeners' Wants

We feel that in this way the prospective set-buyer is more likely to learn from our reports whether any particular set fulfills his requirements. After all, the set-buyer of to-day does not go into his dealer's shop armed with deep technical knowledge; but the intelligent listener certainly knows what he wants in the way of easy control, inexpensive running and so on.

One of the first things we note about a set is the power supply with which it works. If the set is for mains operation, it may be designed for either A.C. or D.C. supplies. Our laboratory A.C. supply can be varied from 100 to 250 volts. Our domestic supply is 205 volts A.C. There is also available a 210-volt D.C. supply.

A considerable number of set-users are still without the convenience of an electric-light supply and must therefore resort to batteries to run the set. We have on hand every type of dry-cell high-tension battery from the standard-capacity to the super-capacity type.

One of the first things we determine about a set is its power consumption. If the set is for mains operation we find out how many watts are consumed as this gives an indication of the running cost. The A.C. sets are much less expensive to run than the D.C. sets. A two-valve A.C. set takes about 20 watts and a three-valver 30 watts. A three-valve D.C. set usually takes about 100 watts on a 200-volt supply.

If the set is for battery operation we find out the total anode-current consumption when the set is in operation by inserting a milliameter in the negative high-tension battery lead.

This provides us with a figure from which we can say whether a standard-, double- or treble-capacity battery is required for economical operation. Up to 7 milliamperes we recommend a standard battery, between 7 and 12 milliamperes a double-capacity, and over 12 milliamperes a treble-capacity battery.

The valve combination is next considered, for this largely determines the degree of sensitivity and selectivity possible. Thus a detector and one low-frequency-valve circuit can be expected to provide only the local stations at good loud-speaker strength. More distant stations can be expected at times, but only assuming good reception conditions and a certain expertness on the part of the operator.

A three-valve combination consisting of one high-frequency stage, a detector, and one low-frequency stage can be expected to provide a selection of foreign stations at loud-speaker strength, but the selectivity is sometimes insufficient to cope with conditions prevailing within 20 miles of a regional broadcasting centre.

Controls on the set have our particular attention and we try to view them from the standpoint of the user. Sometimes we have to reject the set because its controls are unnecessarily critical or mechanically poor in action. This does not often happen in these days when manufacturers realise how important is ease of control for non-technical users.

The tuning control must be able to be readily adjusted to the stations within range. Reaction, if present in the set, must be applicable smoothly and in a way that definitely builds up distant stations. Volume control must be so arranged that the strength of local signals can be cut down to normal requirements, and without affecting the quality of the reproduction.

Selectivity and sensitivity are by no means easy criterions by which a set may be judged. So much depends upon the locality in which the set is to be installed. Thus a set providing sufficient selectivity at our distance from Brookman's Park to separate the two alternative programmes might be hopeless when used within five miles of Brookman's Park.

An Assumption

In this connection we work on the assumption that the bulk of set-buyers are outside the immediate vicinity of powerful transmitters such as Brookman's Park or Moorside Edge. This is justifiable, since such transmitters are intentionally placed in unpopulated areas.

When testing two-valvers we expect to be able to separate the two alternative programmes without difficulty. For this test we use the standard 60-foot aerial.

MAGNUM "SUPER 60"

Built to "Wireless Magazine" Specification

Makers: Burne Jones & Co. Ltd.

Price : £18 10s., complete with valves, aerial, cabinet and royalties paid.

Power Supply : Batteries.

Power Consumption : 12 milliamperes total anode current. This means that for economical working at least a double-capacity high-tension battery is required.

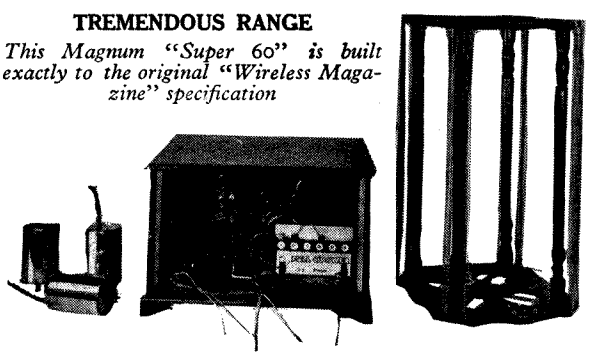
Valve Combination : Altogether there are six valves. Of these, four precede the detector. There is a first detector working on the anode-bend principle and this, in conjunction with the oscillator valve, serves to change the incoming signals' wavelength to 2,400 metres.

Following the detector and oscillator valves are two stages of high-frequency amplification, coupled with band-pass coils tuned to 2,400 metres. Following these high-frequency valves, which are of the screened-grid type, is the second detector valve, which is transformer coupled to the output power valve.

This combination of valves guarantees very considerable amplification before detection and the use of the special band-pass coils ensures an order of selectivity far higher than can be obtained with the normal four- or five-valve set.

TREMENDOUS RANGE

This Magnum "Super 60" is built exactly to the original "Wireless Magazine" specification



Controls : Constructor readers will recognise in the Magnum super-het described here the familiar layout of W. James' Super 60. Indeed, the set under review is simply a commercial interpretation of the constructional details already published in this magazine.

This set will appeal particularly to those who have no wish to make their own Super 60, but who do wish to take advantage of the extraordinary performance of this new type of set.

For those unacquainted with the Super 60, a brief description of the controls of the Magnum set is given. There are two main tuning controls, worked by slow-motion dials reading from 0 to 180 degrees. The left-hand control is marked "oscillator" and the right-hand control is marked "tuner." The oscillator condenser worked by the dial on the left tunes a special oscillator coil and the condenser worked by the right-hand dial tunes the frame aerial mounted on top of the set.

These two controls are interdependent. Firstly, one moves the oscillator control a degree and then this is followed by a slight adjustment of the frame condenser. The two dials are not, therefore, rotated simultaneously.

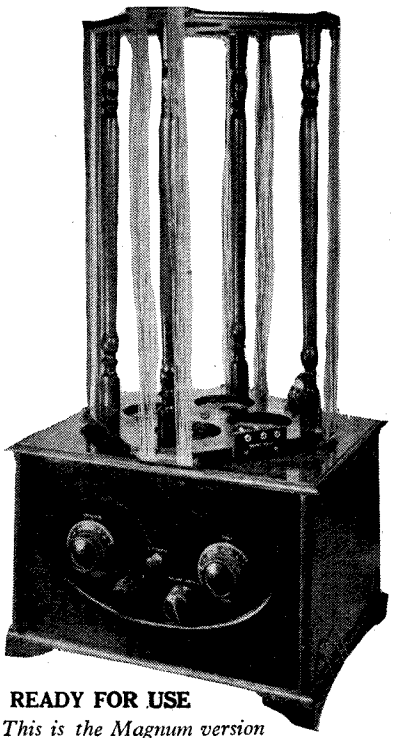
We found it particularly easy to locate the correct relative positions of the two tuning dials by setting the left-hand dial to the 100-degree mark and then swinging the right-hand dial backwards and forwards until a characteristic rushing noise was heard at one particular setting.

Subsequent searching for other stations was very simple. Apart from these two main controls there are three subsidiary controls. Near the oscillator dial is a large knob with three positions for short, medium and long waves. This knob controls a switch on the oscillator coil, and must be worked in conjunction with the three-point plug of the frame aerial, which is wound for medium and long waves.

An extremely useful control, in fact an essential control, is the knob varying the sensitivity of the screened-grid valves. This is mounted near the frame tuning condenser. With this potentiometer form of control we found reception of the widely varying signals within range greatly improved by the ability to even up the volume output.

It is noteworthy that in the reception of most of the more powerful foreign stations this volume control had to be turned towards its minimum, indicating that, even though a frame aerial is used for reception, this set has a very great reserve of power.

The only remaining control is the low-tension switch mounted in the centre of the control panel. From an evening's test we should say that every listener should be able to grasp the essentials of operation of this set within an hour or so. Although selectivity is quite exceptional, the setting of the tuning controls is certainly not critical.



READY FOR USE

This is the Magnum version of W. James' "Super 60," sold as a complete commercial receiver

Sensitivity : If we say that this Magnum product comes up to the standard to be expected from a Super 60 we are saying a good deal. The set behaved admirably, bringing in all the worthwhile distant stations of Europe at full loud-speaker strength. This applies to both medium and long waves. The great sensitivity of the super-het circuit is fully demonstrated in this Magnum set.

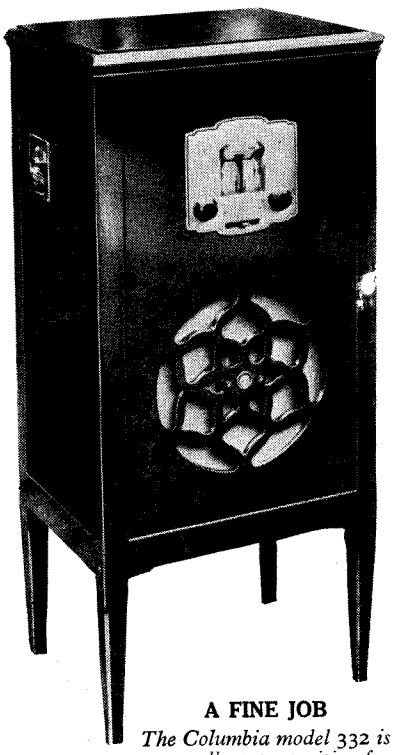
Selectivity : As readers will agree, the selectivity of the Super 60 circuit is probably its most remarkable feature. So we were not surprised to find that, when testing the Magnum set, we were able to bring in Muhlacker quite clear of London Regional. Another noteworthy feat was the reception of the new Swiss station, Sottens, quite clear of the Midland Regional transmission.

On the long waves we were able to get Zeesen perfectly free from Daventry and Radio Paris, showing that the good selective properties of the set are well in evidence on both wavebands.

Quality : This set, like all Super 60 sets, is capable of fine quality of reproduction, provided that a suitable power valve is chosen and that the proper anode and grid-bias potentials are applied. No doubt the band-pass coils have something to do with the fact that, in spite of the amazing selectivity, there is no appreciable loss of high notes. Tested with a linen-diaphragm type of loud-speaker, the overall response of the Magnum set was pleasing.

Summary: Readers should understand that this Magnum six-valver is a built-up assembly following in every detail the specification of the Super 60 published by W. James in WIRELESS MAGAZINE. The price includes everything except the high-tension battery and low-tension accumulator. These batteries ought to be of the double-capacity type in order to obtain economical running costs. The quality of reproduction given by this Magnum Super 60 justifies the use of a first-rate loud-speaker, such as a moving coil or linen diaphragm. We specially recommend this set to set-buyers troubled with local station interference. Although the set's outstanding feature is selectivity, the sensitivity is no less remarkable.

COLUMBIA MODEL 332 CONSOLE



A FINE JOB

The Columbia model 332 is an excellent proposition for those who want a complete all-electric set

Makers: Columbia Graphophone Co., Ltd.

Price : 23 guineas.

Power Supply : A.C. or D.C. mains, 200 to 250 volts.

Power Consumption : On the basis of 6d. a unit the A.C. model 332 costs only ¼d. per hour and the D.C. model ½d. per hour.

Valve Combination : The first valve is a screened-grid high-frequency amplifier, the second valve is a leaky-grid detector and the third valve is a pentode power valve.

This combination provides a considerable amount of amplification for both near and distant stations, but usually a short aerial must be used with this combination, otherwise sufficient selectivity to separate the various stations within range cannot be obtained.

In this Columbia A.C. console the screened-grid and detector valves are of the 4-volt indirectly-heated type and the pentode output valve is directly heated at the same A.C. voltage as the first two valves. There is another valve, but this is used to convert the A.C. supply into a direct source of anode current for the receiving valves. This rectifying valve in the model tested is a DW8 type.

Controls : As we have learned to expect from Columbia products, the controls of this three-valve console are neatly arranged. There is a central escutcheon plate mounted at the top of the front of the cabinet. On this are mounted two tuning scales side by side, so that both can be rotated with the thumb.

To the left of the tuning device is what is called an intensifier, in reality a pre-detector volume control. To the right is the reaction control. Between the intensifier and the reaction control knobs is fitted a neat switch moving in a horizontal direction and having three positions, to switch the set for medium-wave reception, gramophone reproduction and long-wave reception.

On the left-hand side of the cabinet is mounted a smaller control panel carrying the selectivity control, which is a series aerial condenser, the mains on-off switch and socket connections for the aerial and earth wires. These wires are, with the mains flex, the only external connections. Everything else, the three-valve set, mains equipment and large balanced-armature cone loud-speaker, is contained within the neat and attractive oak cabinet.

The tuning scale of the condenser associated with the high-frequency coupling is calibrated in wavelengths and the aerial condenser scale next to it is marked in degrees from 0 to 100. On the medium waves the calibrations go from 225 to 540 metres in steps of 25 metres; on the long waves the dial is calibrated in steps of 100 metres from 1,000 to 1,900 metres. We found these calibrations quite accurate enough to enable distant stations to be found with ease.

From tests we learn to appreciate the fact that the actions of the intensifier, reaction, tuning and selectivity controls are largely inter-dependent. It is no use operating one of these controls without reference to one or two of the others.

The actual tuning operation is quite simple, because once the relative positions of the two dials have been found both can be simultaneously rotated. Operation of the remaining controls is quickly grasped if one carefully studies the instruction booklet, which is concisely worded.

Selectivity : This attribute of the set depends to a great extent upon the proper use of the aerial condenser and intensifier control. At our distance from Brookman's Park the National and Regional programmes overloaded the set when the intensifier control was at its maximum position. Completely satisfactory elimination of these stations was found possible when the intensifier control was moved half-way towards its minimum position.

Under this condition, and with the aerial condenser also set at its mid-way position, the London Regional had a 30-metre spread, so that Strasbourg below and Toulouse above were received clear of the local.

Another satisfactory result was the reception of Sottens clear of the Midland Regional. On the long waves the need for a careful use of the intensifier was still more apparent. Eiffel Tower and Radio Paris were both received clear of the intervening Daventry station, which shows that this console set's selectivity is up to the standard to be expected from a three-valve circuit.

Sensitivity : As the test of this set was carried out after Summer Time had come into force, our log of stations was especially interesting, since at this time of year the inherent capabilities of a set are more obvious than in the winter, when distant signals come in strongly on almost every set.

We were agreeably surprised to find so many of the more powerful European stations, such as Brussels No. 1, Langenberg, Rome, Sottens, Strasbourg, Goteborg, and Hilversum, coming in before dark on this set. The sensitivity with the intensifier at its maximum is very considerable, but some loss of amplification naturally follows when the set is made sufficiently selective to separate the many stations available.

This set is very sensitive on long waves. Huizen and Radio Paris often work when Daventry is closed and both stations are strongly heard on the Columbia Console. Selectivity is adequate for this reception.

Quality : Columbia seem to have discovered the secret of getting very pleasing reproduction from the balanced-armature cone type of loud-speaker. Possibly the larger size of the console cabinet, as compared with the normal loud-speaker cabinet has something to do with the absence of "boxiness" in the reproduction. And no doubt the pentode valve gives a brilliance that might be absent with a low-impedance power valve. Whatever the cause, the reproduction of this Columbia console is very pleasing indeed. Speech especially is notable for its clarity.

Appearance : The oak cabinet of this console is very attractive and neat. The only externals are the wires for the aerial and earth and mains supply.

KOLSTER BRANDES A.C. PUP

Maker : Kolster Brandes, Ltd.

Price : £8 10s., complete with valves.

Power Supply : A.C. mains. A corresponding model for D.C. mains is not available, but readers will recall that there is a Pup for battery operation. If the A.C. supply is between 100 and 120 volts the correct model is KB252. If, as is more probable, the A.C. supply is between 200 and 250 volts, the model to order is KB253.

Power Consumption : 20 watts. This is the normal consumption for a two-valve all-electric set and implies a negligible addition to the electric-light bill.

Valve Combination : The two valves in this set are arranged in the sequence of detector valve and transformer coupled output valve. One has a choice of Mazda, Mullard and Osram types. The detector valve of the model tested was a Mazda AC/HL and the output valve was a Mullard 104V. There is a third valve, used to convert the A.C. supply into a direct-current supply for the anode circuits of the detector and power valves. This is a Philips type 506K.

The two receiving valves are capable of giving considerable amplification provided that the input signal is moderately big. This set can thus be expected to give full loud-speaker reproduction of programmes from the local station.

Controls : Although the set is somewhat unorthodox in its design and layout, we noted at the time of tests that the controls were easy to understand and smooth in action. None of the controls is marked on the cabinet of the set, but there is a very clear instruction booklet showing their functions.

Mounted on the top of the cabinet, which accommodates not only the A.C. two-valve set but also a cone loud-speaker, are two dials, with scales reading from 0 to 180 degrees.

Looking from the front of the set, the dial on the left is for tuning the aerial circuit and the dial on the right is for adjusting the amount of reaction generated by the detector valve. Thus the left-hand dial is rotated for the selection of the stations within range and the right-hand dial provides varying degrees of volume for the stations heard.

To switch the set on and off the set user must make use of the lamp-holder adaptor fitted to the end of the flex coming from the back of the set. But before inserting the mains plug into a convenient socket one must adjust the connection on the mains transformer to suit the voltage of the supply mains. This is an easy job, for there are three plainly marked terminal screws fitted in an accessible position on the mains transformer.

An excellent feature of this set is the provision of an automatic mains cut-off. When the back of the cabinet is removed the electric supply is automatically broken. There is thus no danger of the set-user experiencing a shock when examining the interior of the set.

The only other control, if one may call it such, is the aerial-earth terminal board, fitted at the top left-hand corner of the cabinet. This consists of two alternative aerial sockets, an earth socket and a coil-shorting strap to provide medium-wave reception. The loud-speaker can be prevented from rattling during reception by adjusting a screw fitted to the centre of the loud-speaker grille.

Sensitivity : We were very satisfied with the results obtained on this set when connected to our standard 60-foot test aerial in south-west London. We first of all logged the London National station at 30 degrees, and then the London Regional at 82 degrees on the aerial tuning dial. The strength of these two stations was well up to standard.

We had no difficulty in getting the Midland station at 140 degrees, but readers should note that this reading corresponds to the 479-metre wavelength and not to the present wavelength of Midland Regional.

Results being so satisfactory in the reception of the local stations, we were induced to try for some of the more powerful foreign statious. Here we should point out that this type of set is not primarily designed to do more than receive the locals at loud-speaker strength and any further reception is not merely speculative but almost entirely dependent upon the user's ability to make the most of the reaction control.

Naturally, with our considerable experience of operation, we were able to maintain the set in its most sensitive position, that is just below the point of oscillation, when adjusting the tuning dial to some of the foreign wavelengths.

We were able to tune in and identify Brussels No. 1, Langenberg, Rome, Stockholm, Sottens, Toulouse, Bordeaux, Strasbourg, and Heilsberg at very reasonable loud-speaker strength.

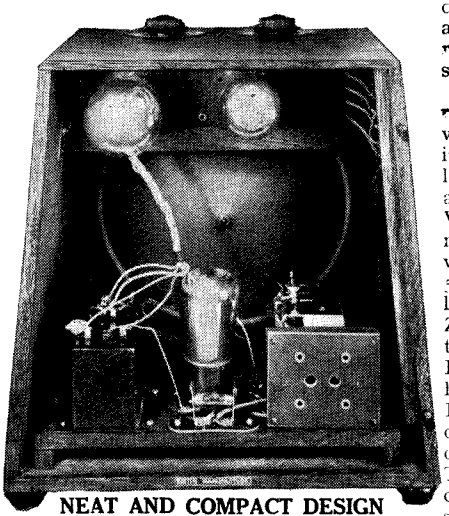
Long waves can be received on this set by withdrawing the shorting strap from the lowest socket on the aerial terminal board. With the aerial connected to socket A1 we got Daventry at 50 degrees at full loud-speaker strength. Zeesen, although partially swamped by Daventry, was clearly heard at 60 degrees. Radio Paris at 70 degrees, Huizen at 98 degrees and Eiffel Tower at 38 degrees completed a very satisfactory long-wave log.

The loud-speaker reproduces the local stations without any objectionable resonances and one soon grows quite pleased with the reproduction. If desired, an additional loud-speaker can be used and for its connection sockets are provided at the right-hand side of the cabinet.

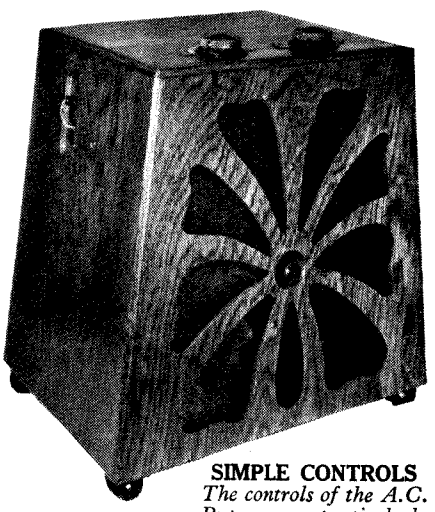
A special fuse is provided to protect the set and valves in the event of a rise of voltage occurring in the supply. Altogether, a carefully thought out set of modest price, giving very satisfactory reception of local stations.

Summary: This two-valver can be recommended to set-buyers wanting an installation for local station reception, self-contained except for an external aerial and earth. The running cost is negligible and the operation can be readily grasped by the novice. The quality of reproduction from the local stations is pleasing. Those with some experience of set-operation can expect to tune in quite a number of foreign stations on this set. Very good value for money.

Appearance: Although the layout of the controls on the cabinet is rather unusual, the general appearance is neat and attractive. The cabinet is in oak.



NEAT AND COMPACT DESIGN
This photograph of the back of the Kolster Brandes A.C. Pup shows how compact is the design



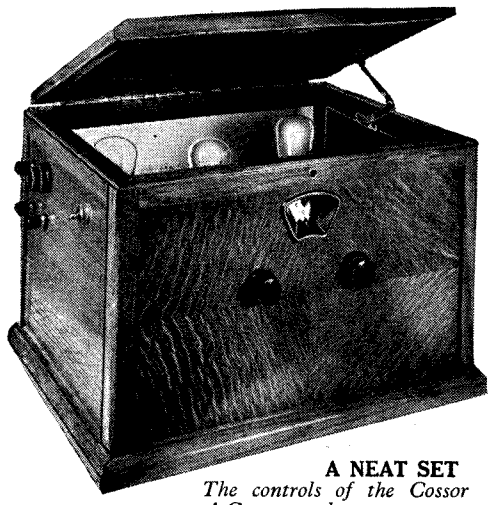
SIMPLE CONTROLS
The controls of the A.C. Pup are particularly simple and can be mastered in a few minutes

COSSOR TWO-VALVE A.C. SET

Makers: A.C. Cossor, Ltd.

Price: £11 10s., complete with valves.

Power Supply: A.C. mains. There is no corresponding model for D.C. mains, but a very efficient Cossor two-valver is available for battery operation. The set under review is for supplies between 200-250 volts, with periodicities between 40 and 100 cycles. To prevent damage to the set and valves, the set leaves the factory connected for 240-to-250-volt supplies. To adjust the set for other line voltages, one must remove the lead from terminal "240" on the terminal block and insert it in one of the alternative sockets provided. This is an accessible arrangement.



A NEAT SET
The controls of the Cossor A.C. two-valve set are arranged in very accessible positions

Power Consumption: 17 watts. This is about the average for a two-valve A.C. set and for the benefit of those anxious about the running cost of A.C. mains sets we should explain that this set will run for nearly 60 hours for the cost of one unit of electricity.

Valve Combination: As this is a two-valver, the combination consists of a detector valve and a transformer-coupled output valve. In this set the detector is a Cossor 41MRC and the output power valve is a Cossor 415PT pentode. These two valves together provide sufficient amplification to give full loud-speaker reproduction when the set is tuned to local or regional stations. The detector valve has a 4-volt indirectly-heated filament but the pentode is heated directly by A.C. at 4 volts.

There is no need for an indirectly-heated filament at the output stage since there is no amplification following this stage. Moreover, the filament of an output valve is usually not susceptible to mains hum.

In addition to the two valves for receiving the incoming signal, this set employs a valve to rectify the alternating current to make it suitable for the anode supplies of the two stages. This is a Cossor type 44SU.

Controls: From notes made during tests of this set, we see that the layout of the controls is quite straightforward. On the front of the set are the two main control knobs. The knob on the right works the variable condenser of the detector tuning circuit and also actuates a clearly-engraved scale, moving through an aperture at the top of the front of the cabinet.

The knob on the left is for increasing the strength of weak stations. It is a small variable condenser controlling reaction in the detector stage.

On the left-hand side of the cabinet are two subsidiary controls. One is a wave-change switch, providing medium waves in one position, from 200 to 500 metres, and in the other position long waves from 1,000 to 2,000 metres. The other subsidiary control is very useful, since it is a pre-set condenser in the aerial lead.

This condenser can be used for increasing the selective properties of the tuning circuit and it was also found useful in reducing the volume of the local stations.

This control operates only when the aerial lead is connected to the bottom aerial terminal. In districts where there is no trouble from local-station swamping the top aerial terminal can be used to provide greater signal strength.

The sequence of operations in this set is quite simple to understand. First of all, the mains plug is inserted in a convenient light or wall socket. Either can be used, thanks to the makers' provision of an adaptor type of plug. This should be standard in all sets, but unfortunately is not.

After waiting a few seconds for the detector valve to heat up, the set-user can start to tune in a station. The switch on the left-hand side of the set must be pushed towards "S" if the medium wavelengths are wanted. Then the left-hand knob on the front of the set is turned as far as it will go in an anti-clockwise direction, for in this position reaction is at its minimum.

Then the right-hand knob is turned until the desired station is heard. If it is not loud enough the left-hand knob can be slowly advanced to increase the volume. But this reaction-control knob must not be advanced too far, otherwise quality of reproduction will be impaired.

Sensitivity: We obtained London National at 25 degrees and London Regional at 44 degrees. Midland Regional and test signals from Moorside Edge were heard at 76 degrees, corresponding to 479 metres. The strength of these stations was fully up to standard. We also obtained Brussels, Rome, Stockholm, Sottens, Hielsberg, and Kiel at moderate loud-speaker strength.

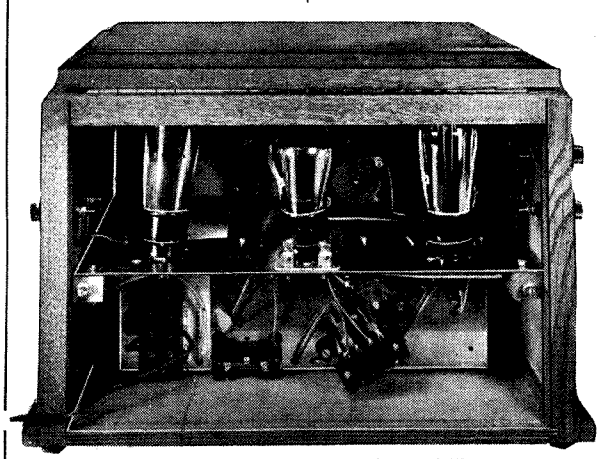
This reception was achieved by a careful manipulation of the reaction control, which we found capable of building up the strength of distant stations very smoothly. There was none of that objectionable "plop" noted with indifferent reaction systems.

The makers evidently realise that in such a set good reaction is an essential part of the design.

Selectivity: The selective properties of a two-valver designed for regional reception need not be exceptional. What is required is an ability to separate the two alternative programmes when the set is used within, say, 10 miles of the regional centre of radiation. From tests we can say that this requirement is fully met by the Cossor A.C. two-valver.

The National had a spread of 13 degrees and the Regional a spread of only 10 degrees. This we consider is very satisfactory for a set using only one tuned circuit. This selectivity was achieved by using the aerial terminal bringing into circuit the pre-set series condenser.

Quality: This set was tested with a high-resistance loud-speaker and quality of reproduction was very satisfactory. Provision is made for a gramophone pick-up and this is justified if a good loud-speaker is available.



SIMPLE INTERNAL CONSTRUCTION
This photograph shows the simple assembly of the Cossor mains two-valver

LOEWE TYPE OE333 ONE-VALVER

Makers : Loewe Radio Co., Ltd.

Price : 3 guineas, complete with special multi-electrode valve.

Power Supply : Batteries.

Power Consumption : The measured anode current of the set was found to be 7 milliamperes with a 90-volt high-tension battery, which could therefore be of the standard-capacity type. This set is, in fact, remarkable for its very low running cost.

Valve Combination : Although this Loewe set has only one valve, this is a very special valve, embodying no less than three valve stages. The first valve stage is the detector and then follow two stages of resistance-capacity-coupled low-frequency amplification. Inside the evacuated glass bulb, which is not much bigger than the normal power valve, are fitted three entirely separate valve electrode assemblies.

The interesting point about this valve is that the resistance - capacity - coupling components are also contained within the glass bulb. As one would expect, this compact construction implies very short leads between the coupling components and the valves. No doubt the low losses of this arrangement account for the very efficient results obtained during tests.

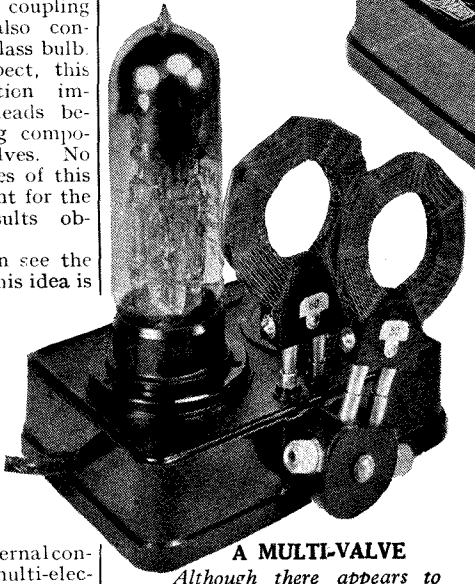
So far as we can see the only drawback to this idea is that when the filament of one of the valves goes the two remaining sound filaments are rendered useless. To a large extent this objection is overruled by the extremely low price of the whole equipment.

The necessary external connections to this multi-electrode valve are made through the six contacts on the base of the valve cap. This cap fits into a suitable socket mounted on the small bakelite container of the set in such a way that there is no possibility of wrongly inserting the valve.

Controls : Control of the Loewe set under review is naturally simple, since the circuit consists of a reactionless detector valve with two stages of low-frequency amplification. The tuning condenser is actuated by a plainly-engraved knob and dial mounted near the multi-electrode valve on the top of the case. Near this tuning control, on the side of the case, is fitted a two-way coil holder. The coil in the fixed socket is the main tuning coil, connected across the grid circuit of the detector valve. The coil mounted in the movable coil holder is the aerial coil, which can be varied in its coupling with the tuned grid coil.

Any good plug-in coils can be used with the set and by means of this variable coupling arrangement any desired degree of selectivity, and incidentally of volume, can be readily achieved.

The makers supply very extensive notes on the installation, operation and maintenance of this set. For our tests we used, first of all, a No. 25 coil in the moving socket and a No. 35 coil for the fixed socket. With these coils the National station was logged at 75 degrees on the dial and the Regional at 150 degrees.



A MULTI-VALVE

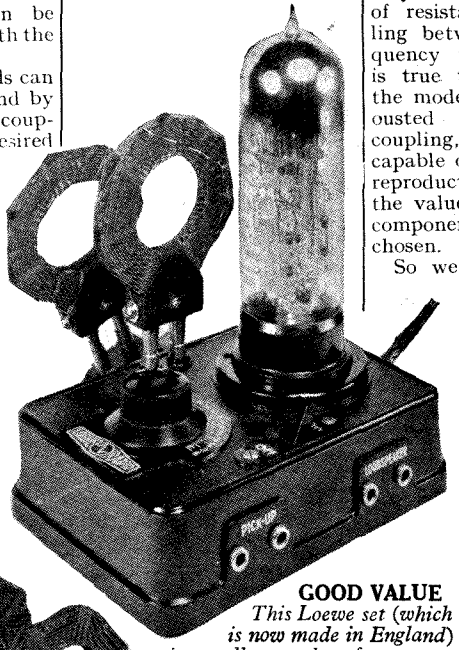
Although there appears to be only one valve, there are actually three sets of electrodes in a single bulb

Selectivity : We were impressed with the results of this test. The swinging aperiodic coil undoubtedly copes with the difficulty of separating powerful regional transmissions. With the coils mentioned we had no difficulty in separating the National and Regional stations.

With a No. 50 coil in place of the No. 35 coil for the fixed socket, we logged London Regional at 70 degrees and London National at 30 degrees. With this larger coil the higher wavelengths were available and we were able to get Midland Regional at moderate loud-speaker strength at 130 degrees.

This is rather remarkable, in view of the fact that there is no reaction to boost up the detector. The swinging aperiodic coil was found very useful as a volume control during the reception of the two local stations.

Sensitivity: This set is primarily designed for the reception of the local stations, which certainly came in during tests with greater volume than we should have expected from the combination of "valves" used. The fact that Midland Regional was tuned in at moderate loud-speaker strength implies that under favourable conditions some of the more powerful foreign stations can be logged on the loud-speaker. The makers suggest that headphones might be used if the set user yearns for stations other than the local. We ourselves were able to get a good sprinkling of foreigners at excellent headphone strength and quite clear of local station interference.



GOOD VALUE

This Loewe set (which is now made in England) is excellent value for money

Quality : In the old days, the search for good-quality reproduction almost invariably ended with the adoption of resistance-capacity coupling between the low-frequency valves. While it is true that in these days the modern transformer has ousted resistance-capacity coupling, the latter is still capable of giving very fine reproduction, provided that the values of the coupling components are scientifically chosen.

So we were not surprised during tests of the Loewe set to find that the quality was extremely good. Allowing for the fact that, as recommended by the makers, only a 90-volt high-tension battery was used, the amount of distortionless volume obtained was quite remarkable.

Sockets are provided for the use of a gramophone pick-up. Our experience of the set serves to show that this provision is justifiable, but for gramophone work we strongly suggest that the high-tension voltage be increased from 90 volts up to the maker's limit of 150 volts.

Summary : At 3 guineas this Loewe set certainly is an attractive proposition for those wanting only the local stations at moderate loud-speaker strength. The low running cost is an additional attraction. It should be noted that in addition to a 90-volt high-tension battery, the multi-electrode valve requires a 4-volt accumulator for the multi-filament supply.

The set will function at its best with a moderately good outside aerial, which need not be cut down in length owing to the fact that the aperiodic tuning arrangement enables the aerial coupling to be reduced to a very low value.

In any case the earth should be as efficient as possible, otherwise howling may be set up.

THE SAXOPHONE IN MOSCOW
This broadcaster seems to be taking his music very seriously

Must We Understand Music?

A technical understanding or knowledge of music is quite unnecessary for its enjoyment says POUISHNOFF, in this talk with Watson Lyle

"HOW are you?" I asked Pouishnoff. As we had not met for some weeks, there was more need than usual for the conventional query.

"Decidedly tired. I arrived home in London at 7 o'clock yesterday morning from an all-night journey after playing in the provinces the previous evening. Then, yesterday afternoon, there was my recital at the Palladium. Yes, decidedly tired!" And subsiding into the soft embrace of a settee, he motioned me to a place beside him.

"Nice audiences?"

Kind Folks

"Oh, yes! And the usual queues of kind folks feeling they must express their pleasure personally. But I can nearly always guess what they are going to say."

"Yes?"

"'I liked your playing *so* much, Mr. Pouishnoff, but'—they always add this apologetically—'I don't understand music at all, you know!' To which my invariable mental reply is, 'Amen! Thank God for that.'"

"Don't you think it necessary for people to understand music to be able to enjoy it?" I put the question seriously, for his concluding exclamation was reverently uttered.

"The only people," he remarked, settling himself more comfortably in his corner, "whose business it is to understand music are the composers and the performers. They must thoroughly understand it to enjoy it completely, and be able to communicate its inner content to the listeners. The full comprehension of music is shared in by performer and listeners. They should take it as it comes to them. To one person it may suggest one train of thought, to another something different as a mental picture; to yet another it may give purely sensory pleasure, and so on.

"There is this varied appeal in all music worth while, and each listener should be free to feel it in his own way. His understanding of it should be free and unbiased. The moment a person listening to music begins to watch where this or that phrase—sometimes it is just part of a phrase—occurs, as per the analytical programme——"

Musical Thrillers

"Turning his listening into a game of finding the clues in a musical thriller, *à la* Edgar Wallace?" I frivolously interrupted. He smiled broadly, his big, expressive brown eyes alight with amusement.

"Wouldn't Sherlock, the sleuth, do better? But, as I was saying, the moment the listener's individual way of receiving the music into himself is blurred or tampered with, good bye to his true enjoyment of it."

"But," I objected, "I find music quotations in programmes a help, sometimes, towards a comprehension of a new work. Scores are not always accessible for study beforehand. Plenty of first performances take place from manuscripts."

"Precisely, but to the musically uneducated person, or those having only a slight, practical knowledge of music—in a word, to the general public who, in the mass, love music—these things are only a bother and a hindrance. From them they gain the idea that it is impossible to know

NEXT MONTH
Watson Lyle will let readers of WIRELESS MAGAZINE into some "Buggins" secrets, for he has recently had a most interesting interview with Mabel Constanduros

what the music is about without being able to read the clues.

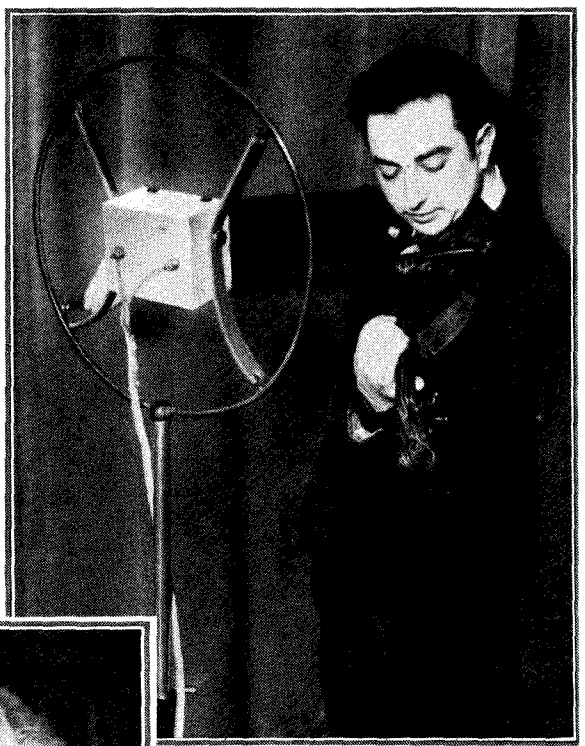
"They confuse the appreciation of music from a technical standpoint with æsthetic enjoyment in it; and, as they know nothing, or next to nothing, about it technically, the only result of trying to 'understand' music in this way is for them to become completely fogged and bewildered and regard good music as something utterly outside their comprehension."

Sheer Waste of Time

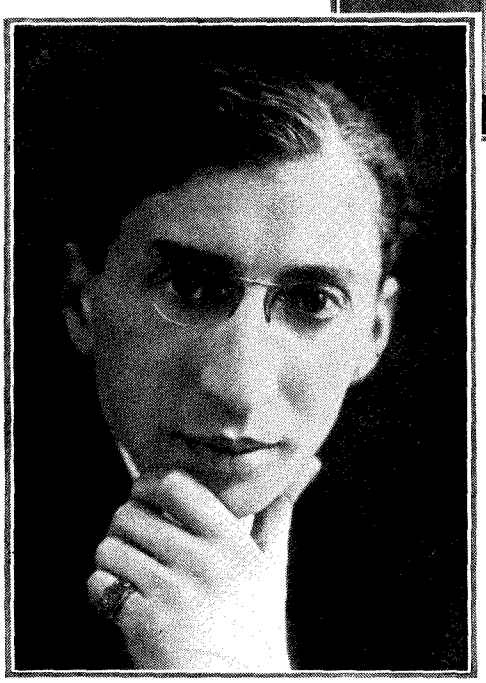
"I have always felt the appreciationist cult for the musically uneducated to be sheer waste of time, if not worse, for all concerned," I interpolated.

"And they are not helped out of their fog," he went on, "by knowing that such and such a piece they are to hear was composed on January 17, seventeen something or other, when the moon was at the full; that Chopin is supposed to have written a certain waltz through watching a little dog whirling round in a vain effort to catch its own tail; that the opening of Beethoven's Fifth Symphony, 'Fate Knocks at the Door,' or that the beginning of Rachmaninoff's Prelude in C sharp minor denotes the frantic knocks upon her coffin lid of a young and beautiful woman prematurely buried!"

"But don't you think that such stories, silly and untrue though most of them are, may sometimes induce folks quite new to any but the simplest kinds of music to listen attentively to try to hear the supposed 'programme' tacked on to it, and in this way to want to hear the piece again for its own sake?' I asked, Fleet Street's "tell a story" fetish rising up strongly within me.



BROADCASTING THE VIOLIN
Another musician photographed in the Moscow studio



A WORLD-FAMED PIANIST
A portrait of Leff Pouishnoff, who has given piano recitals all over the world

"It may," he replied thoughtfully. "Still, the silly story itself does not in the least way help them to understand the music. When they are allowed to take in the music in their own way, they are just as likely to want to hear it again. If it attracts them at all, it will attract of itself. If people need silly stories to make them listen, then they are listening for something that is not music.

"If they listen to the music for itself alone, they will be listening to it without any preconceived notions of what they ought to hear. The phrasing will speak to them of 'tself, like spoken sentences. From that they will go on to an enjoyment of the tone-colour, the harmony.

Blending Tone-colour

"In an orchestral work they will begin to note how, at first, the massed tone of strings, of brass, or of wood-wind is used, then how the separate instruments of these various sections of the orchestra 'speak' in the complete work; how one tone-colour is contrasted or blended with another, and how one composer has a fondness for securing certain effects in one way, and how another composer may secure just these effects by another way.

In all of this, as the listening thus becomes more and more educated, by easy, natural stages, suited to the individual, there is the use made of his themes by the composer and a rough recognition of the architecture of the bigger forms. The bigger works must be heard many times before these details begin to stand out—in some works longer than others, according to the composer, and the listener who happens to encounter him.

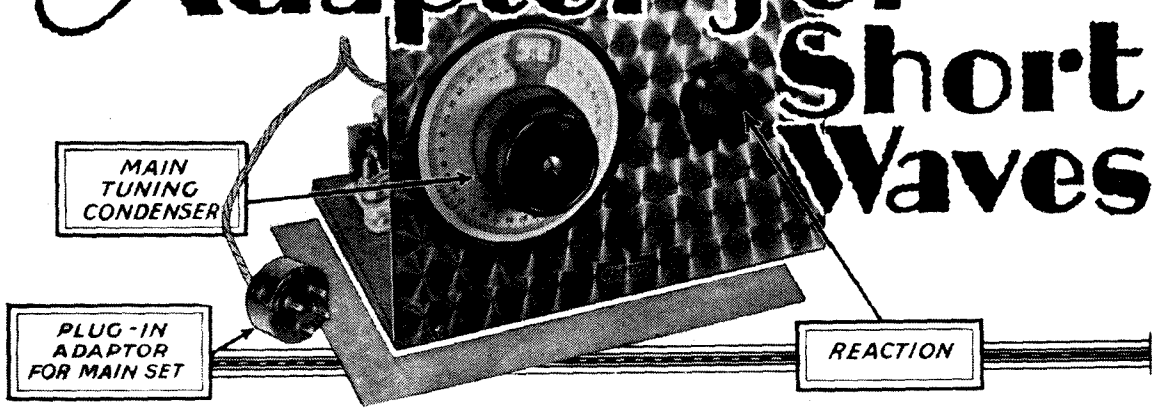
"The listener may read into the music he hears what he chooses. If he likes mental pictures, or 'programmes,' his are just as likely to be right or wrong as are those of the writer of a programme, or the teller of a silly story about the work heard.

"Music speaks to us in the most intimate way, appealing through our emotions, directly to ourselves. It is a universal art, an art for the many, not the few, to understand and enjoy. The illiterate individual is no more debarred from it than the highly educated (but musically ignorant) person. If their enjoyment is along different lines from that of the cultured musician, it is none the less right as a fundamental 'understanding' of what they hear.

What Matters

"From the same performance of a work a variety of listeners thus get their own meaning of it, their own enjoyment (or the reverse), and that is what matters. It is only the composers and the performers who must really *understand music*. That is their job."

The Two-minute Adaptor for Short Waves



Here is a simple unit, needing no additional batteries, with which ultra-short wave reception can be carried out on most standard broadcast receivers.

NO doubt you will think that this is a strange title for a set. But actually, it is just what it is called. With this adaptor any set with one or more stages of low-frequency amplification, at present suitable for long- or medium-wave reception only, can be adjusted in two minutes to receive on the ultra-short waves.

This unit is not intended for use with mains sets; it is designed essentially for use in conjunction with standard battery receivers. *No extra batteries have to be connected to the unit itself*, the necessary current being taken from the receiver with which the adaptor is to be used.

The principle of operation is to remove the existing detector valve from the main receiver and substitute for it a short-wave detector; the low-frequency stages already in the main set are utilised for short-wave reception.

Plug-in Coils

From the photographs that appear in these pages it will be seen how simple is the construction of the Two-minute Adaptor. Standard two-contact plug-in coils are utilised; these are particularly convenient because a number of different makes are readily available.

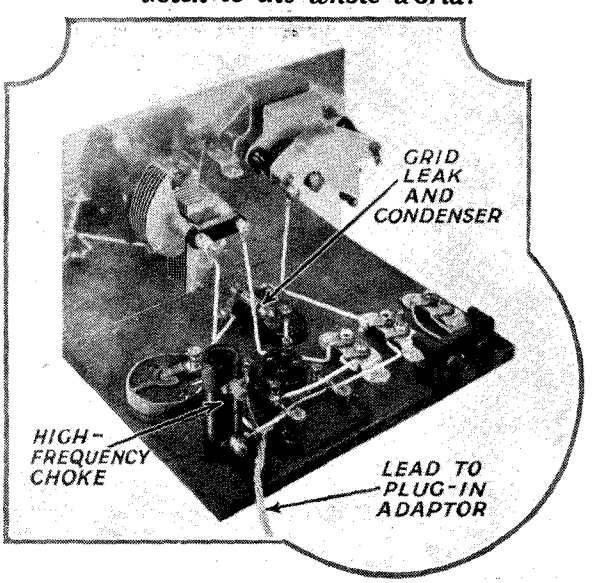
Tested at Finsbury Park the adaptor has given excellent results. The unit was plugged into a three-valve set with two resistance-coupled low-frequency stages and on a recent Saturday evening WGY, a New York station, was received on a moving-coil loud-speaker for fifty minutes with only two short periods of fading.

On the following Sunday Konigswusterhausen was also received at loud-speaker strength from 3.30 to 5.30 p.m. without objectionable fading. At other times Chelmsford (G5SW), Rome, and PCJJ were received on the same loud-speaker—all the time using three valves.

When the adaptor was followed by a single stage of resistance-capacity amplification, many stations were heard at good headphone strength. These included W2XAF, KDKA, W2XAD, WGY, a South American amateur, Madrid, and a Dutch station, PCIOM (?) testing. Various French amateurs and an official station in Paris were also picked up.

It should be noted that in all these cases a rather poor indoor aerial and earth system was employed.

With this unit you will be able to listen to the whole world!



COULD ANYTHING BE SIMPLER?
Even the complete novice can build up this short-wave adaptor without any difficulty

No Trouble

From these results it will be evident that any reader who at present has a set with one or more low-frequency stages, and which is confined to reception on the medium and long wavebands, can take advantage of many short-wave transmissions with the minimum of trouble and expense by putting together the Two-minute Adaptor.

The theoretical circuit arrangement will be clear from the diagram on page 488. There is a semi-aperiodic coil in the aerial circuit, which obviates the necessity for a series aerial condenser; coupled to this is a grid coil tuned by a .0002-microfarad variable condenser.

It is desirable that the capacity of this condenser should be of the value recommended or the tuning will be too sharp, because a small movement of the dial will result in a comparatively large change of capacity.

Smooth Control of Reaction

In series with the anode of the valve is a short-wave high-frequency choke, which helps to give good control of reaction, which is obtained by coupling a third coil to the grid tuning coil. The amount of feedback or reaction is controlled by a .00015-microfarad variable condenser.

Detection is carried out on the leaky-grid principle in the ordinary way, the condenser having a capacity of .0002 microfarad and the leak being of 3 megohms resistance.

In an ordinary broadcast receiver it is standard practice to take one end of the grid leak to low-tension positive in order to improve the rectifying action of the valve. This sometimes results in somewhat erratic control of reaction and as the whole secret of success with a unit of this type is to be able to slide in and out of oscillation smoothly the grid leak is in this case taken to the slider of a 400-ohm potentiometer connected directly across the low-tension supply.

Positive or Negative Detector Bias

In this way the bias on the grid can be made either positive or negative; it is therefore an easy matter to find a point on the potentiometer that gives the smoothest control of reaction with any particular valve.

It will further be seen that no battery connections are indicated in this circuit diagram, but three leads are taken to a four-pin plug. These four pins are arranged in exactly the same way as the pins of a valve.

The filament leads from the detector in the Two-minute Adaptor are taken to the filament pins of this plug and the anode circuit is also connected to the anode pin. The grid pin is left free.

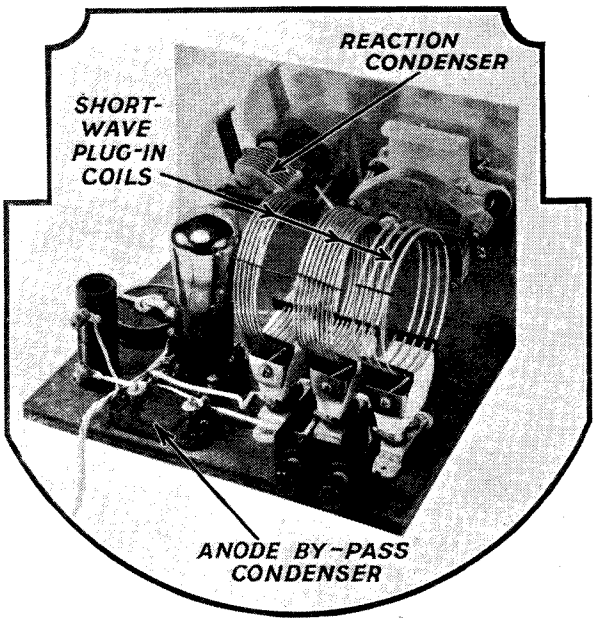
Now we can see what happens when the detector valve in the main receiver with which the adaptor is to be used is removed from its socket. The four-pin plug of the adaptor is inserted in its place.

Filament Supply

The filament of the short-wave detector valve is automatically supplied with current and the anode circuit is connected to whatever stages of low-frequency amplification there may be in the receiver.

As the grid terminal is unconnected, the preceding stages of the main receiver (if it should incorporate any high-frequency amplification) are automatically cut out of circuit.

Shown dotted in the circuit diagram is a .0002-microfarad anode by-pass condenser. This is essential for efficient rectification, but if such a by-pass condenser is already incorporated in the main receiver it should be omitted from the adaptor, otherwise the two condensers will be in parallel and the by-pass capacity will be too large.

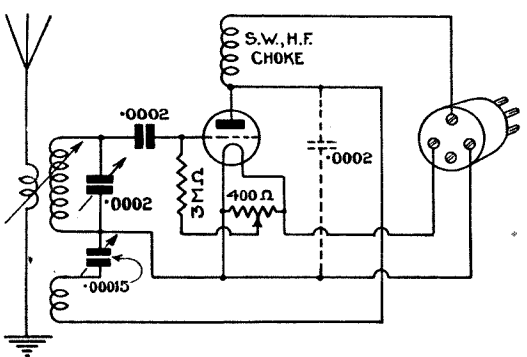


READY TO BE PLUGGED IN

Here is the Two-minute Adaptor ready to be plugged in to any existing set with one or more stages of low-frequency amplification. It will receive stations working on wavelengths between about 20 and 60 metres

In order to avoid hand-capacity effects an aluminium panel is used, and it will also be seen that the main tuning condenser is provided with a metal shield.

All the essential details for construction are included in these pages, but for those who desire them, there are available full-size blueprints. One of these can be obtained for half-price (that is, 6d., post free), if the appropriate coupon on the last page of this issue is used by June 30.



SIMPLE AND STRAIGHTFORWARD

There is nothing complicated about the circuit of the Two-minute Adaptor; the valve is a leaky-grid detector

Where to Send

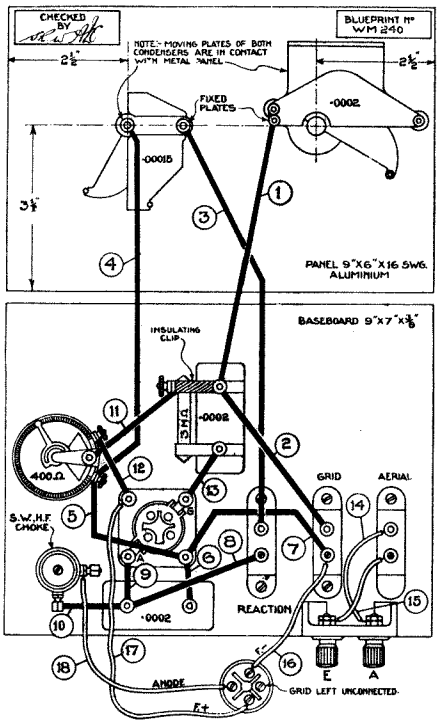
Address your application to Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4; and ask for No. WM240.

There are only three points about the construction that need be emphasised.

In the first place it should be noted that the grid condenser is provided with an insulating clip on one side; in other words, the grid leak is not connected directly in parallel with the condenser.

Secondly, the filament positive and negative leads must be so connected to the adaptor plug that filament positive in the adaptor is connected to the positive side of the filament of the detector valve holder in the main receiver.

THE TWO-MINUTE ADAPTOR—Continued



LAYOUT AND WIRING GUIDE

A full-size blueprint can be obtained for half price (that is, 6d., post free) if the coupon on the last page is used by June 30. Ask for No. WM240

Thirdly, if the .0002-microfarad anode by-pass condenser in the adaptor is to be omitted, because there is already such a by-pass in the main set, connection No. 9 is omitted entirely and connections Nos. 8 and 10, instead of being taken to one side of the condenser as shown in the wiring diagram, are connected direct to the anode terminal of the valve holder (marked A).

Sizes of Plug-in Coils

Before the adaptor can be used, the proper coils must be inserted in the three holders. A set of four coils is available, Nos. 2, 4, 6 and 9. For reception on wavelengths between 20 and 40 metres the following sizes should be used : Aperiodic coil, No. 2; grid coil, No. 4; and reaction, No. 6. For wavelengths between about 30 and 60 metres use coils Nos. 4, 6 and 9 in the same respective positions.

Any good medium-impedance valve will be suitable for use in this adaptor, but care should be taken to see that the anode voltage is not too high. Usually, the valve already used as detector in the main receiver will be suitable for this purpose.

The best setting of the potentiometer slider to give smooth reaction control will depend on the particular type of valve used and the high-tension voltage. A few minutes experimenting will enable the operator to get the best adjustments.

It is very desirable that the aerial should be on the short side. A wire about 20 ft. long, either indoors or out in the open, will be ample for the wavelengths which this unit is designed to receive. As far as possible, it should be unscreened and kept clear of surrounding objects that might result in a bad capacity effect.

SCREEN-GRID CAPACITIES

ONE of the most important electrical properties of a screen-grid valve is its anode-control grid capacity.

A good valve has a low value, and in a suitable circuit the amplification which it is possible to obtain is controlled largely by this small capacity.

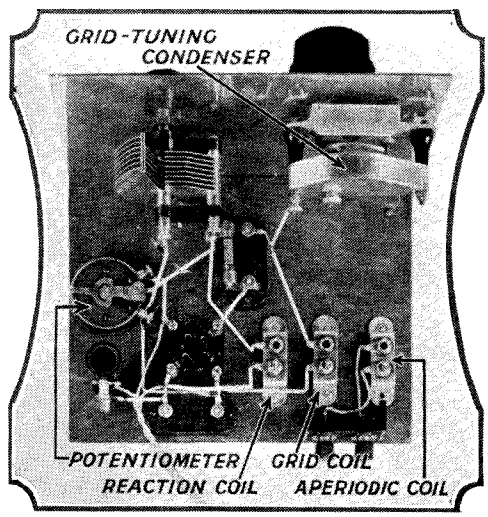
The General Electric Company have just issued an extract from the National Physical Laboratory report on six Osram MS4 valves which had the following capacities :

Valve.	*Leakage capacity in micro-microfarads.*
1	... .0018
2	... .0016
3	... .0024
4	... .0019
5	... .0017
6	... .0019

These valves have a very low leakage capacity and they are remarkably uniform.

Lack of uniformity will show itself in practice by variations in the results. Thus if we had a very carefully designed set using valve No. 2, with its leakage capacity of only .0016 micro-microfarad, and then used valve No. 3, the stage would probably oscillate.

My point is just that with carefully designed sets the results will vary with the leakage capacity. These valves are very good, and if there were no wider variations with all makes little trouble would be met with in practice. W. JAMES.



EASY TO BUILD

This plan view shows how simple is the disposition of all the parts

Components Needed for the Two-minute Adaptor

CHOKE, HIGH-FREQUENCY
1—Igranic short-wave, 2s. (or Wearite, Polar).

COILS
1—Set of Atlas two-pin plug-in, Nos. 2, 4, 6 and 9, 10s. (or Igranic, Eddystone).

CONDENSER, FIXED
2—Dubilier .0002-microfarad, 3s. 4d. (or Ready Radio, Lissen).

CONDENSERS, VARIABLE
1—Utility low-loss .0002-microfarad, 6s. 6d.
1—Formo .00015-microfarad, 4s. 6d.

DIAL, SLOW-MOTION
1—Utility Micro, type 181, 7s. 6d.

HOLDERS, COIL
3—Eddystone low-loss, 3s.

HOLDER, VALVE
1—Magnum, type 1064, 1s. 3d. (or W.B., Lotus).

METAL PANEL
1—Parex 9 in. by 6 in., 3s. 6d.

RESISTANCE, FIXED
1—Dubilier 3-megohm, 1s. 9d. (or Watmel, Lissen).

RESISTANCE, VARIABLE
1—Lissen 400-ohm baseboard potentiometer, 1s. 6d.

TERMINALS
2—Belling-Lee, small black type, marked : A, E, 6d. (or Clix, Eelex).
1—Belling-Lee terminal block, 8d. (or Junit).

SUNDRIES
Glazite insulated wire for connecting.
1—Small knob for reaction condenser.
1—Bulgin multiple cable plug, type P9, 2s. 6d.
Length of rubber-covered wire.
1—Woodcraft oak cabinet, 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

RADIO IN REVIEW

By MORTON BARR

MANY people do not realise that it is just as important to guard against capacity effects on the high-frequency side of a set as it is to cut out any magnetic leakage.

Somehow or other it seems easier to visualise the magnetic field coming from a coil than it is to see, in the mind's eye, the corresponding electrostatic lines of force which spread out from the charged plates of a condenser.

Inter-stage Screening

Capacity reaction is particularly likely to occur, for instance, when several tuning condensers are ganged together on the same shaft.

Though each condenser is in a separate circuit, the end vanes come so close together that any voltage variation in one circuit is bound to influence the plates of the adjacent condenser, unless the two condensers are carefully screened from each other. In the same way, "swinging" voltages on the inside electrodes of one valve, particularly the plate, are liable to affect the electrodes of any neighbouring valve, and so set up undesirable capacity reaction.

To prevent this most designers now favour the practice of enclosing each of the high-frequency valves in a separate metal screen or container.

Inter-stage screening of this kind should be distinguished from inter-electrode screening, such as is used in a screened-grid valve, where an extra grid or "screen" is located inside the bulb of the valve in order to prevent any capacity reaction between the plate and grid of the same valve.

◆ ◆ ◆

Permanent-magnet Loud-speakers

Whilst on this point, it may be worth mentioning that the field from a moving-coil loud-speaker of the type using permanent cobalt-steel magnets is sufficiently powerful to magnetise any iron or steel body in the immediate neighbourhood. It doesn't do, for instance, to bring a wrist watch within close range; otherwise it will probably have to go to the watchmaker to be demagnetised.

Similarly it is better not to set such a loud-speaker too close to the low-frequency side of the set, particularly if the circuit contains any "high-mu" transformers or chokes. The cores of these components are made of an alloy which is particularly sensitive to any magnetic field. Should the cores become permanently magnetised, they are liable to fall off in performance, and may even cause distortion.

For this reason a blocking condenser is always used to shut off any direct current from the previous valve. Otherwise the steady field set up along the windings would tend to saturate the core and so spoil its response to the fluctuating low-frequency currents.

◆ ◆ ◆

Ultra-short Waves

The feat of speaking across the English Channel on a wavelength of 18 centimetres—roughly 7 in.—represents one of the most interesting radio developments of the year. Apart from being the shortest wavelength ever used in practical signalling, the amount of power employed was also amazingly small, less than half a watt being found sufficient to transmit the human voice over a distance of nearly twenty-five miles.

Actually this range could be considerably extended by increasing the height or elevation of the transmitting or receiving aerials, because unfortunately ultra-short waves travel in a straight line, like light. In other words, one cannot, as yet, use them to cover distances farther than one can see.

They are not reflected back to earth from the Heaviside layer, like ordinary broadcast waves, but pass right through—to be lost in outer space.

◆ ◆ ◆

A length of 18 centimetres does not by any means represent the "limit" in short-wave working. Senatore Marconi is now experimenting with waves of only 5 centimetres—roughly 2 in. long—which corresponds to the fantastic frequency of six thousand million a second. The Senatore hopes to use these waves for ensuring safety at sea.

Owing to their small dimensions, such waves can be concentrated into a very narrow beam or "ray" which will penetrate both fog and rain. Two ships fitted with ultra-short-wave wireless equipment of this type would be aware directly one of them crossed the course of the other, even in the densest fog. By means of the "wireless" link, each navigating officer could then acquaint the other of his intended course and so avoid all danger of coming into collision.

At this rate of progress, the idea of the waistcoat-pocket set designed to allow one person to talk to anybody else, when and where he likes, begins to look a little less fantastic than it once did. No doubt it is still a long way off, but we are living in an age when it is difficult to label anything as "impossible."

◆ ◆ ◆

Mains Units

The high-tension voltage supplied by a mains unit is not a constant quantity, but depends upon the amount of current that is being taken by the set. For instance, in a unit rated to give 20 milliamperes at 120 volts, the terminal voltage will fall whenever the stated amount of current is exceeded.

The reason is that the valve or copper-oxide contact used for rectifying the current has a certain internal resistance which remains constant. The voltage "drop" across the rectifier necessarily rises as the current flow increases, and since this represents so much "waste," it must be subtracted from the "net" or effective voltage available across the terminals of the unit.

Have a Look Over "North Regional"!

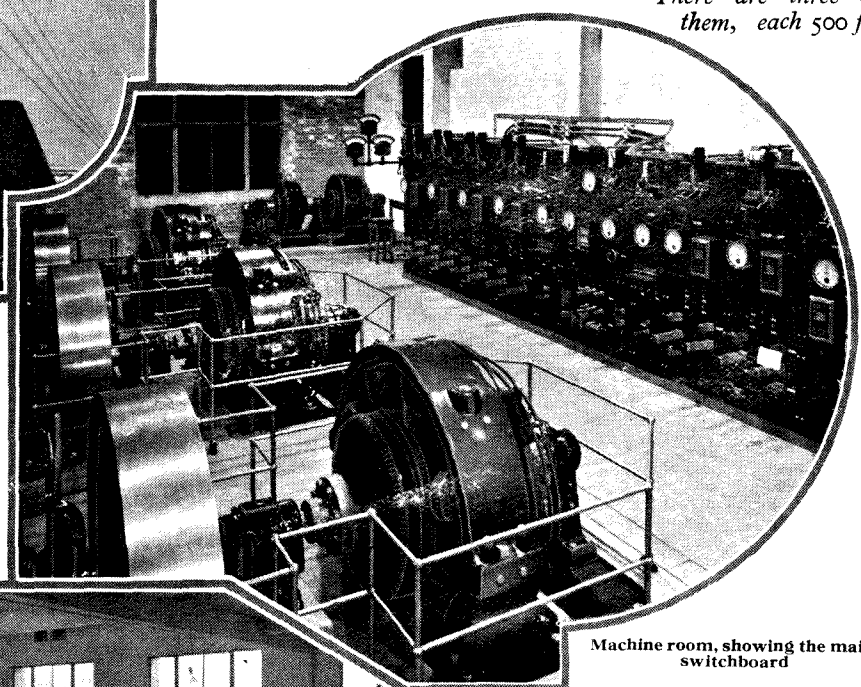
With Alan Hunter, who recently visited the new B.B.C. station in company with the Editor of "Wireless Magazine"

Insulated base of one of the three 500-feet masts at Moorside Edge.

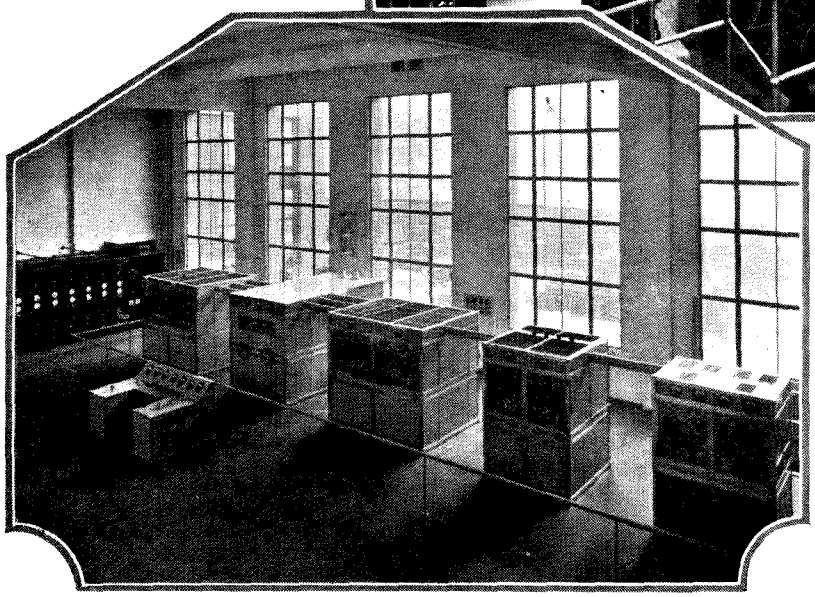
WHEN we arrived at Huddersfield we began to climb, in a motor-coach, to the misty heights of Moorside Edge. What a depressing ride! Grey skies, a persistent drizzle, and an enveloping mist, which entirely hid the masts from view, even when we had finally reached the outskirts of the station building.

Moorside Edge, like Brookman's Park, is well worth seeing. The cheerful red brick building contrasts strangely with the desolate moor around it. The masts are certainly impressive.

There are three of them, each 500 ft. high, arranged in a triangle to support the two aerials, one tuned to 479 metres and the other to 301 metres.



Machine room, showing the main switchboard

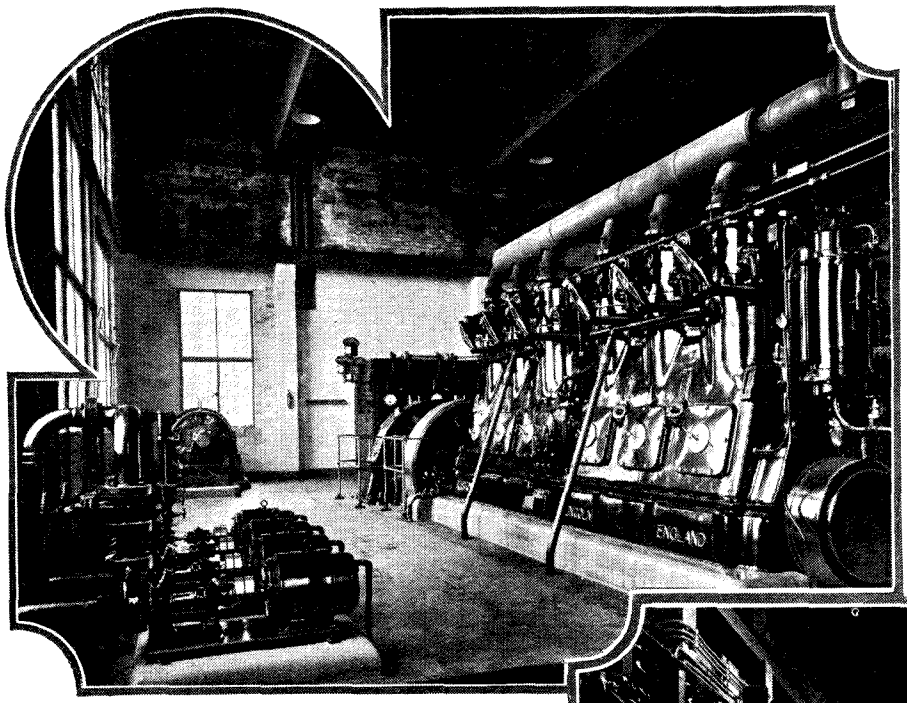


Part of the main transmitter hall, showing regional transmitter and main switchboard

Mast height is very deceptive; only when you begin to climb them does height mean anything. Still, at this altitude, 1,100 ft. above sea level, the masts must be rigidly stayed. I am told they will stand up to a 100-mile-an-hour gale. I hope the station engineers can stand up to the dirty weather also!

Ice on the Aerials

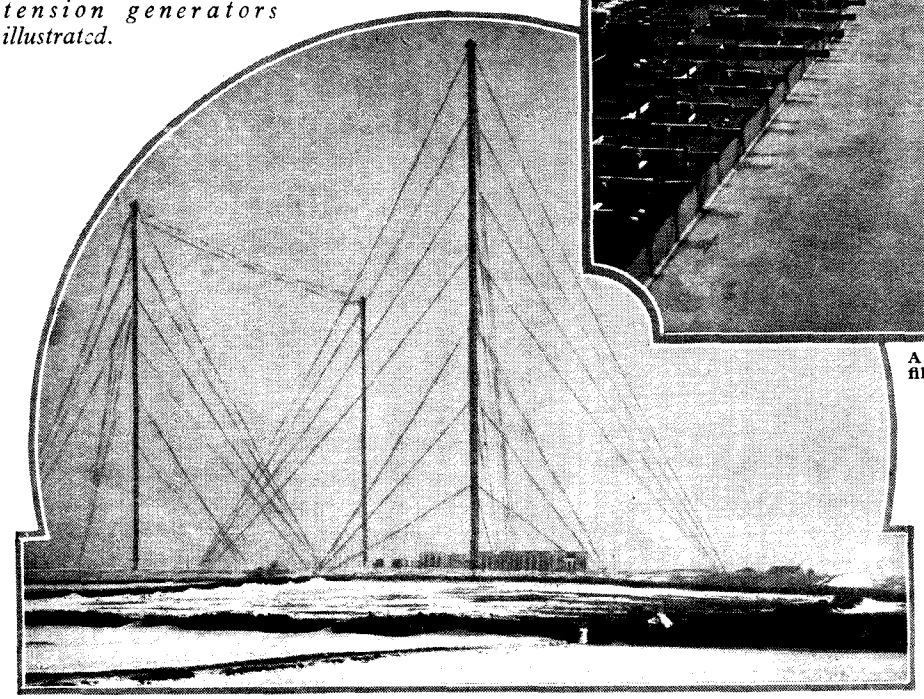
We saw the station in spring, but the B.B.C. knows what winter can mean at Moorside Edge; and to stop



Giant Diesel engines at Moorside Edge

ice forming on the aerial wires—quite a likely event, I should say—the station's generators can be switched over to the aerials and a heating current of several hundred amperes sent through. One hundred kilowatts generates enough heat to melt the thickest ice formation in less than twenty minutes.

Looking over North Regional, I saw all the gear you can see in these pictures. The start-up of the giant Diesel engines was most exciting. These engines drive the high- and low-tension generators illustrated.

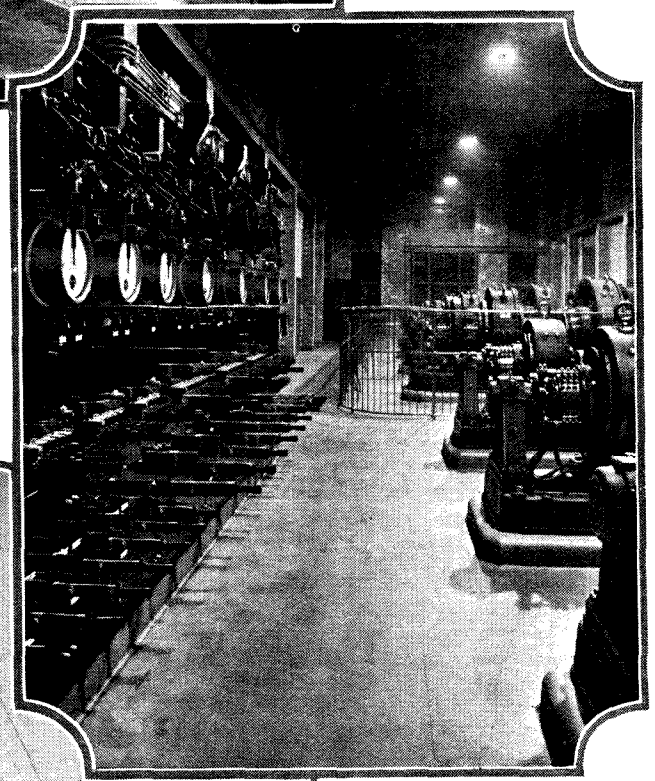


The three 500-ft. masts at Moorside Edge supporting the two aerials, one tuned to 479 metres and the other to 301 metres

Compared with a normal receiving valve, the "bottles" of the transmitting panels naturally loom large; but all this elaborate gear supplies them with just the same high tension, low tension, and grid bias we use in our sets. Only on a very large scale! Think how proud we are of 400 volts high tension. That is very low tension compared with the 12,000 volts applied to the anodes of the valves at Moorside Edge.

Control Desks

The main Transmitter Hall impressed us all. Here we saw the valve panels for each of the two transmitters.



A view of the machine room, with filament generators in the foreground

Everything is controlled at two desks.

Water plays a great part in the modern transmitter. I was shown a reservoir outside the station building said to hold 200,000 gallons. Elaborate precautions had been taken to prevent what would be a disastrous stoppage in the flow of water cooling the anodes of the valves.

Wireless Magazine, June, 1931

Echoes That Make Broadcasting Live!

By J. H. REYNER, B.Sc., A.M.I.E.E.

AT one time or another, during plays or vaudeville items, listeners will have noticed a marked echo effect. Usually this is produced to create some particular illusion. A man may be wandering about a large cave at dead of night. His cries, mutterings and ringing footsteps make one shudder. You can picture the gaping void, the cold and clammy wall of rock along which the man is creeping!

The very life of this scene depends upon the production of this mysterious echo effect. The same words or actions carried out in an ordinary room would be almost ludicrous. So it is that, on many occasions, the effectiveness of a particular incident is made or marred by the production of just the right amount of echo or reverberation, as sound engineers prefer to call it.

Spectacular Occasions

It must not be thought that this effect is only brought into play on these special and somewhat spectacular occasions. Actually, a certain amount of reverberation is present on every transmission. An orchestra performing a classical work requires a different setting from a string quartet or a jazz band.

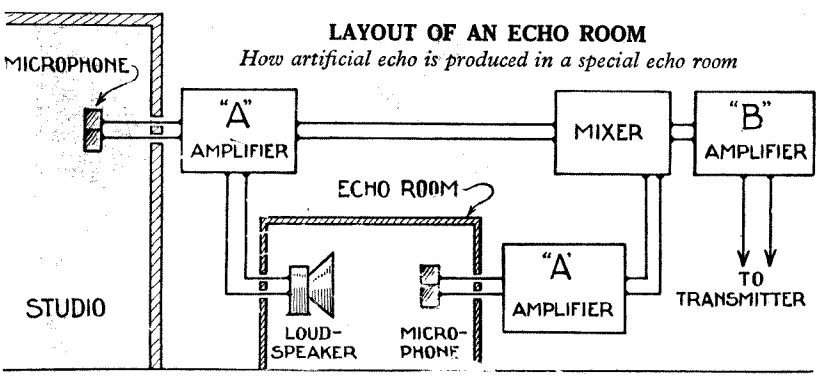
Place any one of these in the setting appropriate for one of the others, and the results will be unnatural, and possibly even unpleasant. Most people realise this as commonsense, but they do not appreciate that the difference lies very largely in the question of the reverberation period of the room in which the performance is taking place.

Theoretically, it is possible to perform all items in one studio, and to adjust the conditions by these artificial means to duplicate the various effects required. Thus the string quartet would be provided with very little reverberation to give the effect of a small heavily-damped room.

More would be provided for the jazz band, and still more for the orchestra in order to imitate the spaciousness of a large concert hall.

The modern tendency, however, is not to adopt this principle, but rather to stage each item in the correct surroundings, as nearly as possible. At the same time, there do remain a large number of cases in which some form of artificial reverberation is desirable, and it is interesting to see how this is done, and just how the effects may be controlled.

What is echo, when we come to analyse it? Simply the reflection of a given sound from a distant point. The term is associated in the mind of the average man with those long-delayed echoes where the sound does not return for an appreciable time.



LAYOUT OF AN ECHO ROOM

How artificial echo is produced in a special echo room

There is time to say several words or to play a short tune on a horn (as they do in the Swiss valleys), and after an interval of a second or two, the whole phrase is repeated by the echo.

The sound has travelled to the distant hillside (or whatever it is) whence it has been reflected back to the starting place. Since sound only travels at the rate of 1,100 ft. per second, several seconds are occupied in the journey there and back if the distance is at all great.

No Delay

Now this echo, or reverberation, is present wherever we go, but the object producing the echo is usually relatively close, so that there is no appreciable delay before the phrase is repeated, and it is not possible to distinguish any actual repetition of the phrase in most cases. The echo follows so closely on the heels of the original sound that the only noticeable effect is a slight prolongation.

For example, in certain classes of room if one said "Ha" it might possibly sound "Haa," the echo effect mixing with the original sound and causing it to appear drawled.

When we say a room is "echo-y" or that it reverberates, we mean that the walls are just far enough away to produce an appreciable and audible lengthening of any sounds which are set up in the room, and also that the character of the walls is such as to make the most of the echoes.

Studio Draping

The draping of studios in broadcasting is an attempt to overcome the second of these two effects. The size of the room may perhaps have to be large and, therefore, to prevent echo to an undesired extent, the walls are draped so that the sound is not reflected but is almost entirely absorbed.

Thus echo effect is produced by the repetition of any given sound a short

interval of time afterwards. The two results are blended together so that in most cases one does not get two separate sounds but only a peculiarly distorted form of sound which we have learned to associate with particular conditions, such as the insides of cathedrals or underground passages.

Blending the Currents

We can achieve the same effect artificially by blending two speech currents similar in form but one slightly later than the other. The resulting effect will depend, firstly, upon the time interval between the two transmissions, and secondly by varying the proportions of two transmissions.

It is found that if a suitable time lag is adopted in the first place, the echo effect can be controlled by simply varying the mixture; this is the method adopted by the B.B.C. for the purpose.

The sound from the original microphone is first passed through an amplifier, where it is stepped up to normal loud-speaker intensity. The output from this amplifier is then split.

One portion goes straight on to the next amplifier, while the second portion is taken to a loud-speaker situated in an "echo" room. This is a perfectly bare room, chosen as a result of tests on its reverberation characteristics.

A little distance away from the loud-speaker, say some five or six feet and usually, slightly above it, is a microphone, the output from which is taken through another amplifier.

The output from this is mixed with the output from the first amplifier, the proportion of one or the other being capable of being varied by the control engineer.

Thus he can take the direct signal from the original amplifier with no echo, or he can take his output from the echo room almost entirely and cut out the direct line. By a suitable blend between these two he can obtain just the right degree of echo he requires.

That is all there is to it. It appears almost incredibly simple. The echo room is quite normal in its appearance, being simply chosen because it has a certain reverberation period. There is nothing else in the room besides the loud-speaker and the microphone.

The relative positions of these two components are chosen somewhat carefully, but once the position which gives the best echo has been determined, the room is shut up and forgotten.

Result of Time Lag

It is possible to produce these effects electrically. Since, as we have seen, the echo is simply the result of a time lag, it is clearly possible to produce electrical networks which retard all the signals by a certain definite amount, and then to mix these signals with the original ones in the same way as at present.

Such apparatus, however, costs several hundred pounds, a cost which is usually far greater than the rent of an echo room, and consequently the straightforward acoustic method is preferred by the B.B.C.

START A MUSEUM

NOVEMBER 14, 1922—over eight years ago—saw the first 2LO broadcast. What elementary sets and gear were used then; what progress has been made since! To-day's apparatus will look equally crude in less than eight years from now. Why not start collecting those components from your discarded sets?

Your Junk Box

If you are already an old wireless fan, somewhere in your junk box will be found some old basket coils—results of your early labours on a "spider." Then there is that old flapping coil holder; the hefty .005-microfarad condenser with plain knob—no vernier adjustment—or perhaps just one vane worked by its own knob.

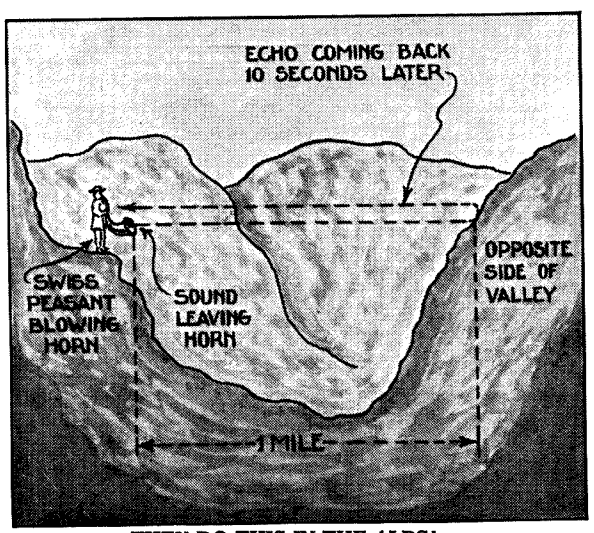
Again, you may still have one of those quaint sliding tuners, or an old crystal detector with its clumsy ball joint.

Even if you are entirely new to radio, if you are a true enthusiast you'll soon be hankering after the "latest." Some of your present gear must get obsolete. Use that gear as the starting point for your museum.

Who knows? Perhaps before long that screen-grid valve will look as ancient as the old bright-emitter.

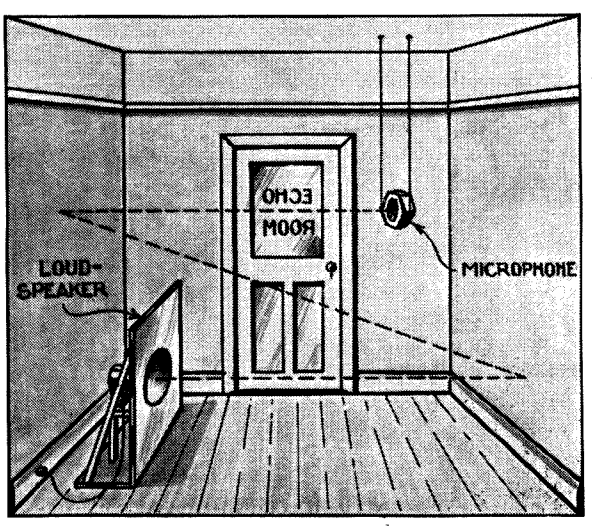
Just a cabinet in the corner of the den would soon become the pride of its owner, if each piece of apparatus no longer up to date were put in it and each component carefully labelled and dated.

L. D.



THEY DO THIS IN THE ALPS!

Illustrating long-delay echo between two mountains, due to the slow speed of sound waves



WHAT IS IN THE ECHO ROOM

There is little apparatus in the echo room used by the B.B.C., here you see the loud-speaker and microphone

WHAT'S RIGHT WITH RADIO!

WHEN one thinks seriously and dispassionately about broadcasting one marvels that so many things are right and so few wrong. Seldom one experiences a breakdown in the programme. The B.B.C. is constant and regular. It is one of the most dependable of our modern institutions.

It is inexpensive. For ten shillings annually one can get the best the country can give in entertainment every evening. During the year one may hear ten operas, each of which would cost ten shillings if we went to the opera house to listen to its rendering.

Nothing Extra to Pay!

One can listen in the greatest of comfort to the world's greatest comedian and there is nothing extra to pay for it. There were people who paid many pounds to listen to Sir Harry Lauder a few years ago. Now one whole hour of his best songs can be listened to through the receiving set. The catalogue would grow if one began to detail the expensive items one gets through wireless, and all for ten shillings a year.

Radio varies its programmes. No listener need fear that the B.B.C. will cram his brain with one subject to the exclusion of all others. There is music of all sorts to suit all types of musical minds, from the B.B.C. dance orchestra to the Queen's Hall concerts and operas from Drury Lane. There are talks on all kinds of subjects, from bee-keeping to housekeeping; from prehistoric subjects to futurist; concerning countries, customs; convictions from North, South, East and West.

There are learned talks to study groups and lessons to children; sermons and services to those who are religiously inclined. In sport one gets all kinds of commentaries on tennis, cricket, football, horse races, and what-not.

If variety is the spice of life, then the B.B.C. are giving it—and that without limit.

Some grumble at the Sunday programme and some at the Monday or Tuesday programme. What one forgets is that the B.B.C. has to please the Sunday person and the Monday person as well as the Friday and Saturday persons. But all tastes are catered for if we take a week into account.

And then if we asked ourselves how much we pay for, perhaps the ten shillings might burn in our pockets.

Ugliness and Discord

There may be hundreds of little things wrong with the B.B.C. to those who have eyes for nothing but ugliness and ears for nothing but discords, but it staggers one to think how many things are right with it.

The programmes are getting better; the listeners are growing in number. Whatever is wrong with other trades radio is still going ahead. And the best is yet to be.

When we hear of things that are wrong with radio, we might do no better than think of the things that are right! E. B. R.

A WHOLE STREET OF WIRELESS

COURTLANDT STREET, situated in the downtown district of New York, has become the rendezvous of thousands of radio fans. Here sets of all types may be purchased, ranging from ancient battery sets priced at 4s. to the latest all-electric consoles costing £50 or more.

Until a few months ago, when the Noise Abatement Committee became busy and put a stop to all excessive din, Courtlandt Street was, without doubt, the noisiest street in the world.

Appalling Din

Each store had a loud-speaker fixed in the street, and connected to a powerful set inside. The resulting din was appalling, speeches, orchestral music, bands, and announcements being heard at the same time, as each shop tried to drown its neighbour. Now the loud-speakers are installed inside, but the street is as busy as ever.

Most of the stores are owned by Jews who endeavour to undercut their rivals; this allows many bargains to be picked up by the shrewd purchaser.

Every facility is given the customer to test a set before purchase. In some of the shops sound cabinets are provided, in which a loud-speaker and the necessary leads are fitted; here one may hear the set in operation without disturbing others.

One store in particular has a rather clever method of testing loud-speakers. Attached to one of the walls is a framework containing several instruments all wired up ready for use. Should a customer be in doubt regarding the type required, he may hear several operated from the same set, a red light indicating which unit is working.

Since the Wall Street crash, the market has been flooded with all kinds of wireless gear, from complete working models to the smallest components. All in search of radio spares or novelties can find them in Courtlandt Street, in greater variety and at more advantageous terms than elsewhere.

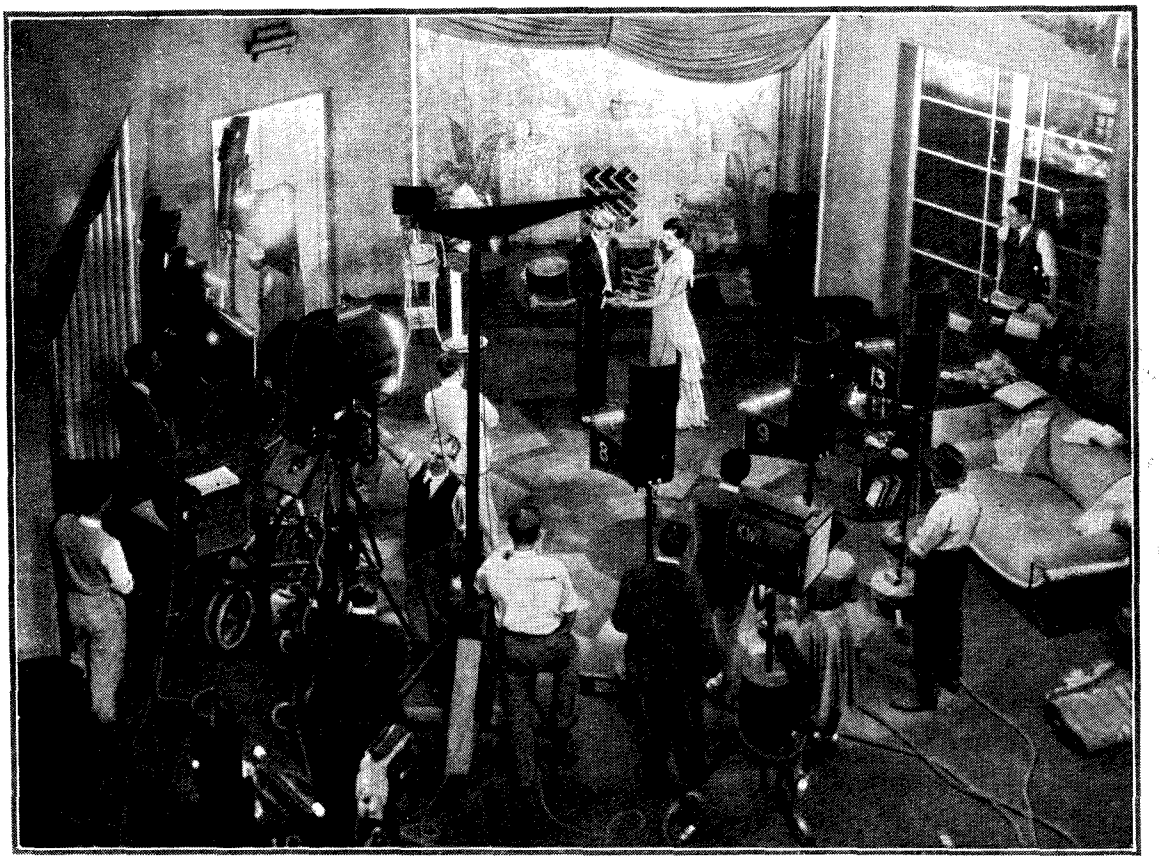
Naturally in a locality where competition is so keen, the dishonest salesman sometimes shows his hand.

A favourite trick consists in placing a set in the window, priced at a ridiculously low figure. The intending customer, scenting a bargain, asks to hear it, but is put off by the offer of a more expensive model. No amount of talk will induce the salesman to sell the set, which is only placed there to draw the unwary into the shop.

Plausible Manner

By his plausible manner a salesman can often persuade the customer to purchase something far more expensive than that individual intended when he first entered the shop.

The majority of the establishments, however, are out for honest business and will repair or exchange any defective article. Satisfied customers have spread the fame of Courtlandt Street far beyond the city limits, and to many thousands of Americans the words "Radio" and "Courtlandt Street" are synonymous. F. B.



PHOTOGRAPHING AND SOUND-RECORDING A TALKIE AT THE STOLL STUDIOS
This photograph gives a good idea of the complicated nature of talkie recording. The Visatone system is used in this studio

ADVENTURES OF A SOUND RECORDIST

IT is a long time since I put my pen to paper to tell of happenings in my local technical world. I have been "talkie" recording and so far have succeeded in recording four complete films without any serious difficulties.

Radio Analogies

Some of my experiences may be interesting to WIRELESS MAGAZINE readers, particularly as they will not only be able to note certain points I mention when listening to various films, but radio fans will find analogies to certain troubles they get in their own field.

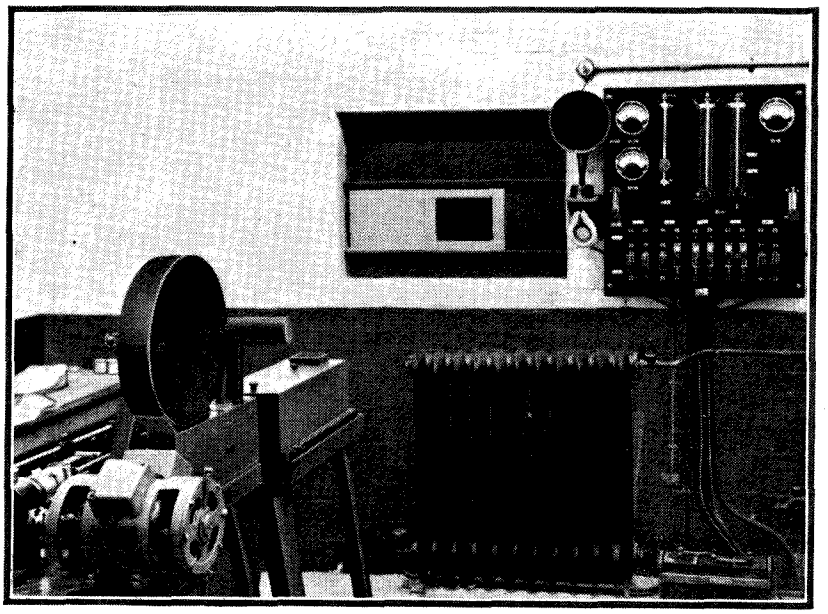
Only the difficulties of a problem really interest one, for with an early success one has the feeling that anyone could have done it. What always surprises me afterwards is the very long time it takes to solve a difficulty. However used to scientific problems one is, somehow or other the mind will not settle down and boldly say *that* is the reason, or *that* is the obvious solution.

This article is of particular interest because it is from the pen of Capt. H. J. ROUND, M.I.E.E., one of the best-known radio engineers in the country. He has, for the time being, forsaken radio for the talkie studio, and here discusses some of his early difficulties in recording sound. His remarks will be read with interest by all radio enthusiasts.

Quite Obvious!

You may think of the reason, but you do not quite believe it yourself, and consequently you mess about (with large expenses and overheads) and finally get out of the wood with a piece of apparatus that is quite obvious and obvious to all your friends.

TALKIE ADVENTURES—Continued



SOUND CAMERA ROOM AT THE STOLL STUDIOS
In a note referring to this photograph, Capt. Round says: "The radiator is nothing to do with the sound apparatus!"

First Troubles

I remember my first attempt at recording sound on film. A wheel with teeth pulled a film through a "gate," which was nothing more than two parallel pieces of metal sprung together to keep the film running flat. The wheel was driven through gearing from a motor and on the shaft of the wheel were other gear wheels, which drove the "take-up" for the film (winding up the film after exposure is always a nuisance).

I had not examined any other talkie apparatus deliberately—I never can understand a piece of apparatus until I have had a shot at the problem myself and found the difficulties; then I can look at the other man's job and see if he has solved them or not.

Speed Variations

Everything was set up and I made a speech of about a minute's duration, which was developed and then put through the same machine with a photo-electric cell attached, amplified up, and put into a loud-speaker.

Of that one minute's speech only one word was in the slightest way intelligible. Weeks of investigation took place; there was no doubt as to what the trouble was—speed variation of the film was the cause of it.

Motors were balanced and gears were recut, but not until we swamped out the variations in speed with flywheels and other devices did we get any sense out of the arrangement. Of course, others had done the same thing for the gramophone.

Even now I do not understand the exaggerated precautions one has to take with film compared with the very simple arrangements in a gramophone, or even a record-cutting table. Variations of speed on film are rather difficult to analyse out because one is always in doubt as to whether it is the "taker" or the "play off" that is at fault.

We initially solved the problem by the very crude and laborious method of taking photographs of a musical note produced by a valve-beat oscillator and then painfully measuring out with calipers the length of each successive wave along the film, and plotting the result. The resulting graph usually pointed to the particular cause of trouble.

A very beautiful little instrument called the Ashdown Rotoscope, which is a form of stroboscope, has lately replaced this method and we can now see any variation of speed taking place at once. That Rotoscope would have saved me many weeks of worry and labour in the early days had I known of its existence.

Wow

Slow-speed variations are called by technicians in the art a "wow," and they show up on piano music very markedly. (Do you remember the "wow" in the piano in *Blackmail*?)

Flutter

Higher speed variations are likely to take place at the frequency of the holes in the side of the film (which move at the rate of ninety-six per second), and these are sometimes called "flutter." They are very difficult to diagnose, but are usually the fault of the projector.

If we hear what we think is flutter —an uncleanness in violin and other continuous tones—we change to another projector, preferably one of another type.

I have one projector which suffers from flutter but has no wow, and another which has no flutter but a pronounced wow, and between them I can usually say whether the recording is good or not.

Wow from London

When the London transmitter sent out some talkie stuff on Saturday, March 7—by the way, some of the speech recording was done on our machines—a patch of music (not ours!) towards the end suffered with serious wow, which was so bad I really think the projection man must have leaned up against the flywheel on his projection outfit!

I remember an amusing interlude in the recording of one of our films. Music was recorded and then played off and several people were quite sure some of the stuff was out of tune. Wow of a slow type was declared to be present.

I could not depend on my own judgment with so many against me, so the composer and pianist were called in to listen. They reported everything O.K. The real trouble had been that the composer at that point had introduced something with a very modern touch into his music!

Weaving

A cause of trouble which is sometimes serious is called "weaving." Variable-density recording does not suffer seriously from this type of trouble, but variable-area recording, such as is used by R.C.A., has to be watched very carefully for it.

Film, when running, has a habit of swaying from side to side or weaving, and has to be restrained. Now this

A SPECIAL ARTICLE BY CAPT. ROUND

weaving effect can happen in the sound camera, in the printing, or in the projection. The total width of sound track is only 80 mils and it is quite possible, due to one of these errors, for half the wave forms to get outside the scene of operations—that is, outside the final light slot in the projector—with a result similar to setting your power valve at zero plate current by means of too much grid bias.

A bit of dirt on one side of the projector light slot will do the same thing.

If there are any S sounds in the film at all then they will become blasty if of any serious amplitude to start with. Variable-density recording can only suffer in strength, but not in quality.

Very Serious Trouble

And now I come to a final source of trouble which we discovered and which caused us more trouble than anything else. This trouble I lightly touched upon some months ago in WIRELESS MAGAZINE.

We suspected why it was occurring, but did not like to believe the theory until one day we proved it up to the hilt. During my early experiments I used variable-density recording and this particular fault never occurred.

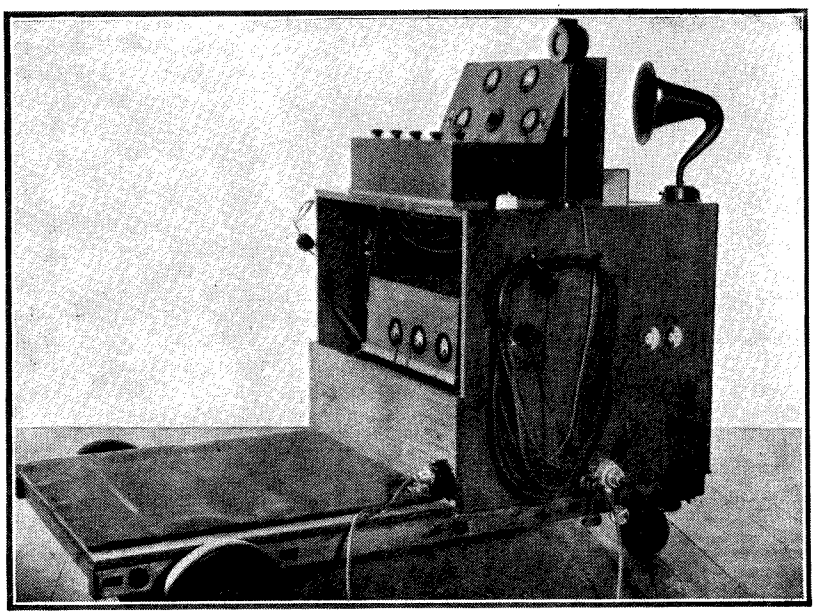
When we transferred over to variable-area recording we were careful to throw in all our previous experience in the way of frequency characteristics of amplifiers, etc., the tendency being always to exaggerate a little the strength of frequencies above 3,000 cycles, to make up for various losses.

Our amplifiers were good up to 8,000 cycles, but whereas with the Kerr cell these frequencies got recorded well, the oscillograph started falling off above 6,500 cycles fairly fast.

Puzzle of the Rasp

Our first recorded speech puzzled me greatly. The lower middle and medium high tones were all right, just as good as before, but every time an S or SH sound came along it was produced with a rasp. I expect everyone has by now heard the sound I mean—it often occurs in cinemas.

I heard a film the other day with Matheson Lang in it where his S sounds went all wrong with every word containing that letter, and it made the most solemn speeches really funny.



MICROPHONE AMPLIFIER AND CONTROL TRUCK

Another piece of the gear used by Capt. Round at the Stoll studios for the Visatone system of talkie recording

We promptly nicknamed the effect "shush," and we now take all steps to avoid it, but in these early trials we were very much puzzled to prove what it was due to and how to cure it. Examination of an S or SH sound indicates frequencies varying from 4,000 to 8,000 cycles and a single S will be shaped something like Fig. 1.

Memory recalled the fact I had had a similar effect on a broadcast receiver when a low-frequency valve had been set too near the bend, so that rectification was indicated.

How was this effect being produced in the film? One of my assistants solved the problem by developing a speech record in two halves, one half to three minutes and the second half to eight minutes.

The latter strip looked very nice—a clean black track such as one likes to see—but when we played it off the results were terrible: every S was distorted and blasting. On looking at these S sounds, however, nothing could be discovered by eye.

Then the three-minute strip was developed and on playing that off everything was all right. So then we took the eight-minute strip and reduced it chemically, the result being stuff even better than the three-minute strip. Obviously there was a meaning to all this and further experiments pointed out the fact that one must not only use a very fine slot of light for these higher frequencies, but the result of that fine slot must not be spoiled.

However fine a slot, if one over-exposes, due to halation and other causes, the photographic result is that of a wide slot.

The reason a wide slot in recording gives a bad effect can be seen by examining the graph of a sine curve shown in Fig. 2.

An ideally thin slot would give a curve of the shape of the black continuous line and the film would be black under this line only. But if for various reasons our light slot is really A B C D as in Fig. 3, then the blackness is underneath the curve graphed out.

Effect of Modulation

Now when playing off with a photocell the ideal record, the average line O is just the same whether the film is being modulated or not, whereas in the record with no modulation the average line is O, but with modulation it is P.

A D.C. component has been added to the modulation and one has to consider what this means when we have an S sound like Fig. 1; on top of the S sound is another component

TALKIE ADVENTURES—Continued

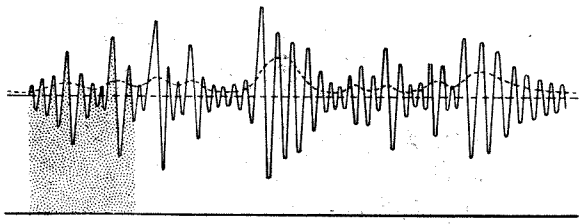


Fig. 1.—Characteristic wave form of the letter S

representing the shape of the curve. It is this shape which gives us the disagreeable S; its variation is rapid enough to be quite audible, as a sort of scrape.

Now here is the annoying thing. If one's film speed is limited, and one has a certain light slot, nothing on earth will enable one to record above a certain frequency without shush if a good density of track is required.

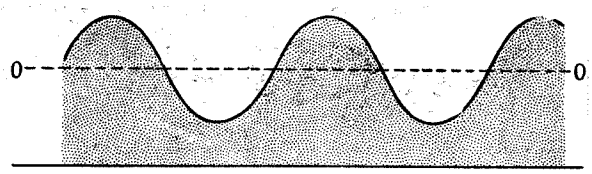


Fig. 2.—Why a wide slot in recording gives a bad effect

What we do is to obtain optically the best light slot we can, get as much light as we can, stop down our lenses as much as possible, and cut off all the frequencies above a certain value, hoping that those higher critics who demand up to 10 and 12 kilocycles will not be present. If we do not get the track black enough, then trouble occurs from ground noise.

When It Is Absent

A little reasoning shows that this shush effect tends to be absent on variable-density records, and if variable-area records were printed as lightly as variable-density ones the trouble could be eliminated.

At the moment it is an ever-present worry, and the trouble is not only in the original taking. If the printing is done carelessly so that there is light spread, due to films not being in contact, or again if over-exposure takes place, then the trouble appears.

Shush is a nightmare to the sound engineer who is honestly trying to keep his higher frequencies well up.

Shush on Broadcast Receivers

Since running into shush in films I have been finding it almost everywhere and one particular case of it is very important. I have two or three broadcasting sets at home—two at least have very sharp tuning—and the sharpest tuned one of the lot shows the shush effect to a very marked degree.

If I tune to Langenberg or Mühlacker, in each case with a strong local station near by, and if the latter is being strongly modulated, say by a speaker with a rather jerky voice, then every now and then I get a nasty splitting sound spoiling my foreign reception.

The nearer I have to tune to the local man to get hold of the foreigner, the worse the effect is, and I actually get it by mistuning quite a small amount from the carrier of the local station, although, in this case, of course, I get the local station's modulation as well.

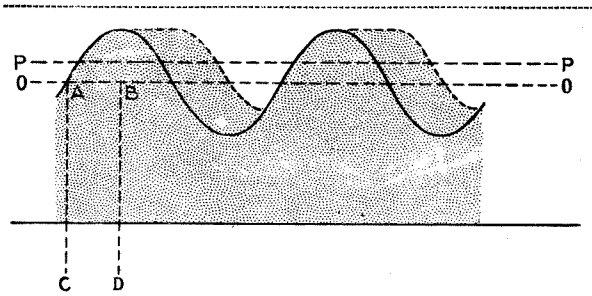


Fig. 3.—Effect produced when light slot is as thin as it should be

The reason for these effects is a very interesting one and points to a very necessary improvement in transmission. I first of all must make my apologies to Stenode disciples, because I am going to use ordinary side-band arguments.

Suppose A (Fig. 4) is the carrier of a loud local station and C is a side band casually produced by some modulation. The distance A—C represents the frequency of the interference note produced by the fundamental and the side band, and this we know is equal to the modulation frequency.

Now suppose B is a distant weak station and we want him free from trouble from A. The dotted line represents a rather ideal filter curve of my receiver tuned to get this distant station. You will notice that it encloses the side band C, which I have represented as stronger than B.

Side-band Reception

Nothing of the big carrier A is being received. A side band being received by itself without a strong carrier to heterodyne it cannot give any normal sort of result. A little careful thought shows that only the shape or envelope of the side-band curve is reproduced by the rectifier, and our friend the shush is being produced in a different way.

A lot of trouble in this direction would be avoided if all high-power stations made a definite habit of not radiating any frequency differences over 6 kilocycles from their carrier.

I know the sound purist will kick, but I honestly think that no frequencies over 6,000 cycles are of any real value in the appreciation of either speech or music. At the very best, by making such frequencies available one opens up a new field of annoyance due to accidental harmonics of lower frequencies.

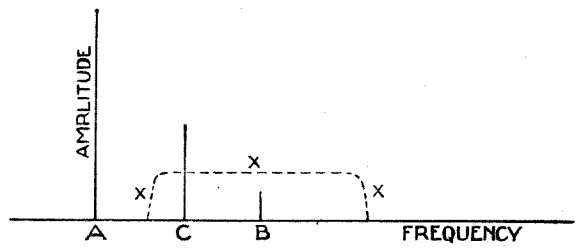


Fig. 4.—Carrier of local station with side band produced by modulator

UNDER MY AERIAL

HALYARD'S Chat on the Month's Topics

Illustrated by GLOSSOP

HERE we are once more on the threshold of summer. Our portable sets have been put into going order, and we have made many plans regarding reception in the open. Our side of the business is complete. We are ready to go out and listen with sky and cloud above

Reception in the open

us, green grass beneath our feet, and glorious views all around us.

What about the other side of this entrancing business though? What special arrangements have been made for our summer programmes?

All I know at the moment is that there is to be a considerable reduction in the number of talks this summer, and that certain regular technical talks on various subjects are likely to be replaced by talks of a general type.

A reduction in the time allotted to talks is no doubt a good thing, especially if we get in return something of the light entertainment variety. What do we want in our summer programmes, though? Could you sit down and draw up an ideal programme immediately on request? I doubt if I could.

When I am listening in the open I like light, jolly music best of all. I do not care for talks, nor for songs. I must say this, however. Several of our summer outdoor broadcasts, such as the Derby broadcast, and the Bisley King's Prize broadcast, are amongst the greatest wireless events of the year.

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Watchet

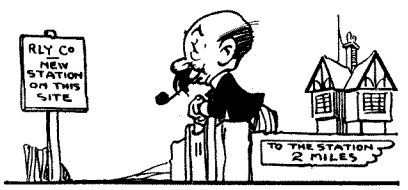
Jolly good news indeed it was that the P.M.G. had granted an additional £157,000 to the B.B.C. and that, in consequence, the B.B.C. would be able to proceed with the erection of the new Western Regional station.

As far as can be gathered at the present time the likeliest site for the new station is Watchet on the north coast of Somerset. Just take out your atlas and find out exactly where Watchet is. Run your finger down the north coast of Somerset—Weston-super-Mare, Bridgwater Bay, Watchet.

Interesting position, isn't it? In some respects Watchet ought to be the most interesting of the regional stations. On the north side o it there is the Bristol Channel. Clearly the Watchet waves will travel well northwards across the Bristol Channel, but how far will they penetrate into mountainous Wales?

From observations taken round broadcasting stations in America, it is certain that the Watchet transmissions will travel best up the Severn estuary, so Bristol will be very well served by the new regional station, as will also Gloucestershire.

My meteorological friend thinks



Likeliest site for the new station

that the Watchet transmissions will travel exceedingly well down the Thames valley, a frequent track of thunderstorms coming in from the west.

When we have Scottish Regional working, and Western Regional working in addition to the London and Northern Regional stations, things will be decidedly interesting. I wonder whether you would like to surmise on the best place in England at which to hear all four "Regionals."

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Shorter and Shorter

Isn't it somewhat strange how, as wireless progresses, wavelengths become shorter and shorter? I wonder what is the actual lower limit of wavelength practicable in wireless.

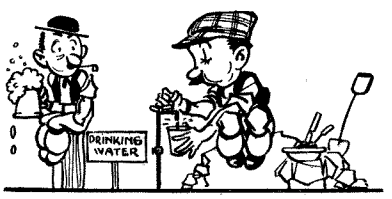
In the early days it was generally believed that the longer the wave-

Franklin Dyall, the well-known actor who played in "The Limping Man," has taken part in radio plays

length the greater the distance the signals would travel. For example, fourteen years ago, when U.S.A. engineers built the famous Arlington station for communication with Paris, a wavelength of 17,000 metres was chosen as the best possible. At the present time Arlington uses a wavelength of 18 metres and does its work on less power.

Rather a big drop from 17,000 metres to 18 metres, isn't it? Eighteen metres does not represent rock bottom in wavelengths, though. Not many weeks ago, a successful demonstration of wireless telephony across the English Channel took place on a wavelength of 18 centimetres.

Just imagine that now! Eighteen centimetres, one inch less than the width of a page of WIRELESS MAGAZINE. How is it that telephony is possible on such a very short wavelength?



Does its work on less power

Of course, in the very earliest days of wireless, Hertz and other experimenters used very short wavelengths, but then those early experimenters were only experimenting in the

UNDER MY AERIAL—Continued

laboratory. They were transmitting and receiving on very short waves, but they were not using those waves for telegraphy or for telephony.

Successful telephony on a wavelength of 18 centimetres seems almost incredible, but it has been done, and who can say but that wavelengths even shorter than 18 centimetres will be used in the future?

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A Shock

Yesterday afternoon I had one of the worst shocks of my life. Even

I switched off the current

to-day I feel quite dithery and hot about the hands. It was all very foolish of me, and I shall not do anything quite so foolish for a long time.

I was working with my new mains receiver in the workshop-laboratory I am allowed to use sometimes. As I anticipated having to work from a wall plug or from an electric-light socket, I had made two supply leads for my set.

One lead had a plug either end. The other lead had a plug at one end for connection to the set and, at the other end, a fitting to fit in an electric-light socket.

It seemed to me a good idea to provide myself with these two alternatives, but now I am not quite so sure, for I got a very tidy shock from the 250-volt mains through using one of those two alternatives.

I had plugged the electric-light fitting into a socket and switched on the current at the wall switch and at the set switch. Then, in order to make a change in the set, I switched off the current at the set switch. After that, I most foolishly took out the leading-in plug from the set. Of course the two prongs of this plug were live and, of course, I accidentally touched them.

Jump? No, I didn't jump. I felt the current though in my right hand, which touched the plug, and I thought I felt the current in my left hand. I did not feel the current anywhere else in my body.

I admit it was most foolish of me and I am telling you of my foolishness so that you can be on your guard against doing a similarly foolish thing with your mains set.

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Four Volts Only

Who are the Electrical Standardisation Committee and have the members of that Committee ever carried accumulators up street and down road to and from a battery-charging station?

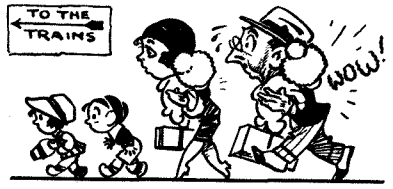
No doubt this Committee is doing useful work in attempting to standardise electrical apparatus of all kinds, but I am afraid the majority of us will not agree with their recent recommendation that all wireless receiving valves should be standardised with 4-volt filaments.

There are, as you know, three types of valve as regards the filament voltage—namely, the 2-volt, the 4-volt, and the 6-volt. I have valves of each type in my house and, whereas the 2-volt valves are in constant use, the 6-volt valves are used very occasionally and the 4-volt valves never at all.

I think my use of these valves is typical of most of us and, if standardisation can be obtained, surely the useful 2-volt valve should be made standard.

If 4-volt valves be made standard it will mean that, in carrying our accumulators to and from the charging station, we shall have to do just twice as much work each year as we

A well-known comedian and entertainer—Leslie Weston. He is a frequent broadcaster



Carrying our accumulators

do at present with our 2-volt valves.

I asked George, my technical adviser, in what units you measured the work in carrying accumulators to the charging station—foot-pounds, watts, or horse-power—and he replied that he wasn't quite sure but that he had always looked upon that sort of thing as horses' work, and that the unit ought to be the gee-up.

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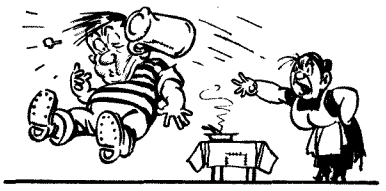
Doomed Again

"You look as if you have been doing a good deal of reading to-day," said George as he came into my wireless reception room last night at his usual hour. "The place is a wireless



Using a transportable receiver

library. Anything new from all this reading?"

"No, George, plenty of good, honest stuff, but nothing you could call really new. The most interesting bit of information I can give you is that the outdoor aerial is doomed," I replied.

"What! A—gain?" said George.

"Don't you think the outdoor aerial is doomed, George?"

"Mine isn't."

"But I thought you were using a transportable receiver these days."

"So I am, with aerial and earth—saves valves and high-tension current. While ever I have a garden, there will be an aerial in that garden, and I shall use that aerial."

"Don't you think the outdoor aerial is unsightly, George?"

"Mine isn't—to me."

"Perhaps not, but it may be to others."

"And theirs may be to me. I am only one. They are many. In point of numbers I am the less offender. It's all a question as to whether you

HALYARD ON THE MONTH'S TOPICS

look at the aerial from underneath or from the side."

"Suppose the use of the outdoor aerial were prohibited, what would you do then, George?"

"Emigrate."

"No, seriously, George, don't you think it might be a good thing in some respects if the outdoor aerial were prohibited? We might have less oscillation to contend with."

"Possibly, possibly. I'll tell you what I should do if the outdoor aerial were prohibited."

"What, George?"

"Buy shares in all the valve companies."

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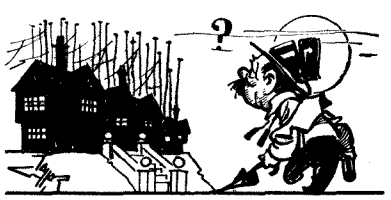
More Listeners

If you want to put a real poser before that wireless friend of yours who is fond of figures and of figuring things out in advance, ask him this question. What will be the number of new receiving licences taken out



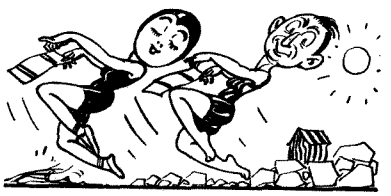
I saw many aerials

during the calendar month following the opening of the new Northern Regional twin station?

A recent journey of mine by road through the West Riding of Yorkshire and back through Lancashire convinced me that wireless could be, and ought to be, a great deal more popular in the industrial North. In some places I saw many aerials, but, taking the journey as a whole, I fully expected to see more evidence of the popularity of wireless.

The position in the north has been that, whereas the Manchester district has had an excellent broadcast station, and whereas Leeds, Bradford, Liverpool, and Sheffield have had low-power relay stations, the greater part of the region has had to depend on long-wave Daventry.

With the opening of the new Northern Regional station, however, the North will have a very greatly improved broadcast service, and undoubtedly this improved service will bring about a big increase in the number of listeners.



A touch of summer madness

A Spitfire

There are no less than six 2-volt accumulators in my house just now. Oh, yes, they all belong to me, but I do not usually have so many in the house. I have been using one of my oldest valves for test purposes, a 6-volt valve, and I needed the extra accumulators to work the 6-volt filament.

Of these six 2-volt accumulators, five are very well behaved cells, but the sixth is the black sheep of the family. It has a nasty little trick of firing acid out through the small hole in the vent plug. I have tried to find out the reason why this one accumulator behaves in this somewhat vicious fashion, but I cannot solve the mystery.

If I move the accumulator from one position to another, the result is that a drop of acid is projected through the vent hole. I do not mind so much if the acid drops on my hand, or on my old coat, but I feel disturbed when the acid drops on the table, or on some of my wireless gear, or on the carpet.

Possibly this curious trick of the one accumulator may be due to a touch of summer madness. Accumulators do behave rather differently in summer from what they do in winter Perhaps I ought to add a quantity of distilled water to this accumulator, since it may be the first to feel the heat. Yes, I'll try that.

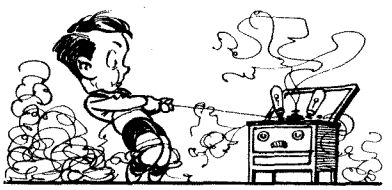
Every listener must know the name of Walton O'Donnell, who is conductor of the B.B.C. Military Band

◆ ◆ ◆

Soldering Tags

Do you ever make use of soldering tags when you are wiring up a new receiving set? I have somehow or other adopted the soldering tag for the time being and I am quite keen on its use.

You know what a soldering tag is, of course. Neat little thing, isn't it?



You can unwire the set

Most manufacturers supply soldering tags with component parts, such as condensers, grid-leak holders, high-frequency chokes, etc. I have always looked upon this free supply of soldering tags as a distinct invitation to use them.

Some constructors may tell you that soldering tags are fiddling little things to deal with. I don't find them so. All you have to do with a soldering tag is to place it on your workshop bench, or on the gas stove, touch it with a little soldering fluid, run a little solder on it, and then solder the wire to it. I rather like putting soldering tags at the ends of my connecting wires.

There are two great advantages in using soldering tags. First, you are certain that you will not damage any component part of your set by the heat from your soldering bit. Secondly, if you wire up with soldering tags at the ends of your connecting wires, you can unwire the set very quickly and without using your soldering bit.

In Berlin recently a hairdresser was summoned for causing interference with radio programmes by negligent use of a hair-drier. The summons was dismissed after lengthy discussion and payment of costs by the hairdresser, but he was warned that a repetition of the offence would result in his imprisonment. That's the stuff to give them!

GETTING AMERICA ON YOUR SET

Provided that you can get at least thirty or forty stations at good strength on the medium waveband, you should have no difficulty in picking up American stations and, as explained here by Kenneth Ullyett, American station reception is the spice of broadcasting.

"IS it possible to get America on my set?" "Must one sit up to the early hours of the morning in order to get Transatlantic stations?" "Do I need a short-waver in order to get America?" "Whereabouts on the dial do I find the medium-band American stations?"

These are all questions which I have been asked during the last few weeks by listeners who, not deterred by the fact that summer is on us and that any long-distance reception is naturally more difficult, are out to get some American stations just to prove that their sets are efficient.

Get Europe First!

I do not want to sound pessimistic, but it is hardly worth while encouraging owners of very small sets—those of a type which already can get only half a dozen or so Continental stations well—in the search for American broadcasters. Freak reception is not an unknown thing, but generally speaking if a set cannot receive European transmissions, then one cannot logically expect it to make sure of America.

If you have some kind of short-wave adaptor, or if you have a short-wave detector which could be added to any ordinary straight set, then, of course, you can get the American transmissions which are so prolific below 100 metres. There are W1XAZ on 31.35 metres, W2XAF on 31.48 metres, W2XAL on 49.67 metres, and all the rest of them, right down to the very short wavers such as W2XAD on 19.56 metres.

But the average man has not the necessary apparatus to get down to the short waves and, perhaps, too, he will not want to be bothered at this time of the year, when there are other attractions than radio. Between 250 and 500 metres there are several American stations to be had, even if you do not want to stay up late and begin your Transatlantic searching at 11 o'clock at night or thereabouts.

The best way to find these is to use well-known stations on the dial as landmarks in getting the Americans.

After all, this is just what you do when logging the more awkward European stations. Little stations like Archangel which, naturally, will be rather difficult to log up at the top end of the scale on 511 metres, are always found by plotting their positions by reference to some big station such as the 20-kilowatt Vienna transmitter on 517 metres. This is what you should do with the Americans.

Let us start at the top end of the dial and see whereabouts half a dozen easy-to-receive American stations—such as WEAF, WJZ, WGY, KDKA, WBZ, and WPG—come in with respect to well-known Continental transmitters.

First pick out Rome on 441 metres and, choosing a time when the big Italian is "off the air," shift the dial up a few degrees, where you should find WEAF. Just above is Lyons on 466 metres, and these two stations will guide you to WEAF's 454 metres.

Now we can drop down a little to Glasgow on 398.9 metres and a little below Frankfurt on 390 metres. Between these two transmitters you will find the Boundbrook (New Jersey) station, WJZ.

Before Bedtime

Lower again, between Manchester on 376.4 metres and Toulouse on 385 metres, is WGY, Schenectady, New York. This station is coming in very well at the moment and although subject to fading, is quite easy to get from between 10.30 and 11 o'clock at night until the early hours of the morning, if you like to stay up so late.

KDKA is a station which you must get in order to justify your American reception and, fortunately, this now is also an easy station to receive.

Go to Bordeaux on 304 metres and a fraction of a degree above, when Bordeaux is not working, of course, you will find KDKA. KDKA's wavelength is exactly 306 metres, and just above it is Cardiff on 309 metres. On the other side of Bordeaux on 303 metres is WBZ, the Springfield (Mass.) station, very well known and, occasionally, very easy to get.

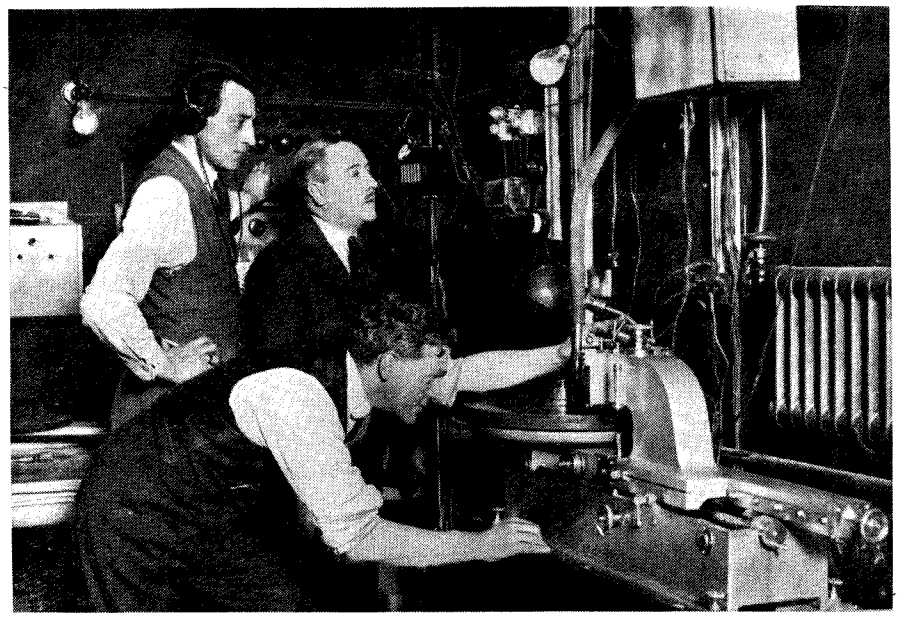
Lowest "Medium" Station

The lowest wave station which you will receive, on the medium band, is the WPG transmitter at Atlantic City, which works on 272 metres. This is just between London and Heilsberg, but both these transmitters will have to be closed down, unless your set is abnormally selective, before you will bring in Atlantic City.

A wavemeter is a very handy thing to have when spotting the positions of these American stations accurately, but the relative positions with respect to the European stations I have indicated here should be a help.

Gramo-Radio Section

A SPECIAL FEATURE FOR THOSE INTERESTED IN THE ELECTRICAL REPRODUCTION OF RECORDS



BEHIND THE SCENES IN A RECORDING STUDIO

This photograph shows sound engineers at work in a recording room. The wax "master" can be seen on the right; one of the engineers is adjusting the cutter

HOW MANY VALVES SHOULD BE USED?

ONE of the debatable points about the radio gramophone centres round the number of valves. An examination of the range of present-day machines shows that many firms favour three valves, one or two trust two valves and the more enterprising firms employ four or five valves.

Minimum Number

Actually, the very minimum number of valves for an instrument capable of reproducing gramophone records and broadcast programmes is two. The first of these valves would be the detector when the machine acted as a radio set, and the first low-frequency valve for gramophone reproduction. A switch can readily be arranged to convert a detector with a grid leak and condenser to a negatively-biased low-frequency valve.

Such a two-valve radio gramophone shows to better advantage with records than when receiving Broadcasting. This is because the voltage from the pick-up is likely to be greater than the voltage of a wireless signal, unless the local station is very close at hand.

It is quite possible with a pick-up of good sensitivity to load fully a super-power valve preceded by one stage of transformer-coupled low-frequency amplification.

If the listeners' requirement is local-station reception of broadcasting, and moderate volume reproduction of records, the two-valve radio gramophone is well worth considering.

When we come to consider more exacting radio requirements, such as can be fulfilled only with four or five valves, we find very few really satisfactory radio gramophones.

While it is true that two valves, consisting of a stage of low-frequency-amplification, transformer-coupled to a power output valve, serve very well for satisfactory reproduction of gramophone records it is far from true that two valves will meet most radio needs of to-day.

In the first place, the absence of any high-frequency amplification means that an efficient aerial and earth system must be fitted up. Many people object to an outside aerial wire and many more have not the facilities for such an erection. Two or three stages of high-frequency amplification obviate the need for an external wire, and a radio gramophone so equipped can reproduce foreign programmes at full loud-speaker strength, using only the mains wiring as an aerial.

H.F. Amplification

Many of the radio gramophones at present available provide insufficient selectivity for modern requirements. This is usually because there is only one stage of high-frequency amplification and consequently only two tuned circuits.

From all points of view, the really good radio gramophone should have at least two stages of high-frequency amplification. Assuming a detector and one power output stage, this means four valves as a minimum for complete satisfaction.

A. S. H.

GRAMO-RADIO QUESTIONS

If you want any information on gramo-radio or gramophone matters you are invited to make use of our information bureau. Full details and a coupon will be found on the last page of this issue.

The First Five Thousand

WHITAKER-WILSON has now listened to five thousand sides of different records for the benefit of "W.M." readers. In this article he discusses how he would compile a library of records.

AS a general rule, articles in WIRELESS MAGAZINE are written first and illustrated after, which seems to be quite a sane and sensible course of procedure to adopt. In this case, however, the reverse has been the method; I am writing this article to the illustration or, at least, the illustration has given me my main ideas.

Going Begging!

As a matter of fact, I was actually discussing this month's article with the Assistant Editor when this picture was brought to his table; I instantly begged for it.

I do not know who the lady is but may I suggest, if it be not too late symbolically, that she is Miss 1931? At all events, she appears to be choosing records.

If she really wants to know anything about records I think I can tell her; I ought to be able to, for I have reviewed two thousand five hundred of them or, to make it look more imposing still, I have heard five thousand *sides*.

I have just been looking at the various headings under which I have reviewed these five thousand sides. They have undergone some amount of change since we first devised them. We believe in change here; we do not believe in stagnation.

I wish there could be more variety in records; of the quality of them, on the whole, I cannot complain, though occasionally a perfectly good matrix is spoilt by the stuff the recording needle scratches on to it.

The Right Way

Although there may be some definitely bad records, so many are issued that it is easily possible to set about collecting for a really good library if one goes about it the right way.

I cannot claim to have done it myself, but I think I can see how it might be done. If I were the lady in the picture I think I should try to collect a few good records, using the headings we print as a general sort of guide. May I take them in order?

The first section is sacred music. Not everybody is interested in sacred music, of course. Even so, I think it is worth while—apart from any matter of religion—if only on the grounds that the greatest composers have all written it. A number of hymns, carols, and anthems appear now and again, which must appeal to people or they would not continue to be issued.

I am not thinking of them in particular; my thoughts are here centred upon the oratorios, an extraordinary number of which have excerpts recorded. Mendelssohn's *Elijah* and Handel's *Messiah* are recorded *complete* by Columbia, and most of the movements by H.M.V., likewise Bach's *Mass in B minor*.

Expensive Business

To acquire these in their entirety is rather an expensive business, but the most attractive numbers are well worth while thinking about.

Next on the list is the classical orchestral music. Here it is difficult to make any actual suggestions because so much is recorded, a great deal of it existing at least in triplicate. No library can, however, possibly be complete without the inclusion of good classical records.

Unless you are really "up" in classical music you may be a little dismayed at the vast quantity of it that appears in the lists of the various houses.

My suggestion to you is that you combine wireless and gramophone theoretically, just as you combine them practically by buying a radio gramophone. By keeping a keen eye on the programmes you can learn much. If you chance to hear an orchestral work that really compels your attention, make a note of its name and composer and turn it up (under the composer's name is best) to see if it is done.

You will find, in many instances, that a really popular work will be repeated before very long, and you may have another opportunity of hearing it. The second hearing may decide matters for you, and you may make a purchase that will always give you pleasure.

Grand Opera

Then, again, there are the grand opera records. If you are attracted by grand opera you cannot do better than study the activities of your nearest opera-house during the season. To hear an opera is generally to be caught by at least one big aria.

To buy operatic records haphazard is a risky proceeding unless you really know what you are doing, but when you have heard a song in the flesh, so to speak, you need not fear to act precipitately.

Light operatic works do not need quite such careful choosing, because you are more likely to know what you want. They have been issued in hundreds. I suggest that you make friends with a gramophone record dealer and ask to hear more than one version of the same work. I do not think you will experience any difficulty in the matter; in these keen days dealers are anxious to please.

Knowing the Singer

It is unwise to order a record of a song you happen to like unless you are certain of your singer. You will be surprised, if you listen to the same song sung by two different people, how much difference there is. I wish I had space enough to make comparisons in the gramophone record columns; I should compare and contrast in a very outspoken manner.

There are many people who like military band records. Personally I loathe them, merely because a sharp pitch is used which makes me

feel wobbly inside. Nevertheless, there is a great use for these records. Moreover, I have rarely heard a bad one. The standard of military orchestral playing in this country is extraordinarily high.

Those who are really keen about these bands generally know which to look out for; I think the *band should be the guide* in the majority of cases.

Military Band Music

One word of advice. Avoid arrangements for military bands as distinct from music written for them. You may not always be able to be certain as to whether a work is really military band music or not; if you see the work mentioned in a catalogue as being played by a military band *as well as* by a symphony orchestra, do not buy the military band version. I am sure you will find that good advice.

As to organ music, I scarcely know what to say. Cinema organ music is generally well recorded, but I detest it so cordially that I shall not be honest if I say anything nice about it.

If you are interested in the better reproduction of gramophone records take care to read this section of "Wireless Magazine" each month

MISS 1931 CHOOSES HER RECORDS

With very little trouble a good library of gramophone records can be got together—but you must buy your discs with discrimination

As to real organ records, just one here and there is moderately successful. The organ has never been recorded satisfactorily, neither has it ever been broadcast well. My advice to you is that you try to hear a good recital by a good organist, if you know where there is one, and leave it at that.

Fine Piano Records

Piano records are another matter altogether. It is possible to obtain some very fine ones. Here I think you must go by your composer. If you want Chopin, for example, you must use discretion. I go even so far as to suggest that you ignore the question of price in this instance.

Supposing you want his *Waltz in A flat* (he wrote two, as a matter of fact, but I mean the popular one), naturally your thoughts turn to Pachmann, the greatest Chopinist who has ever lived. He is not the only one, however, by a long way. I am sure the only method is to ask your dealer to let you hear more than one version of such pieces.

All this takes time, of course, but if you want your library to be successful, you must not mind going to some trouble to make it so.

For Leisure Hours

With regard to light orchestral music, this embraces such a variety of works that I can scarcely offer you advice. Although I am never keen on arrangements for orchestra of works not intended for it, I should be merely pedantic if I sug-

THE FIRST FIVE THOUSAND

(*Continued from page 507*)

gested you avoided purchasing records of this description.

Light orchestral music is for the leisure hours; I never have any, so I do not listen to light orchestral music. You may, of course, be more fortunate.

Then there are the funny records. I am ashamed of my humorous record column very often.

With well-known comedians you are generally safe; they rarely give you rubbish. On the other hand, these so-called humorous descriptive records are so utterly bad that I have rarely been able to recommend the purchase of one of them. Of all the various kinds of records that are published, these are the worst.

Finally, the dance records, of which there are thousands. Even with them I suggest careful buying. Simply because a dance tune has a life of six months at the most that is no reason, that I can see, why it should be bought carelessly.

Listen to the dance music on the wireless and get your facts—I mean the names. Then ask to hear more than one version. I do my best to offer a guide and have taken to "starring" outstanding dance records, giving my reasons in the reviews. Sometimes it is on account of the rhythm, sometimes it is the tone of the band, sometimes the recording appears to me to be likely to reproduce well for dancing purposes.

The question is always whether you require the record for dance purposes or merely because you like the tune.

A NEW INDUCTION MOTOR

By CAPT. H. T. BARNETT, M.I.E.E.

NOT only on account of their lower cost, but also because of their great quietness in running, absence of wearing parts and remarkable constancy of speed under varying load, induction motors have displaced the commutator type wherever alternating current is available.

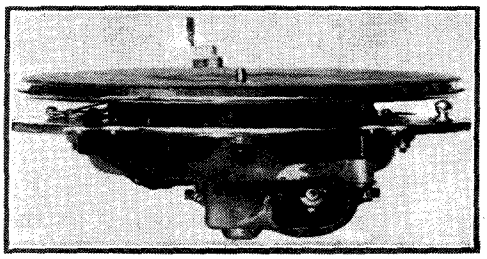
Several months ago the well-known Garrard factory issued a motor of this type. I got one of the first and have had it in use ever since. Its performance leaves nothing whatever to be desired.

In workmanship it is the best that Britain can do and in design it leads by several points anything previously produced.

All the main oiling is done through a hole down the record spindle, on the top of which there is a removable cap. The only other lubrication necessary is to the governor bearing centres, easily reached.

From the purchaser's point of view perhaps the most useful thing about the design is that the motor may be used for any voltage between 100 and 250 volts and for any periodicity between 40 and 60 cycles.

Sent out adjusted for 200 to 250 volts, it is only necessary to alter the position of a small link coupler (accessible by removing the turntable) should it be desired to work the motor at a voltage in the neighbourhood of 100.



A BRITISH INDUCTION MOTOR

The Garrard Induction Motor is suitable for most A.C. Voltages without alterations. The price is £4 17s. 6d.

The motor, like the Paillard, is not synchronous, the drive being due to the generation of foucault currents in the periphery of a drum attached to and rotating at the same speed as the turntable.

The power of the drive is sufficient to permit considerable dissipation of energy in the centrifugal brake and therefore the speed at any setting of the regulator varies very little indeed.

DEMONSTRATION RECORDS

SINCE the production of *Finlandia* (Symphony Orchestra, H.M.V. C1827, 4s. 6d.), there has been no outstanding record for showing what the ordinary gramophone can do as a maximum performance all over the scale and with various kinds of tone, from drums to piano and strings, until the issue in February by Parlophone of *Golden Memories of Grieg* (E11063, 4s. 6d.).

Terrific Drum Roll

It begins with the terrific roll of the drums at the opening of the Grieg Concerto, and then goes on to the beginning of the piano part. I never before heard such drum or piano or orchestral tone come out of my Perophone.

Get this record if you wish to show the best an acoustic gramophone can do, but if you put it on radio amplification *start it with the volume control half off.*

A record that on my radio machine shows bass brass tone as I never heard it before is *Fire and Blood March* (Parlophone E6389, 2s. 6d.).

H. T. B.

THE YEOMEN OF THE GUARD

LOVERS of Gilbert and Sullivan operas will welcome the new abridged version of *The Yeomen of the Guard* recently released by H.M.V. on six 10-in. records at 3s. each.

Many wireless favourites, including Stuart Robertson, who takes the part of Sir Richard Cholmondeley, and George Baker, feature in an excellent cast. This version is conducted by Dr. Malcom Sargent, the young conductor who is so often heard over the radio.

Excellently Recorded

The whole work is excellently recorded and is well worth its moderate cost. An album to hold the six records can be obtained for 3s.

An excellent guinea's worth of real music.

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.

Sacred Music

All Hail the Power of Jesu's Name, Westminster Central Hall Choir, with organ, 3s. **H.M.V. B3728**

And *A Few More Years Shall Roll.* Personally I should have chosen hymns with more sense in them than these have. I dislike both. The recording is below H.M.V. standard and the record has a bad surface noise.

Church's One Foundation, St. James' Church, London, N.W., 1s. 3d. **IMP 2425**

And *Fight the Good Fight.* I should have placed the latter with *Onward Christian Soldiers* had I anything to do with it. Quite well produced.

Holy, Holy, Holy, St. James' Church, London, N.W., 1s. 3d. **IMP 2424**

This and *Onward, Christian Soldiers* comes from the choir of St. James', West Hampstead. Both are well done but strangely ill-matched. This is a reverent hymn; the other is a piece of Victorian ecclesiastical vulgarity.

★**Jubilate Deo,** Monks Choir of St. Pierre de Solesmes Abbey, 6s. 6d. **H.M.V. D1979**

See the review of the *Kyrie Eleison*; the remarks apply here. Again, I suggest you ask to hear it.

★**Judas Maccabaeus** (Handel), Malcolm McEachern, bass, with orch., 4s. 6d. **COL DX224**

Arm, Arm, Ye Brave, and also *Honour and Arms* (Samson).

MALCOLM McEACHERN

Excellent singing of Handel with a well balanced accompaniment. Congratulations to Columbia on a fine piece of recording. It should sell excellently.

★**Kyrie Eleison, Agnus Dei,** Monks Choir of St. Pierre de Solesmes Abbey, 6s. 6d. **H.M.V. D1971**

This is really beautiful. I have loved plainsong all my life, but I have rarely heard it sung with a finer spirit than here. Ask to hear it; I feel you will be captured by its atmosphere. You can almost smell the incense.

★**Through the Darkness,** Peter Dawson, bass-bar., with orch., 4s. 6d. **H.M.V. C2099**

This is the great bass solo from Rossini's *Stabat Mater.* I hate it in English, but that is no reason why he should not sing it in English. He makes a fine job of *Rolling in Foaming Billows,* from Haydn's *Creation,* on the other side. A splendid record. Congratulations to him and H.M.V.

Here you see Peter Dawson, the popular bass singer, playing one of H.M.V.'s latest machines

Grand Opera and Classical Arias

★**Ballo in Maschera** (Verdi), Felipe Romito, bar., with orch., 2s. 6d. **PHONY P113**

He is splendid in it and also in *Credo* (from Verdi's *Otello*). There is a fullness of tone that is very satisfying. I consider this a very fine record.

★**Chanson Indoue,** Amelita Galli-Curci, sop., with orch., 6s. **H.M.V. DA1164**

Exquisitely rendered; her voice is very beautiful and her phrasing so sane and sensible. I admire it intensely.

GALLI-CURCI

★**Cavalleria Rusticana,** parts 1-4, Grand Opera Chorus, with full orch. (d.s.), 2s. **BRDCST 5225-6**

Two complete discs of well-sung opera for four shillings, all told, is very cheap. Excellent recording.

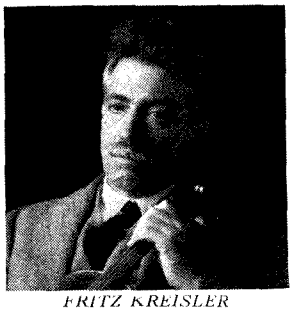
★**O Love from thy Power,** Marian Anderson, cont., with orch., 2s. 6d. **PHONY P112**

From Saint-Saëns' opera *Samson and Delilah. This is something like!* Come on, Phonycord, this is admirable. Please let us have some more. This is worth anybody's buying! A very good voice, by the way.

Chamber Music

★**Chanson Louis XIII,** Fritz Kreisler, violin, with piano, 6s. **H.M.V. DA1139**

And *La Précieuse,* both by



FRITZ KREISLER

Couperin. A very fine Kreisler record that should appeal to many lovers of this virtuoso. Ask to hear it, especially those of you who yourselves play the violin. You will learn something in tone and neither work is really technically difficult.

Light Opera & Songs

Bonnie Banks of Loch Lomond, Arthur Vivian, bar., with orch., 2s. **BRDCST 5228**

And *Annie Laurie.* Both good, but hackneyed.

Captain of the Team, Raymond Newell and chorus, with orch., 3s. **COL DB430**

And *Song of the Highway.* Both excellent in their way. I am not *very* enthusiastic but the record may please many people.

RAYMOND NEWELL

CHOOSING YOUR RECORDS—Continued

Half-caste Woman, Noel Coward, bar., with orch., 3s. **H.M.V. B3794**
Not impressed, either with his singing or his music, the singing especially. He wants *lessons*. I thought he was a playwright; it seems to me that he is playing a game of Jack-of-all-trades. This is not at all a success, in my opinion. There is another one on the other side called *Any Little Fish*. Sounds like *fried* fish should sound when recorded!

I'm Yours, Betty Bolton, with orch., 1s. 6d. **WIN 5247**
Of the type she generally sings, this is as good as she generally is. That is not very complimentary but I cannot honestly say anything nicer.

Is Yer Mammie Always with Ye? Kit Kenn and Male Quartet, with orch., 3s. **COL DB418**
An old stager, of course; it is a bit stodgy. I much prefer *He's Been a Long Time Gorn* on the other side, but neither is up to Columbia's usual standard.

★**L'Ultima Canzone,** Armand Tokatyan, ten., with orch., 8s. 6d. **H.M.V. DB1471**
The Last Song, in other words, of Tosti, who made us all say good-bye to summer so often. Very Italian and very pleasing. His voice is not so good as his interpretation, but there are thrilling moments on both sides. An outstanding record.

★**Little Things in Life,** Joseph White, with orch., 1s. 3d. **IMP 2434**
He sings excellently though his r's are too provincial for my liking. I like Billy Scott-Comber singing *Loving You the Way I Do*. I recommend this disc because there are *two good voices*.

My Handy Man Ain't Handy No More, Elsie Carlisle, with orch., 1s. 3d. **IMP 2439**
Not worth hearing. I prefer *Driving Me Crazy* on the other side.

My Missouri Home, Big Four, with piano, 3s. **COL DB411**
The Big Four (what a name!) sing pleasantly and I like the tune, though I should not want to put it on more than once. That is my feeling about this record. I can only suggest you ask to hear it.

★**Song of the Flame,** soloists, full chorus, and orch., 1s. 6d. **BRDCST 3029**
This is excellent light music with some decent writing in it. I wish all light music were as good. Ask to hear it; you will admire *Song of the Flame*, the companion. Very good choral singing.

★**Song of the Highway,** Tom Kinniburgh, with orch., 1s. 3d. **IMP 2438**
He does the film edition, I understand. A very good voice. I recommend the disc for that reason.

To My First Love; You'd Better Ask Me, Dora Labbette and Hubert Eisdell, with piano, 3s. **COL DB431**
A very well-balanced duet with two beautiful voices. Other side: *Little Irish Girl*. I

DORA LABBETTE

HUBERT EISDELL

wish they would find something better than these hackneyed effusions. Good artistes wasted!

Wedding Bells are Ringing for Sally, Layton and Johnstone, with piano, 3s. **COL DB414**
And *On a Little Balcony in Spain*. A typical L. & J. record and worth getting.

Wilfrid Sanderson's Popular Songs, Morlais Morgan, Gladys Knight, and Scala Concert Orch. (d.s.), 1s. 6d. **WIN L5233**
Songs of yesterday or, perhaps better, before the War. Well done, but overdone in my opinion. Still, if you like Wilfrid Sanderson's ballads, you will get most of the popular ones here.

Classical Orchestral Music

★**Slavonic Dance,** Royal Opera Orch., Covent Garden (d.s.), 4s. 6d. **H.M.V. C2149**
Nos. 1 and 3 of Dvorak. Here is some stirring Bohemian music for you, excellently recorded, too! I think I must label it "classical," but lovers of light music need not be afraid of it.

★**Symphony No. 1 in A flat Major, Op. 55** (Elgar), London Symphony Orch. (d.s.,) 6s. 6d. **H.M.V. D1946**
I have longed for this to be "done." At last we have it. Those of you who, like myself, consider Elgar's first symphony one of his finest works, should buy this. I have nothing but admiration for it.

★**Symphony No. 3 in F Major, Op. 90,** 1st to 4th movements, Vienna Philharmonic Orch. (d.s.), 4s. 6d. **H.M.V. C2026-9**
Brahm's "third" is one of his most attractive. All Brahms lovers should consider this as an immediate investment. I have not space to describe the movements of so colossal a work, but I imagine that no one would contemplate buying a Brahms symphony unless he knew something about it.

Military Bands

★**Alexander March,** Ceylon Military Band, 1s. 3d. **IMP 2421**
A good military band record. I recommend it as being very well produced.

★**Famous Regimental Marches,** Band of H.M. Welsh Guards (d.s.), 2s. **BRDCST 5230**
Very good. Many people will really enjoy this.

★**Jolly Fellows** (w.), H.M. 1st. Batt. Border Regiment, 1s. 6d. **PIC 723**
And *Waldmere March*. An excellent military band record with a better surface than I have examined by Piccadilly for some time. Quite an outstanding record.

★**Marche Militaire** (Schubert), Phonycord Military Band, 2s. 6d. **PHONY P110**
Excellent in every way. Sincere congratulations to Phonycord on a really good military band record which I heartily recommend.

More Songs by the Camp Fireside, Band of H.M. Welsh Guards (d.s.), 1s. 6d. **BRDCST 3032**
Very well done and suitable for those who like such things. Personally I detest them, seeing no use for them in these days.

Piano Solos

Moonlight, Russian Potpourri, Nicolai Sinkowsky, 2s. **BRDCST 5229**
Played on a Russian *Balalaika*. Very clever indeed, but I can't *bally well liker*, or however you pronounce the thing's name. Ask to hear it; you may be interested. It is certainly novel. As it is nearest to a cheap piano in tone I will put it in the piano section and risk it!

★**Sonata in C Major, Op. 53** (Beethoven), Frederic Lamond, piano, 6s. 6d. **H.M.V. D1985**
Lamond is considered to be one of the authorities on Beethoven, so that anyone who loves the *Waldstein* Sonata of Beethoven as they should love it, cannot do better than get these discs. It is a great achievement in recording, especially as the work contains so much movement. I am delighted with it.

★**Tuneful Melodies of To-day,** Laddie Ray, piano (d.s.), 1s. 6d. **BRDCST 3030**
Of *Roamin' thro' the Roses* type. He plays them admirably, executing nice little modulations between each one. I think (and hope) this will be popular.

Spoken Records

Aboard the "Saucy Sue," Seafarers (d.s.), 1s. 6d. **WIN L5232**
Divided into two scenes, called *Morning* and *Night* respectively, this is a descriptive affair. It is rather above the average, but is the sort of record to hear before buying.

Lays from Lancashire; "The Cup," Nelson Jackson, 1s. 6d. **WIN 5236**
In strong Lancashire dialect, this is moderately good. I feel that the diction is rather too slow; there is nothing funny and the whole thing appears to lack point. The rhymed lines, again, are a little irritating.

Light Orchestral Music

★**An Old Church Legend,** J. H. Squire Celeste Octet, 3s. **COL DB422**
This is so picturesquely rendered that I recommend it unreservedly as being admirable light music. Ask for it.

★**Ave Maria,** Hastings Municipal Orch., 3s. 6d. **DEC K573**
This is the Bach-Gounod melody very well done. I am inclined to place this as light orchestral music, especially as Massenet's *Meditation* is the companion.

Believe me, if all those Endearing Young Charms, Cedric Sharpe Sextet, 3s. **H.M.V. B3748**
And *Down in the Forest*. Very well played—if you want them. Why must we have a trashy ballad dished up. Cannot *six* brains think of something better?

★**Grieg,** Tom Jones and his Orch. (d.s.), 3s. 6d. **DEC K571**
Those who appreciate Tom Jones and Grieg at the same time will enjoy this clever adaptation of his music for orchestral purposes. This is an excellent light-music record.

★**Islamey,** Oriental Fantasy, New Symphony Orch., 4s. 6d. **H.M.V. C2086**
By Balakinef. This is very eastern and interesting from that point of view. I am placing it amongst the light orchestral records because I want you to realise that it is not "highbrow." Any lover of orchestral music would like it.

Light Cavalry, Gandino and his Orch. (d.s.), 1s. 3d. **IMP 2423**
Cavalleria Rusticana, in other and more general terms. For the price this is very good. The recording is quite good but some of the effects are blurred.

Morgenblatter (w.), Schomberg's Viennese Orch., 1s. 6d. **PIC 724**
And *Voices of Spring*, both being Strauss waltzes. Quite well done.

SPECIAL REVIEWS BY WHITAKER WILSON

Oh, Fraulein Grete, Scala Salon Orch., 1s. 6d.
WIN 5248
Of the light orchestra type, this is by no means amiss. I think the Scala band produces excellent lunch-time music. The surface is not as good as usual, though.

Old England, Sydney Baynes and his Orch., 4s. 6d.
COL DX222
A medley of old stuff of the *Allan Water* type. The playing is excellent but the material rather boring. Light orchestral, I suppose!

★**Solemn Melody,** New Light Symphony Orch., with organ, 4s. 6d.
H.M.V. C2176
And Raff's well-known violin *Cavatina*, played by the orchestra mentioned conducted by Malcolm Sargent. The *Solemn Melody* (Walford Davies) is an excellent piece of delicate scoring. It is beautiful music and you will like both sides as fine specimens of light but dignified orchestral music.

Song of the Drum, Scala Concert Orch. (d.s.), 1s. 6d.
WIN 5245
This makes very good light orchestral music; the tunes are clearly defined and the record is quite pleasing. I recommend it on account of its tunefulness.

★**Waltzes of the World,** Tiergarten Light Orch. (d.s.), 2s. 6d. **PHONY P109**
Not necessarily modern dance waltzes; therefore this admirable production goes into the "light orchestra" section where it takes a high position in the matter of excellence.

★**Wedding of the Winds,** Vienna Cameo Orch., 2s.6d.
PHONY P111
And *Dwarf's Parade*; I recommend it for its excellent tone and lack of any surface noise. It is a pleasure to listen to light orchestral music of this type.

★**William Tell,** Vienna Symphony Orch., Parts 1-4 (d.s.). **WIN 5240**
Very well produced, the recording making Rossini's admirable scoring clear and effective. Edison Bell is producing good bass in its records. There are two discs.

Humorous Records

Grandma and the Weather Announcer, Mabel Constanduros and Michael Hogan (d.s.), 1s. 6d.
BRDCST 3025
Very characteristic. Admirers of Miss Constanduros will relish this; it is full of her particular type of humour. Some of it is very clever.

Laughing Sam the Railway Man, Joy Day and Merry Andrew, 1s. **BRDCST 693**
Another laughing record. It did not make me laugh, but it will so affect anyone who has *not* heard a "laughing record."

Oh, Sebastian, Bobbie Comber, com., with orch., 1s.
BRDCST 695
A very jolly tune. He is very pleasing, though not actually "a scream."

Old Contemptibles, Debroy Somer's Band (d.s.), 4s. 6d.
COL DX225
Here is another of them! Well, you can have all the nice war songs over again and imagine the happy days of the trenches when everybody was getting killed. *Cock Robin*, and *What Did We Join the Army For?* etc., etc. The humour is so obscure that it shall go into the humorous column.


DEBROY SOMERS

Pass! Shoot! Goal! Walter Miller, with Harry Hudson's Melody Men, 1s. **RAD 1471**
This is sheer rubbish. Ask to hear it and see whether you agree with me or not. Another decoration for the "tripe" section.

Sandy the M.P., Sandy Powell, com. (d.s.), 1s.
BRDCST 694


SANDY POWELL

Very good; he has recovered from a temporary lapse into mediocrity.

★**Sing, Holly, Go Whistle, Hey, Hey,** Leslie Sarony, com., with orch., 1s. 6d.
BRDCST 3026
And *Topsy Turvy Talk*. I like his voice immensely, not from the vocal point of view, but from the personal side. Sarony is an *excellent* comedian. I wish this record every success.

Dance Music

All Through the Night (w.), Marius B. Winter and his Dance Orch., 1s. 6d.
BRDCST 3034
A pity it is so entitled as it leads one to think it is the well known Welsh melody. It is quite good in the waltz sense, but not so valuable from that point of view as *Cheerful Little Earful* (f) which is on the other side.

★**Always in All Ways** (f.), Jack Phillips' Melodians, 1s. 6d. **BRDCST 3039**
Another outstanding dance record, excellent for reproduction on an electric machine. It is a splendid foxtrot, with charming counter-themes in the accompaniment.

★**Baby's Birthday Party** (f.), Hal Swain and his Band, 1s. **BRDCST 699**
This is a distinctly good dance band which I recommend to your consideration.

Bathing in the Sunshine (f.) Alan Green and his Band, 1s. 6d. **PIC 734**
And *Peanut Vendor*. Both have a greatly improved surface. Piccadilly is vastly improved recently in this respect.

★(f.), Jack Payne and his B.B.C. Dance Orch., 3s.
COL CB236
And *Hurt*. Both are outstanding successes.

Betty Co-ed, Ambassador Club Band, 1s. 6d. **WIN 5250**
And *Blue Again*. This is so played as to sound more like an ordinary military band record, but I suppose it must go into the dance section.

(f.), Frank Novak and his Collegians, 1s. 3d.
IMP 2431
And *Tears* (w) by Buddy Blue and his Texans. The difference between the tone of the two bands makes the record interesting. Both works, however, are done to death.

(one-step), Marius B. Winter and his Dance Orch., 1s. 6d. **BRDCST 3036**
And *Tap Your Feet*. Both well done by this quite good band. Excellent recording.

Choo, Choo (f.), Sid Phillips and his Melodians, 1s.
RAD 1474
This is perfectly *mad*. Ask to hear it if you don't know it; it is very amusing. *That Lindy Hop*, on the other side, is not quite so exciting. A good record, on the whole.

Drink, Brothers, Drink (w.), Lew Sylva and his Band, 1s.
BRDCST 698
And *Tears*. Very well done and suitable for dancing.

★**Falling Star,** (w.), Midnight Revellers, 2s. 6d.
PHONY P120
I shall be glad when Phonycord lets me use an ordinary needle, but I like the records. This and *You're Driving Me Crazy* are splendidly produced.

★**Gipsy Princess** (f.), Eddy Walis Symph. Dance Orch. (d.s.), 2s. 6d.
PHONY P117
An outstanding dance record. A really jolly quick foxtrot. I recommend it for electrical reproduction; it sounds excellent on the machine here.

I'm Alone Because I Love You (w.), Alan Green and his Band, 1s. 6d.
PIC 730
And *Waiting by the Silv'ry Rio Grande*. Quite a good dance record; surface very fair indeed.

★Society Night Club Orch., 1s. 3d. **IMP 2426**
Very well done. The two waltzes on this disc will appeal as studying the dancers' point of view. I recommend it on that account alone.

★**I'm Tickled Pink with a Blue-eyed Baby** (f.), Jack Payne and his B.B.C. Dance Orch., 3s. **COL CB221**
Excellent. Buy it at once! It has *Ha! Ha! Together* on the other side.

Jay Wilbur and his Band, 1s. 3d. **IMP 2430**
A good companion to *Choo Choo*, which is becoming very popular. Wilbur is generally good; here he is very rhythmic indeed and the record is admirable for dancing.

If You Can't Sing, Whistle (f.), Midnight Revellers, 2s. 6d.
PHONY P119
And the *Ha! Ha! Together* atrocity. Both admirably produced. Which makes me ask Phonycord again to produce more serious music.

Lady of Spain, Hal Swain and his Band, 1s.
BRDCST 700
This is a quick-step in triple time. It has a strange lilting effect, but I am not sure I should care to dance to it. *Blue Again*, on the other side, is excellently produced.

★Jack Phillips' Melodians, 1s. 6d. **BRDCST 3040**
Very pleasant rhythm here; I am very attracted to it. *Drink, Brothers, Drink* is the title of rather a quick waltz on the other side. The singing is excellent.

Like You (f.), Henry Hall and his Gleneagles Hotel Band, 2s. **DEC F2248**
This has a modern harmony touch about it in places. It makes a pleasant foxtrot of a medium pace. *Cobblestones* sets an entirely different rhythm. Both are eminently suitable for dancing.

Love Among the Millionaires (f.), Million-Airs, 2s.
DEC F2241
And *Choo Choo*. Very well done.

★**Love's Old Sweet Song** (w.), Jack Payne and his B.B.C. Dance Orch., 3s.
COL CB240
Quite a good arrangement. The playing is so good that it must be marked as being one of the outstanding records of the month.

Mama, Yo Guiero un Novio, El Guila de Mexico Orch., 2s. 6d. **PHONY P122**
A very pleasant tango. If you want a tango song, here is an excellent one.

Makin' Wicky-Wacky Down in Waikiki, Ambassador Club Band, 1s. 6d.
WIN 5239
A good record; the bass especially comes through well. The tune is reminiscent of other tunes I have heard and the singing is only moderate. The recording is the chief attraction here.

★**Mary** (f.), Oceanic Dance Band, 2s. 6d.
PHONY P121
A very interesting piece of dance music. The bass is really remarkable. This is the last of a batch of Phonycord records I am reviewing this month; I must say I am amazed at the improvement in them. They are really excellent.

(*Cont. at foot of next page*)

GRAMO-RADIO NOTES AND JOTTINGS

New Brunswick Records

ANOTHER addition to the range of cheap records has recently been made by Warner Brunswick, Ltd., by the issue of new 10-in. records.

These records, known as Panachords, bear a light blue label and retail at 2s. each. The first discs released, which, by the way, were pressed from American recordings, consisted almost solely of dance music, but it is understood that future releases will include items of a more varied nature.

These new discs will be issued on the fifteenth of each month and will thus alternate with the releases of Warner Brunswick records issued on the first of each month.

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Records for Gramo-Radio Tests

We have been asked to select and recommend a few records containing special recording features that will enable gramo-radio fans to test the capabilities of their apparatus and at the same time possessing outstanding musical entertainment value.

A good record for this purpose is the *March of the Caucasian Chief*, recorded on H.M.V. E521. The main theme of this march is given by the drums, double basses and flutes, and this combination makes it an ideal record for testing the capabilities of the set and loud-speaker to reproduce both the high and low frequencies.

Some fine bass singing has recently been recorded on a new Columbia record, DX224. Malcolm McEarchern sings two popular arias by Handel on this record, his low notes being excellently recorded.

Bach's Toccata and Fugue recorded on H.M.V. D1428, played by the Philadelphia Symphony Orchestra under Leopold Stokowski, is well worth having as an example of massive orchestral recording.

Caution is necessary when buying piano records for test purposes, so many items being recorded none too well.

Piano Record

A new group of Mendelssohn's *Songs without Words* played by Ignar Friedman, a clever pianist, and recorded by Columbia on DB454-457, is a good example of piano recording.

Lastly, Quentin McClean's organ records, also by Columbia, are excellent for this purpose. His version of Wagner's *Ride of the Valkyries* contains some really good examples of bass recording.

CHOOSING YOUR RECORDS—Cont.

from preceding page

On a Little Balcony in Spain (f.), Sam Lanin and his Dance Orch., 1s. 3d. **IMP 2429**
And *Peanut Vendor*, both of which are getting over-produced. I like this orchestra.

★**Rainbow** (f.), Jerry Hoey and his Band, 1s. 6d. **PIC 736**
A good bass distinguishes this record. I recommend it as you may find it a good test record for your loud-speaker. Beyond which, it is attractive.

Sleepy Head, Jack Gordon, with orch., 1s. 3d. **IMP 2436**
A very sleepy tune. I think the song is appealing. So is *Really Mine* as sung by him. Imperial is certainly acting with wisdom and discretion in the matter of selection of voices. These dance songs sound so much better when well sung.

Song of the Congo (f.), Adrian Schubert's Dance Orch., 1s. 3d. **IMP 2426**
This is a wild effusion, but quite a welcome change from the general run of fox-trots. Ask to hear it.

★**Songs I Heard at Mother's Knee** (f.), Terence O'Neill, with orch., 1s. **RAD 1475**
A pleasant tune still more pleasantly sung. The recording is Edison Bell's best.

★**Stomping** (f.), Jimmy Wornell's Hot Blue-bottles, 1s. 6d. **BRDCST 3033**
This is a "hot jazz" record and can be recommended for its purpose on that account. Some of the effects are very amusing.

★**Sweetheart of My Student Days** (f.), Ted Wallace and his Campus Boys, 3s. **COL CB230**
Very well produced. Other side, *Lady Play Your Mandoline* (f.), with Ben Selvin and orchestra. An excellent disc for dancing.

★**Ten Cents a Dance** (f.), Jack Hylton and his Orch., 3s. **H.M.V. B5991**
An excellent vigorous fox-trot. Jack Hylton's band is *improving*. Ask to hear this; it is one of his best achievements.

JACK HYLTON

★**That's What Loneliness Means to Me** (f.), Palm Beach Hawaiians, 2s. **DEC F2246**
A slow fox-trot. Very effective. I also like *Really Mine*, a waltz on the other side. I think I ought to recommend this as an outstanding record.

★**Them There Eyes** (f.), Marius B. Winter and his Dance Orch., 1s. 6d. **BRDCST 3035**
This is a very jolly fox-trot, well scored and also well sung. *Under the Roofs of Paris*, on the other side of the disc, is an excellent waltz. An outstanding dance record!

Thinking of You, Dear (f.), Dave Frost and his Orch., 2s. **DEC F2247**
And *On a Little Balcony in Spain*. These things get reduplicated hopelessly; all I can say is that this is quite a good version.

★**To Whom it May Concern** (f.), Bert Lown and his Hotel Biltmore Orch., 3s. **H.M.V. B5981**
And *Tears*. Both are excellent for dancing, being well toned-up and very rhythmical.

Viennese Nights, Million-Airs (d.s.), 2s. **DEC F2218**
Fox-trots one side and waltzes the other. It is quite well done, though not outstanding in any way. The singing is certainly above the average.

We all go Oo, Ha, Ha, Together, Jay Wilbur and his Band, 1s. 3d. **IMP 2432**
And *Overnight*. The former I detest, but the latter is worth hearing. The voice in the latter case is extremely pleasant.

Wedding Bells are Ringing for Sally (w.), Alan Green and his Band, 1s. 6d. **PIC 737**
And *Hurt*. Quite a good edition of both.

★**What Good am I Without You?** (f.), Midnight Revellers, 2s. 6d. **PHONY P118**
And *Beyond the Blue Horizon*, both of which are so well done as to make a first-rate dance record. The scoring is very attractive.

★**When Kentucky Bids the World Good-morning** (f.), Jack Payne and his B.B.C. Orch., 3s. **COL CB233**
And *Peanut Vendor*. A splendid specimen of Jack's art.

When You were my Sweetheart and I was the Kid Next Door (f.), Jay Wilbur and his Orch., 1s. 3d. **IMP 2427**
This makes a good dance record. The words are also good. *Cheerful Little Earful* is on the other side. This again is getting over-produced.

★**When Your Hair has Turned to Silver** (w.), Jack Phillips' Melodians, 1s. 6d. **BRDCST 3038**
This is a very good tune and impelling from the rhythmic point of view. It makes a perfect waltz. *On a Little Balcony in Spain* is the companion and very well played.

★Lew Sylva's Band, 1s. **BRDCST 702**
Very well produced and thoroughly suited for the ballroom.

★**You're Driving Me Crazy,** Bob and Alf Pearson, with piano, 1s. 6d. **BRDCST 3028**
And *Tears*. Both done in their characteristic style. I think they are excellent; their rhythm is very attractive.

ABBREVIATIONS USED IN THESE PAGES

bar. ..	baritone	IMP	IMPERIAL
BRDCST ..	BROADCAST	orch.	orchestra
BRUNS	BRUNSWICK	PHONY	PHONYCORD
COL	COLUMBIA	PIC ..	PICCADILLY
com.	comedian	RAD	RADIO
con.	contralto	sop.	soprano
DEC	DECCA	ten.	tenor
d.s.	double-sided	w.	waltz
f.	fox-trot	WIN	WINNER
H.M.V.	HIS MASTER'S VOICE	ZONO ..	ZONOPHONE

DOES YOUR AMPLIFIER OSCILLATE?

The following notes are of special interest for they are compiled by the Service Department of the Mullard Wireless Service Co., Ltd.

THERE are few listeners to-day who are not aware of the evils of oscillation in the detector stage. Most listeners, too, understand how low-frequency oscillation may be built up in the audio-frequency portion of their receivers, and know how to avoid this trouble by decoupling the anode circuits of the various valves.

But it is not so generally known that high-frequency oscillations may exist—perhaps even unsuspected—in a low-frequency amplifier, and may cause not only loss of power but also serious damage to valuable apparatus.

Poor Rectification

Of course, the possibility of the existence of radio-frequency currents in a low-frequency amplifier due to imperfect rectification in the detector stage is understood by most amateurs, and the design of suitable stoppers is well known.

But comparatively few people are aware that, in certain circumstances, there is a tendency for unwanted short-wave oscillations to be actually generated in the output stage of power amplifiers.

This tendency is always greater when modern valves of high mutual conductance are used, and the arrangements more particularly prone to develop this trouble are those in which pairs of valves are connected in parallel or in push-pull or in a combination of both, especially when the wiring has that symmetrical disposition so beloved by the amateur constructor.

Grid Voltage

Such an arrangement may quite conceivably have a natural period of oscillation corresponding to a wavelength of a few metres, and a sudden increase in signal voltage applied to the grid, even if of only momentary duration, may then be sufficient to send the circuit into oscillation.

When high-frequency oscillation of this sort occurs, the immediate and audible result is a considerable decrease in volume. But the most serious effect is a large and sudden increase in anode current which, of course, causes overheating of the valve or valves, and may result in ruining them.

Further damage may occur in amplifiers using big output valves, such as the Mullard DO/60, due to very high transient voltages being induced in the output choke or transformer, for these voltages may be sufficiently high to puncture mica insulation.

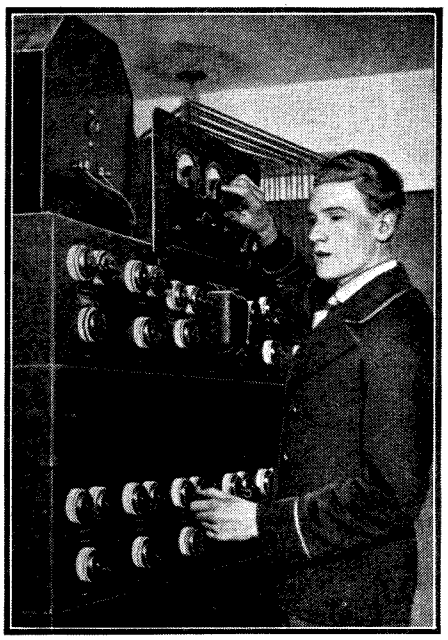
It does not always happen that this "parasitic" high-frequency oscillation becomes so acute as to cause serious increase in anode-feed current, but it is always accompanied by reduced volume, and frequently by indifferent reproduction. In fact, there is no doubt that quite a large proportion of cases of poor performance in amplifiers can be put down to this cause.

If high-frequency oscillation of this nature is suspected, it can be readily diagnosed by one or two simple tests. The most reliable of these is to use a tuned exploring coil and flashlamp. A piece of stiff wire should be bent into a single ring about 3 in. in diameter with a small variable condenser included in the loop, and an ordinary flash-lamp bulb connected to the two ends.

This loop should be lowered over the valve connections; take care, of course, not to short-circuit any of the wires. If violent high-frequency oscillation is present, the high-frequency currents induced in the loop may be sufficient to light the lamp.

Another, but more rough and ready, test is to touch the grid terminal of the output valve with the finger or with a piece of metal when, if the valve is oscillating, a sudden change in anode current will be noticeable.

Oscillation can also be detected by holding a neon lamp to the grid terminal, when the lamp will glow if the oscillations are sufficiently powerful. It should be remembered, however, that in the case of very big output valves, the grid-bias voltage by itself may be sufficient to cause the neon lamp to glow.



A REAL AMPLIFIER!

Part of the installation at Chiltern Court, Baker Street, where forty-seven power valves are employed

Listeners will naturally wish to learn what precautions should be taken to avoid these self-generated oscillations.

In the first place, symmetrical arrangements of wiring in circuits employing valves in parallel or in push-pull should be avoided.

Only Certain Cure

Undoubtedly the best "stopper" and, indeed, the only certain cure, is a wire-wound resistance of 80 to 100 ohms, inserted in the anode circuit as close as possible to the anode terminal of the valve holder. Such a resistance effectively damps any high-frequency currents in the anode circuit and thus prevents the building up of really serious oscillations. It is, of course, essential that the resistance should be capable of carrying the anode current of the valve.

Another useful device for stopping "parasitic" high-frequency oscillation is the inclusion of a 5,000-ohm resistance in the grid circuit, close to the grid terminal. The value of this resistance should not exceed 5,000 ohms, for higher values may affect the grid-bias voltage.

THE TRIUMPH OF THE SUPER 60!

For the guidance of prospective builders of the Super 60 who may have doubts regarding the possibilities of the set in their districts, we print here 74 extracts from reports received from no fewer than 67 localities.

It will be evident that the Super 60 is giving more than usual satisfaction all over the country.

The Super 60 was fully described in the March and April issues of WIRELESS MAGAZINE, but so great was the demand that both numbers soon went out of print. For this reason full details were reprinted in the May issue, a few copies of which are available from the Publisher at 1s. 3d. each, post free. Full-size blueprints cost 1s. 6d. each, post free; ask for No. WM 229.

ABERYSTWYTH (Cardigan)
"Station after station came in all round the dials and it has been impossible to identify one-half of them up to the present. In some FIVE MINUTES I was able to get from twenty to twenty-five different programmes perfectly clear, but there were others not counted where there was trouble from other stations."

ACOMB (Yorkshire)
"I have had the Super 60 built for three weeks and am more than satisfied with the results. The set worked right from the start without any trouble and the total number of stations logged is seventy-three, of which about forty can be relied upon to give real entertainment value any night."

ASTON (Birmingham)
"I have logged seventy-two stations on the loud-speaker, only using a frame aerial made on a cardboard box. . . . I was surprised how easily the stations came in, all clear and at good strength, and no overlapping."

ALEXANDRIA (Dumbartonshire)
"Over three evenings' listening I have logged an average of over sixty stations; most have REAL entertainment value. . . . In the meantime, the search for the perfect is at an end, thanks to the excellent Super 60."

BANGOR (County Down)
"I am delighted to be able to get reception on short, medium, and high wavelengths with splendid quality, absence of mush, and, above all, ease of manipulation."

BEMBRIDGE (Isle of Wight)
"I have just concluded the tests on my Super 60, and have no hesitation in saying it is the most fascinating set I have ever handled. . . . Its great point is simplicity of operation, and its performance can be summed in the following nutshell: 'Think of a station and you have it.'"

BIRMINGHAM (Warwickshire)
"I am absolutely delighted with the results obtained, which are far better than those from any other set I have used before. Mr. James is to be congratulated, and I take this opportunity of wishing him and 'W.M.' all the success they deserve."

"I have built a number of sets, but the Super 60 is far ahead of them all. It is easy to operate, although sensitive, and stations come in and go out cleanly in quite an amazing manner."

"The Super 60 separates Midland Regional from Langenberg in Birmingham, and that, in my opinion, is a greater achievement than separating Mühlacker and London Regional."

BLETCHLEY (Bucks)
"I have built dozens of sets, but I must congratulate Mr. James for designing the best ever. It is ideal for regional conditions and the quality on a moving-coil loud-speaker is excellent."

BOSCOMBE (Hants)
"I can confirm the claims you make for the set. It is very delightful to get so many concerts so clearly and with such good quality, all over the Continent. Two Moscow stations come in nearly as loudly and clearly as 5XX."

BOURNEMOUTH (Hants)
"I must congratulate you on a wonderful set and I am amazed at what it will do. Here I am about half a mile from Bournemouth station, but it cuts out entirely within three degrees of the oscillator dial. I have so far logged about forty foreign stations, the majority of which require considerable reduction of volume to be bearable."

BRIGHOUSE (Yorks)
"It is the best set it has been my luck to handle. I live within five miles of Moorside Edge . . . but the Super 60 cuts it out in one degree. I listened to Prague (while Moorside Edge was testing) and did not even get a background of Moorside Edge. So far I have logged thirty medium-wave stations at good strength and eight long-wavers."

BRIGHTON (Sussex)
"I cannot explain how pleased I am with my Super 60. . . . I do not think you could wish for anything better."

BUSHEY (Herts)
"As soon as the receiver was connected it started bringing stations in, and for reception of stations it is all you claim for it. Last night . . . I actually tuned-in sixty-eight stations on the loud-speaker."

CHORLTON-CUM-HARDY (Lancs)
"I can cut out 2ZY, three miles away, on one degree of the condenser and the new Regional when working on 479 metres (the new wavelength) also on one degree. The new Regional is nearly twice the strength of 2ZY. . . . I must congratulate Mr. James on this wonderful set."

COLWYN BAY
"I am situated in a hollow on the North Wales coast, badly screened with hills, trees and buildings. . . . The Super 60 was finished this week and immediately tried out. It is very easy to build, being free from complications; works easily and smoothly, the knife-edge tuning with consequent freedom from disturbance and overlapping stations being delightful. So far sixty-three stations have been logged. May I offer my hearty congratulations and express my best thanks for a wonderful layout."

COVENTRY (Warwickshire)
"The outfit works exceptionally well, about fifty stations being received well with a real enjoyment value."

EDINBURGH
"The sixty stations claimed for it come tumbling in with remarkable volume, clarity, and with a most silent background. The set should have been called the 'Super-charged 60,' so well does it accomplish all that you claim for it."

"I have given up counting the really loud stations that it brings in—and with such ease of control. . . . May I add that I have been able to get over a dozen (no exaggeration) fellow amateurs to order coils, etc., for themselves."

ERITH (Kent)
"It is a wonderful set, and if anyone had told me a week ago that it was possible to get such good results without using a Stenode I would have been sceptical."

ESCRICK (Yorkshire)
"I write to let you know that I have completed the building of the Super 60 wireless set according to the plan published in your March issue, and the results are quite good, especially as this is my first attempt. It is certainly not very easy to identify all the stations."

GALASHIELS
"Having built the Super 60 and had it on test for three evenings I cannot help but let you know that it is **the** finest set I have ever handled. Congratulate Mr. James on my behalf. It does everything he says, and more. . . . I am, at the moment of writing, listening to W2XAF at full loud-speaker strength."

GARFORTH
"I have identified sixty-seven stations to date. All can be brought up to loud-speaker strength. Naturally, the weaker stations have a noisy background, but the stronger ones are free from this. The quality is exceedingly good and selectivity amazing."

GHYLL HEAD (Cumberland)
"I have only had the set in operation a few days. I have only actually identified the following sixty-eight stations, all of which have been received at FULL loud-speaker strength. . . . Others have been heard, but not identified. The set is most satisfactory in every way. The quality excellent and selectivity astonishing. The programme value of this set is infinitely higher than any other set I have ever heard or owned."

GLASGOW
"Having built your Super 60, I take the liberty of complimenting you on this set. It gives excellent results, getting in every station without interference from the Glasgow station, although we are only a matter of 300 yards from it."

"The set is highly selective, very powerful, and gives excellent quality—astonishing quality in view of the power valve used—and with a minimum of hiss and valve noise."

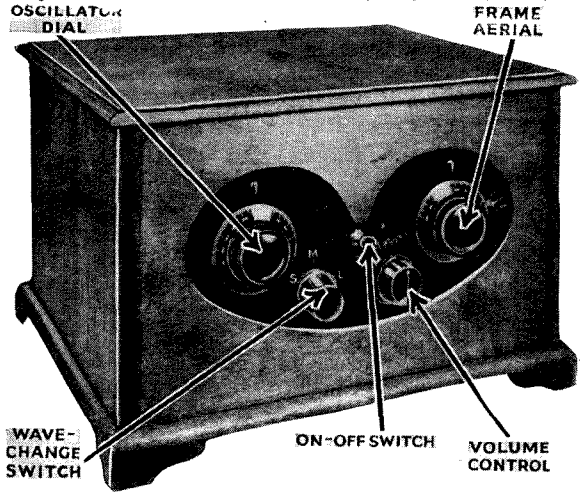
"About a month ago —— sent me one of his very latest nine-valve all-mains console super-hets—the very latest thing in the U.S.A. In one round of the dial I tuned-in seventy-seven stations. On trying out your set I was amazed and promptly sold the American set on the grounds that, while it was wonderful, yours was far less noisy and much to be preferred."

GOSPORT (Hants)
"I have logged approximately seventy stations since last Thursday. I hope you will publish reports and get this set the publicity it deserves. I am persuading all my friends to build one or have one built."

GRANTOWN-ON-SPEY (Morayshire)
"In a few minutes I had over a score of stations each with volume and purity of a kind hitherto unknown to me. I have not as yet tried to log sixty stations, but your claim of that number at good loud-speaker strength can certainly be substantiated."

HAYWARDS HEATH (Sussex)
"Have received Leeds by daylight; would this be considered good? . . . I built this set solely to get rid of Mühlacker, which I can now do easily, with some to spare."

HORBURY (Yorkshire)
"I feel it a duty to write and congratulate you on Mr. James' latest design, the Super 60. . . . I am only a few miles from the new North Regional transmitter, and I have tuned out its



EASILY OPERATED TUNING CONTROLS

This photograph of the Super 60 shows how simply the controls are arranged. Note that there are only two tuning knobs.

test (daylight) transmissions in two degrees, which implies something exceptional. . . ."

HOUNSLOW (Middlesex)

"I propose to send you a graph I have drawn showing the medium- and long-wave stations I have received on the loud-speaker, over seventy in number."

HOVE (Sussex).

"I have completed the Super 60 and wish to say how pleased I am with its performance. Using a temporary frame, I have received numerous stations at good strength WITHOUT THE SLIGHTEST INTERFERENCE."

HUDDERSFIELD

"You will, no doubt, be interested to hear of my successful efforts in building an A.C. version of the Super 60. Four and a half miles from Moorside Edge, the Regional station has a spread of only eighteen kilocycles. It is undoubtedly the set for this district. . . . By the way, I have logged some eighty stations, all at loud-speaker strength."

ILFORD (Essex)

"The selectivity, sensitivity, volume, control, etc., are splendid and I am very pleased with my outfit. I should like to express my appreciation of Mr. James's design and from my results cannot speak too highly of it as a last word for those who are after the ideal set. I recommend the Super 60."

IPSWICH (Suffolk)

"It is remarkable how the Super 60 brings in foreign stations, even better and cleaner than the home ones. My wife, who is very musical, dislikes all wireless, but when she heard the B.B.C. Dance Orchestra playing on the Super 60 she was delighted."

KEIGHLEY

"Well done, Super 60. I am now listening to Langenberg at ample volume. Not remarkable? No, but the North Regional giant is working at full pressure and not a sign of it, just dab the drum dial one degree and, lo, there she is—and not half. I have never built, or desired to, a wireless set before, but the Super 60 got me, and how easy. Yes, sir, you have the goods."

KNARESBOROUGH (Yorkshire)

"Many thanks for the Super 60, which I have got going finely. . . . I have logged too many stations on the medium waves to mention here. . . . I am certain, after trying out all kinds of circuits, that you have got THE thing for the present-day congestion of the ether."

LONDON

CHELSEA

"I write to say that I have built the set and am obtaining excellent results. I am delighted with the selectivity and good quality." [This report comes from a lady.—ED.]

CLAPTON

"Searching brought me excellent results from Moscow on the high waves and from the Spanish stations on the medium. Since then I have had numerous stations. In truth, I am more keen on a good selection of stations with good selectivity than an untold number of stations log."

EAST HAM

"The selectivity has naturally pleased me, but I was quite prepared for it. Not so the sensitivity; this has been a complete revelation. . . . If the sensitivity was an eye-opener, still more so was the tonal quality I succeeded in getting. This, I think, has pleased me most of all."

FINCHLEY

"Myself and four friends have each made one up and are astounded at the results. Between us we have tackled every notable circuit you have brought out, but never have we found anything like the Super 60."

KILBURN

"The very set I have been looking for. It is 'the goods.' . . . Very many thanks for a really grand set. One cannot beat a super-het, to my mind."

PALMERS GREEN

"In just under the hour I had bagged something like fifty stations, all on the medium band and all much too loud to be comfortable with the volume control about half-way round. Since then I have logged sixty-five stations on the medium and eight on the high band that can be relied upon many times for good loud-speaker strength, and many more that are not so reliable."

PECKHAM

"I have logged all the stations on the medium and long waves as in the test report, but what has impressed me more than anything else with the set is the results obtainable on the ultra-short waves. I can get at least four American stations with certainty any evening at real loud-speaker strength."

PUTNEY

"Your Super 60 is a clinker . . . with a Mazda PT40 and choke output I can get all the stations you enumerated at full and excellent moving-coil loud-speaker strength."

SOUTHWARK

"I have built your Super 60 and find it a magnificent set in every way up to what you claim for it."

STROUD GREEN

"The Super 60, I must confess, gives the knock-out blow to all previous sets I have tried, and to my mind there is no other set even approaching it. It is so simple to handle, gives tremendous volume, combined with good quality, and great selectivity."

WEST KENSINGTON

"I have obtained practically all the stations summarised on page 140 of the March WIRELESS MAGAZINE. The quality and volume are as near perfect as is mechanically possible."

WOOD GREEN

"I have never had such a wonderful set before and I have made forty-three sets up to date. The selectivity is simply marvellous and the power is enormous . . . I have turned it into a portable."

LOWESTOFT (Suffolk)

"I obtained the parts for the Super 60 on Friday afternoon and got it working on Saturday evening, having done the construction in a few hours, and the results were all you claim for it."

LYTHAM (Lancashire)

"Your Super 60 is superb . . . in fact, all the medium-wave and long-wavestations seem to tip-toe from the loud-speaker in single file and in perfect order; there is no log required."

MANCHESTER (Lancs)

"Your Super 60 is a miracle; no other word fits it. . . . I am afraid I would get writers' cramp if I tried to write out all of the eighty-two stations I have picked up on it, apart from half a dozen unidentified short-wavers."

"I must say that I have no difficulty whatever in making the Super 60 up. By the way, why the sixty? After I logged seventy-two stations (nine on long and sixty-three on medium) I gave up counting! Just after midnight I tuned-in WGY and KDKA quite easily on the medium waves; the speech and music were perfect."

"I built the Super 60 up in just over three hours, and am pleased to say that I have never handled a set like it. I have logged all the stations mentioned in your list with the exception of Hilversum, which happens to be my pet station."

MOTTINGHAM (Kent)

"The results are all that you claim. Such selectivity I have never before experienced and for a super-het the simplicity of control is remarkable."

NONINGTON (Kent)

"I have now logged forty-five stations on the medium wavelengths and nine on the long. . . . I am, of course, extremely pleased with the set and have never heard anything to equal it on medium and long waves."

NOTTINGHAM (Notts)

"No words or pen could express to the full what its worth is. I can only endorse BM/PRESS: 'Build and prove it.' . . . I have not appended a list of stations, as it would require an extensive notepaper pad."

PEACEHAVEN (Sussex)

"I can only say, from the results I have obtained from this set, that all the other sets I have built now appear to have been a gross waste of time and money. The results are perfect in every way—tone, ease of control, and remarkable selectivity being only a few of its wonders."

PLYMOUTH (Devon)

"Having completed the Super 60, I may say that it is wonderful. I can bring in any station that is broadcasting after dark and a great many come in well during daylight; the long waves are equally good, and all those mentioned in the log in WIRELESS MAGAZINE come in in daylight . . . . I consider this set should be a boon to all my fellow West Countrymen."

RUSTINGTON (Sussex)

"As, so far, an old frame aerial has been used, the Super 60 has been tried on the medium waves only, and well over fifty stations have been received, quite forty of which come in as well and perfectly as the London National and Midland stations. . . . What pleases me so much in the Super 60 is not only its amazing selectivity and sensitivity, but the really loud and pure volume."

SHEERNESS-ON-SEA (Kent)

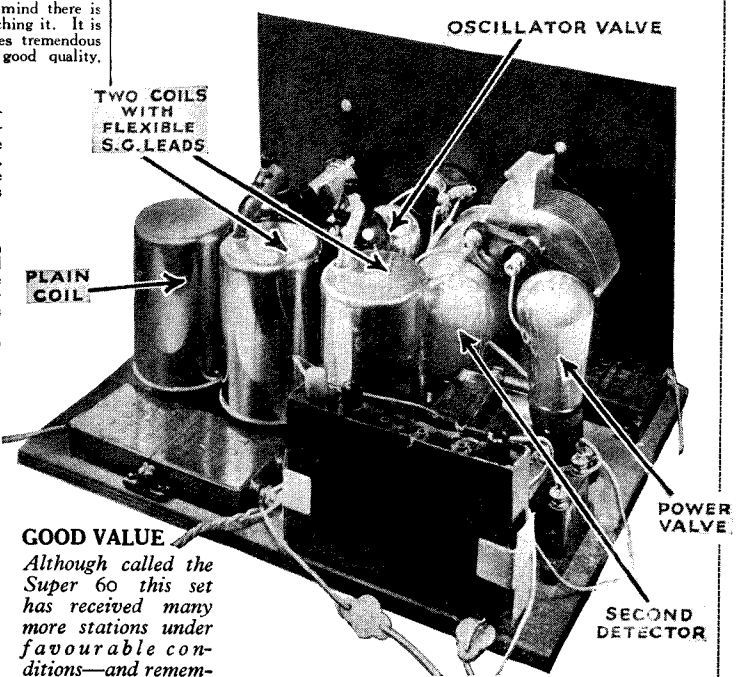
"The model, as you say, brings in all the stations as advertised, and in addition I have been listening to amateurs on and about 155 metres."

STOURBRIDGE (Worcester)

"The set certainly comes up to all you say in its favour as to selectivity and the quality is very good."

SWINDON (Wilts)

"With my portable edition of the Super 60 I have actually logged over sixty-five stations, and on only seven of these did any jamming occur. From this readers can see it is no ordinary set. . . . I have also received two American stations with a two-turn frame on the ultra-short waves."



GOOD VALUE

Although called the Super 60 this set has received many more stations under favourable conditions—and remember that the cost of a complete receiver is only £12 or so!

PORTSMOUTH (Hants)

"As a rough test, last evening (Sunday) I tuned-in fifty stations falling over each other to get out of the loud-speaker. . . . I simply had to make the Super 60—it was irresistible—but at the same time used A.C. valves; but I am pleased to say have succeeded in what I thought was to be a tricky job."

PRESTATYN (Flintshire)

"In half an hour I tuned-in forty stations and then turned back to London Regional, which came in clear without interference. On tuning to the right the big German came in equally clear, as did Graz on the other side of London."

RADCLIFFE (Lancs)

"I wish to let you know that I have partly finished THE SET—James' Super 60. . . . Had not time to log all the stations or the inclination, as they came in-out all over the dial."

ROMFORD (Essex)

"As you ask for reports on this set, I thought you might like to know how it behaved as an all-mains (A.C.) job. . . . It is quite sufficient to say that after a few minutes I came to the conclusion that 'If it's worth getting—the Super 60 will get it!'"

TENBY (Pembroke)

"Although in a bad district for reception, I have logged forty stations at good loud-speaker strength. . . . Using a moving-coil loud-speaker, the reproduction is perfect. I must say it's the finest set we have handled."

UCKFIELD (Sussex)

"I have constructed the Super 60. Selectivity is A1. I am able to tune London Regional, Mühlacker, and Algiers without interference from each other."

WELLING (Kent)

"To me it is simply a revelation and far exceeding my expectations; it is simply amazing. At present I have logged thirty-five medium-wave and seven long-wave stations."

WEST MERSEA (Essex)

"I should at first like to say your claims have not in the least been exaggerated, all the stations you claim as being receivable are easily receivable in this district."

WHITCHURCH (Salop)

"The Super 60 does all and more that you claim. The Super 60 . . . gives perfect separation of all stations that are not heterodyned, lacks nothing in sensitivity, and is far easier to tune."

Super 60 Questions

Here W. James, the designer of the Super 60, answers some typical questions asked by readers. The points raised will interest everybody

AS is usual when a set that interests a large number of readers is described, numerous letters are received asking whether various modifications can be made without spoiling the results.

In many instances parts are on hand and the reader naturally wishes to know whether they may be used. Other readers have a mains unit and a good power output valve, and want to know whether they may be included without spoiling the quality or the selectivity.

I will therefore deal with a number of points, as they are sure to be of interest to all those who are interested in this set:

I hear the local station in more than two places of the oscillator condenser. How can I remedy this ?

Try a little larger feed resistance to the oscillator valve. If this weakens the signals by a fair amount, try reducing the resistance, which in the set has a value of 15,000 ohms.

The oscillator must work properly, being neither too weak nor too strong. Also add a fixed condenser of .002 microfarad between the anode and filament of the power valve.

A little care in the adjustment of this stage, with its grid bias and high tension, will put matters right, and don't overlook the anode voltage of the first detector.

I always use a moving-coil loud-speaker and a big output valve. Could I fit this with the Super 60 ?

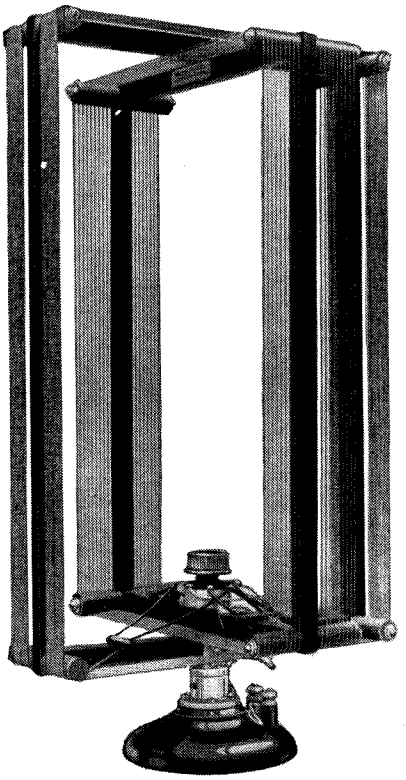
This can be effected and the quality should be excellent. See the remarks printed above regarding the high-tension supply. You can, of course, fit as large a power stage as desired, provided the power is available and the detector circuit is attended to as well.

Can a pentode be used ?

Of course, a pentode can be used in the last stage of the set provided the high-tension supply is adequate.

A filter ought to be fitted in the anode circuit of the valve in order to correct the tone and to safeguard the valve in case the loud-speaker is disconnected. An output choke-condenser filter may be used, the choke having a centre tap, or a special pentode-type transformer can be employed effectively to couple the loud-speaker and the valve.

If you have obtained good results from a pentode in an ordinary set, there is no reason why equally satisfactory results should not be obtained when the pentode stage is fitted to the Super 60 receiver.



A NEW FRAME AERIAL

This is the new Wearite frame aerial, which is wound with Litz and provided with a wave-change switch. The price is 2 guineas

I suggest a 100,000-ohm stopping resistance in the grid lead from the intervalve transformer to the grid of the pentode, and the output tone-correcting filter consisting of a resistance and a condenser ought to be used.

Those who have batteries of large capacity will be able to run a pentode, but some readers have a mains unit and are therefore able to supply the stage with about 150 volts.

There is no possibility of trouble, I suppose, if I used a large power valve and a mains unit ?

Use a large power valve by all means, with the right grid bias for the high-tension employed. Add a choke-condenser filter for the loud-speaker or a transformer.

Also, apply plenty of voltage to the detector valve, so as to obtain the necessary output with the minimum of distortion. There is no real need to change the .0002-microfarad grid condenser to one of .0001 microfarad, or to reduce the value of the grid leak.

But as the size of the power valve has been increased and its grid bias is greater than that of the original small power valves recommended, a bigger output is needed from the rectifier and this is to be obtained easily by increasing its voltage.

With the larger power valve carefully connected better quality will be obtained, and more volume from many stations. The valve will give a greater output and when signals of sufficient strength are there better reproduction will be enjoyed as the tendency usually is for the smaller power valves to be overloaded.

Will it be satisfactory to use a more expensive low-frequency transformer in the set ?

You can do so if you have one on hand, but the small one used was proved satisfactory. If you propose using a big output valve, when the anode current of the detector will be fairly large if the voltage is suitably increased, a bigger transformer would be of advantage.

What about 6-volt valves ?

If you want to use 6-volt valves, choose types from the table at the

Have you told your friends about the Super 60 ?

front of this issue having impedances approximately equal to those of the 2-volt valves recommended. The results may be a trifle better with the 6-volt valves.

I cannot tune to a sufficiently high wavelength on the long-wavelength range. Can I add a condenser to raise the wavelength?

You could add a fixed condenser of .0001 microfarad to the condenser tuning the oscillator, or better still, connect a pre-set condenser across the oscillator tuning condenser and adjust it in order to obtain the desired range.

The trouble really is that the long-wavelength coil in the oscillator unit is not quite large enough, but as this cannot easily be altered, except by the makers, the easiest way out of the difficulty is to add the condenser.

Have you tried the Wearite frame aerial and found it satisfactory?

Yes. The frame aerial measures about 9 in. across and has a total height of 20 in., the frame part being 16 in. The two windings are at right angles, of silk-covered Litz wire.

There are three terminals on the base for the outside ends and the tap and there is a switch for connecting the medium- or long-wavelength sections.

The tuning ranges are normal and the signal strength good, with sharp tuning. Constructionally the frame is also a sound job and it is, therefore, quite a satisfactory aerial for the Super 60.

Does the set work properly when supplied from a direct-current mains unit?

Yes, of course, provided the unit is of good make. The supply to H.T.+1, for the anode-bend detector, ought to be through a potentiometer.

The other circuits may be supplied in the usual way. With the ordinary smoothing arrangements and the decoupling circuits, good results are obtainable, as with other sets. Quite a number are in use. A big power valve may, of course, be used if the unit will pass the current.

Is anything gained by using a very small frame aerial as I have one and it seems to be satisfactory?

The frame should not be too small or tuning difficulties may be experienced. Better results are obtained from a frame of the sizes described and there is nothing against using a frame of even greater dimensions.

Careful experiments have shown that the frames described are good ones, combining electrical efficiency with reasonable bulk. Solid wire is not as good as stranded wire, provided all the strands are connected to the contacts.

What should be the normal current of the first detector, with the oscillator disconnected?

About .1 milliampere or a little more. The grid bias usually found suitable is negative 3 volts, and the high tension must be adjusted to suit the valve.

If you have a meter the current is easily measured by joining it in the H.T.+1 lead. You should also try adjusting the high tension to this valve when a weak signal is being received in order that the maximum strength shall be obtained.

Also try a bias of −1.5 volts and a lower value of high tension, as this bias is applied to the oscillator as well as to the first detector.

Can power grid detection be used?

By this I suppose you would like to try a .0001-microfarad fixed condenser in the grid circuit and a .5-megohm grid leak, also to use a low-impedance valve and plenty of high tension.

You can do so, of course, but little will be gained. The values given are suitable for the set as described. If you raise the possible output from the detector, and the power stage will not take the stronger signals, of what is the use?

Actually nothing is gained, excepting that the higher notes are strengthened a little and I doubt whether this increase would be noticed using ordinary apparatus. Power-grid detection by itself means nothing. The detection is bound up with the power stage.

THE LAST WORD

The Super 60 of W. James—
A set of matchless beauty—
All other "super" receivers shames,
Including those sets with fancy names,
For W. James' constructing fame's
As great as his sense of duty!

Test the receiver by day or dark,
It's as good as its fine appearance—
At only four miles from Brookman's Park
You can tune out Mühlacker or Graz and hark
To the London Regional's friendly bark
Without any interference.

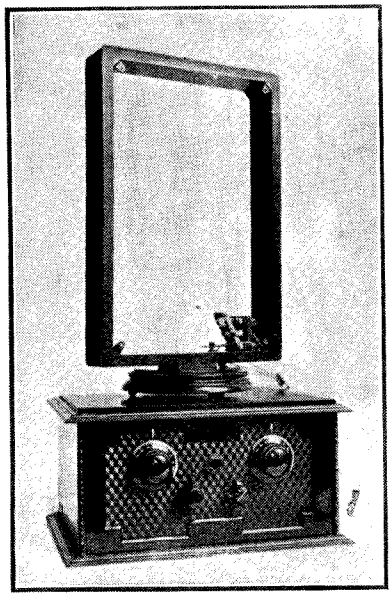
Sixty stations on horn or cone!
(Just try it, you unbelievers)
Arrange for an evening or two alone,
Get busy with tools, and you will own
The most elegant set you've ever known—
A monarch among receivers!

C. P. P.

It's a set worth building and talking about!

CONSTRUCTORS' EXPERIENCES WITH THE JAMES SUPER 60

Here we present five more detailed reports on W. James' Super 60 taken at random from our post-bag. They show the enthusiasm every constructor has for this fine set. These reports are from Canterbury, Guildford, London (Stoke Newington), Torquay and Weybridge



A NOVEL SUPER 60 CABINET

This Super 60, made by an Ipswich reader whose report appears on page 515, is made from two picture frames and painted white inside

THIS letter, from a Stoke Newington reader, is a tribute to the adaptability of the set:

Congratulations on the Super 60. I have made many sets, including the 1927 and 1928 Fives, and the Touchstone Four, but nothing approaches the Super 60. It is all you claim for it and more, for, to fit my cabinet, to use parts already in my possession and to allow switching for gramophone, the layout had to be altered a great deal.

This seems to have had no ill effect, as the number and strength of foreign stations received make it impossible to identify them all in the short time I have had on the set to date.

FROM Weybridge comes a report from a reader who has had previous experience with super-hets:

Hearty congratulations to you and Mr. James on an outstanding design. It is simple to build; reasonable in cost and upkeep (12 milliamperes at 150 volts); it has none of the snags of the super-het of years ago; the background is now as silent and the quality as good as that of a straight circuit; and I find its "reach" much exceeds your modest claims.

As for ease of operation, it reminds me of the difference between the old "crash" change and the Daimler fluid fly-wheel; the operations are simple and the control complete.

Apart from the addition of a fuse (in memory of old super-hets!) and loudspeaker sockets on the base, I have kept to specification, but after trials I removed four turns from the Peto-Scott frame (medium wave) and added a .0001-microfarad condenser permanently across the oscillator tuner terminals.

With these modifications I can tune below Leeds and above Ljubljana on the medium waves and from the aeroplanes to Lahti on the high waves. Without the added capacity I could not include Budapesth or Radio Paris.

In view of experience with various super-hets in the old days, the selectivity, of course, does not surprise me, but what does interest me is the complete extinction of all the old weaknesses of this type of receiver.

With a Mazda P240 output fed with 200 volts from a Regentone unit and working a Ferranti moving-coil loudspeaker, the quality is for all practical purposes quite equal to that of a good straight circuit and similarly the background is no more noisy—a very great advance indeed.

I notice one curious phenomenon. On four or five medium-wave stations the oscillator tunes with the kind of down-and-up howl which one associates with the disreputable "please don't do it" method of "getting" a faint station.

My only criticism is of the small dials of otherwise good slow-motion condensers. I cannot understand why our makers cannot turn out an adequate dial or why they perpetuate the silly system of crowding 180 degrees into a tiny dial by only marking alternate degrees and leaving alternate tens unfigured. Can anything be more annoying! This grouse applies to the majority of dials marketed, and demands serious attention by our condenser makers.

Apart from this detail I have nothing but unqualified praise for the performance of a very remarkable receiver.

A TYPICAL report on the Super 60 comes from a satisfied constructor at Torquay:

Some months ago I built a five-valve set incorporating screen-grid valve and push-pull output and was justly proud of it. Indeed, I said that something "revolutionary" would have to occur before I altered it.

Then came the "revolution" in the form of the Super 60. I gave the matter considerable thought at first, because I had gone to large expense in installing mains unit, chargers, cabinets and sundries; but I eventually considered the selectivity problem and decided that with careful laying out of the set I should incur a very minimum of further expense.

Using my low-frequency side as before and making up the first five valves as specified in the Super 60, I have an astounding eight-valve receiver for the small additional outlay of approximately £5.

I found the construction as easy as any straight circuit and in five hours was able to test. I found tuning much easier than with an ordinary "three," merely because having "got on" a station, it was impossible for another to interfere.

On the long waves, I received the usual stations from Radio Paris down to Oslo and was astonished to get two stations (presumably Russian) below Oslo.

Reasonable Estimate

On the middle waves I found your list of sixty odd stations to be a very reasonable estimate. Starting at 180 on the oscillator dial, I seldom had to move the pointer *more* than one degree to obtain a station; and continuing in this way found station after station down to 80 degrees.

I experienced *no trouble whatever*, and such stations as Langenberg and Midland Regional; Mühlacker and London Regional; Mühlacker and Algiers, were all easily separated. In fact, as far as Mühlacker and London Regional were concerned, I moved the pointer hardly a degree and with a movement of 45 degrees on the frame aerial completely cut the Regional out and brought Mühlacker in at *full volume*. Reversing the action, Mühlacker disappeared and Regional came in at equal volume.

I next tried my ultra-short wave adaptor, plugging in on the second detector socket and using the centre tap of the long-wave winding for an aerial. My first station was Moscow and later W2XAF. This alone proves the absolute general utility of the Super 60.

Large Mains Unit

I am using a large mains unit capable of about 200 volts at approximately 50 milliamperes, and experience no trouble whatever. For grid bias I have put in a separate battery for the first valve, as I use a 27-volt battery for the low-frequency side. This does away with "stray leads."

I cannot understand anyone having heard the Super 60 at work building or even buying another receiver at any price. After all, the set is cheap in price and combines the highest points to be aimed at in present day reception, namely: ease of operation, sensitivity, purity, volume, selectivity, compactness, cost of upkeep and, last but not least, original cost.

In designing this super-het and placing it before the public you have rendered a great service to those seeking distant

stations, and I, for one, will raise my hat to anyone who can beat it at three times the price. At last we can tune in and have what we want—not only the *main* stations, but *all* the stations. Congratulations to Mr. James and the WIRELESS MAGAZINE.

Short-wave Aerial

P.S.—I have, since writing the foregoing, made a small three-turn aerial, and "gone down" on the ultra-short waves, Rome on 25 metres, W2XAF on 31 metres, and VRY on 43 metres being strong on the loud-speaker. I have this evening enjoyed the programme from W2XAD, relaying the Kenmore Hotel and Hotel New Yorker. The range is definitely as low as 15 metres.

HERE is an enthusiastic report from a Guildford reader who has logged over seventy stations in one evening. A push-pull output stage has been added:

Mr. James has indeed given us an amazing receiver in his Super 60. Having by me most of the necessary components, excepting the coils (and herein lies the secret of Mr. James' splendid design), frame aerial, etc., I have built the Super 60 with some additions to the L.F. side.

Sensitivity without quality is of no use to me, and although I have no doubt whatever that the circuit as Mr. James designed it will provide excellent quality, I determined to aim at the best in this respect.

I therefore added after the second detector valve a resistance-capacity coupled stage followed by two power valves in push-pull, with Varley input and output transformers.

The result is really magnificent, and I have the best quality I have ever been able to obtain, combined with amazing selectivity and sensitivity.

London Regional, Mühlacker, and Graz are separated entirely with something to spare; and although I do not hanker after foreigners, I obtained over seventy stations on the loud-speaker in one evening.

I can only find one slight drawback—the crowding of long-wave stations to the top of the dial with Radio Paris almost off the condenser.

Far from finding the frame aerial—a Peto-Scott wound by myself—non-critical, it will completely obliterate all except three or four stations at its minimum setting.

I am using six-volt valves: first detector, PM5B; oscillator, PM5X; first L.F., PM6D; and two Osram P625A's in the output. The receiver is run from a home-made D.C. unit, with about 200 volts on the last valves.

Having by me a baseboard and panel, etc., I departed at some length from Mr. James' layout, but kept the wiring as short and as near the baseboard as possible.

The total filament consumption of all eight valves is just under one ampere. I am using a well-known moving-coil speaker with a 38-in. square baffle, and the entire result is beyond every expectation.

May I be allowed to congratulate Mr. James and to thank you for publishing details of so fine a receiver?

P.S.—You are welcome to publish this letter if you think fit.

EXCELLENT results are reported by a Canterbury reader:

I have built the Super 60 and find it excellent. In this district (sixty miles from Brookman's Park) one is not overwhelmed by the National and Regional transmitters, but there is the ever-present difficulty of the German stations nearby and more particularly Mühlacker.

However, on the Super 60, Leipzig, Graz and Mühlacker come in quite clear of London, even without making use of the directional properties of the frame aerial.

I am a little disappointed in the quality as the bass notes are not so prominent as on another set I have, using the same power valve (Marconi P625A).

The set is absolutely stable at full power, except possibly in the region of 500 metres, when there is an inclination to go into oscillation when the screen volts are full on.

I have not conformed to the layout exactly as I wished to put the set in a box with the tuning dials on the top. Panel and baseboard measure 15 in. by 10 in., so there is plenty of room and I have added a choke output.

The valves used are: oscillator, PM5X; first detector, DE8HF; S.G., PM16's; second detector, PM6D; power, P625A. 120 volts on all valves except the last, which receives 180.

The transformer is a Marconiphone, ratio 4 to 1. The frame aerial is a Bodine, which is somewhat directional.

I have another super-het, built nearly five years ago, with three I.F. valves, but its power and tuning properties are nothing like the Super 60. It has the old Remler intermediate transformer.

The Super 60, I find, does not require the full voltage on the screened-grid valves for any ordinary stations, but Manchester and Glasgow come in at comfortable loud-speaker strength: those are stations not generally heard on ordinary sets, at all events in these parts.

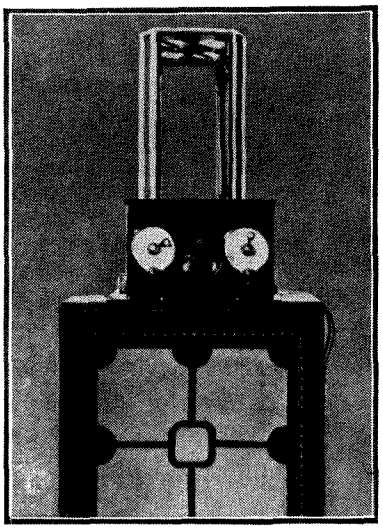
Admirable Control

I was surprised at the power, but the screened-grid volume control is admirable.

I have not tried the set on the long waves as my frame is not adapted for it, and I have no other frame by me.

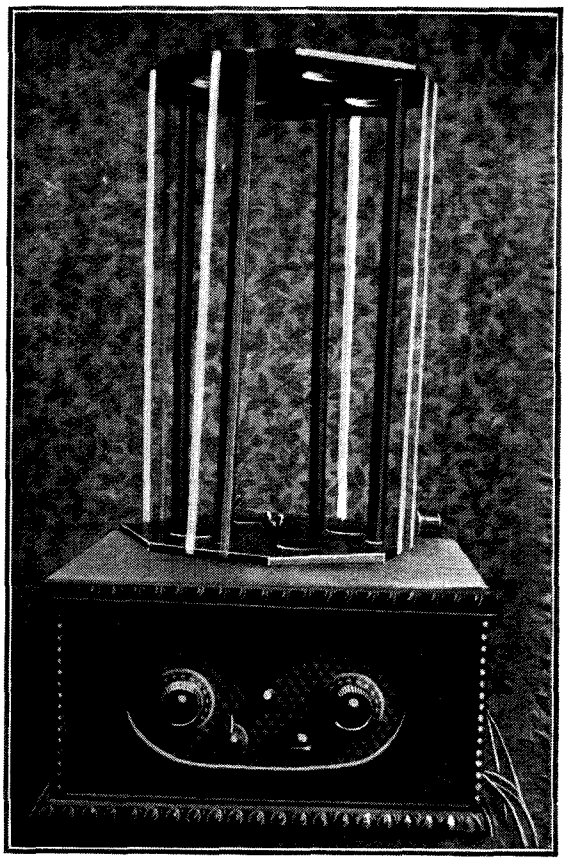
I must congratulate Mr. James on having designed a set which combines extreme selectivity with power and quality.

If you can suggest any means for recovering my bass notes, I shall be glad; they have not exactly disappeared, but are only less prominent. Possibly it may be due to some cutting of the sidebands.



SOLVES THE MOORSIDE EDGE PROBLEM

This is the comment of a Brighouse constructor, who is only 5 miles from the new station. *See report on page 514*



FORTY STATIONS ON THE FIRST TEST

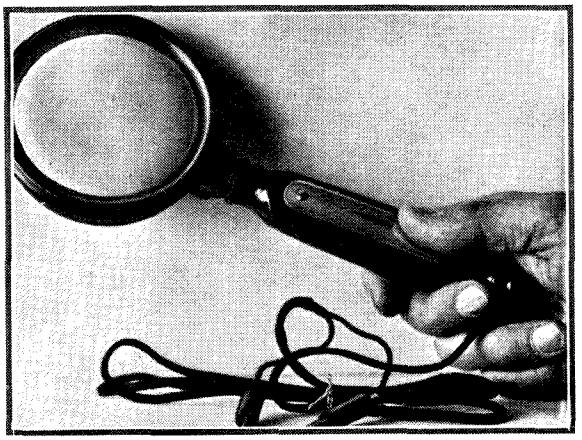
"I dialled about 40 stations on the first test and expect to get others," says the Chorlton-cum-Hardy reader who built this set. *See report on page 514*

RADIO *for the* DEAF

By Dr. ALFRED GRADENWITZ

IT has long been known that those who are hard of hearing as a rule are fairly good at telephoning, sound vibrations reaching the nervous centres of their ears (providing these be intact), even independently of the tympanum or drum, through the intermediary of mechanical vibrations set up in the bony part of the skull.

While engaged in an investigation of this phenomenon and in an attempt to use it in connection with a radio listening device for the deaf, Dr. G. Eichhorn, of the Zurich (Switzerland) Radio Engineering Institute, was struck by another idea eventually embodied in a special piece of apparatus.



A PHONE FOR THE DEAF

This phone has been specially designed for the use of deaf people. The inventor is Dr. Eichhorn.

The principle underlying its construction may be described as follows: The human body is connected up to the anode circuit by a device consisting of a piece of insulator or rather half-conductor, such as cellophane, coated with metal on one side, and the opposite side being applied to the ear, or any other part of the skull close to the acoustic centre of hearing, so that there is actual contact.

Telephone Currents

The audio circuit of a radio set is traversed by the continuous current and the superimposed alternating telephone currents. Tests of the Radiophone, as the new apparatus is called, showed that its sensitiveness mainly depends upon the continuous-current tension, which should be inversely proportional to the alternating current fluctuations to be heard.

The audibility of a given acoustic intensity will increase, rapidly at first and eventually at a slower rate, as the continuous-current tension increases, the maximum with low alternating-current tension being about 120 to 150 volts, but considerably less with higher alternating-current tension.

A standard valve receiver with moderate loud-speaker energy has been found quite sufficient for any practical purposes, providing that there is no output transformer doing away with the continuous-current component.

This apparatus is based upon an electrostatic effect of the condenser constituted by the metallised surface of the half-conductor, on the one hand, and the human body on the other. The instrument is slightly larger than the membrane of an ordinary headphone. The handle comprises a metal strip which should be touched in order to connect the human body up to the anode circuit. Comparative tests with an ordinary headphone showed that the acoustic intensity in the latter is higher than in the Radiophone, while this ensures a much more pure and natural rendering, a particularly valuable feature in connection with the reception of speech. In fact, partly deaf persons having their nervous ear centres intact have been enabled by using the Radiophone fully to enjoy radio broadcasting.

Body Vibration

These facts strikingly show that the skin or any other soft parts in immediate proximity to the ear are, by an electrostatic effect, set vibrating, these vibrations being transmitted direct to interior parts of the organ of hearing—a fact bound to prove of much importance to physiologists and ear specialists.

THE LEAKY GRID

THE correspondence to this important section of WIRELESS MAGAZINE is getting so heavy, and so behindhand, that I have decided to destroy all the letters for which there was no room last month and begin on the present batch. I give my answers to the more important only:

ELSIE (Stow-in-the-Wold).—I am glad to hear that you followed the floating commentary on the Oxford and Cambridge boat race with such interest.

GEOFFREY (Newcastle-on-Tyne).—I do not think even Mr. James's Super 60 will *guarantee* the vaudeville sopranos sounding in tune. If you like, I will ask the next time I see him, but he is a very modest man and I feel certain that he would not claim impossibilities for his set, wonderful though it be.

The only set I know of that can *never* fail is the Hannen Swaffer Supersupersuper 120. It has twenty valves and is, I fear, rather expensive to construct. If you really want it I can get you a blueprint, but it is rather cumbersome, being slightly larger than the original ground plan Sir Christopher Wren used for St. Paul's Cathedral.

CUTHBERT (Moor Park).—I quite agree with you; Brookman's Three-plus-One *is* a very silly title for a set. It should, of course, be Plus-Four. I will see that it is altered for the next issue.

MRS. J. M. B. (Wigan) says that, after having seen my photograph in that idiotic article I wrote recently on knob-twisting, she thinks that Lissenden's cartoons are no good as they are too flattering. Thank you.

W. W.

RADIO MEDLEY

*** A RADIO FAN'S CAUSERIE CONDUCTED BY BM/PRESS ***

From the Malay States

I GET many letters addressed simply to "BM/PRESS, London, W.C.1," but I was more than usually interested the other day when I received such an envelope with a Federated Malay States stamp on it.

The letter was from Mr. George P. Forbes, of Bahau, N.S. He is the owner and operator of a station with the call sign VS2AT, which is a B.E.R.U. "Empire link" station.

Mr. Forbes says that he was much interested in the short-wave possibilities of the Super 60 when he saw the first description of that famous set and he asks whether the WIRELESS MAGAZINE could produce a super-het specially intended for use on the short waves exclusively. I have passed this suggestion on to the right quarters.

The First Number

This enthusiast has taken "W.M." right from its first number and has built quite a number of short-wave sets and other apparatus, including the Girdle Two, Pole-to-pole Short-waver, the Crusader, and the World-wide Short-wave Three. He also has an electrically-reproducing gramophone which is an adaptation of a gramo-radio set described in "W.M."

It is most refreshing to find such enthusiasm for WIRELESS MAGAZINE productions in a place which is so many thousands of miles distant.

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More Templates Wanted

Too many manufacturers are sending out without templates components that have intricate methods of fixing. I have just come across two glaring examples. One was a well-known A.C. induction motor and the other a slow-motion dial that needs three fixing holes.

The difficulty with the motor is that the spindle does not coincide with the centre point of the circle that must be marked out before the necessary "well" can be cut in the motor board. It is quite a long job, necessitating compasses and calipers, to make sure that the motor will be at exactly the right angle when finally screwed in position.

Calipers were also required to mark out the positions of the three holes necessary for fixing the slow-motion dial on a panel.

Look Before Buying

Now this is all wrong. In cases like this, manufacturers should be forced to supply templates. I suggest that you avoid buying any parts needing more than one hole for fixing unless a template is supplied with it. The same applies to pick-ups; choose those supplied with a template so that you have no trouble about the track alignment being correct.

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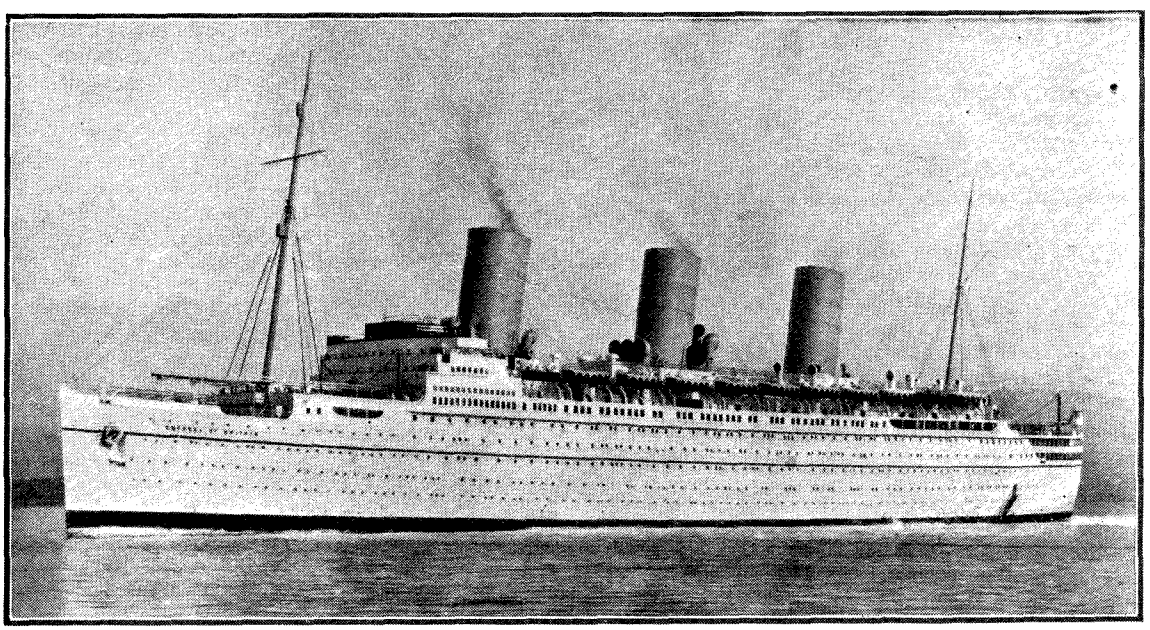
Coloured Knobs

Whilst on the subject of components again I must also say something about the colours of knobs. I was very surprised to see the other day that a cheap but satisfactory wire-wound potentiometer was moulded from some brown material and supplied with a brown knob.

I can imagine how annoyed a constructor would be if he got hold of one of these components unknowingly. Nothing is uglier than to see a coloured control on a standard black panel, when all the other control knobs are also black.

In this case I believe that a black knob can be obtained if specially ordered, but it is something of a



EXIDE BATTERIES FOR THE NEW CANADIAN PACIFIC SUPER-LINER, THE "EMPRESS OF BRITAIN"

This 42,500-ton liner is equipped with Exide batteries for telephonic communication, a Sperry gyroscopic compass, the emergency Marconi wireless plant, and for synchronising over one hundred clocks

RADIO MEDLEY—Continued

An Icelandic soprano from U.S.A.—Violet Manine Code, a recent broadcaster

mystery to me why brown should ever have been chosen, especially as mahogany-finished panels are rapidly losing favour.

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Coils That Come and Go!

"Why is it that all the wireless press use a set of coils for one or two circuits and then barge off to another type?" asks Mr. P. W. Frohman, who lives somewhere along the Great West Road.

"I have got coils in my junk box that have cost me over £8 and they are worth about the same number of pence. I have now come to the point that I am not going to make up any set that does not use a type of coil which I have; one can use up most components, but coils are a dead waste."

The answer to this is quite simple, I think. New coils are only introduced because they have some advantage over existing types. The new ones may be better in point of efficiency; cheaper to manufacture; or simpler to use.

Surely my correspondent is not suggesting seriously that the new coils introduced from time to time are not improvements on older patterns?

New Sets with Old Coils

If there are many readers of WIRELESS MAGAZINE who feel like this about coils I suggest that they write to the Editor. I have no doubt that he would be willing to produce some up-to-date sets using old coils if there were any general demand for them. It is pretty safe to say, however, that such sets would not be as good as those employing the latest forms of tuners.

I shall be glad to hear other readers' views on this matter.

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Technical Questions

May I just point out to my numerous correspondents that technical questions should not be addressed to me, but to the Information Bureau. They must be accompanied by the coupon on the last page and certain rules must be observed.

This warning is occasioned by a letter from Cheshire which says: "Could you oblige by giving me a full list of articles required to make an all-electric radio-gram; also advise if you could supply a blueprint?"

I am very sorry, but this kind of thing is quite outside my province. My job is to discuss matters of general interest, and not to give advice about individual difficulties, much as I should like to help all my readers.

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Infra-red Rays

However, I must put in a different category a question asked by Mr. Thomas Dowds, of Skelmorlie. He particularly wants books or other literature dealing with the infra-red rays discovered and used by Mr. J. L. Baird during his television experiments.

Elsie Carlisle is a frequent broadcaster and popular variety artiste

Mr. Dowds seems to have made extensive inquiries without any luck. "I would like to obtain a book explaining the uses, propagation and range of the ray; also the components needed and cost of same, with an idea of running costs," he says.

If anybody can help I shall be glad to pass the information on to the right quarter. I believe that the G.E.C. people have issued some pamphlets that throw some light on the subject.

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Metal-coated Valves

I mentioned last month that Mullards were producing mains valves with a coating of metal sprayed on the outside of the bulb to act as a screen. I now learn that other manufacturers are doing the same thing and I have just had an opportunity of trying two Cossor metal-coated screened-grid battery valves in my Super 60 (I am still shirking the D.C. radio gramophone I referred to previously!).

In the battery valves the metal coating is connected to one filament pin, and this must, of course, be the one connected to low-tension negative in the set. If the screen is connected to low-tension positive and the metal coating of the valve happens to touch any other screening in the set (or one of the copper coil cans in the case of the Super 60), then the accumulator would be short-circuited.

This is a point which should be carefully watched, otherwise you will see some smoke coming out of your set!

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Neut versus S.G.

"More stable, much quieter in operation, better quality, better selectivity, amplification appears quite as good in *actual practice*."

Such are the reasons why Mr. L. F. Parkes, of Birmingham, favours neutralised triodes in preference to screened-grid valves for high-frequency amplification. For some years this reader used a set with two neutralised stages, but recently it was rebuilt with screened grid valves and dual-range coils.

CONDUCTED BY BM/PRESS

Constant Balancing

"As soon as I can find a dual-range coil where neutralising remains really constant on both wavebands I am reverting to triodes for these reasons (unless the Super 60 can give equal quality)," says Mr. Parkes.

Personally, I am all for the Super 60, but if Mr. Parkes does not feel inclined to try this I suggest that he uses the special Binowave coil for neutralised triodes designed by Mr. W. James.

◆ ◆ ◆

A Valve Suggestion

I have a suggestion to make to valve manufacturers. It would be a very great convenience to all valve users if the characteristics were printed on a small slip of paper that could be stuck firmly round the bulb.

The present method of packing a comparatively large slip in the valve box is not too good. The slips easily get lost.

What Is Wanted

What I should like to see is a small paper band round each bulb with a note of (1) impedance; (2) maximum anode voltage; (3) anode current at 120 volts; (4) in the case of low-frequency valves, two or three grid-bias values; and (5) filament voltage and current.

If anybody can improve on this suggestion I shall be glad to hear from them.

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D.C. Motors

All listeners who are unfortunate enough to be on D.C. electric-light supplies seem to have trouble with electrical radio equipment. We have already learned how unlucky a number of readers have been with D.C. mains sets and units; now I have a note from Lt.-Col. O. H. Bayldon, of Beaulieu, regarding D.C. gramophone motors.

He has tried four and discarded three as quite impossible, in spite of heavy screening and condensers across the brushes.

"I have had good results from a Columbia," he says. "This is a heavy, slow-running machine with vertical armature shaft carrying the turntable direct, so the motor runs at turntable speed. It is powerful, even running and dead quiet."

Lt.-Col. Bayldon has his own private 100-volt D.C. supply. For high tension he uses the mains boosted up with two 70-volt accumulators, all in series. A six-point double-throw switch puts these two batteries in parallel and in series with the mains and a pendant lamp, which is across the filament battery.

Permanent Arrangement

Except for correcting the acid level the batteries never have to be moved; the low-tension accumulator is always charged while the light is burning and the high-tension accumulators are switched over to charge at regular intervals.

In an interesting postscript Lt.-Col. Bayldon says that when using five-pin valve holders he always tries to get those made by firms which spell cathode with a K. As he points out, C and G look very alike when moulded in bakelite. Manufacturers please note.

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Photographic Aid

Last month I asked photographic enthusiasts if they could give hints that would be of use to WIRELESS MAGAZINE readers who want to take photographs of their sets. In response to this I have received a most interesting letter from Mr. W. Mills, who is a photographic dealer at Hanwell. Here are his comments:

"It is practically impossible to take a snapshot indoors, especially with a small camera such as is obtained at a shop for about 12s. 6d. Also the ordinary 3½ by 2½ camera is no use owing to the size being too small for practical work.

Correct Exposure

"A half-plate stand camera with a good lens is ideal for the job. It is usual to use a fairly fast plate for indoor work and to give a time exposure with a camera on a stand. The usual thing is to give an exposure of six to ten times the exposure that would be given outside in the shade, according to the lighting in the room, etc.

"But owing to the usual set having a black panel, and usually an oak or dark cabinet, detail will be somewhat missing. To obtain the very best results with maximum detail a panchromatic plate with a suitable light filter should be used."

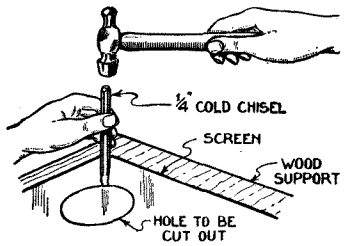
These points seem to me to be very sensible and I hope that they will be appreciated by constructors.

BM/PRESS

METAL SCREENS

THE making of a screen is not a difficult job providing suitable tools are available. The material most commonly used is aluminium or copper sheet.

When buying the material the metal dealer should be asked to cut the screen in the flat to approximately the required dimensions, otherwise difficulty may be afterwards experienced if a pair of metal-cutting shears or snips



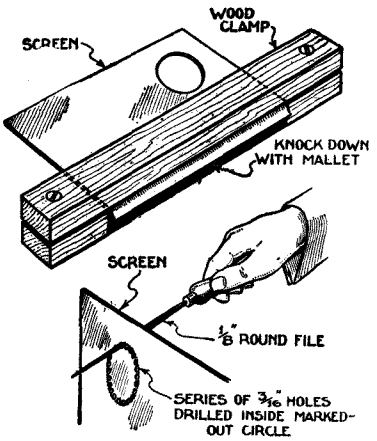
USING A CHISEL TO CUT THE HOLE FOR A SCREENED-GRID VALVE

is not at hand to cut the sheet to size.

A simple method of bending the edge of the screen so that it can be fixed to the baseboard, is illustrated below; two strips of planed timber (preferably hardwood) are provided with a stout wood screw or countersunk head bolt and nut at each end. The screen is then clamped between the wood strip so that ⅜ in. projects.

The projecting strip may then be bent neatly at right angles by knocking it down with a mallet or hammer shaft.

The screens for many sets require a



FILING AWAY THE CONNECTING STRIPS BETWEEN HOLES IN ORDER TO REMOVE SURPLUS METAL

hole of approximately 1⅝ in. diameter to be made in them for the fitting of a screened-grid valve. After marking out the position of the hole, the surplus metal may be removed by drilling a series of 3/16 in. holes inside the circle and filing through from hole to hole with a ⅛ in. round file. The edges of the hole should finally be smoothed by means of a half-round file.

An alternative method of cutting the hole is to cut round the marked out circle with a ¼ in. cold chisel, afterwards smoothing the rough edges with a half-round file as before.

A. P.

THE EVER-TUNED REGIONAL TWO

Designed by the "Wireless Magazine" Technical Staff

THE idea behind this set is to produce a simple yet powerful receiver for use in regional broadcasting areas, but with this important difference from the usual receiver—that one or other of the twin regional transmitters can be received merely by the operation of a switch, without the need for making a tuning adjustment.

Self-Contained

A further advantage of the design is that the batteries and loudspeaker are contained in the same case as the receiver chassis. The only external connections that have to be made are those for the aerial and earth.

From these remarks it will be apparent that the Ever-tuned Regional Two is an ideal set for general use by the family; it will appeal particularly to those who dislike fiddling with a condenser dial every time reception is carried out.

The circuit of the set comprises a leaky-grid detector and a transformer-coupled power stage; the theoretical arrangement will be clear from the diagram on above.

For the sake of convenience, a standard two-contact plug-in coil is used for tuning, the actual adjustments for the two regional programmes being made by means of two .0003-microfarad semi-variable condensers.

One side of each of these condensers is taken to a change-over switch so that only one of them is in use at a time. The fact that a single coil is used in conjunction with the two condensers means that the two stations to be received must work on reasonably adjacent wavelengths.

With a No. 60 centre-tapped coil, for instance, a tuning range of approximately 240 to 490 metres is obtained; in other words, a coil of this size covers the London National and Regional transmitters, Midland Regional and the new North Regional station.

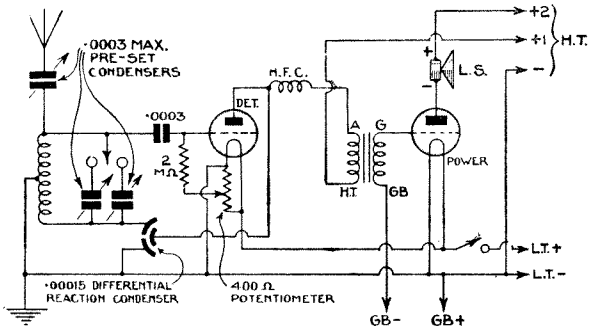
With a No. 200 centre-tapped coil a range of approximately 1,000 to 1,800 metres is obtained. This size of coil will give Daventry National (5XX) and Radio Paris, for instance.

In order to increase the efficiency of the detector valve one side of the grid leak is taken to the slider of a potentiometer connected directly across the low-tension accumulator. In this way the bias on the valve can be varied until the best working point is obtained.

Slider Position

In practice the best results will be obtained with the slider about one-quarter of the way round from the positive end of the potentiometer winding; the best position varies, of course, with different detector valves and different anode voltages.

In the anode circuit of the detector valve is a high-frequency choke; this, in conjunction with a differential condenser of .0003-microfarad capacity, gives reaction.



STRAIGHTFORWARD AND EFFICIENT CIRCUIT

Here is the circuit of the Ever-tuned Regional Two. It comprises a leaky-grid detector and power stage

It will be noticed that no separate reaction coil is used. This is because the circuit is of the Hartley type and one half of the centre-tapped coil is used as a reaction winding, although the whole coil is used for aerial tuning in the ordinary way.

One Reaction Setting

With a little care, it is possible to obtain one setting of the reaction condenser for both tuning points on the coil. When this effect can be obtained, the only operation needed to pick up a programme is to pull out the knob of the on-off switch mounted at the right-hand side of the set.

The switch on the left-hand side of the set is for selecting one or other of the stations already tuned by the semi-variable condensers. A programme will be received whether this switch is in or out; it is operated simply to give a change of programme.

There is little more that need be said about the actual circuit arrangement. The connections to the low-frequency transformer follow standard practice and grid bias i applied to the power valve in the ordinary way.

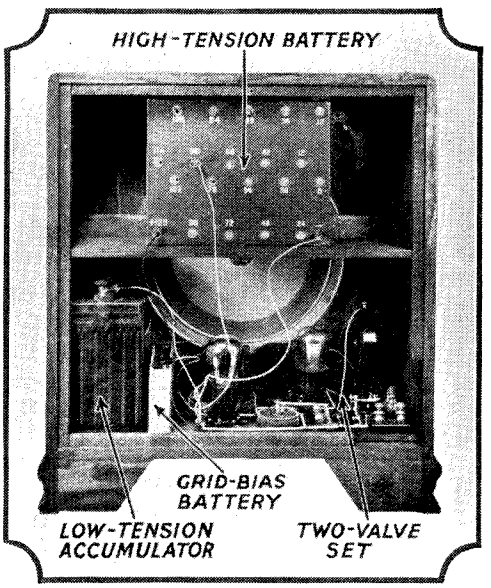
No choke-filter or transformer output circuit has been included, because the loud speaker unit used is well able to take the anode current passed by any ordinary two-volt power valve.

Every detail needed for the construction of the set is included in these pages, but those who desire one can obtain a full-size blueprint for half-price (that is, 6d., post free), if the coupon on the last page of this issue is used by June 30. Address your inquiry to Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, E.C.4., and ask for No. WM241.

These blueprints show the position of every component at full scale and save a considerable amount of time when the parts are being laid out. Moreover, each wire is numbered in the best and most convenient order of assembly. Here it may be noted that the wires shown in outline (as distinct from those shown solid) should be made with rubber-covered flex.

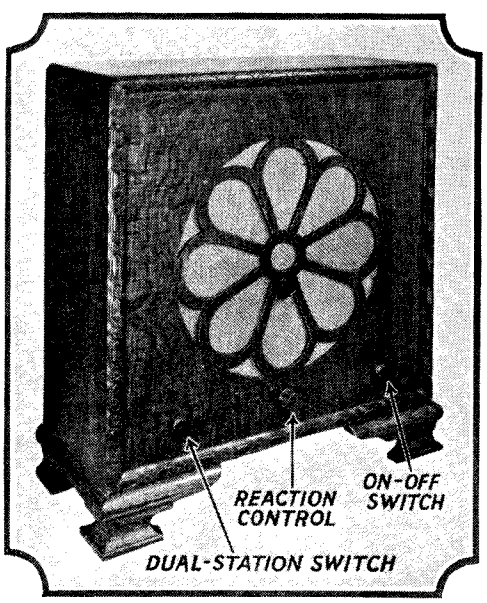
It will be clear from the photographs how the set is assembled. The cabinet is really intended for housing a loud-speaker unit only, but in this case the receiver and the batteries are also incorporated. No ebonite panel is used for the control components, these being mounted directly on the case immediately underneath the loud-speaker fret.

The positions of the three control components, namely the two switches and reaction condenser, will be clear from the blueprint or reduced-scale drawing reproduced on page 526. These three parts should be fixed in position first and then the loud-speaker assembly should be inserted in the cabinet.



EVERYTHING IN THE CASE

How the complete outfit is assembled in the case. It will be noticed how accessible every part is



ONE SWITCH FOR TWO STATIONS

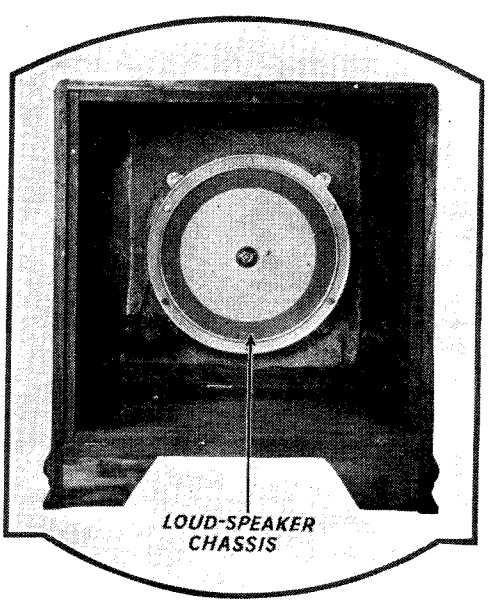
A choice of two stations is given by the left-hand switch

Baseboard Assembly

The main part of the receiver, that is all the parts fixed to the baseboard, can be assembled outside the cabinet. When all the baseboard components have been screwed in position, wiring up can be started. To begin with connect all the wires from No. 1 to No. 16; these connections can be made either with solid wire or rubber-covered flex, as the constructor prefers.

The next part of the construction is to fix flexible connecting wires to the panel mounted components; these are connections No. 17 to No. 29. The length of each connection is clearly indicated on the wiring guide, so that no difficulty will be experienced at this stage.

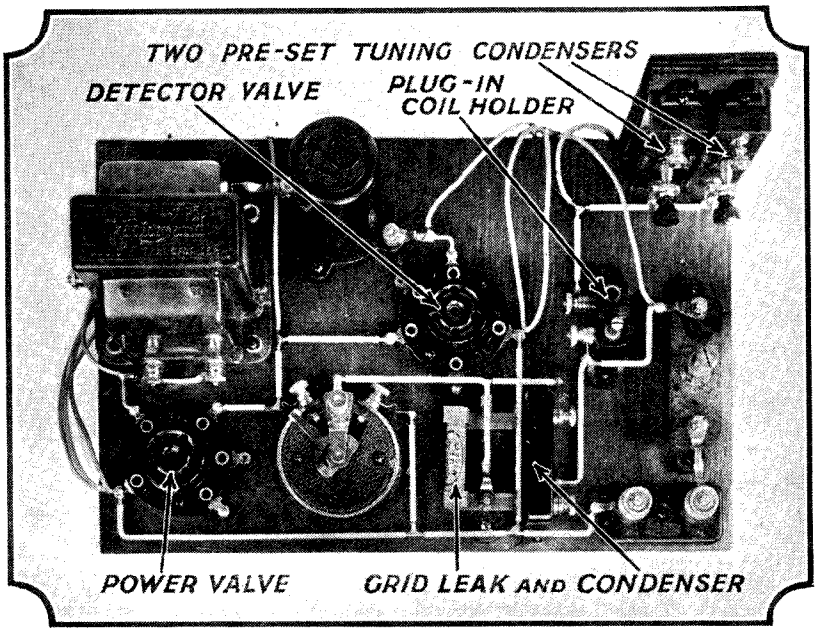
As soon as these wires have been fixed to the panel components, the baseboard should be placed in



COMPLETE LOUD-SPEAKER ASSEMBLY

This photograph shows the loud-speaker chassis and unit in position

THE EVER-TUNED REGIONAL TWO—Cont.



SIMPLE LAYOUT

This view shows how all the components are laid out on the baseboard

the bottom of the cabinet and the free ends connected to the appropriate terminals on the baseboard components.

It should be noted that one of the loud-speaker tags is connected to the anode terminal of the power-valve holder, the other tag being connected to the 120-volt tap of the high-tension battery (these connections are not numbered). Remember to connect the loud-speaker cord with a red thread running through it to the high-tension battery.

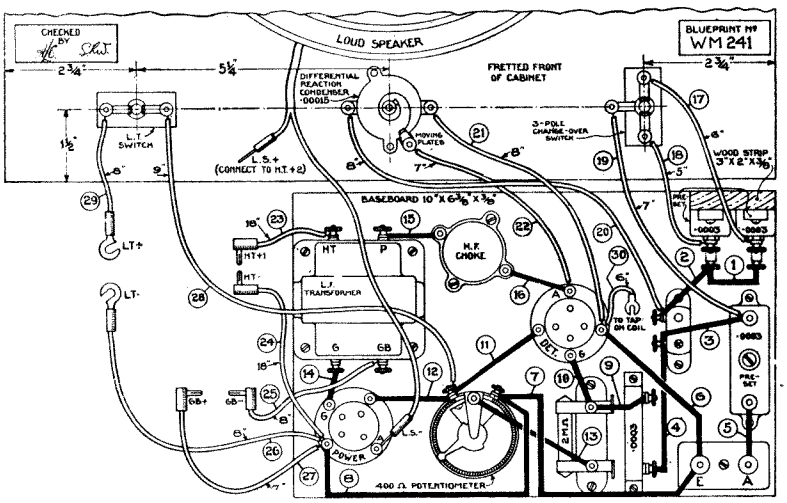
Semi-variable Condensers

There are three condensers of the semi-variable type, all three being mounted at the right-hand end of the baseboard (looking from the back of the set). One of these condensers is mounted horizontally, but the other two are fixed vertically to a small block of wood so that they can be easily adjusted by means of a screwdriver.

Battery Voltages

The next step in the assembly is to fix the battery shelf in position and connect the appropriate flexible leads to the battery terminals. Normally, the lead marked H.T.+2 should be supplied with 120 volts, as already explained. The lead marked H.T.+1 should be tapped along the battery until the best results are obtained; normally a voltage of about 100 will be suitable for the detector valve.

When choosing valves for the set, keep an eye on the anode-current consumption. For economical working the total current taken from the high-tension battery should not exceed about 10 milliamperes.



LAYOUT AND WIRING GUIDE

This layout and wiring guide can be obtained as a full-size blueprint for half-price (that is, 6d., post free), if the coupon on page 552 is used by June 30. Ask for No. WM241. Connect leads up in numerical order

COMPONENTS REQUIRED FOR THE EVER-TUNED REGIONAL TWO

CHOKE, HIGH-FREQUENCY
1—British General, 5s. 6d. (or Lewcos, Wearite).

COIL
1—Lewcos No. 60 centre-tapped plug-in, 3s. 6d. (or Atlas, Igranic).

CONDENSER, FIXED
1—Lissen .0003-microfarad, 1s. (or Edison Bell, Watmel).

CONDENSERS, VARIABLE
2—Formodenser .0003-microfarad maximum, 3s. (or Sovereign, R.I.).
1—Sovereign .0003-microfarad maximum, 1s. 6d. (or Formodenser, R.I.)
1—Telsen .00015-microfarad reaction, 2s. 9d.

HOLDER, COIL
1—Lissen, two-contact type, 1s. (or Lotus).

HOLDER, GRID-LEAK
1—Lissen, type LN160, 6d. (or Bulgin).

HOLDERS, VALVE
2—Lotus, type VH/31, 1s. (or Clix, W.B.).

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

RESISTANCE, FIXED
1—Lissen 2-megohm grid leak, 1s. (or Watmel, Dubilier).

RESISTANCE, VARIABLE
1—Lissen 400-ohm potentiometer, baseboard mounting type, 1s. 6d.

SUNDRIES
Glazite insulated wire for connecting.

TRANSFORMER, LOW-FREQUENCY
1—Telsen Radiogrand, 12s. 6d. (or Ferranti AF8, R.I.).

ACCESSORIES

BATTERIES
1—Ediswan 120-volt, 14s. 6d. (or Pertrix, Siemens).
1—Lissen 9-volt grid bias, 1s. 6d. (or Pertrix, Siemens).
1—C.A.V. 2-volt jelly acid accumulator, type 2NS17, 16s. (or Gecophone, Exide).

CABINET
1—Osborn, transportable model, £1 3s.

LOUD-SPEAKER
1—Squire chassis, type P77, 15s.
1—Blue Spot unit, type 66K, £1 5s.

VALVES
1—Mazda HL210, 8s. 6d. (or Cossor HL210, Lissen HL210).
1—Mazda P220, 10s. 6d. (or Cossor P220, Lissen P220).

FIXED TUNING FOR TWO STATIONS

Assuming that the detector valve would take about 2 milliamperes, approximately 8 milliamperes can be allowed for the power valve. At this consumption a power valve with a low impedance and good amplification factor can be obtained.

It is important to apply the correct bias to the power valve and the maker's instructions regarding this should be followed implicitly.

When inserting the valves and coil in their holders do not forget to make a connection to the centre-tapped terminal on the plug-in coil.

Condenser Adjustments

The final stage of the construction is to switch the set on and adjust the two semi-variable condensers. This is done from the back of the set. The change-over switch for the two stations is that on the extreme right. It has three terminals and two contact arms, one of which is longer than the other.

The switch should be so fixed that the longer contact arm is at the top; then when the knob of the switch is pushed in the right-hand semi-variable condenser will be in circuit.

This condenser should then be adjusted for one or other of the desired stations. The knob can be turned by means of a screwdriver from the back of the set, but in order to avoid capacity effects, one with very little iron should be used.

Indeed, it is preferable to use a rod of wood with one end cut to a chisel edge. There will then be no metal to affect the tuning range of the coil and there will be no hand-capacity effects.

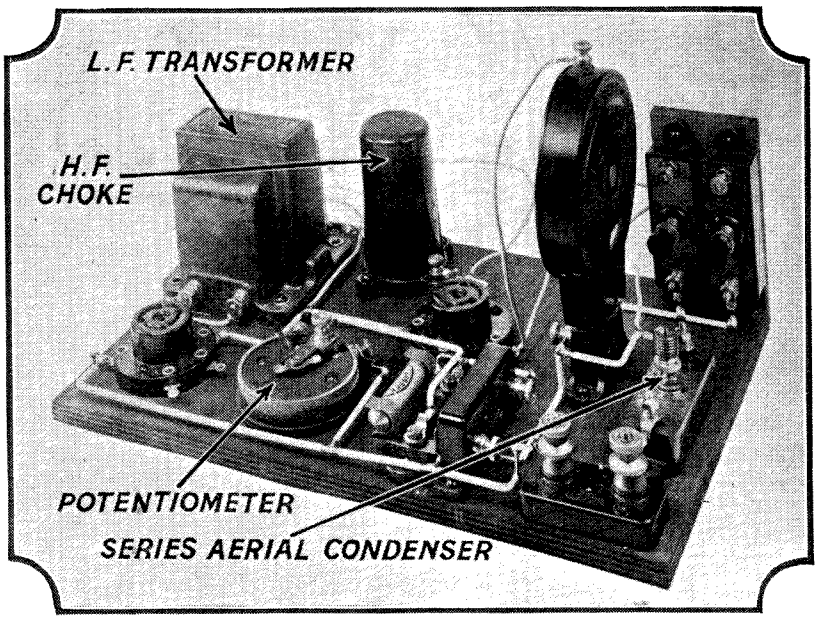
When one station has been tuned-in at good strength, the knob of the switch should be pulled out and the left-hand condenser adjusted for the second station.

Controlling Selectivity

A few words may be usefully said about the aerial series condenser mounted on the baseboard. This is included to enable the operator to control the selectivity of the whole receiver. The longer the aerial in use the smaller must be the capacity of this condenser to enable regional transmissions to be separated. The capacity is decreased by turning the knob to the left, that is in an anti-clockwise direction.

To begin with, this condenser should be set at its maximum capacity; in other words, the knob should be screwed to the right as far as possible. Thus set, and with a fairly long aerial within a few miles of a regional transmitter, it will probably be found that the two

(*Continued on page* 546)

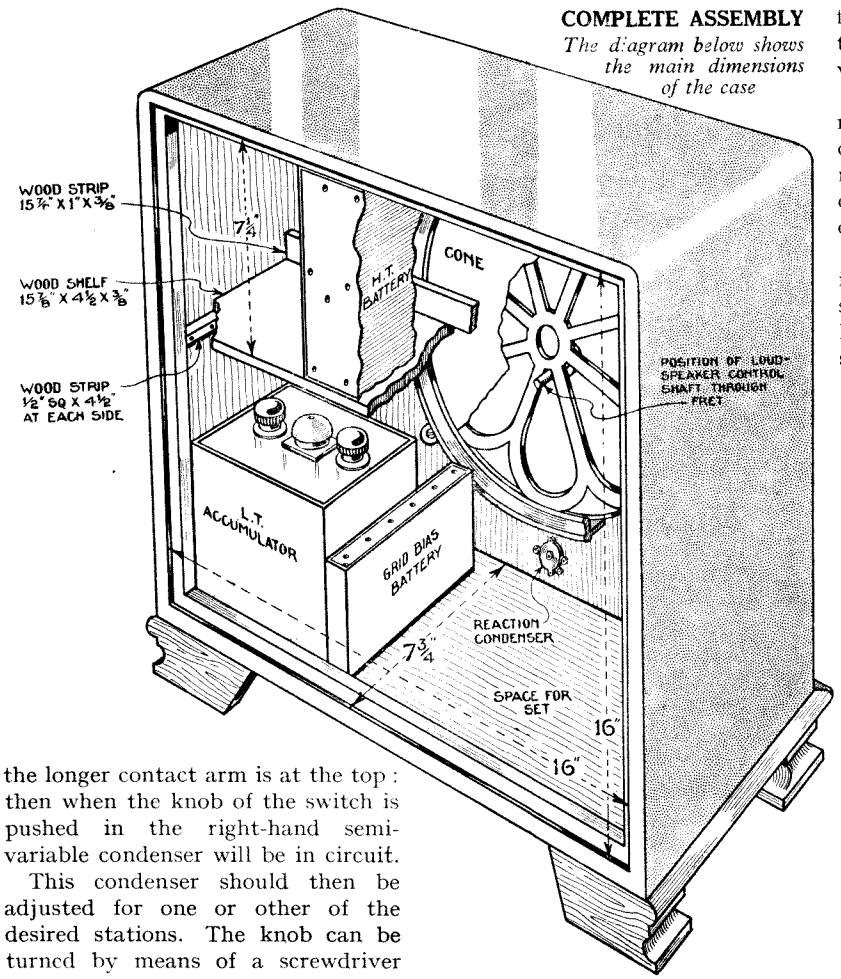


ANY BEGINNER CAN TACKLE THIS DESIGN

So simple is the construction of the Ever-tuned Regional Two that any beginner can assemble it without difficulty

COMPLETE ASSEMBLY

The diagram below shows the main dimensions of the case



★ CHOOSING A ★ PERMANENT MAGNET MOVING-COIL LOUD-SPEAKER

This month Capt. H. T. BARNETT, M.I.E.E., turns from his favourite gramophone topics, and discusses a matter that interests every set owner. His remarks on the choice of a loud-speaker are essentially practical and will be found of considerable help to prospective buyers.

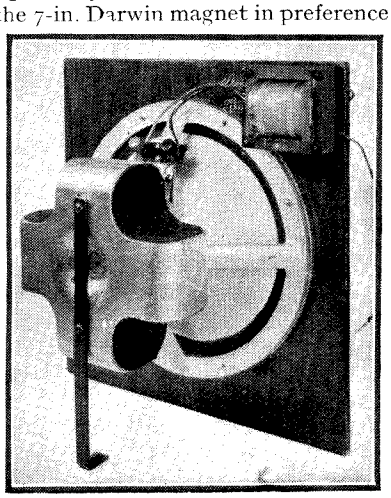
IN looking through advertisements of these loud-speakers and when comparing the performances of various makes I have been struck with the difficulty that a novice must find in deciding for himself which of them is the best value for money for his particular requirement.

For all but very large halls, in my opinion, the electrically-excited magnet loud-speaker should not be used.

Acoustic Advantages

The acoustic advantage obtained from using two or four loud-speakers on the end or on the end and side walls of a room is so great that I should strongly advocate the use of a plurality of loud-speakers employing the 7-in. Darwin magnet in preference to having one big loud-speaker of the cinema or super-cinema class.

I would only use the electrically-excited loud-speaker when two or four big ones were necessary to fill the building with tone.



IN CHASSIS FORM

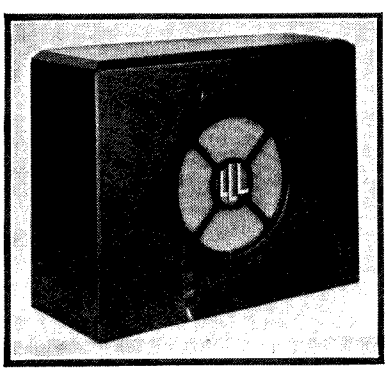
This is the larger of the W.B. permanent-magnet models. The price of the chassis is £6 : 6 : 0; a cabinet model can be obtained for £8 : 18 : 6

Output or Pure Tone

The output volume of pure tone that can be obtained from permanent-magnet reproducers at present on the market is determined more by the size of the magnet than by any other factor. The other factors *might* produce great differences, but in practice they do not.

The *weight* of the Darwin magnet used may roughly be assumed to be proportional to the output of good-quality tone that the loud-speaker will give.

Just a few instruments have badly-designed coil carriers, but in the case of goods sold by a reputable firm it may safely be assumed that if one experienced any trouble through the coil or its spool coming into contact with the magnet poles, then that firm would put the loud-speaker right.



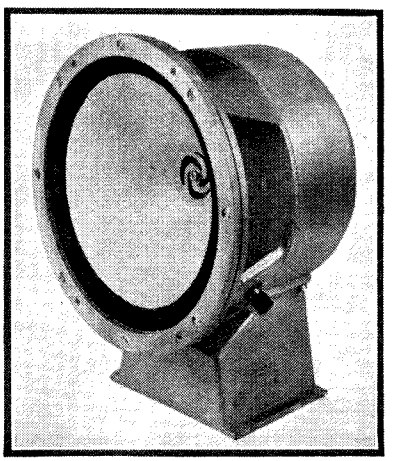
BEST VALUE YET?

Although only 4 guineas, the Lanchester loud-speaker gives an excellent performance. *See the test report on page 542*

When fitted to *the same baffle or baffle case* the difference between any two well-made reproducers having the same Darwin magnet and the same coil impedance is very small.

Therefore, apart from the case work, which is another and a different matter, you can compare roughly the weights of the Darwin magnets of the various loud-speakers against their chassis form prices.

You cannot go by the diameter of the magnet—I know of two magnets, roughly 5½ in. in diameter, but having very different thicknesses of metal.



A MASSIVE JOB

The new Parmeko permanent-magnet chassis, which costs £6 10s. A test report appears on page 540

Except for the portable type of radio gramophone (all from the mains), which I know to be coming out shortly, I should not advise the use of any instrument having a magnet smaller than the lighter of the two 5-in. Darwins.

The pure output from these loud-speakers is not too much even for a small room; the lighter of the two 5-in. magnets is the one used in the Edison-Bell unit, complete in polished walnut case and sold at between five and six pounds retail.

Several Good Makes

Several good makers supply an instrument made up with the heavy Darwin 5½-in. magnet; in the Edison-Bell series, complete with baffle board and with a condenser and choke or transformer protection for the moving-coil winding, the retail price is five guineas.

I have not yet seen a reproducer with the heavy 7-in. Darwin magnet. There is one coming out shortly I

know. I should use two of them in a large drawing-room, one at each end; or four of them in a ballroom, one in each corner placed as high up as possible.

Of course, before you make your final choice you must rule right out of the running any loud-speakers whose coil impedance does not suit your set, unless you wish to go to the expense of a transformer to use with it.

Coil Impedance

I like a D.C. impedance for the coil about one-tenth that of the output-stage impedance of the valves in the case of a small instrument. Of course, the A.C. speech ratio impedance of the coil being dependent not only on the D.C. resistance, but far more so on the counter electromotive force factor, in the case of exceptionally strong magnetic fields smaller lengths of coil winding are effective, therefore with the big magnets the D.C. impedance of the coil might well be not more than one-twentieth that of the output stage of the valves.

Super-cinema Model

I have seen the big Epoch super-cinema loud-speaker working very efficiently with its transformer compensated coil equivalent to a D.C. impedance of less than one-thirtieth of the output-stage impedance of the two LS5A valves in parallel used with it, but then, of course, this coil moves in what no doubt is the strongest magnetic field commercially practicable.

A CABINET MODEL

This permanent-magnet (model 131) is by Marconiphone. The price complete is 10 guineas; in chassis form, 6 guineas

Makers are very careless about giving the D.C. impedance of their coils. Some of them give what they call a speech ratio impedance without stating the periodicity. Dealers rarely know anything at all on the subject.

I always write to the makers for the information, unless a loud-speaker is sold (as the Edison-Bells are) as wound for pentode or wound for power-valve output.

Where a plurality of loud-speakers is to be used it must not be forgotten that one great convenience of the permanent-magnet type is that they may be coupled and the coupling changed precisely as desired. For example, when using four of them they might all be in parallel (one quarter the impedance of a single one), all in series (four times the impedance), or two series pairs in parallel (the same impedance as a single loud-speaker), this adaptableness giving one considerable latitude of choice in purchasing reproducers for a big room.

In practice and within limits series coupling favours the bass and parallel coupling the treble.

Baffles for Deep Bass

Baffles to develop deep bass and percussion tone without roar or boom are best in case, box, or cabinet form with the back substantially open. The wood *must* be thick. For the 5½-in. large magnet an 18-in. cube would be good. For the 7-in. magnet I should make the cube equivalent to 21 in.

4.15 a.m., G.M.T.

"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."
—Jay Coote, in the WIRELESS MAGAZINE.

Alarm goes off like the Final Trump—
Blithely from my bed I jump,
Land on the floor with a mighty bump
And rush around half frozen;
Throwing on coat and socks and boot,
Down to the radio set I scoot,
I've just been reading the great Jay Coote—
I'm going to listen to Posen!

4.15—I shiver and shake,
Can it be true that they're awake?
Surely friend Jay has made a mistake,
For the world seems dead and dreary.
Ah! there it is—but oh, dear me!
What fools these (Posen) mortals be
To crawl from bed at half past three
To talk to the cold and weary.

What fools be they who, too, instead
Of slumbering in nice warm bed
Come creeping ghostwise in the dead
Of night for recreation;
Fools too be we (Jay Coote and I)
To leave the soothing sheets and hie
Downstairs to twiddle knobs and try
To pick up this Polish station!

C. P. P.

THE MONTH'S RADIO MUSIC

The popular "schoolmaster" comedian, Will Hay, is a great favourite with all listeners

NOW that the B.B.C. Winter Season of Symphony Concerts has closed broadcast programmes have little interest for those who enjoy classical orchestral items in particular. The new orchestra has played admirably throughout the season and is to be heartily commended for its work.

Relayed Across Europe

Many of the concerts were relayed throughout Europe and, in the case of the famous Bach concert of November 12 of last year, to the United States. This is ample proof that this country has now a definite established position in the musical world.

The last few concerts at the Queen's Hall have included some fine renderings of works of entirely different types. On April 22 we had the pleasure of hearing again Handel's popular oratorio *Israel in Egypt*. In this the choral singing was magnificent and the orchestral playing superb.

The week following, Sir Henry Wood conducted a well-varied programme, in which the soloists were Myra Hess, an English pianist of note, and Göta Ljungberg, the famous Swedish soprano. Schumann's Concerto in A minor was played well with Myra Hess as soloist, and with a delicacy of feeling that made it a welcome change to Bax's Symphony No. 2. This symphony was well played, but hardly suitable for broadcasting.

The Dance of the Seven Veils and Final Scene from Strauss's opera, *Salomé*, was pleasing, but Göta Ljungberg was hardly given the chance to show her magnificent voice to its full.

Adrian Boult, musical director of the B.B.C., has written books on the art of conducting

Conducted by Boult

The last concert of this series, conducted by Dr. Adrian Boult, included the Concerto No. 4 in C Minor for pianoforte and orchestra by Saint-Saëns. Cortot, the famous French pianist, played the solo part and the orchestra is to be commended on its excellent accompaniment work.

Elgar's Variations on an Original Theme (Enigma) was the attraction of the evening and was played with the usual thoroughness of the orchestra. Mahler's *Lieder eines fahrenden Gesellen* (Songs of a Wayfaring Lad)

A favourite contralto frequently heard from all B.B.C. stations, Rispah Goodacre

were well sung by Maria Olszewska, the opera singer who is at present appearing at the grand opera season at Covent Garden. Altogether, a very enjoyable concert.

The Sunday evening orchestral concerts will finish at the end of May. When these concerts were started by the B.B.C. last year, we were told that they were to supplement the

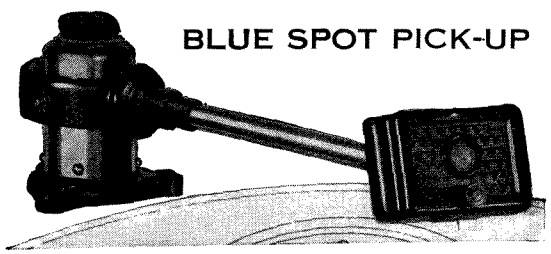
(*Continued on page* 532)

Made with the precision of Scientific Instruments

IF genius be "an infinite capacity for taking pains," Blue Spot products must take rank with the highest works of genius. No scientific instrument could be built with more scrupulous care, more painstaking precision. Blue Spot products *are* scientific instruments.

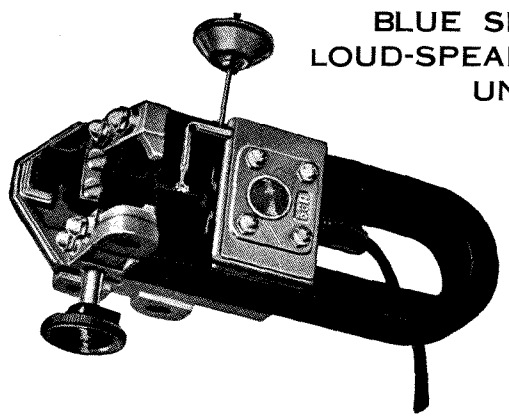
And the results justify the pains. No matter how exacting the critics, Blue Spot products satisfy them.

BLUE SPOT PICK-UP



Blue Spot Pick-up is a triumph of technical efficiency. It is mounted on ball bearings and counter-balanced. It is as free as the wind to travel from side to side or up and down. In consequence it follows the tracking on the record *exactly*, taking note faithfully of every detail. The automatic lift gives you ease in needle and record changing, while the volume control gives you effective variation. A Blue Spot Pick-up is the ideal link in the lifelike recreation of your records through your amplifier. **Price Complete £3 3s.**

BLUE SPOT LOUD-SPEAKER UNITS



These Units have earned a high reputation for quality. There is a model to suit every purpose. 66K is most efficient for medium and small powered inputs. Its tone is liquid. It reproduces the original with fidelity—adding nothing and taking nothing away. It never distorts, never rattles, never blurs. To listen to music through a Blue Spot Unit is as good as listening to the original artiste. Get a Blue Spot Unit to-day.

Price 25/-

66R (as illustrated) possesses the same features as 66K but is designed for large volume. It will handle an enormous output without distortion, the impedance being such as to match that of all modern super-power valves without the necessity of costly output transformers. **Price 35s.**

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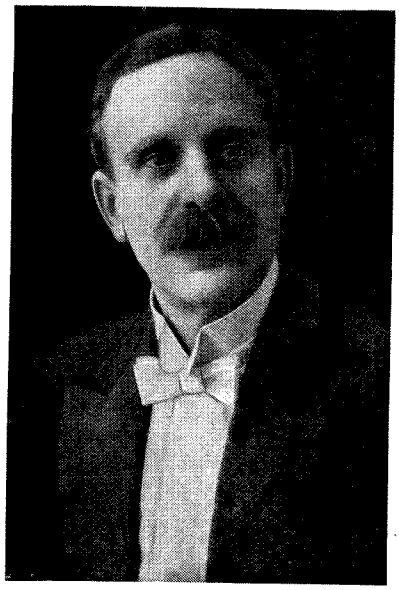
MONTH'S RADIO MUSIC—Cont.



One of the best clarinet players in the country, Charles Draper, plays in the new orchestra

Wednesday evening concerts and were to be of a more popular nature. The B.B.C.'s idea of popular orchestral concerts, at least as far as these concerts were concerned, was not what the majority of listeners expected. If anything, this series was, taking events all round, far more of a serious nature than the Queen's Hall concerts. Nevertheless, they have been thoroughly enjoyable and an excellent contrast to the hotel broadcasts of the alternative programme.

The programmes of June and July will not have the full benefit of the new orchestra, as these will be holiday months as far as the orchestra is concerned, one half of the players being away each month.

Classical "High Spots"

The main "high spot" in classical music these months will be the Grand Opera relays from Covent Garden. However, during June several interesting concerts will be given by the remaining half of the orchestra. The conductors for these will be Leslie Heward, conductor of the City of Birmingham Orchestra, on June 9; Percy Pitt, late musical director of the B.B.C., on June 10; and Frank Bridge, on June 12.

Arthur Catterall, the popular leader of the orchestra, will be playing with his string quartet in the Foundations of Music during the week from June 8 to June 14.

Marjorie Edwards, entertainer at the piano, has given some enjoyable performances from Midland Regional

We have little cause to grumble at present concerning the number of organ recitals, these items apparently having been given a regular position in the main programmes, as we have constantly urged in these pages.

Many recitals have been broadcast and have been extremely enjoyable. Berkley Mason's organ recital from All Saints Church, Margaret Street, was thoroughly enjoyable, and from a technical point of view the transmission was excellent.

Listeners will be interested in the announcement that an organ, specially designed for broadcasting purposes, is to be erected in the new concert hall at Broadcasting House. At the present time no definite news as to the size or type is available, but we understand that special experimental tests are shortly to begin.

Trying the Largest Pipe

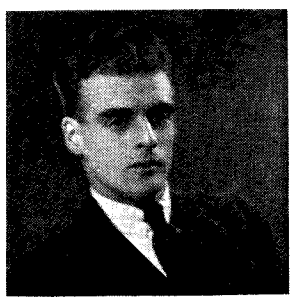
For this purpose the proposed largest pipe will be tried out for the purpose of noting if any reverberation effects are felt in any other part of the building, especially in the adjoining studios. Organ broadcasts should come into greater prominence when Broadcasting House is opened.

A frequent broadcaster in the Scottish and Irish programmes, Muriel Childe, soprano

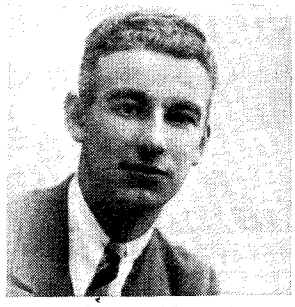
The seating of this concert-hall studio was originally designed to have accommodated a thousand people, but in order to improve the acoustical

(Continued on page 534)

Beatrice Galloway is heard in the "Ridgeway Parades" in the National programmes



A clever pianist, Leslie England, frequently plays in London programmes



Wilfred Howe-Nurse, baritone, was recently heard in a ballad concert from London

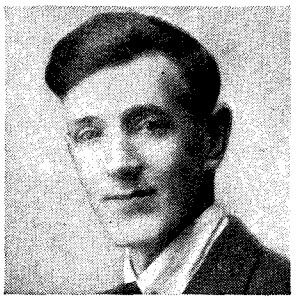
A favourite broadcaster in the provinces, Russell Green, pianist

THE MONTH'S RADIO MUSIC—Continued

John Morel, baritone, is one of the best singers heard via ether

A fine contralto, Grace Reynolds, always chooses attractive songs

A notable provincial violinist, Winifred Flavell, recently broadcast from Midland Reg.



Joe Corrie, a dramatist whose works are frequently heard from Scotland

properties for broadcasting purposes, the seating capacity has been reduced to 750.

Wales' Orchestra

The National Orchestra of Wales, the fate of which has been hanging in the balance for some considerable time, has again had a further reprieve for six months. This orchestra is in danger of disbandment owing to lack of financial encouragement in Wales and, because the B.B.C. no longer intends to finance the orchestra to the extent that it has done in the past.

The mid-day concerts on Mondays given by this orchestra are a popular feature of the lunch-hour programmes. Although comparatively small, this orchestra has given some good renderings of famous works. It would be a pity if disbandment is necessary, both for listeners and for Wales, and it is up to the Welsh people to provide funds for its maintenance if the good work that already has been done is not to be wasted.

Several hundred congratulatory letters reached Savoy Hill after the performance of a "Memories" programme arranged by Joseph Lewis. Programmes of this character have always met with public approval and if the B.B.C. acts with the public taste these programmes will be repeated at less frequent intervals.

Audience on Its Feet

The name of John Morel stands out among many good singers who have been heard during recent weeks. He had been singing professionally for only a year when at a Promenade Concert, about eighteen months ago, he had the audience on its feet shouting his name and refusing to be quiet until he had given several extra songs.

(*Continued on page 546*)

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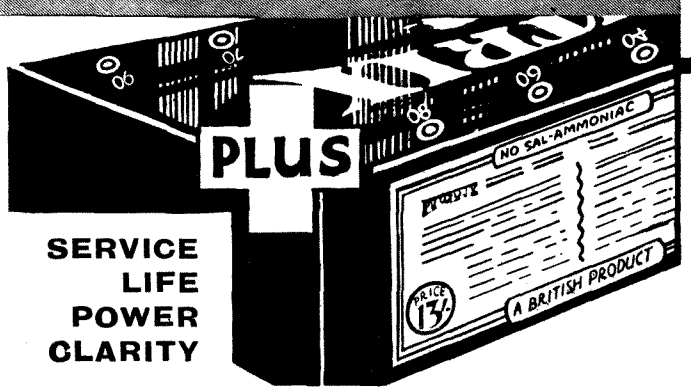

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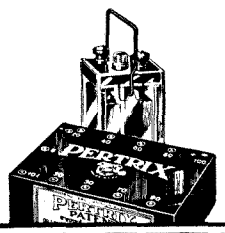

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It helps us if you mention "Wireless Magazine"

A LISTENER'S LOG

By JAY COOTE

OF the Spanish broadcasters, Radio Barcelona (EAJ1) appears to be the only one well heard in the British Isles; its old rival Catalana (EAJ13) has been dismantled and is being re-erected, I am told, at Valencia.

Spain, for 1932, had planned something big in the way of a broadcasting revival, when she hopes to place her radio on a par with her neighbours. Possibly the advent of the revolution may postpone radical alterations, but I understand that the original plan will be carried through eventually.

Alternative Programmes

Madrid, as the capital, is to have national and regional stations to provide an alternative programme and other powerful transmitters are to be installed in the provinces.

Some of the existing stations may be retained as local relays to work on a common national wavelength. Madrid National, as a 60-kilowatter, would prove an asset to distant listeners, but how would it fit in the broadcast band?

◆ ◆ ◆

If you listen to Barcelona or to San Sebastian you will find that since the eventful Fourteenth of April the stations close down to "La Marseillaise," a fact which may puzzle listeners, leading them to believe that they are hearing a French broadcast.

But as the Royal Anthem was discarded something had to be used as a stop-gap, so why not that soul-stirring revolutionary march?

◆ ◆ ◆

By the way, contrary to expectations, Spain did not adopt Summer Time this year. You must therefore remember that she is one hour behind B.S.T. and that consequently her studios may still be on the air at 1.30 a.m.

Possibly by now Genoa may have found another position in the wave-band. For many weeks this unfortunate Italian has been wandering around his temporarily allotted wavelength in order to avoid interference with Cracow and Radio Natan-Vitus (Paris). Wilno, also, with tests from its new high-power transmitter on 312.8 metres, has ruthlessly upset the apple-cart.

A Polish "Channel"

It is a Polish "channel" and as a result Genoa has tried to squeeze in between Riga and Munich a wavelength which suits its local listeners much better. It is important that some change should be made, for according to the Italian reorganisation scheme Genoa's power is to be boosted to 10 kilowatts (aerial). Turin, by the way, is to remain as it is, but two further

(*Continued on page* 538)

LISTENER'S LOG—Continued

20-kilowatt transmitters are to be built without delay at Bari and at Florence. Even little Bolzano is to be pepped up.

By the time you read these notes Trieste may be testing and a search should be made now and again in the later evening hours on and around 247.7 metres. It is a hefty station of which the signals should be received at good strength.

Notwithstanding its acquisition of a super-power station at Rome, the E.I.A.R. proposes to put up a similar big noise at Milan to serve the northern districts of Italy.

Generally speaking, however, it will be found that for the present, at least, the programmes are picked up from two groups, namely Milan, Turin, Genoa, to which Trieste and Bozen are to be added, and from Rome, Naples, with the addition later of Palermo and Bari. How Florence will fit in is not yet quite clear.

◆ ◆ ◆

A passing reference to Italy induces me to dilate on the beauty of the performances relayed by Rome from the San Carlo at Naples or from its own Teatro Reale. They are broadcasts which should not be missed for on such evenings we are offered opera at its best, with first-class singers accompanied by an equally first-class orchestra.

Listen for Announcement

Unfortunately it is seldom that the work to be presented is mentioned in the advance programmes and lovers of good music would be wise to tune in to Rome on any evening at a few minutes before 8 p.m., when an announcement regarding the forthcoming entertainment is regularly made.

Although timed to start at 8.55 p.m. B.S.T., you must not be disappointed if, in company with the audience at the theatre, your patience is tried to the extent of a delay varying from fifteen to twenty-five minutes or so. This applies specially to the Naples Opera House, which seems to be exceptionally unpunctual.

During the long wait the "mike" is alive and, believe me, it would be difficult to find a noisier yet better-tempered audience anywhere.

A point of interest you may note is that, contrary to the German custom, where clapping is forbidden until the curtain falls, the Italians enthusiastically applaud any vocal or orchestral number which may appeal to them, irrespective of the danger run in marring the continuity of the performance.

On some occasions, in the middle of an opera, I have heard a song repeated three times, followed by a personal request from the artiste to the audience to spare his vocal cords !

◆ ◆ ◆

A Sticky End

If your memory is good you may recall that there existed at Caen (Normandy) a small broadcaster which styled itself Radio Nord-Ouest.

Nightly, for some months, it announced forthcoming events with a blare of trumpets, made extravagant promises to its listeners and suddenly, without warning, came to a sticky end.

Apparently it held no authority from French officialdom and one day the powers-that-be sent their menials to cut the aerial lead-in, dismantle the plant and generally mess-up the installation.

Incidentally, it is alleged that the executives of the writ, with a keen eye to useful perquisites, helped themselves to components likely to prove useful for their own private hook-ups. And withal they threatened the poor owner with severe penalties for his misdeeds. The station closed down.

It took the French law authorities just three months to deliberate on this particular case and recently the local Tribunal, after mature reflection, fined the Director of Radio Nord-Ouest the sum of 16 francs, or roughly 2s. 8d. !

The station, by the way, had existed since 1924, but had dared to resume its broadcasts after a two years' silence.

◆ ◆ ◆

Stay-at-Homes

No longer, through the intermediary of Radio Strasbourg, are we to pay nightly visits to the Café de l'Odeon, to the Café de la Paix, or to the Aubette in that city, for the proprietors of these establishments have decided that such broadcasts induce their clients to stay at home and listen to the musical programmes through their loud-speakers.

OUR TESTS OF NEW APPARATUS

Mazda Super-power Valve :: Parmeko Loud-speaker :: Belling-Lee Connections :: Lanchester Loud-speaker :: Efectone Loud-speaker

MAZDA SUPER-POWER VALVE

THERE are many engineers who consider the practice of running valves in parallel in the output stage to be undesirable, and who prefer the use of one single "bottle." Our own experience tends in the same direction, and the valve manufacturers certainly give one little excuse to-day for parallel working, at any rate for reasonable power output.

Amazing Sensitivity

Valves which will give an undistorted power output of 5 watts have, of course, been available for some little time, but this is apparently not considered enough. We must be able to produce this power output with a relatively small input. So the Mazda people say, for their PP5/400 is capable of being loaded fully with 32 volts grid swing, which is a sensitivity undreamed of only a short time ago.

The valve, of course, is a mains valve in that it has a 4-volt filament taking 2 amperes, and is designed for an anode voltage of 400. The internal resistance is 1,500 ohms, and the amplification factor 9, giving a mutual conductance of 6 milliamperes per volt. These figures have been checked on the valve submitted, and were found substantially correct.

The construction of the valve is intriguing. The filament is 16 in. long, arranged in four V-shaped loops. Around these are the grid and anode of the customary rectangular cross section, the anode in particular being built up in a most robust manner. It is ridged for extra strength, and stayed at various points. In fact it looks as if it had been designed by an architect.

This construction is, of course, necessary, because the tolerances are rather smaller than usual in order to obtain the amazing characteristics. There seems to be no doubt that this valve will stand reasonable knocking about, and those users who are able to employ 400 volts high tension will do well to consider it in their next set.

◆ ◆ ◆

PARMEKO LOUD-SPEAKER

THE Parmeko permanent-magnet moving-coil loud-speaker is produced in the same workmanlike manner that characterises this firm's products in general. A large permanent magnet is employed, giving a strength of some 9,000 lines per square centimetre in the gap.

It is housed in an aluminium casting to which the diaphragm support is bolted, while the base contains a built-in output transformer having two ratios, of 11-1 and 22-1. It will be seen that a low-resistance coil is employed, the actual resistance being 15 ohms, this being recognised as the best practice owing to the more constant impedance over the working range.

Special Diaphragm

A 7-in. diaphragm of special paper is employed, the periphery being supported by soft leather, while a simple spider attachment is used for centring. The test results of this loud-speaker gave immediate evidence of an excellent upper register.

A run over the frequency scale showed a fairly level characteristic, falling off somewhat in the region of 1,000 to 3,000 cycles, rising beyond this point in a flat resonance, subsequently falling off again. The output, however, was well maintained at 6,000 cycles.

The lower register was disappointing,

(*Continued on page 542*)

OUR TESTS OF NEW APPARATUS—Cont.

the output being distinctly less than with our standard instrument. While we ourselves dislike reproduction in which the bass is accentuated at the expense of the treble, we could not help feeling that in this particular instrument the lower frequencies were not well enough in evidence.

The instrument was tested on a 5-watt amplifier, and was found to be of a high sensitivity, particularly for a permanent-magnet model. The price is £6 10s. for the loud-speaker alone, the base with transformer being a further £1 10s.

(*See photograph on page* 528)

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BELLING-LEE CONNECTORS

A NEW form of Belling-Lee connector has been placed on the market. This connector is intended for clipping round the shank of the terminals on an accumulator. It consists of two phosphor-bronze springs of square section, mounted side by side, and opening at the ends in a V formation.

No Loose Connections

This V is kinked so that it will embrace a terminal shank, but the size is slightly smaller than that of the average terminal. Consequently when the connector is pushed round the terminal shank it embraces it with a tight grip, avoiding any possibility of loose connection.

The end of the device is threaded and is covered by a small cap, which not only serves to hold the wire firmly, but carries an indication as to the particular lead.

These connectors were formerly marketed with L.T. markings only, but they have now been produced in various colours, and with H.T., L.T., A.C., Pick-up and various other markings.

◆ ◆ ◆

LANCHESTER LOUD-SPEAKER

ONE of the disadvantages of the permanent-magnet moving-coil loud-speaker is its price. In order to obtain the necessary high field strength, a heavy magnet of special steel (usually containing a high percentage of cobalt) is necessary, and as these special magnets are expensive, the cost of the whole component is accordingly on the high side.

It was with interest that we tested an instrument made by Lanchester's Laboratories, Ltd., which sells at £4 4s. only. This loud-speaker is provided with a particularly small magnet system, and the cone also is of somewhat smaller diameter than usual, so that the whole apparatus in its case only measures 13 in. by 10 in. by 5½ in. The case, incidentally, is finished in blue leather cloth with slightly bevelled edges, and has a distinctly attractive appearance.

Our test results showed that the performance was as attractive as the appearance. It is not too much to say that we were startled by the sensitivity and quality. There was obviously a very even frequency response, the upper register being more in evidence than usual. Yet there was no harshness, at any rate on normal volume, and we found that the apparatus compared very favourably with our standard—a much more expensive instrument.

A low-resistance coil is used, but an input transformer is built into the loud-speaker; this is designed to suit the majority of valves. We checked up the impedance and found that it varied but little up to 2,000 cycles, after which it rose somewhat rapidly, as is usually the case. The value at 400 cycles was 6,000 ohms, approximately.

The sensitivity was such that the instrument would work quite well on an output of 500 milliwatts; we consider that the instrument is well worth hearing.

(*See photograph on page* 528)

◆ ◆ ◆

EFECTONE LOUD-SPEAKER

THE Efectone "100-pole" loud-speaker unit belongs to the balanced-armature type. The unit is robustly made, having a large horseshoe magnet terminating in four polepieces. The "100-pole" designation applies, of course, to the laminations of these polepieces. An adjustment is provided whereby the polepieces may be forced apart.

Controlling Sensitivity

In transit the polepieces are allowed to rest up against the armature, while for use the adjustment is brought into operation, the distance between the armature and the polepieces being set to suit the input. Thus with a small input a fine

(*Continued on page* 544)

AROUND AND ABOUT

MANY readers will have been amused by the verses that appear in WIRELESS MAGAZINE from time to time over the initials "C.P.P.," which are those of Charles P. Parsons, M.A., F.Z.S. Now Mr. Parsons, under the pseudonym Craven Hill, has produced a book of fourteen short stories. The title is "The Survivor, and Other Tales of the Wild" (The Sheldon Press, 5s.).

◆ ◆ ◆

We learn from Ferranti, Ltd., that a full range of mains transformers for use with the various Westinghouse metal rectifiers is now available. Model EM1, at £1 15s., is suitable for use with the Westinghouse rectifier H.T.1; EM3, at £1 5s., for types H.T.3, 4, 5, and 7; and EM2, also at £1 5s., for type H.T.6. Ferranti's also announce a three-valve screened-grid receiver for home constructors.

◆ ◆ ◆

An addition to the range of Marconi valves is the HL2, which has recently been released. This valve has an impedance of 18,000 ohms and is suitable for use in a detector or first low-frequency stages. Full characteristics will be found in the valve table on page 452 of this issue.

◆ ◆ ◆

Those whose electric supply is direct current will be interested in the new Gecophone four-valve receiver for D.C. mains. This set consists of two stages of high-frequency amplification with screened-grid valves, a detector, and a pentode output stage. The circuit is similar to that of the alternating-current mains set reviewed in the April issue of WIRELESS MAGAZINE. The receiver is housed in a handsome walnut cabinet and costs £25.

◆ ◆ ◆

Telephony transmissions take place daily from the new Vatican short-wave station from 9 to 9.30 a.m., on 19.84 metres, and 6 to 6.30 p.m. on 50.26 metres. These times must not be taken as official, but as a rule signals can usually be heard. (Times mentioned are Greenwich Mean Time.)

◆ ◆ ◆

The first broadcasting station in Bulgaria has recently been opened at Sofia. Installed in a bank building, this station has a power of 1 kilowatt and works on a wavelength of 319 metres. The call sign is *Rodno Radio*.

◆ ◆ ◆

The new Polish station at Vilna will shortly begin experimental transmissions on a wavelength of 312 metres. Its power will be 20 kilowatts.

◆ ◆ ◆

A Calais hotel proprietress has been fined 5,000 francs (about £40) for causing interference to radio reception by using a faulty electric gramophone motor. Several cases have occurred on the Continent of this nature and a Belgian town has made interference with radio reception an indictable offence, with a heavy fine or one week's imprisonment as the penalty.

◆ ◆ ◆

Some interesting figures are revealed in the annual report of the National Broadcasting Company, one of America's foremost broadcasting companies. The total receipts of the N.B.C. for 1930 amounted to $22,000,000 (approximately £4,500,000), compared with our B.B.C's £1,000,000. A substantial part of this income was obtained from advertising fees, over 263 companies having availed themselves of the benefits of radio publicity. It is interesting to note that religious broadcasts occupied 5,734 broadcasting hours, and that the cost of agricultural broadcasts for farmers amounted to nearly a million dollars.

A reduction in the price of the Gecophone wavetrap to 11s. 6d. has recently been made by the General Electric Co., Ltd.

◆ ◆ ◆

Fluxite, Ltd., have recently introduced a new-size tin of Fluxite soldering paste for the benefit of home constructors who may find it more convenient to purchase smaller tins. This new size is sold at 4d. and is known as the Junior Fluxite.

◆ ◆ ◆

A. Brodersen, of 11 Northampton Square, E.C.1, distributing agent for N. & K. inductor loud-speakers in this country, announces that in future a guarantee will be given with every instrument. This guarantee, valid for twelve months, covers any mechanical defect that may occur during that period. If an exchange is desired the loud-speaker must be returned in the original box accompanied by the guarantee certificate.

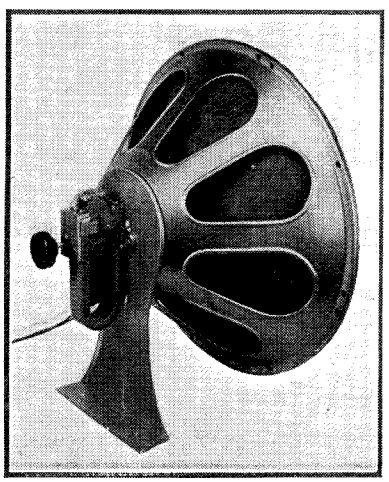
◆ ◆ ◆

Listeners will be able to identify all Italian stations by a new distinctive opening signal that has recently been introduced by E.I.A.R., the Italian Broadcasting Company. This is the chimes of a clock with a background of organ and orchestral music.

◆ ◆ ◆

If you are interested in the Ever-tuned Regional Two (fully described on pages 524–527) look in the Somerset Street windows of Selfridge and Co. It is on show there.

OUR TESTS OF NEW APPARATUS—Cont. from page 542



NEW "100-POLE" LOUD-SPEAKER
Efectone balanced-armature loud-speaker

clearance can be used, giving good sensitivity, while for louder signals the maximum clearance is adopted.

The winding is tapped to give facilities for correct matching to the output valve of the amplifier and instructions are provided for the connections. The unit is bolted on to a pressed metal chassis of conventional form, which carries a 14-in. paper diaphragm.

The whole chassis is carried on a stand which is clearly intended to serve merely as an additional support, for it is much too flimsy to hold the speaker by itself. If the chassis is fixed to the baffle board round the periphery of the cone, however, as is usual, this will be quite satisfactory.

No Sign of Rattling

On test the sensitivity was a little below the average, but the speaker gave quite pleasant results when the optimum tapping on the winding had been chosen, and there was no sign of rattling on 1,500 milliwatts input.

An aural test with a falling frequency record indicated a number of resonances, notably at 3,000 cycles, with minor peaks at 1,800 and 800 cycles. The output, however, was maintained up to 5,000 cycles, although the level here was not very high. The bass reproduction was fair.

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1 Readi-Rad 20,000-ohm Link Resistance		1	3
1 Readi-Rad 1-megohm Grid Leak			10
1 Sovereign 50,000-ohm Potentiometer		4	6
1 Readi-Rad Wavechange Switch		1	6
1 Readi-Rad On-and-off Switch			10
1 Telsen "Ace" L.F. Transformer		8	6
1 Portable Cabinet (to specification)	2	5	0
1 Ormond Portable Chassis and Loud-speaker Unit	1	5	0
100 Yds. Lewcos 9/40 Enamelled Frame Aerial Wire, LZ2140		4	3
50 Yds. Lewcos 27/40 Enamelled Frame Aerial Wire, LZ2240		5	6
8 Belling-Lee Wander Plugs		1	4
1 Packet "Jiffilinx" for wiring		2	6
6 Mullard Valves to specification	3	16	0
Screws, Flex, Plugs, Cortabs, etc.		1	7
TOTAL (including Valves, L/S Unit, and Cabinet)	**£13-13-0**		

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1 C.A.V. 2N.S.17 L.T. Accumulator		16	0

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There is news in the "Wireless Magazine" advertisements

THE EVER-TUNED REGIONAL TWO

(*Continued from page* 527)

stations to be tuned-in are not entirely free from mutual interference.

The procedure is then to unscrew the knob gradually until both stations tuned-in on the two vertical condensers are quite free from interference.

It should be remembered that the further the knob of the baseboard condenser is unscrewed to improve the selectivity the greater will be the loss of signal strength. For this reason the knob should be screwed in as far as possible, consistent with obtaining proper separation of the two transmissions.

Potentiometer Slider

While the preliminary adjustments are being made do not overlook the potentiometer right at the back of the baseboard. Careful adjustment of the slider, in conjunction with changes in the voltage applied to H.T.+1, will result in one setting of the reaction condenser giving good results for both positions of the wave-change switch.

When these adjustments have been made the back of the cabinet can be put in position and further reception carried out simply by operating the two switches on the front. Pull out the right-hand switch to put the set on and move the left-hand switch to get one or other of the two fixed tuned transmissions !

RUSSIAN RADIO

ACCORDING to the Communist's Almanac for 1931, there were 1,267,000 receiving sets in Soviet Russia instead of the 2,500,000 allowed for in the Five-year Plan. The 150,000 receiving sets which were to be added during the "special quarter," from October 1, 1930, to January 1, 1931, were only partially realised, according to reliable estimates, by no more than 65 per cent.

On April 1, 1927, there were only 157,000 radio receiving sets, of which 52 per cent. were of amateur production. The sets in operation now are professionally manufactured and number ten times as many sets as four years ago. F. P.

THE MONTH'S RADIO MUSIC

(*Continued from page* 534)

As a result of his reception on that occasion he was offered a theatrical engagement which he accepted.

There is nothing to cause one to grumble at the vaudeville programmes that have been broadcast at the beginning of this summer. Programmes have contained all the old favourites and quite a deal of new talent for which the B.B.C. is always searching.

Revues and Light Music

Revues and light musical entertainment have been heard in plenty. Ernest Longstaffe, Gordon McConnel and Philip Ridgeway have all produced passable entertainments of this type. There is one fault, however, to be found in the "Parades" arranged by Philip Ridgeway. These have become rather tiring owing, probably, to unnecessary noise.

Other producers manage to "get over" entertainments with the same amount of fun and vivacity, but with far less noise. T. F. HENN.

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CRYSTAL SET

6d., post free

Regional Crystal Set	WM176
"B.B.C." Crystal Set	AW281

ONE-VALVE SETS

All these 1s. each, post free

Hartley One	WM198
One Control One	AW265
Regional Ultra-selective One	AW278
"B.B.C." One	AW280

TWO-VALVE SETS

All these 1s. each, post free

Brookman's Two (D, Trans)	WM168
Programme Two (D, Trans)	WM177
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
★Ever-tuned Regional Two (D, Trans)	**WM241**
Talisman Two (D, Trans)	AW194
Hyper-Selective Two (D Pentode)	AW198
British Broadcast Two (D, Trans)	AW215
Easy-tune Two (D, Trans)	AW226
Wavelets Two (D Trans)	AW229
No Battery Mains (A.C.) Two (D, Trans)	AW230
No Battery Gramo-radio 2 (D, Trans)	AW238
1930 Talisman 2 (D, Trans)	AW239
Easy Tune Short-wave 2 (D, Trans)	AW242
Searcher Two (D, Trans)	AW245
Arrow Two (D, Trans)	AW249
Forty-Five Shilling Two (D, Trans)	AW250
Searcher Short-wave 2 (D, Trans)	AW259
Challenge Two (D, Trans)	AW261
Loftin-White 2 (A.C. Set)	AW263
Everybody's All-in 2 (D, Trans)	AW273
Twenty-Shilling Two (D, Trans)	AW274

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 552) 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.

THREE-VALVE SETS

All these 1s. each, post free

Brookman's Three (SG, D, Trans)	WM161
Brookman's Push-pull Three (HF, D, Trans), 1s. 6d.	WM170
Celerity Three (SG, D, Trans)	WM173
All-nations Three (D, 2 Trans)	WM178
Inceptordyne (SG, D, Pen.)	WM179
Music Marshal (D, 2 Trans)	WM190
Gramo-Radio D.C. Three (SG, D, Trans)	WM196
Concert Three (D, 2 Trans)	WM199
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
Baffle-board Three (D, RC, Trans)	WM226
Plug-in Coil Three (D, 2 Trans)	WM232
Clarion All-electric Three (SG, D, Trans,—A.C. Rectifier), 1s. 6d.	AW200
Knife-edge Three (D, RC, Trans)	AW201
Regional Three (SG, D, Trans)	WM236
Gramo-Radio AC3 (SG, D, Trans)	WM237

FOUR-VALVE SETS

All these 1s. 6d. each, post free

Standard-coil Four (HF, D, 2RC)	WM122
The Drum Major (HF, D, RC, Trans)	WM137
Arrow Four (SG, HF, D, Trans)	WM154
All-electric Four (SG, D, RC, Trans)	WM162
Transportable Four (SG, D, 2RC)	WM180
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
Brookman's Three-Plus-One (SG, D, RC, Trans)	WM233

FIVE-VALVE SETS

All these 1s. 6d. each, post free

Overseas Five (3SG, D, Trans)	WM191
Regional A.C. Five (3SG, D, Trans)	WM224
James Quality Five (2SG, D, RC, Trans)	AW227

SIX-VALVE SETS

All these 1s. 6d. each, post free

Hyperdyne	WM221
The Super 60 (Super-het)	WM229
★A.C. Super 60 (Super-het)	**WM239**
Century Super (Super-het)	AW287

PORTABLE SETS

Wayfarer Portable (Super-het)	WM139	1/6
Pedlar Portable (D, 2 Trans)	WM197	1/-
Super 60 Portable (Super-het)	WM238	1/6

AMPLIFIERS

All these 1s. each, post free

Auditrol Amplifier	WM132
Concentrator (HF Unit)	WM169
Radio-Record Amplifier (DC Mains)	WM183
Selecto Amplifier (HF Unit)	WM210

MISCELLANEOUS

Brookman's "Wipe Outs" (Wave-traps)	WM186	1/-
Staminator Unit for A.C. Mains	WM202	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/-
Loud-speaker Tone Control	WM234	1/6
"WM" Linen Diaphragm Loud-speaker	WM235	1/-
★Two-minute Adaptor for Short Waves	**WM240**	**1/-**

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 June 30, 1931 (or until July 31, for overseas readers)

FOR ONE BLUEPRINT ONLY

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.*

This coupon is valid for a blueprint of any **ONE** *only of the following sets at the prices indicated :—*

A.C. SUPER 60 (*page* 470), *No. WM239, 9d., post free.*

TWO - MINUTE ADAPTOR (*page* 488), *No. WM240, 6d., post free.*

EVER - TUNED REGIONAL TWO (*page* 524), *No. WM241, 6d., post free.*

INFORMATION COUPON

Valid only until June 30 1931 (or until July 31, for overseas readers)

If you want to ask any questions cut out the above coupon and send it, together with a postal order for 1s. *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.

Alterations to blueprints or special designs cannot be undertaken; nor can readers' sets or components be tested.

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

THREE specially-equipped direction-finding stations have been brought into use by the Paris authorities to detect unlicensed transmitters. Cross bearings enable any station to be immediately identified. The same system is being used for detecting oscillations from badly-handled receivers.

◆ ◆ ◆

Weedon & Co. have drawn our attention to an error in their advertisement which appeared in the May issue of WIRELESS MAGAZINE. The size of linen required for the "W.M." linen-diaphragm loud-speaker should have read 20 in. instead of 19 in. square.

◆ ◆ ◆

Readers who are contemplating building their own cabinets for the Super 60 Portable described in the May issue should note that a polished loud-speaker fret and frame for winding the aerial can be obtained from the Carrington Manufacturing Co., Ltd., at a cost of 8s. 6d.

◆ ◆ ◆

We have received a pamphlet from Ferranti, Ltd., of Hollinwood, Lancs, describing the new Ferranti rejector, a wavetrap specially designed for cutting out the new North Regional station at Slaithwaite. It is claimed that stations with a wavelength of 30 metres either side of the North Regional can be heard whilst that station is working. The price is 7s. 6d.

◆ ◆ ◆

Samples of frame-aerial wire specially for use with the Super 60 have been received from C. V. Radio of 131 Bunhill Row, E.C.1. This wire is supplied on two reels and supplied with tags for making connections at the end and centre-taps.

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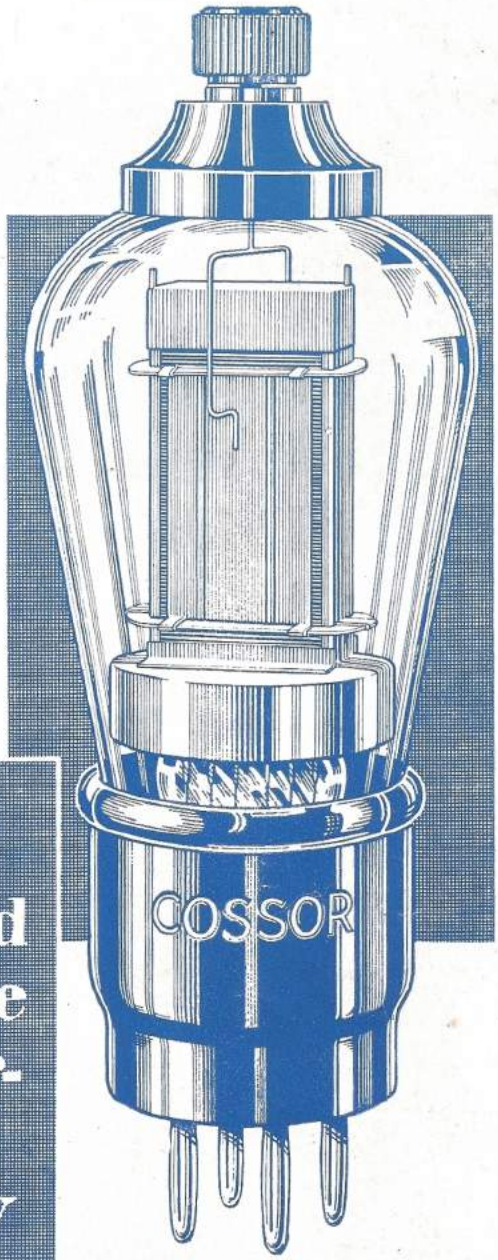
Specified for the "Super 60"

Because of its outstanding efficiency and its high effective amplification the Cossor 215 S.G. is specified for the Intermediate Frequency Stages of the "Super 60." Greater effective amplification is definitely ensured by the New Cossor Screened Grid Valve. This is due to its minute inter-electrode capacity which has been reduced to the order of .001 micro-microfarads—lower than that of any other Screened Grid Valve on the market. Because of this and because grid current has been eliminated the use of this new Cossor Valve will considerably increase the efficiency of your Receiver.



The Screened Grid valve with the lowest inter-electrode capacity

Cossor 215 S.G. 2 volts, ·15 amp. Impedance 300,000 Amplification Factor 330. Mutual Conductance 1·1 m.a./v. Normal working Anode Volts 120. Positive Voltage on Screen 60-80 Price . . 20/-

Use these valves in your "Super 60" and ensure maximum results :—

Oscillator	Cossor 210 L.F.
First Detector	Cossor 210 H.L.
S.G. Intermediates	Cossor 215 S.G. (2)
Second Detector	Cossor 210 H.L.
Power	Cossor 215 P.

The above Cossor Valves are obtainable from any Wireless Shop.

THE NEW COSSOR 215 S.G.

GREATEST EFFECTIVE STAGE GAIN

A. C. Cossor Ltd. Highbury Grove London, N.5.

♡ 81.

MORE POWER TO YOUR PORTABLE

CHANGE OVER TO MAZDA . . .

A 4-valve combination

S.G. 215	H.L. 210	L. 210	P.220 or P.220a
20/-	8/6	8/6	10/6 13/6

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You can get the correct Mazda valves for your set from all good radio dealers.

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V.117

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