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SUPERHET S.W. ADAPTOR

Wireless Magazine

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JANUARY 1932

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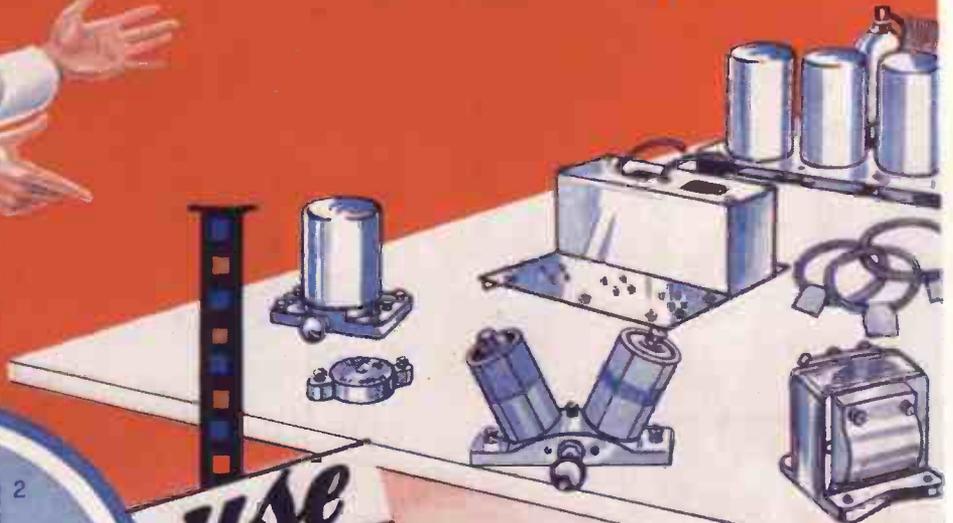
**THE 1932
SUPER 60**



W. James Produces
A New Super-het
With Provision for
a Pick-up

NORMAN
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An Xmas Recipe for Better Reception



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- and
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are specified for the 1932 "SUPER 60" Receiver described in this issue.

Just as the finest ingredients for his Christmas fare are the pride of every chef, so Lewcos Components are the pride of the discriminating wireless enthusiast—they both know that the results achieved will add zest to the feast.



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LEWCOS RADIO PRODUCTS FOR BETTER RECEPTION

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Editor:
BERNARD E. JONES

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

Wireless Magazine

The Best Shillingsworth in Radio

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Research Consultant:

W. JAMES

Assistant Editor:

D. SISSON RELPH

THE EDITOR'S CHAT

IN many parts of the country our Christmas Number of last month was unobtainable a few days after publication. We were out of print almost immediately. We had failed to visualise the extent of the demand, and we now have to express regret that many of our friends were unable to obtain a copy.

But that regret is mingled with the unctuous gratification that generally finds expression in the words "I told you so"! Please DO place your regular order for WIRELESS MAGAZINE and avoid thereby all risk of disappointment.

Of the many reasons that contributed to the success of our Christmas Number was the presence in it of the New Economy Three, a screen-grid three-valver, complete with coils, valves, loud-speaker and batteries, all for £5. This month we give you its sequel—the New Economy Two—an all-British set, which you won't build except for local-station reception, but for that it will answer your purpose remarkably cheaply.

I will refer to only one other of our sets, the James 1932 Super 60, which, with its band-pass aerial tuning, is sharper on the aerial side than a frame-aerial receiver, the only aerial it needs being 20 ft. or so of wire, either indoors or outdoors. It is arranged so that a pick-up can be kept permanently connected to the set and brought into use by means of a panel switch.

A big point is that the set uses many of the parts to be found in the original version. The first Super 60 can generally be converted to the 1932 edition—a better set—at a cost of not more than £5.

We have put a lot of hard work into our supplement this month—World-wide Reception on Your Set, with Special Reference to the Short Waves. In this supplement are included two adaptors, by means of which any standard set can be converted for short-wave reception. We give lists of short-wave stations and times of trans-

World-wide Reception on Your Set, with Special Reference to the Short Waves

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Next issue published on Wednesday, January 20th.

missions; hints on tuning; and data for recognising European stations.

The whole idea of this supplement is to enable the listener to reach out to more programmes and still further radio enjoyment.

I am proposing to take the wind out of the sails of some of my prospective critics. I anticipate letters galore after my readers have had an opportunity of seeing what P. K. Turner—our new and valued contributor—has to say in his article, "New Ideas in Tuning." We have done as much as anybody to popularise band-pass tuning; we have spoken of its advantages and given many sets of which the professed virtue is the band-passing arrangement.

Now, in this issue, we allow P. K. Turner to put forward ideas diametrically opposed to the principle we have helped to advance. Well, why shouldn't we? Our whole policy in conducting WIRELESS MAGAZINE is to give our readers the benefit of the best radio brains available, and good brains, you will remember, don't always agree together.

Radio is growing up and radio thinkers are growing up with it. There are plenty of people—some of our own writers among them—who will fight valiantly for band-passing, but they cannot ignore P. K. Turner's declaration of faith in saying that the best way of getting selectivity is first to get needle-sharp tuning and then to make up for the diminished strength of the sidebands by arranging the low-frequency amplifier to compensate for the loss.

There has recently been a big revival in the public's interest in television, particularly in the United States, and it will be within the knowledge of most readers that Mr. J. I. Baird recently went to the States to arrange for the mass-manufacture of television. Incidentally, when he arrived there he married Miss Margaret Albu, and we offer him our very hearty congratulations.

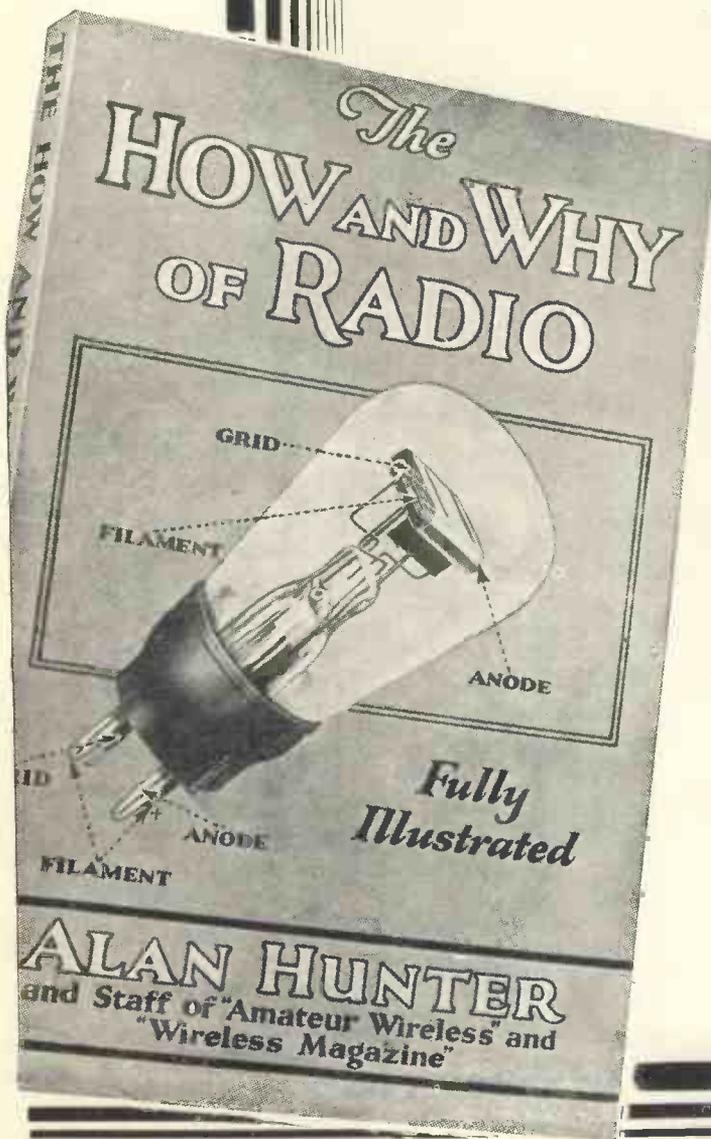
We are attempting, in two special articles in this issue, to interpret the present position of television—in particular Baird television—for the guidance of our readers.
B. E. J.

YOU MUST BUILD THE 1932 SUPER 60—See page 699

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

EXPRESSLY WRITTEN FOR THE BEGINNER

2/6
NETT



“The How and Why of Radio” by Alan Hunter, has been expressly written for beginners.

It provides a clear conception of the general theory and practices of wireless reception in simple, non-technical terms, and contains over ninety clearly defined illustrations. It has been mainly compiled from the series of articles in AMATEUR WIRELESS:—“The How and Why of Radio”—which proved so popular during the past twelve months.

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VALVES TO USE IN YOUR SET

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Anode Current at 120 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
2-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
Cossor ..	210RC	50,000	40	.1	.8	1.5	—	1.5
Tungsram	R208	50,000	35	.1	1.0	1.0	—	1.5
Six-Sixty	210RC	45,400	50	.1	1.1	1.0	—	1.5
Mullard..	PM1A	41,600	50	.1	1.2	.75	1.5	1.5
Marconi ..	H2	35,000	35	.1	1.0	1.0	—	1.5
Osram ..	H2	35,000	35	.1	1.0	1.0	—	1.5
Six-Sixty	210HF	25,000	19	.1	.75	1.5	—	—
Eta ..	BY2023	23,000	20	.12	.85	1.5	—	3.0
Tungsram	H210	25,000	25	.1	1.0	2.0	1.5	3.0
Mullard..	PM1HF	22,500	18	.1	.8	1.0	3.0	4.5
Cossor ..	210HL	22,000	24	.1	1.1	.75	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
Mazda ..	HL2	21,000	32	.1	1.5	—	—	—
Cossor ..	210HF	20,000	22	.1	1.1	1.2	1.5	3.0
Mullard..	PM1HL	18,500	28	.13	1.5	1.2	1.5	3.0
Marconi ..	HL2	18,000	27	.1	1.5	1.0	1.5	3.0
Osram ..	HL2	18,000	27	.1	1.5	1.0	1.5	3.0
Six-Sixty	210HL	17,200	26	.1	1.5	2.0	—	1.5
Tungsram	L210	16,000	16	.1	1.0	4.0	6.0	9.0
Eta ..	BY1814	14,000	18	.12	1.3	3.0	—	2.5
Cossor ..	210Det	13,000	15	.1	1.15	2.5	—	—
Six-Sixty	210LF	12,500	10.6	.1	.85	3.0	4.5	7.5
Mullard..	PM1LF	12,000	11	.1	.9	3.0	4.5	7.5
Six-Sixty	210D	10,600	17	.1	1.6	4.0	3.0	7.5
Cossor ..	210LF	10,000	14	.1	1.4	3.0	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	—	—
Mullard..	PM2DX	10,000	17	.1	1.7	2.0	3.0	6.0
Mazda ..	L210	10,000	15.5	.1	1.55	5.0	2.5	4.5
Mazda ..	L2	10,000	19	.1	1.9	3.0	—	3.0
Tungsram	LC210	10,000	10	.1	1.0	4.0	6.0	9.0
Tungsram	PD220	10,000	17	.2	1.7	4.0	4.5	7.5
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
Cossor ..	220Pa	4,000	16	.2	4.0	10.0	3.0	4.5
Eta ..	BW1304	4,000	13	.2	3.2	6.0	1.5	6.0
Marconi ..	LP2	3,900	15	.2	3.85	10.0	—	—
Osram ..	LP2	3,900	15	.2	3.85	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	6.5	4.5	6.0
Tungsram	P215	3,300	5	.2	1.5	12.0	9.0	12.0
Eta ..	BW303	2,700	3	.32	1.1	11.0	15.0	25.0
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	15.0	23.0
Marconi ..	P2	2,150	7.5	.2	3.5	15.0	—	—
Osram ..	P2	2,150	7.5	.2	3.5	15.0	—	—
Six-Sixty	220SP	2,060	7	.2	3.4	—	—	—
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
Mullard..	PM252	1,900	7	.4	3.7	14.0	10.5	12.0
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	—	—
Cossor ..	230XP	1,500	4	.3	2.3	18.0	13.5	22.5
2-volt Double-grid Valves								
Cossor ..	210DG	27,000	5.1	.1	.19	—	—	—
Tungsram	D6210	5,000	5.0	.1	1.0	—	—	—
Marconi ..	DG2	3,750	4.5	.2	1.2	—	—	—
Osram ..	DG2	3,750	4.3	.2	1.2	—	—	—
Six-Sixty	210DG	—	—	.1	.8	—	—	—
Mullard..	PM1DG	—	—	.1	.8	—	—	—
2-volt Screen-grid Valves								
Tungsram	S210	430,000	300	.12	.8	—	—	—
Mazda ..	215SG	400,000	450	.15	1.1	—	1.5	1.5
Mazda ..	S215B	333,000	500	.15	1.5	2.0	—	1.5
Cossor ..	215SG	300,000	330	.15	1.1	—	—	1.5
Eta ..	BY6	300,000	300	.15	1.0	2.5	—	—
Six-Sixty	215SG	220,000	190	.15	.87	2.0	—	—
Mullard..	PM12	212,000	200	.15	.94	—	—	—
Cossor ..	220SG	200,000	320	.2	1.6	—	—	1.5
Lissen ..	SG215	200,000	180	.15	.9	—	—	1.5
Marconi ..	S22	200,000	350	.2	1.75	—	—	—
Marconi ..	S21	200,000	220	.1	1.1	—	—	—
Osram ..	S21	200,000	200	.1	1.1	3.0	—	—
Mazda ..	S215A	—	800	.15	1.1	—	—	—
2-volt Pentode Valves								
Lissen ..	PT225	64,000	80	.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	—	—	.3	2.0	11.5	9.0	15.0

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Anode Current at 120 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
2-volt Pentode Valves—Continued								
Mazda ..	220Pen.	—	—	.2	2.5	—	—	—
Cossor ..	230HPT	—	—	.3	1.8	.95	7.5	12.0
Osram ..	PT2	—	—	.2	2.5	5.5	3.0	4.5
Mazda ..	Pen.230	—	—	.3	1.5	—	—	—
4-volt Three-electrode Valves								
Marconi	H410	60,000	40	.1	.66	.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
Cossor ..	410RC	50,000	40	.1	.8	.6	—	—
Marconi	LH410	30,000	25	.1	.83	1.0	2.0	3.0
Osram ..	LH410	30,000	25	.1	.83	1.25	1.5	3.0
Tungsram	H407	25,000	35	.07	1.4	2.5	1.5	2.0
Lissen ..	HLD410	21,000	25	.1	1.2	2.5	1.5	3.0
Cossor ..	410HF	20,000	22	.1	1.1	1.5	1.5	3.0
Tungsram	R406	18,000	25	.06	1.4	3.5	2.0	3.5
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
Osram ..	410LF	10,000	17	.1	1.75	3.0	2.0	4.5
Lissen ..	L410	8,500	15	.1	1.8	3.5	1.5	4.5
Marconi	L410	8,500	15	.1	1.77	3.0	2.0	4.5
Osram ..	L410	8,500	15	.1	1.77	3.5	3.0	4.5
Mullard..	PM4DX	7,500	15	.1	2.0	2.0	3.0	6.0
Six-Sixty	410D	7,250	14.5	.1	2.0	4.0	3.0	6.0
Tungsram	LD410	7,000	16.5	.1	2.3	4.5	4.5	7.5
Marconi	P410	5,000	7.5	.1	1.5	6.0	6.0	10.5
Osram ..	P410	5,000	7.5	.1	1.5	6.0	6.0	10.5
Six-Sixty	410P	4,100	7.8	.1	1.9	7.5	7.5	12.0
Marconi	410P	4,000	8	.1	2.0	7.5	4.5	9.0
Mullard..	PM4	4,000	8	.1	2.0	5.25	7.5	10.5
Tungsram	L414	3,300	10	.15	3.0	6.0	6.5	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
Six-Sixty	420SP	2,150	6.5	.2	3.0	10.0	13.5	22.5
Marconi	P415	2,080	5.0	.15	2.4	—	—	—
Cossor ..	425XP	2,000	7	.25	3.5	—	6.0	13.5
Mullard..	PM254	2,150	6.5	.2	3.0	9.0	9.0	15.0
Mazda ..	P425	1,950	3.5	.25	1.8	26.0	14.0	26.0
Tungsram	P414	1,700	5	.15	3.0	12.0	9.0	18.0
Cossor ..	4XP	1,200	3	.6	4.0	20.0	12.0	—
Marconi	PX4	830	5	1.0	6.0	35.0	12.0	16.0
Osram ..	PX4	830	5	1.0	6.0	35.0	12.0	16.0
4-volt Screen-grid Valves								
Tungsram	S407	400,000	350	.07	.9	—	—	—
Mullard..	PM14	230,000	200	.075	.87	—	—	—
Six-Sixty	4075SG	220,000	190	.075	.87	3.0	—	—
Cossor ..								

AN ENTIRELY NEW RANGE



MULTI-GRID VALVES

An entirely new range of Tungram Multi-grid Valves—the first of the new Tungram series. Of unique construction, they supersede entirely the pentodes at present on the market; they are so arranged internally that the electron stream is *twice* controlled by the grid.

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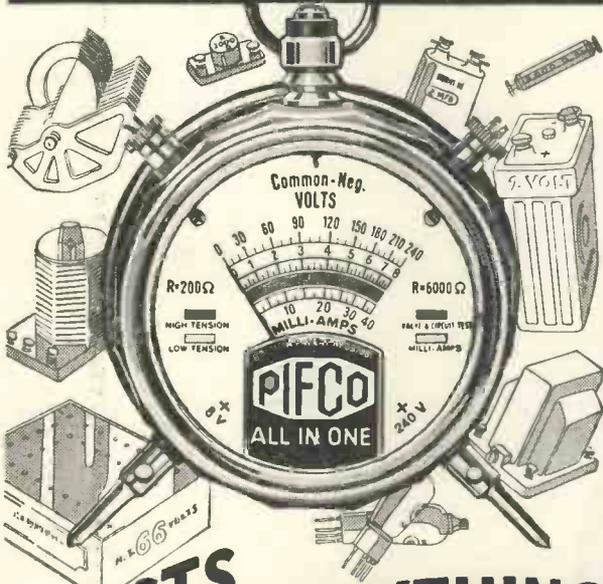
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Ⓜ P. 3a

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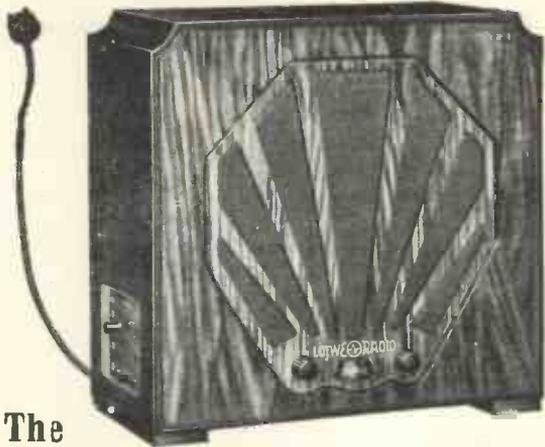
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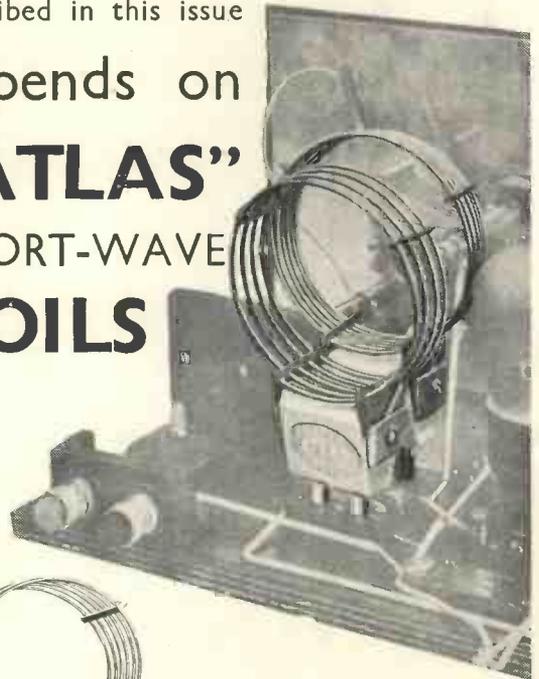
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VALVES TO USE IN YOUR SET—Continued from p. 628

Make	Type	Impedance	Amplification Factor	Flament Current	Wt./ml. Conductance	Anode Current at 120 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
6-volt Three-electrode Valves—Continued								
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	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	3.0	7.5
Marconi	P610	3,500	8	.1	2.28	7.0	6.0	9.0
Osram	P610	3,500	8	.1	2.28	6.0	6.0	9.0
Tungstram	P615	3,300	10	.15	3.0	10.0	4.5	7.5
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	3.0	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 250 v.)	
Osram	P625	2,400	6	.25	2.5	11.0	6.0	12.0
Tungstram	SP614	2,300	6	.15	2.6	17.0	6.0	18.0
Cossor	610XP	2,000	5	.1	2.2	22.0	7.5	15.0
Mullard	PM256	1,850	6	.25	3.25	—	9.0	18.0
Six-Sixty	625SP	1,780	5.8	.25	3.25	—	15.0	36.0
Marconi	P625A	1,600	3.7	.25	2.3	20.0	13.5	36.0
							(at 200 v.)	
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	—	—	—
6-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	—
6-volt Pentode Valves								
Marconi	PT625	42,000	80	.25	1.85	10.0	6.0	15.0
							(at 250 v.)	
Osram	PT625	42,000	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	PT624	24,000	60	.25	2.5	14.0	7.5	15.0
Cossor	615PT	—	—	.15	1.5	17.0	6.9	7.5
A.C. Three-electrode Mains Valves								
Eta	D'V4230	23,000	40	1.0	1.75	2.5	—	1.5
Tungstram	G150	20,000	10	.5	.5	—	—	—
Cossor	41MRC	19,500	50	1.0	2.6	2.0	.5	1.5
Tungstram	R150	18,000	25	.5	1.4	1.5	—	—
Six-Sixty	41DX AC	17,700	85	1.0	4.8	—	—	—
Mullard	904V	17,000	85	1.0	5.0	3.0	.75	1.0
Tungstram	AR4100	16,000	33	1.0	2.0	2.5	—	3.0
Cossor	41MHF	14,500	41	1.0	2.8	2.5	1.5	2.0
Mazda	AC/HL	13,500	35	1.0	3.0	4.5	1.5	3.0
Six-Sixty	4GP AC	12,000	36	1.0	3.0	—	—	—
Cossor	41MHL	11,500	52	1.0	4.5	3.0	.9	1.5
Mazda	AC2HL	11,500	75	1.0	6.5	3.0	—	1.5
Marconi	MH4	11,100	40	1.0	3.6	4.0	1.5	3.0
Osram	MH4	11,100	40	1.0	3.6	4.0	1.5	3.0
Mullard	354V	10,000	35	1.0	3.5	2.0	2.0	3.0
Marconi	MHL/4	8,000	20	1.0	2.5	5.0	3.0	6.0
							(at 200 v.)	

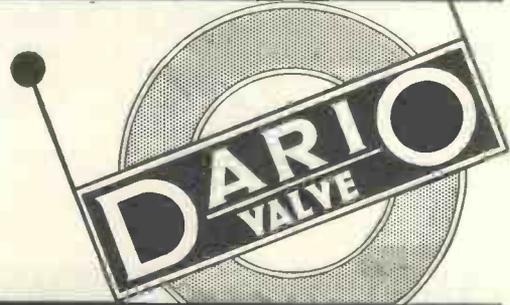
Make	Type	Impedance	Amplification Factor	Flament Current	Wt./ml. Conductance	Anode Current at 120 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
A.C. Three-electrode Mains Valves—Continued								
Osram	MHL4	8,000	20	1.0	2.5	5.0	3.0	6.0
							(at 200 v.)	
Tungstram	AG4100	8,000	16	1.0	2.0	5.0	—	—
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	SS4D at AC	7,000	16	1.0	2.3	7.5	3.5	8.0
Cossor	M41P	5,000	10	1.0	2.0	6.5	4.5	7.5
Six-Sixty	4L AC	5,000	16	1.0	3.2	—	—	—
Mullard	164V	4,850	16	1.0	3.3	5.0	4.5	6.0
Eta	DW704	4,500	7	1.0	1.5	10.0	6.0	13.5
Eta	DW1003	3,300	10	1.0	3.3	12.5	7.5	13.5
Six-Sixty	SS4PAC	3,000	10	1.0	3.3	12.0	5.9	8.0
Osram	ML4	2,860	12	1.0	4.2	12.0	5.0	8.0
Mullard	104V	2,850	10	1.0	3.5	11.0	5.0	8.5
Marconi	ML4	2,800	12	1.0	2.5	—	—	—
Mazda	AC/P	2,650	10	1.0	3.75	14.0	6.0	12.0
Cossor	41MP	2,500	18.7	1.0	3.2	15.0	3.0	5.0
Eta	DW702	2,250	7	.23	3.2	18.0	10.0	17.0
Tungstram	P4100	2,200	7	1.0	3.2	—	—	—
Eta	DX502	2,100	5	.15	2.4	12.0	4.5	15.0
Six-Sixty	HV4/1	2,100	6.3	1.0	3.0	—	—	—
Cossor	41XP	2,000	4	1.0	3.0	15.0	12.0	14.0
Mullard	AC064	2,000	6	1.0	3.0	15.0	9.0	14.0
Tungstram	P430	2,000	5	.3	2.5	20.0	—	—
Eta	DW302	1,800	3.5	1.05	1.95	33.0	—	20.0
Cossor	41MXP	1,500	11.2	1.0	7.5	23.0	6.0	9.0
Mazda	AC/P1	1,450	5.4	1.0	3.7	—	—	—
Mullard	AC044	1,150	4	.7	3.5	17.0	16.5	28.0
A.C. Double-grid Valve								
Cossor	41MDG	40,000	10	1.0	.25	—	—	—
A.C. Screen-grid Mains Valves								
Six-Sixty	4SGAC	1,000,000	1,000	1.0	1.0	1.5	—	—
Mullard	SV4	909,000	1,000	1.0	1.1	—	—	—
Eta	DW6	800,000	1,000	1.0	—	1.0	—	—
Mazda	AC/SG	800,000	1,200	1.0	3.0	5.0	.5	.5
Mazda	ACS2	600,000	3,000	1.0	5.0	—	—	—
Tungstram	ASH100	600,000	900	1.0	1.5	—	—	—
Cossor	MSG/HA	500,000	1,000	1.0	2.0	2.0	—	—
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
Marconi	MS4B	350,000	1,120	1.0	3.2	—	—	—
Osram	MS4B	350,000	1,120	1.0	3.2	3.2	1.0	1.0
Mullard	S4VB	257,000	900	1.0	3.5	4.0	1.5	1.5
Cossor	MSG/LA	200,000	200	1.0	3.75	4.5	—	—
Eta	DW2	200,000	240	1.0	—	2.5	—	—
D.C. Three-electrode Mains Valves								
Mazda	DC/HL	13,000	35	.5	2.7	—	—	—
Marconi	DH	10,800	40	.25	3.7	—	—	—
Osram	DH	10,800	40	.25	3.7	—	—	—
Mazda	DC3HL	10,000	37	.1	3.7	—	—	—
Marconi	DL	2,660	12	.25	4.3	—	—	—
Osram	DL	2,660	12	.25	4.3	—	—	—
Mazda	DCP	2,220	10	.5	4.5	—	—	—
Mazda	DC2P	2,220	10	.1	4.5	—	—	—
D.C. Screen-grid Mains Valves								
Marconi	DS	450,000	500	.25	1.1	—	—	—
Osram	DS	450,000	500	.25	1.1	—	—	—
Mazda	DCSG	—	1,000	.5	2.75	—	—	—
D.C. Pentode Mains Valves								
Marconi	DPT	30,000	90	.25	3.0	—	—	—
Osram	DPT	30,000	90	.25	3.0	—	—	—
Mazda	DCPen.	—	—	.5	3.5	—	—	—
Mazda	DC2Pen.	—	—	.1	3.5	—	—	—

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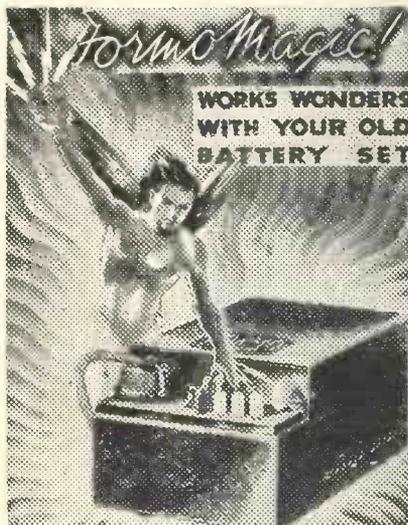
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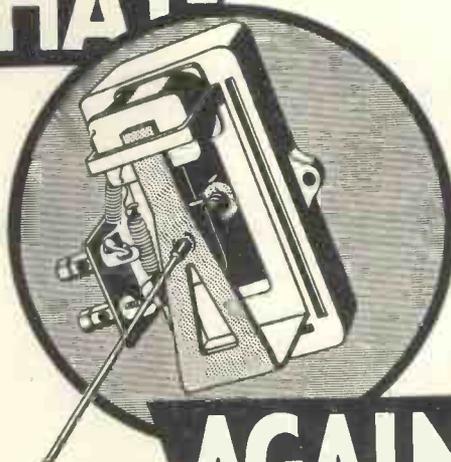
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(M.C. 109)

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BELLING-LEE "B" TYPE TERMINALS and BELLING-LEE WANDER PLUGS are SPECIFIED FOR THE 1932 SUPER 60

BELLING-LEE FOR EVERY RADIO CONNECTION

Advt. of Belling and Lee Ltd., Queensway, Ponders End, Middx.

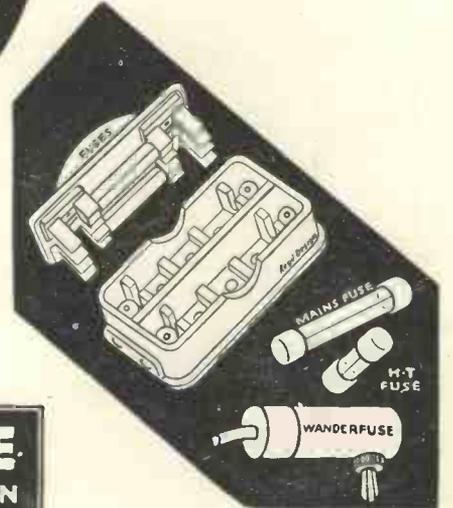
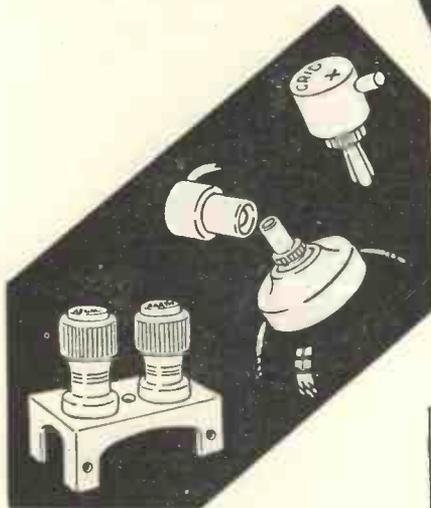
COMPLETE RANGE OF FUSES

TWIN BASEBOARD FUSE-HOLDER, with two 1-amp. fuses for mains leads (illustrated below) 3/6.

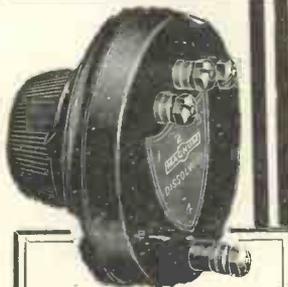
WANDERFUSE, combined wander plug and fuse, with 150m/a. fuse, 1/6.

SPARE FUSES, in two lengths, H.T. ratings 60 m/a., 150 m/a. and 1/2 amp), 1/2 in. long; mains ratings, 1, 2, and 3 amp), 1 1/4 in. long.

All ratings are sold at 6d. each



BUILD THE "ETHER ROVER"



MAGNUM DISSOLVER

As specified for the "Ether Rover" 10/-

- | | |
|--|--------|
| 1 Varley multi-cellular type BP2 H.F. choke | 3 6 |
| 1 Watmel type DX3 H.F. choke | 4 0 |
| 1 Lewcos band-pass filter coil, type BPF | 12 0 |
| 1 Lewcos dual range, type ATG, coil | 8 6 |
| 1 Magnum .0001-mfd. fixed condenser | 1 6 |
| 1 Magnum .0002-mfd. fixed condenser | 1 6 |
| 2 Magnum .01-mfd. fixed condensers | 5 0 |
| 2 Formo 1-mfd. fixed condensers | 5 0 |
| 2 Formo 2-mfd. fixed condensers | 6 6 |
| 1 British Radiophone .0005-mfd. three-gang condenser with disc drive | 1 16 4 |
| 1 Ormond .0002-mfd. differential reaction condenser, type R/190 | 4 0 |
| 1 Ebonite panel, 18 in. by 7 in. | 7 0 |
| 1 Grid-leak holder | 0 6 |
| 4 Benjamin vibrolders | 8 0 |
| 1 Bulgin 0.2-milliampere moving-coil meter, type MC2 | 1 10 0 |
| 1 Bulgin 0.50 milliampere moving-coil meter, type MC8 | 1 10 0 |
| 6 Belling-Lee wander plugs as specified | 1 0 |
| 2 Belling-Lee spade terminals as specified | 9 |

£ s. d.

- | | |
|--|----------------|
| 1 Magnum spaghetti resistance, 10,000 ohms | 1 0 |
| 4 Magnum spaghetti resistances, 20,000 ohms | 6 0 |
| 1 Magnum spaghetti resistance, 30,000 ohms | 1 6 |
| 1 Dubilier 1-meg. grid leak | 1 9 |
| 1 Magnum dissolver | 10 0 |
| 2 Lissen terminal blocks | 2 0 |
| 1 Six-Sixty valve screen | 1 3 |
| 1 Wearite on-off type 622 switch | 1 0 |
| 1 R.I. Hypermu L.F. transformer | 1 10 |
| 1 Readi-Rad Instamat output transformer. | 1 7 6 |
| Tinned copper wire, insulated sleeving, screws, etc. | 4 3 |
| | £12 0 0 |

Any of the above parts supplied separately as required.

The "Ether Rover," as above, ready wired and tested, including valves, batteries, loud-speaker and cabinet as specified, royalty paid ... 23 15 0

The "Ether Rover," radio-gramophone model, ready wired and tested, including valves, batteries, loud-speaker, cabinet, motor and pick-up, royalty paid ... 28 0 0

The "Ether Rover," "Super 60," and all Wireless Magazine sets are available ready wired and tested or as constructional kits.

Comprehensive lists including a list of short-wave stations and a booklet dealing with the "Stenode."—free on request.



MAGNUM "UNIVERSAL THREE"

The ideal set for short-wave and broadcast reception. Covers 15 metres to 2,000 metres. Complete with coils and valves. Royalty paid **£15**

BURNE-JONES & CO., LTD.

"MAGNUM" HOUSE, 296 BOROUGH HIGH STREET, LONDON, S.E.1 Telephone: HOP 6257 & 6258
SCOTTISH AGENT: MR. ROSS WALLACE, 54 GORDON STREET, GLASGOW, C.1

It helps us if you mention "Wireless Magazine"

Broadcast Identification Sheets

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

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

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

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



313.5m.
(957 kc.)
Power: 0.7 kw.
* **NATAN-VITUS**
(Paris France)

214 miles from London.

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

Announcer: Man.

Call: *Allo! Allo! Ici poste de Montmartre des Emissions Radio Natan-Vitus.*

Opening Signal: Metronome. Interval signal: two notes (F sharp, D sharp).

Main Programme: G.M.T. 09.00, gramophone records (Sun.); 11.00, talks (Sun.); 20.00, gramophone records, talk (daily, except Sat. and Sun.); 20.30, variety (Sat.).

Transmissions are simultaneously broadcast on 48.75 metres. Closes down with the usual French good-night greetings, followed by old popular melody: *Mont' la d'assus* (gramophone record).

* A new high-power station is under construction.



368.1m.
(815 kc.)
Power: 1.5 kw.
BOLZANO
(Italy)

623 miles from London.

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

Announcer: Woman.

Language Used: Italian only.

Call: *Ente Italiano Audizioni Radiofoniche Stazione di Bolzano*, abbreviated to EIAR, (phon.) *Eh-yah Rah-dee-owe Bol-szano.*

Opening Signal: Short melody played on a musical box.

Main Daily Programme: G.M.T. 12.40, gramophone records; carillon from Gries Monastery (12.50); 16.50, news; 19.00, time signal, concert; 21.00, relay of outside broadcast; 21.30, news.

Closes down with the opening call followed by *Fine della trasmissione Signori, Buona notte*, after which the Italian National Anthem and Fascist Hymn are played.



368.1m.
(815 kc.)
Power: 13.2 kw.
HELSINKI
(Finland)

1,130 miles from London.

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

Announcer: Woman.

Languages Used: Finnish and Swedish.

Call: (in Finnish) *Huomio! Huomio! Taala Suomen yleis radio Helsinki-Lahti*; (in Swedish) *Giv Akt! Giv Akt! Har Finlandsrundradio Helsingfors-Lahti.*

Main Daily Programme: G.M.T. 06.45, physical exercises (Sun.); 08.00, sacred service (Sun.); 15.00, gramophone records; 16.35, concert; 18.30, concert; 19.45, news (Finnish); 20.00, news (Swedish) 20.15, dance music (Sat.).

Closes down with Finnish National Anthem followed by good-night greetings, i.e. (Swedish) *God Natt*, (Finnish) *Toivotan kaikkille.*

Relay: Lahti, 1,796 metres, 167 kilocycles, 54 kilowatts; Viipuri (Viborg), 291 metres, 1,031 kilocycles, 13.2 kilowatts; Pietarsaari (Jakobstad); Pori (Bjoerneborg) and Turku (Abo) on common wavelength of 245.9 metres, 1,220 kilocycles; Tampere (Tammerfors), 559.7 metres, 536 kilocycles.



424.3 m.
(707 kc.)
Power: 100 kw.
MOSCOW
(U.S.S.R.)

1,555 miles from London.

Standard Time: G.M.T. plus three hours.

Announcers: Man and woman.

Call: (phon.) *Sloo-schah-eet-e-yea!* (twice). *Rah-dee-owe stan-see-ya ee-men-ee Mosh-va Stal-ee-na.* Opens its transmissions by playing *L'Internationale* (gramophone record).

Language Used: Russian only.

Main Programme: G.M.T. 05.00 onwards, talks; 20.00, concert; 20.55, relay of chimes from Spassky Tower, Kremlin; time signal and weather; 24.00, news bulletin. Relays Moscow (T.U.), Leningrad, and occasionally provincial transmitters.

Closes down towards 01.00, with *L'Internationale.*



1,481m.
(202.6 kc.)
Power: 100 kw.
MOSCOW-NOGHINSK
(U.S.S.R.)

1,555 miles from London.

Standard Time: G.M.T. plus three hours.

Announcers: Man and woman.

Call: *Sloeschaitje! Gouvoeret Moskva Kominternu.*

Main Daily Programme: G.M.T. 03.00, physical exercises, news, and concert; 05.35, concert; 08.55, time signal; 14.00 and 18.00, concert; 20.55, relay of chimes from Kremlin, etc.

Closes down at 21.00 with good-night greetings: *Dosvedanja. Spakoino nokhi.* Later, towards 21.15, the station re-opens for the transmission of press news bulletins, read out slowly to enable provincial newspapers to take them down in long-hand.

SEVEN GIANT T.C.C. CONDENSERS

used by 200 K.W.
PRAGUE



Here is illustrated one of the seven giant 5 mfd. condensors standing 6 ft. 6 ins. high.

T.C.C.

ALL-BRITISH
CONDENSERS

The Telegraph Condenser Co. Ltd., Wales Farm Rd., N. Acton, W.3.

WITH an output of 200 K.W. Prague becomes the world's most powerful medium-wave broadcaster—and it has come to Britain for its condenser equipment. Each of the 7 T.C.C. Smoothing Condensers has a capacity of 5 mfd. with a working load of 25,000 volts D.C. Other T.C.C. equipment supplied to this station includes H.F. Condensers—mica dielectric immersed in oil—which are called upon to work up to 50,000 volts peak load!

This order was secured in open competition and is a remarkable testimony to the efficiency and reliability of T.C.C. All-British Condensers.

♥ 9334

When replying to advertisements, please mention "Wireless Magazine"



Price Includes : OAK CABINET IN DULL WAX FINISH OR FRENCH POLISHED, WITH BASEBOARD AND DARK OAK PANEL READY DRILLED.

OUR OFFER!

All purchasers of the genuine British-made Clarion Cabinets here advertised will upon sending direct to us the



"Clarion Seal" enclosed in each cabinet, receive post free the **Clarion Gift of a British-made Automatic Screwdriver**. A boon to constructors

Phone: Dishopgate 6371

CLARION Illustrated Catalogue "W" Free on request

Radio Furniture 28-38 MANSFORD STREET, LONDON, E.2.

BY SPECIAL REQUEST!

At the special request of the "Wireless Magazine" we have produced this original and exclusive design of Cabinet for the "1932 SUPER 60."

Do you realise that we could not give you such splendid "Cabinet Value" were it not for the fact that hundreds of "W.M." readers are sure to build this modern set?

Clarion do not allow the public to say, "I can't get one." Clarion have an adequate supply of cabinets ready for all building this Super set in time for Xmas or New Year festivities.

36/-

Carr. Paid in U.K.

ORDER YOURS NOW! IF your dealer can't supply, order direct.

CLARION XMAS GIFT!

Here is a Loudspeaker Cabinet designed to harmonise perfectly with the Clarion "1932 Super 60" Cabinet. Made of choice OAK with ample room for L.T. and H.T. Batteries. Takes any Cone up to 15-in. diameter

READ OUR OFFER to all purchasers of the above, or of the Clarion "1932 Super 60" Cabinet.



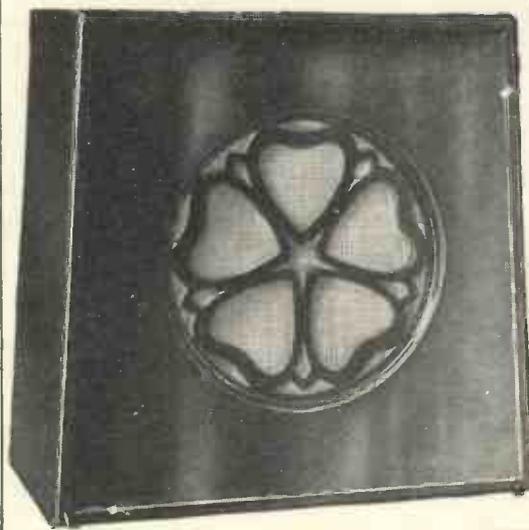
16½ in. x 16½ in. x 10 in.

26/-

Carr. Paid in U.K.



Reproducers are now available in attractive Cabinets



THE R. & A. "TYPE 40" Reproducer is more sensitive and responsive than any other speaker of its type on the market. The *Wireless World* Test Report states:—"Design ingenious and workmanship thorough . . . of more than average sensitivity . . . speech which is amazingly good, even by comparison with moving coil instruments, provides more than sufficient volume for normal requirements . . . performance and workmanship bear all the marks of a thoroughbred and at the very reasonable price of 16/6 it stands in a class by itself."

R. & A. "FIFTY" 16/6

Ask your dealer to demonstrate R. & A. Reproducers. If out of stock he can obtain at short notice. Write us for literature, describing the full range of R. & A. Reproducers, including Cabinet Models, sent Post Free.

THE R. & A. "Fifty" has been produced to meet the demand for an R. & A. "Type 40" with a smaller cone. *Wireless World* Test Report states:—"The characteristic would do credit to a moving coil . . . The reproduction of speech is comparable with that of a moving coil . . . the reproduction of music is beyond reproach." 10 in. dia. by 4½ in. deep.

R. & A. '100' 45/-

THE R. & A. "100" PERMANENT-MAGNET MOVING-COIL REPRODUCER *Wireless Trader* Test Report states:—"In power handling capabilities the R. & A. "100" is above the average of its type and will deal with 5W undistorted AC with no signs of trouble . . . At upper end of scale the reproduction is very good . . . response generally is rich and full bodied. The tone will appeal to a wide public, as there is plenty of bass, and no shrillness . . . will work well with quite a modest output valve . . . Excellent value for money." The R. & A. "100" will satisfy your most critical demands. **REPRODUCERS & AMPLIFIERS LTD. FREDERICK ST., WOLVERHAMPTON**



Speedy replies result from mentioning "Wireless Magazine"

IN TUNE WITH THE TRADE

FETTER LANE'S Review of Catalogues and Pamphlets

SEND TO US FOR THESE CATALOGUES!

Here we review the newest booklets and folders issued by nine manufacturers. 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 ½ d. stamp, to "Catalogue Service," WIRELESS MAGAZINE, 58/61 Fetter Lane, E.C.4. Valid till Jan. 31

HOME RECORDING

A NUMBER of my friends get a great deal of fun out of making their own records at home. Some of them have electrical systems which they connect up to the output side of their sets, and make jolly good records of everything from Jack Payne to Adrian Boult and his merry men!

If you have not yet tried this sort of thing then I advise you to write for a free copy of the literature on the new Kingston-Wearite home recorder.

The standard model of this is arranged for connecting up to a wireless set and a microphone unit is supplied separately for those who want to record their own items. The tracking system is so simple that I confess to being very impressed.

230

FOR MAINS USERS

A LITTLE booklet which I know will be in demand by those who have already a full list of Regentone mains units is that giving details of the new products. Some of the newcomers are the two-valve all-electric sets for only £6 15s., the special eliminator for the Pye Q Portable; and the new low-tension chargers.

231

AS ON THE BUSES

EVER since I heard that the Dagenite people were supplying a number of accumulators to the L.C.O.C. for use in London buses, I have realised that the amalgamation of three well-known British battery firms—Peto & Radford, the Hart Accumulator Co., Ltd., and the National Accumulator Co., Ltd.—is resulting in a really first-rate battery.

The wireless types seem to share the sturdiness of their automobile brothers. Some of the range are fitted with a novel tell-tale device, showing the state of charge. These are glass-cell jobs;

there are also a number of free-acid and jelly-acid non-spill batteries in celluloid containers.

A novelty is a radio accumulator in the same sort of moulded container as a car battery. A sturdy job, I think. These are all described in the new booklet R 151.

232

A NEW BAKER'S BOOK

A MOVING-COIL enthusiast who wants to keep up to date should take my tip and get the new E.M.I. book issued by Baker's Selhurst Radio. The new battery and mains-energised models are described and, as great strides have been made in moving-coil technique during the past year, the facts given are particularly interesting.

In this book loud-speakers from the small 9 ¼-in. cone standard model to the 14 ½-in. cone super-power cinema model are described. Useful circuits are given showing suitable output arrangements for triodes and also for tone correction where pentodes are used.

Altogether a fine book for the practical man.

233

GOOD CONTROL

IF there's one thing I loathe about a poorly made set, it is its frailty of control. Reaction condenser shafts which wobble and midget tuning knobs which give only a rough approximation are things to avoid.

Generally it is not the control which is at fault, but the condenser behind the panel. If you get a good condenser with rigid bearings and fitted with a clear scale, you will find it a big step towards bringing in more stations.

I class Polar condensers among the best and a most attractive booklet can now be had describing the range. Useful little parts, such as the Polar high-frequency choke and Polar fixed potentiometer, are included.

234

HOME-BUILT MAINS UNITS

ONE big advantage of making your own high-tension unit is that you can choose a type giving just the right output for your set. There is no fear, if you choose wisely, of getting a type which does not give enough milliamperes, or one which has not enoughappings.

F. C. Heayberd & Co. supply kits of parts for home-built units and also complete units. They are described in a catalogue which I have just received.

Mains users who are not satisfied with their present equipment will be well advised to tell Heayberd's just what their present set is, so that a suitable model can be selected.

235

THE NEW COSSOR BOOK

THERE are some catalogues which I can confidently recommend to all set users. Here is one I am sure will interest every set user, or at least every valve user. Cossors have done a very good thing in their new book, a 44-page production. It is indexed in the usual way with 2-, 4- and 6-volters, and mains valves, in separate sections. The rectifiers and new power valves are also dealt with.

In every instance the valve is illustrated, its special purpose described, static characteristic curves given, and electrical and mechanical measurements clearly stated.

What more do you want to know when choosing a new valve?

236

CHEAPER FUSES

I SEE that reductions have just been made in the prices of Microfuses. In some cases these reductions are considerable. The 100-milliamper fuse which previously cost 2s. 9d. is now only 1s. 6d. Special light fuses to carry 5, 10, and 25 milliamperes are available, and the "heavies" are in ranges from 50 to 500 milliamperes.

One of these days I will get some clever person to tell me how Microfuses are made. The element is not wire, but thin metallic filament. They are, of course, just the thing for making your set absolutely safe and avoiding ruined valves.

237

WHY NOT A NEW BATTERY?

ONE of your New Year resolutions—and I hope you won't break it so easily as most others—should be to get a new battery for your set. As though to remind me of this bright idea for the New Year, the Fuller Accumulator Co. have sent me a number of booklets, one set of which deal with high-tension and grid-bias batteries and the other with accumulators.

Fuller make high-tension accumulators, too, so you are well catered for in the range if you prefer this method of getting high tension. These booklets give useful hints on choosing and working batteries and accumulators. Really useful, believe me.

238

Order Your Next Issue of

**WIRELESS
MAGAZINE**

Now!

It Will Be Published on Wednesday,
January 20

A FEW FACTS ABOUT TRUE AND EFFICIENT RECTIFIERS

 **WESTINGHOUSE** 

METAL RECTIFIERS

are the most efficient rectifiers known for radio receiving sets—there are **NO FILAMENT LOSSES.**

 **WESTINGHOUSE** 

METAL RECTIFIERS

require **LESS COSTLY TRANSFORMERS** for receivers than other rectifiers.

 **WESTINGHOUSE** 

METAL RECTIFIERS

require **SIMPLER CIRCUITS** than any other rectifier.

 **WESTINGHOUSE** 

METAL RECTIFIERS

give **LONG TROUBLE-FREE RECEPTION,** and radio receivers **ARE MORE EFFICIENT** for their use.

**BUY RADIO SETS AND MAINS
UNITS WHICH INCORPORATE**

 **WESTINGHOUSE** 
METAL RECTIFIERS

THE WESTINGHOUSE BRAKE & SAXBY SIGNAL CO. LTD.,
82, YORK RD., KING'S CROSS, LONDON, N.I. 'Phone: North 2415

Mention of the "Wireless Magazine" will ensure prompt attention



THE NEW REGENTONE 2v. A.C. ALL-ELECTRIC RECEIVER WITH BUILT-IN SPEAKER £8:10



THE REGENTONE 2v. A.C. ALL-ELECTRIC RECEIVER (WITHOUT SPEAKER) £6:15

JUST IN TIME FOR CHRISTMAS

a new version of the famous

REGENTONE ALL-ELECTRIC RECEIVER

a gift for your friends or your family

Radio for your family or your friends this Christmas. Luxurious, yet inexpensive. A perfect gift . . . a perfect radio set, in two forms. Here is a new version of the famous Regentone 2-v. A.C. All-Electric Receiver . . . in a handsome walnut finish cabinet, with built-in loud-speaker. It costs, complete with B.V.A. valves, only £8 : 10s. If you already have a good speaker, there is the original Regentone 2-v. All-Electric Receiver. What a remarkable receiver it is, giving National and Regional programmes at loud-speaker strength, as well as other British and Continental stations. Really keen selectivity . . . a few degrees on the dial cuts out any station. Simple to operate . . . there is only one tuning dial. In a handsome All-British walnut finish bakelite cabinet, complete with B.V.A. Valves. It costs £6 : 15s.

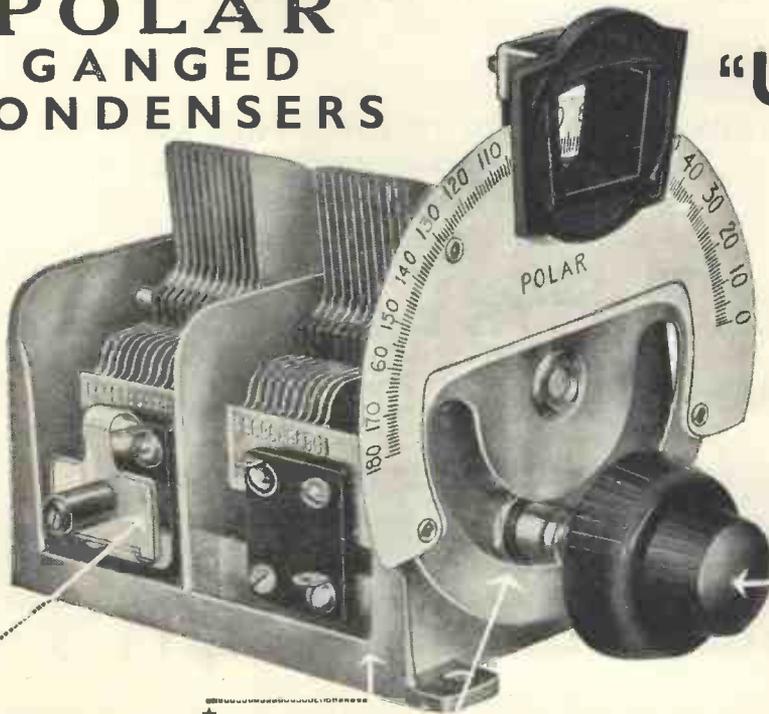
Ask your local dealer for a demonstration and full particulars, or write for the FREE Regentone Art Booklet giving full details of Regentone products. (D.C. Mains Units from 35/-, A.C. Mains Units from 50/-.)



REGENTONE LIMITED, Regentone House, 21 Bartlett's Buildings, E.C.4. Tel.: Central 8745 (5 lines).
Irish Free State Distributors: Kelly & Shiel, Ltd., 47 Fleet Street, Dublin.

POLAR

for GANGED CONDENSERS



The "UNIKNOB"

TWO-GANG CONDENSER

21/-

.0005 x .0005

* AIR DI-ELECTRIC TRIMMER

Controlled by centre knob ensuring the same degree of accuracy as that obtained by two single tuning condensers, but with greater ease and simplicity of operation.



GANGED CONDENSERS

24-page Catalogue "M" Free. OLD SWAN, LIVERPOOL

- * MINIMUM TRIMMER For balancing circuit capacities.
 - * DIE CAST FRAME Ensuring rigidity under all conditions.
 - * SLOW MOTION DRIVE Fitted with illuminated scale.
- Standardised by leading set manufacturers. Specified by the Technical Press.
- WINGROVE & ROGERS, LTD., 188-9 STRAND, W.C.2

Mention of the "Wireless Magazine" will ensure prompt attention

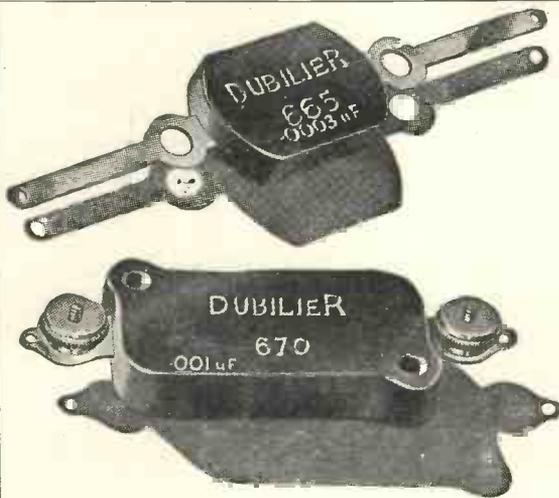
Use the condensers with a world-wide reputation

These are the **BRITISH Batteries** recommended for your **NEW ECONOMY TWO**

To be a real economy set—the designer of the New Economy Two believes—whatever its price, the components must all be the very best of their kind for their particular purpose. So he recommends Fuller Batteries—specifying a Fuller "Sparta" H.T. Dry Battery, 120 volt, price 10/9; and a Fuller Grid Bias, 9 volt, price 1/-.

Fuller Batteries are best for every wireless purpose. They outlast other batteries, and improve reception the moment they are installed. Being machine-made and tested, each one you buy is always as good as any other—their quality is **invariable**. Whether you make your set, or buy it ready-made, always fit the appropriate Fullers.

Notwithstanding their advantages over other reputable makes, Fuller prices are no dearer.



Dubilier condensers are famous the world over for their infallible accuracy and uniformity. Therefore, when you buy condensers, always demand Dubilier, the condenser in which you can place absolute reliance. They are made in England by British workpeople by a British company.

This latest range of moulded-in mica types fulfils the long-felt need for the best possible condensers at an extremely low cost, built as only Dubilier can build them.

All radio dealers stock them.

PRICES

- TYPE 665**
.0001, .0002, .0003 mfd.
6d. each.
- .0005 mfd., 9d. each.
- TYPE 670**
.0001, .0002, .0003 mfd.
1/- each.
- .0005, .001, .002, mfd.
1/3 each.
- .005 and .006 mfd.
1/6 each.
- TYPES 610 and 620**
Prices from 1/8 to 3/- each



"SPARTA" H.T. BATTERY

Fuller H.T. "Sparta" Batteries are obtainable in all types and sizes. 60-120 volts, prices ranging from 5/3 to 10/9



GRID BIAS BATTERY

Fuller Grid Bias Batteries are obtainable in two types and sizes. Type F51, 9 volts, price 1/-; Type F52, 16½ volts, price 1/9

For full particulars of all types and sizes write for list D3.

BRITISH and BEST FULLER SUPER BATTERIES

EMISSION UP TO 20 MILLIAMPS.

FULLER ACCUMULATOR CO. (1926) LTD.
CHADWELL HEATH, ESSEX.

Telephone: Seven Kings 1200.

Telegrams: "Fuller," Chadwell Heath.

Contractors to British and Overseas Government Departments, Railways, etc.

DUBILIER

CONDENSER CO. (1925), LTD.

DUCON WORKS, VICTORIA ROAD, N. ACTON, LONDON, W.3

You will get prompt replies by mentioning "Wireless Magazine"

RADIO IN REVIEW

By MORTON BARR

MULTI-DIAL tuning has almost completely disappeared in favour of single-knob control. With the straight-circuit type of set, ganged tuning is certainly all to the good, because it involves very little, if any, sacrifice in efficiency. But it is doubtful whether a too rigid adherence to the principle of uni-control can always be justified.

Turning to Super-hets

Congestion in the ether is now so bad that designers are compelled to turn to special circuits such as the super-het, or to use complicated band filters, in order to secure even a limited standard of selectivity. And ganged control under such conditions, especially when combined with a dual-wave switch, becomes a very intricate problem.

Not only must all the tuned circuits on the high-frequency side be kept strictly in step, but the degree of mutual coupling between the sections of the band filter must also be varied as one changes over from the medium to the long waves.

Personal Skill

It is doubtful whether the complications involved in ganging all these controls together is really worth while, merely for the sake of saving one or two extra controls on the panel. After all, there is something to be said in favour of giving the listener an opportunity of using a little personal skill in bringing in the more distant stations.

Single-knob control, by all means, for those who have little interest in the game beyond hearing the programmes, but it need not be made standard practice at all costs.

It is to be hoped that something will be done to improve conditions in the ether before we get to the point when distant reception will be a complete "washout" and we shall all be "anchored" to the local B.B.C. programme.

The situation is rapidly becoming impossible, simply because none of

the countries concerned are willing to make any concessions. All are willing to "take" but none to "give," and meanwhile we are all suffering the consequences—innocent and guilty alike.

The suggestion put forward by the B.B.C. is not unreasonable, and would certainly produce a large measure of relief. It amounts in brief to each country being "rationed" to such an extent that every transmitter would be separated by at least twelve kilocycles—instead of nine—from its nearest neighbour in the frequency scale.

Under such conditions any well-designed straight circuit, having at least one high-frequency stage, would be able to receive a majority of the remaining Continental programmes without overlap or mutual interference.

Our proposals have, however, been turned down, and there seems to be no possibility of relief until the international delegates meet again in six months' time at Madrid. Incidentally, a drastic "combing out" of superfluous transmitting stations would enable manufacturers in every country to standardise the design of sets and still further reduce prices.

There is some hope that next year a concession may be obtained in the direction of extending the broadcast waveband down to 150 metres at one end of the scale, and up to 545 metres at the other. The extension downwards would be particularly valuable because it would make room for no less than fifty-six new stations, each separated by a gap of ten kilocycles.

The extra accommodation beyond the 550-metre mark would not prove so welcome—unless the 600-metre wavelength now used for ships' morse were simultaneously shifted still higher up the scale.

Rugby's Giant Valve

To listeners who are accustomed to a filament consumption of about one-tenth of an ampere, a valve designed to take a heating current of no less than 500 amperes must come as a bit of a shock! Yet that is what the new giant valve transmitter for the Rugby station takes. The actual filament emission is 160 amperes and the power rating is 500 kilowatts.

The valve is built entirely of metal and porcelain, and can be taken to pieces for overhaul and repair. The secret which has made its construction possible is the use of an oil distillate, in place of mercury, for maintaining the necessary high vacuum.

The oil has an abnormally high surface tension at ordinary temperatures so that it can be used in the exhausting-pump without giving off any vapour to vitiate the vacuum inside the valve.

Moving-coil "Sensitivity"

The "sensitivity" of any moving-coil loud-speaker depends upon the strength of the magnetic field inside the gap containing the speech coil. The flux or field is measured by the number of "lines of force" passing across each square centimetre of the gap.

In practice, with a separately excited or "pot" type of magnet the effective flux can be brought up to a maximum of about 12,000, as compared with 8,000 lines for the cobalt-steel or permanent-magnet type.

On the other hand, unless the extra energising current required can be taken from the mains, the balance of convenience lies with the permanent-magnet model, the slightly lower level of sensitivity being a matter of no practical importance.

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Date

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for February

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A BRITISH CHALLENGE

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One knob tunes three ganged condensers; no reaction. Volume control also acts as the "off" switch. Coil excited speaker. In Walnut Cabinet. A.C. or D.C. Mains.

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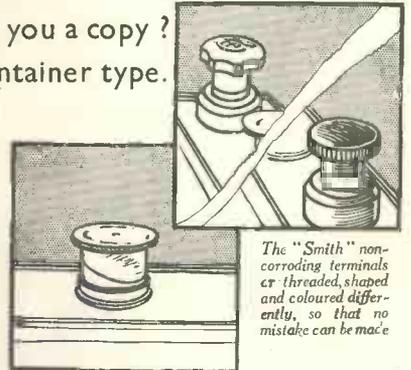
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BLUE SPOT
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Listen to the BLUE SPOT receiver slipping in Home and Foreign stations without a trace of overlapping or interference. See how quickly you can flit around Europe picking from the choicest programmes the tit-bits that please you most. Admire the wonderfully rich tone of the speaker. Only a BLUE SPOT speaker can achieve such perfect reproduction.

Carry the set about? Of course you can. It will play wherever there is an electric point handy. Just plug in and tune in. It costs no more to run than a reading lamp. The complete Table Grand Receiver in its beautiful cabinet of walnut, complete with moving coil loudspeaker, valves, and Royal-ties paid cost 25 gns.

Ask your dealer to let you hear Blue Spot.

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W.400 in oak—similar in design to loud-speaker 100 D. (without loudspeaker.) Price £18.

The Blue Spot circuit, while employing two screened grid detector and output valves, and a fifth valve for rectification only, has one H.F. stage followed by a detector and two L.F. stages. It is to this modern arrangement that much of the efficiency of the Blue Spot receiver is due, particularly its ability to bring in foreign stations at full volume. So great, indeed, is the reserve of power, that local stations should be tuned in at full strength without the use of either the volume or reaction controls at all.

Send for Receiver Catalogue No. W.M. 12.



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WHAT "W.M." SETS ARE DOING

BROOKMAN'S FOUR (January, 1930)

SEEDLEY (Lancs).—This set has given remarkable results and I have logged over eighty stations. The results are really magnificent.

FIVE-POINT SHORT-WAVER

(January, 1931)

S.S. KARATTA (at Adelaide, Australia).—I have built this set with wonderful results. I have built practically every short-wave circuit up to date and can say without fear of contradiction that the Five-point Short-waver stands alone for distance, volume, and clarity. I have received every station of any mention on the loud-speaker.

FIVE-POINT THREE

(October, 1930)

HECKINGTON (Lincs).—I have made the Five-point Three because of its simplicity and so that the other members of my family, who are not wireless fans, could manage it. I have obtained thirty stations on the loud-speaker in one evening and can always rely on at least twenty of these for an alternative programme.

FOURSOME PORTABLE

(August, 1930)

EDINBURGH (Scotland).—This set is giving me very satisfactory results, eight stations having been received on the long waves alone. The running costs are very economical.

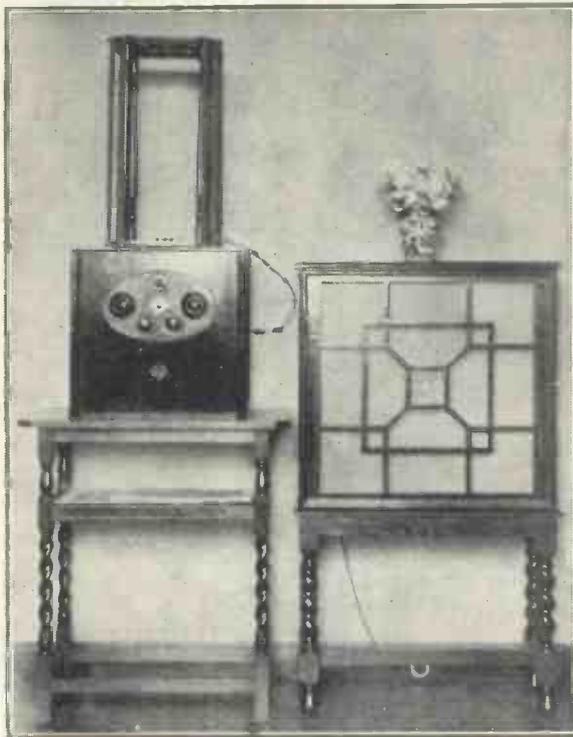
HOME AND GARDEN THREE

(August, 1931)

DARTFORD (Kent).—Here at Dartford, approximately thirty miles from Brookman's Park, this set is absolutely "it." It is enough to say that I am now making up another two for friends who have heard mine. I have kept rigidly to the specification and have had no trouble whatsoever.

SCALFORD (Melton Mowbray).—Although I am forty-eight miles from Daventry, I get moderate loud-speaker results on the frame alone. I

Here we present thirteen enthusiastic reports from readers, both home and overseas, who are getting good results with "W.M." sets. When sending your report remember that half a guinea is paid for every photograph of a "W.M." receiver printed in these pages.



AN EXCELLENT COMBINATION

Here is the Super 60 and "W.M." Linen Loud-speaker as constructed by a Carnarvon reader. He has certainly made a good job of the cabinet work!

am very pleased with the set. When I attach an aerial to the fixed vanes of the tuning condenser, the results are marvellous. London National and Regional and foreigners are received at excellent strength. Congratulations!

NEW BROOKMAN'S THREE

(November, 1930)

CARNARVON (Wales).—The result is in excess of expectations. Quality was all that could be required and sensitivity was such that I logged nine long and thirty-five medium-wave stations with ease in a couple of evenings. As regards selectivity, I was pleasantly surprised. I could get

Algiers with Mühlacker working; not, of course, clear, but reasonably enough. It takes a Super 60 to get Algiers clear—up here, anyway.

STATION-FINDER TWO

(September, 1931)

DARTFORD (Kent).—This little set is a perfect gem. With an aerial 80 ft. long and 25 ft. high, I have logged the following stations at sufficient strength after dark to be comfortably heard in the room: Brussels No. 1, Langenberg, Beromünster, Oslo, Rome, Sötens, Toulouse, Mühlacker, Strasbourg, Brussels No. 2, Hilversum, Heilsberg, Bord-

eaux, Huizen, Berlin, Warsaw and two Paris stations, and, of course, London Regional and National, Northern Regional and national, and our old friend 5XX.

INGATESTONE (Kent).—I am very pleased with this set. You say this is a set really confined to local reception, but I have logged in all twelve stations.

SUPER SENIOR

(October, 1931)

SIDCUP (Kent).—This set has now been in use for some four weeks and it is a great improvement on the Century Super, good though it was. The volume is better and even more foreigners are obtainable at full strength. I have listed about eighty, all worth hearing, using a 20-ft. outdoor aerial. It is run from a small A.C. eliminator, which only gives a maximum voltage of 110 volts at 19 milliamperes.

SUPER 60

(March, 1931)

KIRKDALE (Liverpool).—Truly a marvellous set. I think that anyone who builds this set has one as good as the best of commercial sets.

LEITH (Scotland).—From the minute I pulled out the switch I have had nothing but success. I have logged about seventy stations in a night. The other evening my boy, who has had no experience whatsoever, had a go, and in thirteen minutes he heard thirty-seven stations, but, of course, there was no time to identify them. I have made up for myself and friends at least twenty different sets, all of which have been good, but this one is really something different.

TWO-MINUTE ADAPTOR

(June, 1931)

BADULLA (Ceylon).—The first time I tried the Two-minute Adaptor in conjunction with a McMichael Super-range Four Portable, I tuned in the following stations within one hour, all at loud-speaker strength: W2XAF (America), PCJ (Holland), The Vatican, and Königwusterhausen (Germany).

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PZ2**

**A RADIO BATTERY
DESIGNED FOR
RADIO —**

**CAPACITY
35
AMPERE HOURS**

WHEN DISCHARGED AT
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Rate of charge

2 Amperes

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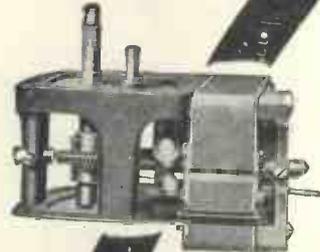
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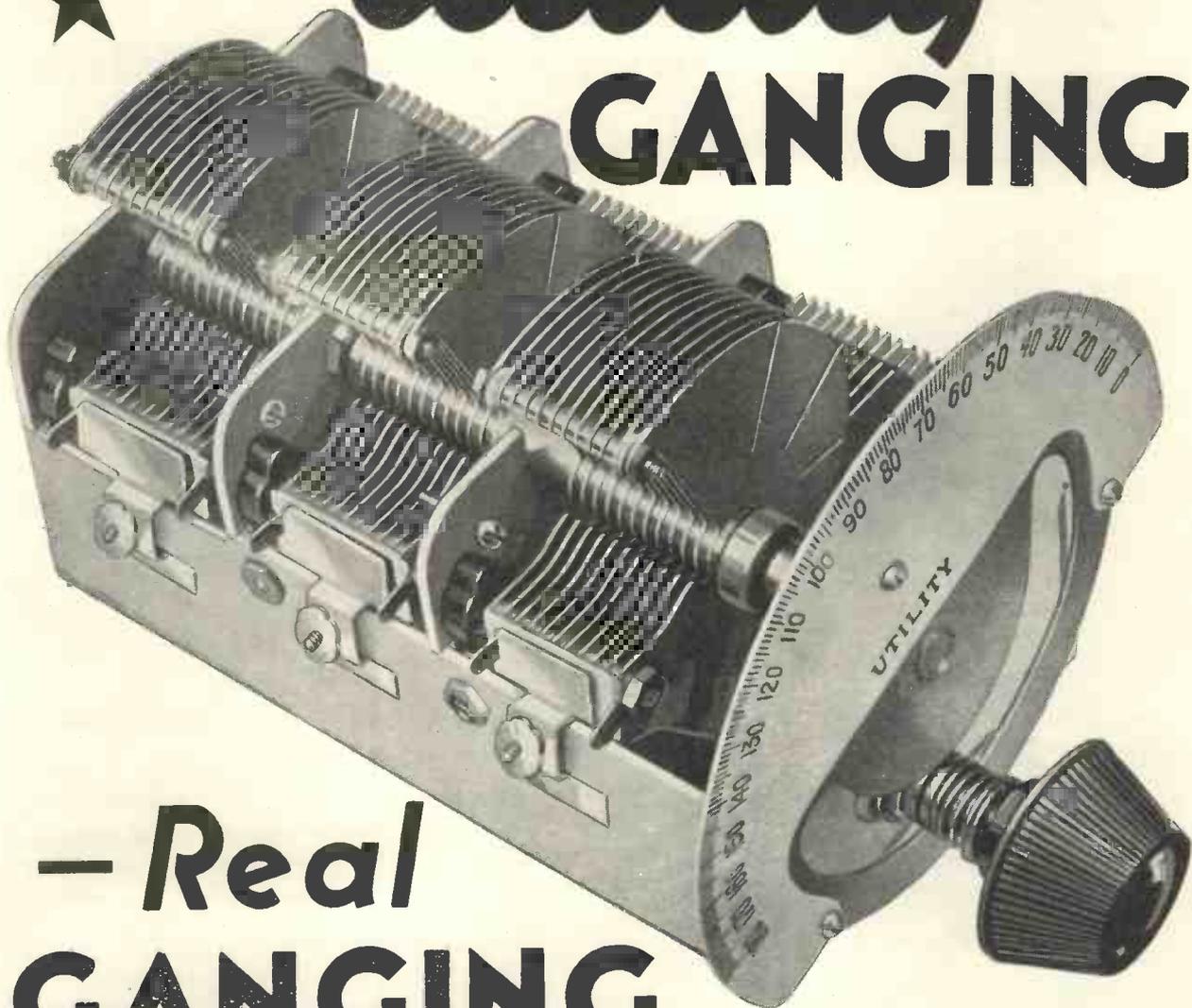
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"His Master's Voice" Instruments for yourself and your friends



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102



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Automatic Record Player

(Model 117). In a handsome walnut cabinet of compact design, fitted with the new "His Master's Voice" automatic record-changing mechanism, pick-up and volume control. By connecting it to your radio receiver, eight 10 or 12 inch records (unmixed) may be played at one loading or a single record repeated up to eight times. A unit you have been waiting years for. A.C. or D.C.

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(Model 116). The new "His Master's Voice" pick-up, volume control, electric turntable motor and automatic start and stop, housed in an oak cabinet of pleasing design. By connecting it to a loudspeaker radio-receiver, records may be played from one's armchair. Interchangeable resistances may be clipped in to the volume control to match the pick-up to any radio receiver. A.C. or D.C.

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This pick-up is similar to the one fitted to all our new instruments. It can be attached easily to any type of tone-arm and is supplied complete with a logarithmic volume control and connecting leads. The weight of the pick-up is 5 1/2 ozs.; it has an input of over 1 volt R.M.S. and a D.C. Resistance of 6,000 ohms.

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"His Master's Voice" RECORDS FOR CHRISTMAS . . .

"His Master's Voice" December list comprises over 90 records. Every type of music for the festive season is included . . . Dance, Vocal, Instrumental, Orchestral and Humorous, also Hymns and Carols . . . and every one is made by world-famous artists exclusively for "His Master's Voice." No matter what your taste in music may be, you cannot fail to find in the list the records you want.

"HIS MASTER'S VOICE"

Speedy replies result from mentioning "Wireless Magazine"



A SCHOOLBOY TACKLES TELEVISION AND "LOOKS-IN" TO THE UNITED STATES

Norman Stokes, a 14-year-old English schoolboy, explaining the working of the home-made television receiver with which he picked up a transmission from America. Second on the left is Dr. James Robinson, inventor of the Stenode

WHATEVER is written about television is in the nature of a wild surmise. This article may be no exception to that rule, but it is at least inspired by real happenings—and much has happened lately to orient the views of the television scoffers.

Within Two Years?

Forecasts about the date of real television have shrunk from a far-off five or ten years to an imminent two years at the most.

Television is surely unique among scientific developments in having so much advance publicity. Commercial interests all over the world are waiting on the infant science with extraordinary intentness. But unlike Topsy, this television simply refuses to grow. We have been waiting so long to see television grow that many have been forced to the conclusion that the snags are too great for human ingenuity to overcome.

Recent rumblings from America indicate that the commercial interests are forcing the pace, in an endeavour to recoup fortunes lost in the allied but slumping art of the films.

That famous showman, "Roxy," has been over here trying to make our flesh creep with the wonders of Radio City, a mammoth centralisation of the entertainment industry already rising to incredible skyscraper heights in New York.

These Americans take television for granted, as though its almost insuperable technical difficulties were already overcome. Discounting their national characteristic of optimism, we are still left vaguely disquieted by the assurance with which the leaders of American entertainment speak of the imminence of television.

More Than Propaganda

This grandiose talk of cornering the world's entertainment resources for Radio City's television broadcasts cannot be dismissed as mere propaganda from America. Apparently, there are many millions of dollars already sunk in the venture, which has as its keynote the full service implications of commercially practical television.

The natural question to ask is whether the B.B.C. is doing anything to counter the threat implicit in the

There are many rumours that television is about to make its debut as a real source of entertainment as distinct from its present purely experimental interest. In these notes ALAN HUNTER reviews the position as it is to-day and sums up the possibilities of developments within a short time.

It seems that at last television in this country will get "on the move" and interesting announcements may be made before many weeks have passed.

This article is followed by another from the pen of H. J. BARTON CHAPPLE, who is working on television in association with J. L. Baird. He reviews the advances that have been made in the Baird system of transmission and explains how television broadcasts are put out by the B.B.C. His disclosures will be read with interest by all who want to know what is being accomplished in this country.

What Is Happening to British Television

FUTURE TELEVISION POSSIBILITIES—Continued

fulfilment of the plans for Radio City. Are we leaving everything to Baird, or are some of our leading radio companies quietly preparing for real television?

B.B.C. Attitude

I am not able to say what is going on behind the scenes in the research laboratories of the radio industry of this country, but I can say quite definitely that the B.B.C. has completely changed its attitude about the immediate possibilities of a television service through its stations.

We may take it, I think, that until recently the B.B.C. has viewed the efforts of Mr. Baird and kindred workers with something approaching amused tolerance, certainly not with respectful awe or with particularly keen enthusiasm. Grudgingly, the Baird transmissions have been allowed to take place through the Brookman's Park twin stations (at Baird's expense), but only at times when the average listener could not possibly participate in the experiments, even supposing he had the necessary apparatus.

There has obviously been no attempt on the part of the B.B.C. to popularise television. Transmissions early in the morning and late at night have been conducted with something approaching stealth.

We can to some extent sympathise with the B.B.C. Its attitude has been scrupulously impartial, at any rate. And every listener knows that the B.B.C. is almost fanatically impressed with its service obligations. Anything in the experimental way is anathema to most of the engineers!

What, then, has happened within the last month or so to cause such a noticeable change of front at Savoy Hill when the subject of television is mentioned? I think we may trace the change to the recent decision to experiment with 7-metre transmission.

Marconi Transmitter

Most listeners have probably heard that the B.B.C. has ordered from Marconi's a 2-kilowatt set for 7-metre transmission, but the possibilities of this apparatus in connection with television have certainly not been considered.

I am not suggesting for one moment that the B.B.C. ordered its 7-metre transmitter specially for

television, because I know this is not so. What does occur to me is that, in its sudden awakening to the menace of American television, the B.B.C. is about to seize upon the possibilities of immediate television through the ultra-short waves.

Recently the chief engineer of the B.B.C., Mr. Noel Ashbridge, went to the Long Acre laboratories of the Baird Company for a demonstration of short-wave television. He came away very impressed—more impressed than with any previous demonstration. At about the same



ELIMINATING THE DISC

This "mitror screw" is a German invention to replace the familiar disc used for most systems of television. It gives post-card size without magnification

time, "Roxy" was over here, and short-wave television was being freely discussed as one of the main resources of the Radio City venture.

B.B.C. programme chiefs were being impressed with the fact that, if Radio City were all the "Roxy" contingent made it out to be, there would eventually be a virtual American monopoly on all worth-while entertainment artistes.

At this time also, Mr. Hanson, the chief engineer of the National Broadcasting Company of America, visiting this country with "Roxy" and other American "entertainment kings," stated his emphatic conviction that television would come soon, and more than likely through the cathode-ray system.

My own belief is that the recent

visit of "Roxy" and his satellites has had a tonic effect on the B.B.C., whose changed views on television coincided strangely with the startling disclosures about Radio City.

To get down to immediate possibilities, I should say that the B.B.C.'s 7-metre transmitter will not be ready until after Christmas, and it will probably take two or three months to get going on the top of Broadcasting House. Meanwhile the normal broadcasting facilities are being extended for the Baird television experiments.

Question of Range

When the first 7-metre signals are sent out we shall be able to judge more readily than at the present time how such a short wavelength would lend itself to television. It is by no means certain at present how far these signals will travel, but the range is limited in any case to about 12 miles.

This would be an advantage, for it would mean that television experiments could go on at any time of the day or night without interfering with existing services.

The greatest advantage of the ultra-short waves for television would be the widening of the frequency channel to an extent that would enable really detailed images to be sent out. At present the Baird Company, rightly or wrongly, are working on the principle that we must put up with scarcely recognisable images, because of the 9-kilocycle frequency limitation.

On the ultra-short waves it would be possible to send out a very much wider frequency band of image signals, although this would mean, of course, that a very special receiver would be needed.

Nobody will Talk

In this country it is impossible to get anyone to talk about plans for a real attack on television. The Baird people can seldom be coaxed into a direct answer to a plain question. As for the B.B.C., it is almost laughable to observe the consternation that is evoked by even the most ingenious inquiry about television!

I mention these facts, which are well known to other writers, because my article is really incomplete without some confirmation or denial from the authorities involved.

TELEVISION: What Is Being Done

IT is only natural to find that the broadcasting of television signals has undergone considerable improvement since the experimental service was first started by the Baird Company.

Prior to the year 1929, experimental television transmissions were sent out from the roof of the laboratories in Long Acre; one of the accompanying illustrations shows the transmitting aerial and another part of the transmitting apparatus employed in those days, and for this reason are particularly interesting.

Limited Service Area

Since only a relatively low power could be utilised, however, it will be appreciated that the service area served was of a somewhat narrow compass. Accordingly negotiations were undertaken between the Baird Company and the B.B.C. to ascertain whether it was possible to broadcast similar television signals inside the normal broadcasting band as allocated to public service stations.

Readers will remember that after protracted discussions and a special demonstration of television through the old 2LO station before a repre-

Experimental television broadcasts have now been transmitted by the B.B.C. from the Brookman's Park stations for many months. The pictures are put out on the National wavelength and the accompanying sound transmission is made on the Regional wavelength.

The writer of the article, H. J. BARTON CHAPPLE, Wh. Sch., B.Sc., is working in conjunction with J. L. Baird and therefore has first-hand information about his subject.

sentative committee of the engineers of the Post Office, the B.B.C. and Members of Parliament, an experimental service was inaugurated through 2LO on September 30, 1929.

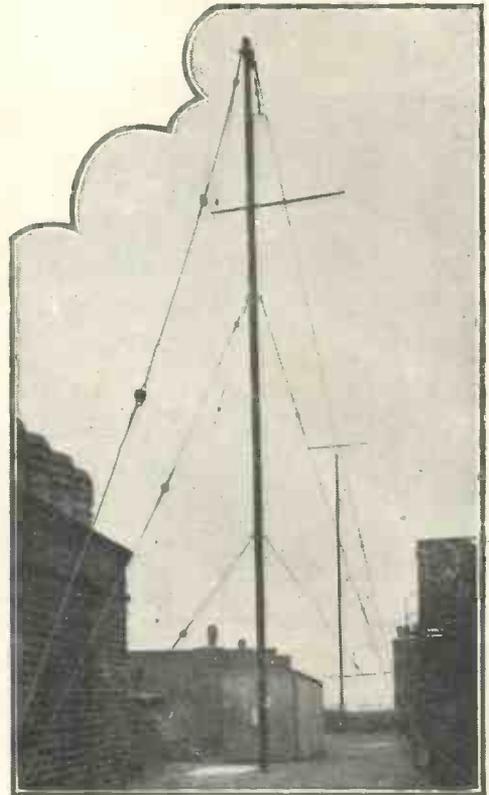
Unfortunately this was for vision alone since the Brookman's Park transmitter was then unfinished, but this single service ran successfully for seven months until March, 1930. Dual sound and vision then made its bow to the public on that date, the twin transmitters of Brookman's Park providing the necessary vehicle for passing the signals into the ether.

These transmissions are still on the air, but during the course of the last two years very great strides have been made in working both the control room and studio at Long Acre as well as in the technique associated with this new order of sight transmissions.

Views of both the original control room and studio have been included with this article and readers will see for themselves that they were of rather small dimensions. In the latter a "subject" is seated before the partition aperture through which passed the moving spot of light and the case containing the photo-electric cells is also noticed just above this opening.

It will be obvious from the fixed position of these cells that the scheme is only suitable for close-up images, that is to say head and shoulder images or scenes of a similar character.

The old control room was very cramped or, at least, eventually reached this stage owing to the addi-



BAIRD'S ORIGINAL AERIAL

The original aerial used by the Baird Co., but which is now no longer to be seen on the Long Acre roof

tion of apparatus found necessary to maintain the service of broadcasting. In the foreground is the light-spot transmitter mounted on a table on which was accommodated double-pole double-throw switches for A.C. or D.C. mains supplies together with resistance controls and an ammeter. This table form of transmitter proved very efficient and is still in service for many demonstration purposes.

The familiar scanning disc with its heavy flywheel is quite conspicuous and behind this is the "gate" for adjusting accurately the depth of the light area, but these sections of the apparatus and their prime functions have been described very fully on previous occasions in these columns so need not be dealt with further.

Pilot Television

On the benches at the back we have modulation meters, amplifiers, the pilot televisor, supply switches, etc., in fact, all the familiar apparatus which one associates with a control room handling signals for transmission purposes.

Now, as I mentioned before, developments in the transmitting technique soon convinced the Baird

WHAT IS BEING DONE—Continued



HOW IT WAS DONE AT FIRST

The old Baird studio, showing a "subject" seated in front of the partition aperture, above which are the photo-electric cells

Company that if the service of television was to be not only maintained at a high standard, but allow for extensions and improvements, more space and a more efficient layout for the control room and studio was desirable.

Marked Improvements

The work was put in hand, the transference of activities made gradually and, now the new material has been functioning for some months, marked improvements having resulted. It is therefore opportune and interesting to examine and explain for the first time the whole scheme adopted for conducting a normal television broadcast from the Long Acre premises.

First of all, the new control room and its associated studio are separated by a large noise-proof partition; that is to say sounds emanating from the studio itself cannot pass through into the control room.

Three windows are included in this dividing wall, the two outer ones being employed in conjunction with the pair of television transmitters, while the third and smaller one in the centre functions as an inspection aperture. High-quality plate glass

has to be employed in these windows and this must be thinner than is really advantageous for deadening the sound.

If this course was not adopted, absorption of light would take place, with a consequent reduction in efficiency and, furthermore, the quality of the glass must be of the highest order otherwise curious distorted image effects would be brought about.

Two television transmitters are employed, one of these being a light-spot disc model somewhat similar in character to the earlier pattern transmitting table which I mentioned was in use in the old control room. This new pattern can be seen in the far right-hand corner in the illustration depicting the new control

room in its semi-completed stage.

The disc model is utilised for the close-up images, but it is now possible to "swing the light beam" both horizontally and vertically as desired in order to follow any movements of the artist and keep him or her centrally disposed in the light area which is scanned.

Programme Scope

Obviously, this removal of the earlier restrictions placed on artist movement was a big factor, for it adds to the scope of the programme material that can be exploited for close-up purposes.

In spite of this, however, it was felt that from the entertainment point of view a great deal was missing owing to the inability to transmit full-length images.

Necessity will always be the mother of invention and to enable the Baird Company to develop this side of their service, intensive research work was carried out, culminating in the new mirror-drum transmitter now employed for both the semi-extended (three-quarter-length images) and extended scenes.

This mirror drum transmitter is sketched in skeleton form in Fig. 1 and is seen to consist of a light source—in this particular instance an arc—and two focusing lenses.

Thirty Revolving Mirrors

The light beam from the arc, after having passed through these two lenses, meets a tilted mirror which, in turn, reflects the beam on to the revolving drum of thirty mirrors



TELEVISION A TOE-DANCER

A demonstration of toe-dancing was presented to "lookers-in" from the old studio and control room. Full-length images can now be transmitted through the B.B.C. Station at Brookman's Park

B.B.C. TELEVISION TRANSMISSIONS

driven by an efficient and constant speed motor.

Since each of these tiny mirrors on the drum periphery is inclined at a slightly different angle from its predecessor, the light beam is reflected from each so that in effect we create on any surface (placed in the direct path) a light area built up from thirty vertical light strips in juxtaposition.

Illuminated Area

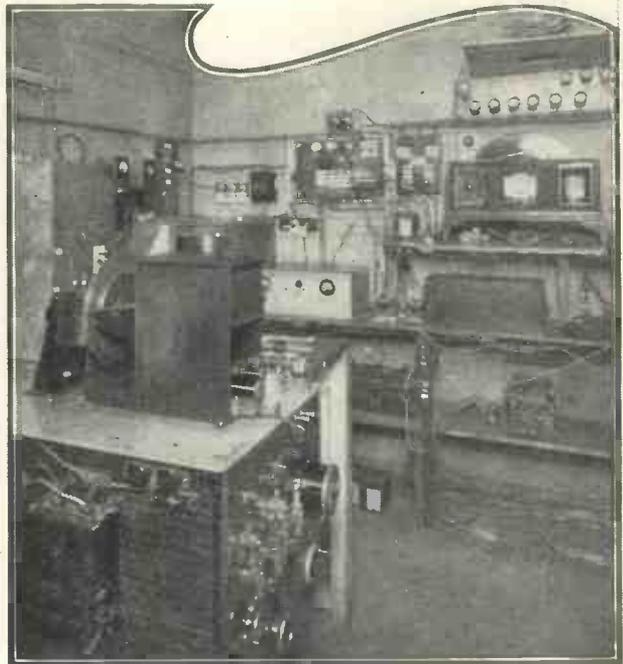
Before entering the studio and finally reaching the normal background screen the light strips pass through one or more other lenses whose function is to adjust the size of the total illuminated area according to the nature of the subject broadcast by television.

This gives the operator very complete control and obviously broadens the scope of the scene which can be transmitted. As in the case of the light-spot disc model, the beam can be adjusted horizontally to follow an artiste's movement when such a course is necessary.

Before coming to the studio, let

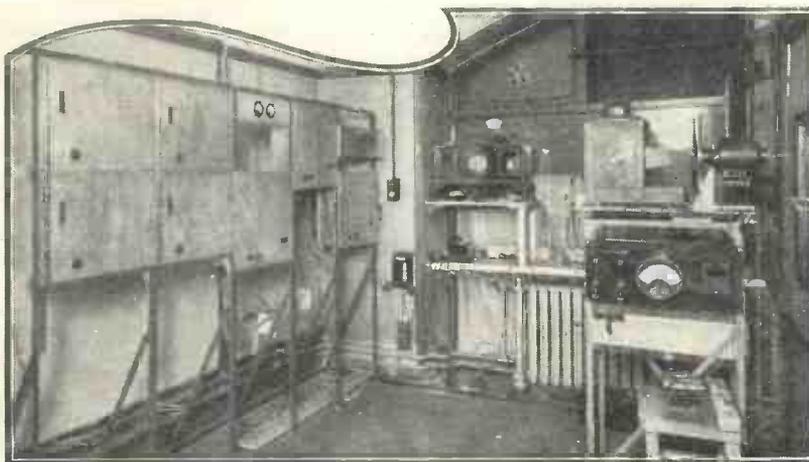
studio, more than one bank of cells is utilised and it is therefore necessary to "mix the signals." This is carried out in quite an ingenious manner through the medium of suitable controls arranged on large amplifier panels which, as will be noticed from the accompanying illustration, run along the whole length of one wall of the control room.

In addition on these same panels will



BAIRD'S OLD CONTROL ROOM

The old control room, showing a television spot-light transmitter in the foreground. This was part of the original Long Acre installation



CONTROL ROOM USED FOR PRESENT-DAY TRANSMISSIONS

Here is the new control room, from which signals are sent by landlines to the B.B.C. for broadcasting from Brookman's Park

me deal briefly with the scheme now employed for transmitting the images through to Savoy Hill in their form of an electrical replica.

The television signals are translated from light and shade by means of the photo-electric cells and the resultant current modulation is passed through three separate amplifiers and a corrector before being handed on to the landline linking Long Acre with Savoy Hill.

As we shall see when we come to the

now be found modulation meter controls for signal strength correction, inter-panel linking plugs and jacks, switches for changing negative images to positive ones and vice versa, etc.

Furthermore, duplicates of each amplifier are kept ready in case of an unforeseen breakdown and in this way it is possible to avoid any of those "technical hitches" (an expression covering a multitude of sins) which are so apt to mar a programme.

Provision is also made to enable a quick change-over from landline demonstrations to radio and vice versa. During the broadcast there is one engineer normally on the control board and he is responsible for both the vision and sound signals which are sent through the landline.

In addition to being in readiness to establish telephonic communication with the engineers at Savoy Hill he effects the signalling to the studio director for passing on any instructions appertaining to the strength of voice, position of the artiste or artistes and so on.

Looking After Transmitters

A second engineer devotes his time wholly to the transmitters themselves, either the mirror drum or light-spot disc model as the case may be. Since the normal Baird television service programme is split up into several items and scenes there are naturally transition stages from one type of scene to another.

At these periods a synchronising signal is radiated on the vision wavelength and this enables lookers-in to maintain their vision apparatus in synchronism, both phase and frame, and thus be ready immediately for the next scene without having to make

WHAT IS BEING DONE—Continued



BROADCASTING A TELEVISION SKETCH

An incident in one of the "restricted" sketches put over in the earlier days. Note the microphone, photo-electric cell case and signalling panel

sketches produced in which only one artiste had to appear at a time; marionette players; and exhibitions of toe dancing. Two of the accompanying illustrations record incidents in this connection.

Extended Scenes

The whole technique has altered, however, now that extended scenes are possible. No longer need the activities of the studio director be confined to close-up views for he can show full-length images. This extended and semi-extended scene has proved most popular, for the weekly programmes are now found to contain sketches with two or three artistes complete with stage properties, various forms of dancing—classical, ballet, cabaret, step, etc.—illustrations of various strokes in sport, sections of a dance band and songs at the piano.

any adjustments of motor speed.

Witness the televising of *The Man with the Flower in his Mouth* in July,

Only the other day three short

Undoubtedly this is a very real advantage and avoids any break in the continuity of the programme at the receiving end, which, after all, is of short enough duration. In addition, so as to assure lookers-in that the television transmission has not failed while these change-overs are made, gramophone records are transmitted on the sound wavelength, this being faded out as soon as the television transmission is ready to continue.

So much, then, for the control-room activities. Let us now take a peep into the studio and watch what happens during the broadcast.

In the earlier days of the service there were many critics who passed unfavourable comments and frequently these were based on the fact that a head and shoulders image, once the first interest had worn off, presented very little entertainment value.

Restricted Broadcasts

Possibly this criticism was to a certain extent justified inasmuch as it restricted the nature of the broadcast that could be put over. It must not be lost sight of, however, that this scheme of close-ups was exploited very ingeniously and several very intriguing transmissions were produced.

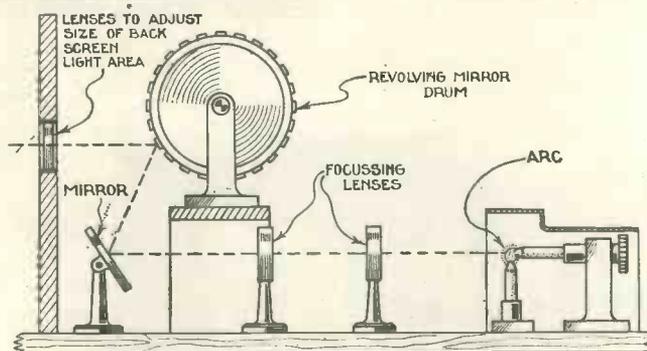


Fig. 1.—Essential parts of a television transmitter shown in diagrammatic form

rounds of a boxing contest provided excellent entertainment, while another popular feature is the weekly cartoon on topical subjects.

I think enough has been mentioned to convince the most rooted sceptic that advances have been made and television as a form of entertainment is gradually establishing itself.

Progress will continue together with the development of the new technique which has arisen and this is more fascinating for it is pioneering work.

1930, with the co-operation of the B.B.C., while there were many small

which has arisen and this is more fascinating for it is pioneering work.



GEAR THAT WAS USED TWO YEARS AGO

Some of the original transmitting gear utilised for broadcasting television in 1929. It is not needed now that the B.B.C. makes the transmissions

OUR LIGHTER BROADCASTERS

Jokes, Songs and the Piano



(Above). Naughton Wayne is a frequent broadcaster of jokes, as regular listeners will know



(Left). Do you know him? This is Chick Farr, another comedian who broadcasts frequently



(Above). You all know her! Clarice Mayne is a popular comedienne and her broadcasts are always welcome

(Below). Another comedienne who broadcasts is Wyn Richmond. She sometimes appears with Roy Fox



Drawn for
"Wireless Magazine"
by
LISSENDEN



(Above). May Tomlinson is frequently heard in recitals of light songs

(Right). Well known for syncopated piano solos, Raie da Costa broadcasts and makes gramophone records



* * * * *

THE NEW ECONOMY TWO

* * * * *

A STAR
★
SET



IN the following pages we give details for making a complete two-valve set—with valves, batteries and loud-speaker—for approximately £3 5s. All the parts used are British made and the receiver will give good reception of the local stations.

Instant Success

This set is a companion to the New Economy Three, a £5 screen-grid three-valver described in a special supplement in the December WIRELESS MAGAZINE. That design was an instant success. It appealed to those who want to hear foreign stations, while this two-valve edition will meet the needs of those who only require the British transmissions.

A unique form of wood-chassis construction is employed which has the merits of cheapness and simplicity. Even if you have never built a set before, you will



IN AN OAK CABINET

This is the New Economy Two installed in the cabinet specially designed by Peto-Scott's

have no difficulty in the assembly of the New Economy Two. In these pages are included every detail, including a half-scale layout and wiring diagram with the

actual lengths of all the connecting leads.

Although this set is intended only for local-station reception (that is within fifty miles or so of a broadcasting station) it will nevertheless pick up a number of Continental broadcasts under favourable circumstances. The "bag" of foreigners will depend to a considerable extent on the efficiency of the aerial and earth system. The bigger the aerial, within reason, the more foreign stations will be received.

Home-made Tuning Coil

One of the features of the design is the inclusion of a home-made dual-range tuning coil specially designed by the WIRELESS MAGAZINE Technical Staff. If it is not desired to make this coil it can be bought ready wound for a few shillings. The cone loud-speaker can also be assembled at home.

Build This All-British Two-valver!

BUILDING THE SET AT HOME

THE whole assembly of the New Economy Two can be accomplished during the course of one or two evenings. The first part of the construction to be undertaken is the building of the wood chassis, full details of which are given in the diagram on this page. If a separate loud-speaker is to be used, the receiver can be built up on a small wood or ebonite panel and baseboard.

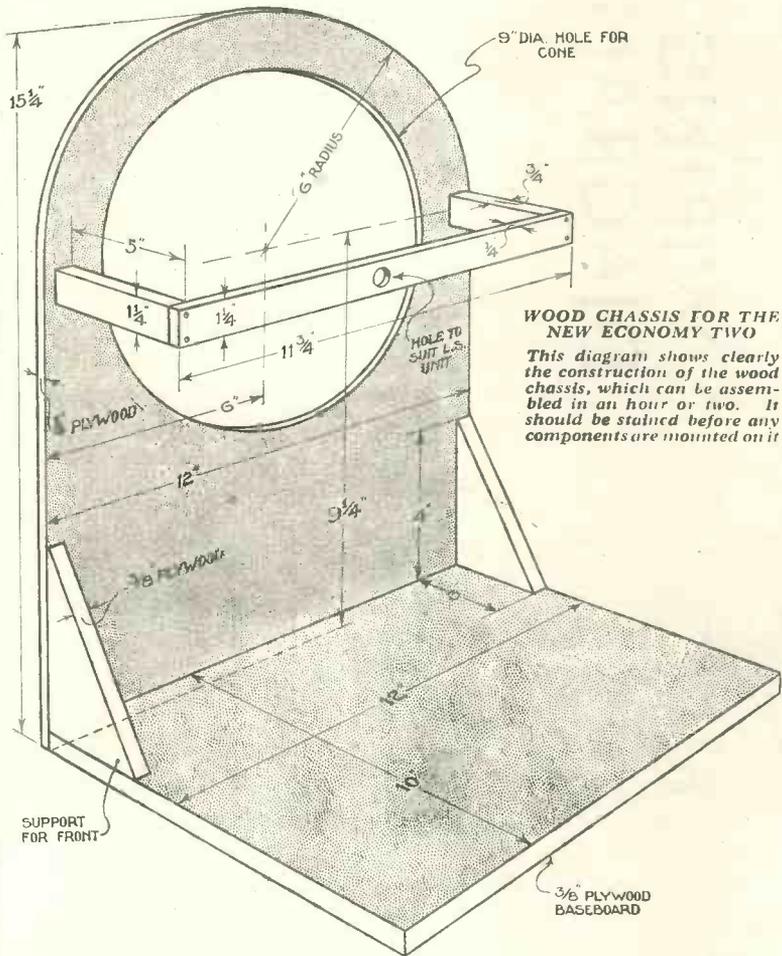
Coil Details

All the details for making the dual-range coil will be found on page 664. There are three windings—medium- and long-wave grid and reaction. One gauge of wire (No. 28 d.s.c.) is used for the whole coil, which makes the construction very simple.

Switching for medium- and long-wave reception is accomplished by means of a simple plug and socket arrangement. When the plug is put in the socket the set is adjusted for the medium waves; the plug is pulled out for long-wave working. If desired, of course, a push-pull switch for this purpose could be fitted on the panel.

Assembly and Wiring

When the chassis and the coil have been assembled the rest of the construction can be proceeded with. The half-scale layout diagram on pages 662 and 663 shows clearly the positions of the com-



WOOD CHASSIS FOR THE NEW ECONOMY TWO

This diagram shows clearly the construction of the wood chassis, which can be assembled in an hour or two. It should be stained before any components are mounted on it

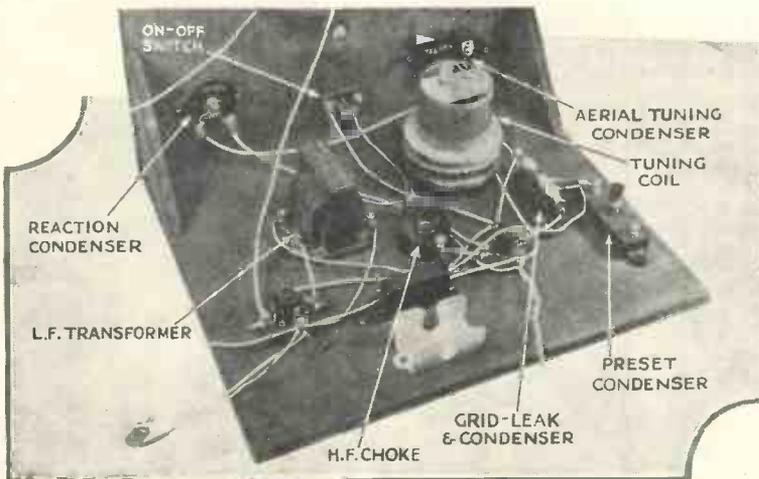
ponents on both panel and baseboard. The diagram should be consulted in conjunction with the

photographs printed in these pages—there will then be no possibility of making a mistake.

If the constructor does not like the appearance of the bare chassis, an oak cabinet can be obtained from Peto-Scott's for a guinea. This is illustrated on the opposite page.

Few Tools Needed

Very few tools are needed for building the set—most will already be in the reader's possession. They are a small screwdriver, a pair of pliers that will also cut wire, a bradawl, and a pair of scissors for cutting the cone diaphragm. If not already to hand, any of these can be obtained from a sixpenny stores. Even the beginner will have no difficulty in making a good constructional job of the New Economy Two.



CHIEF COMPONENTS IN THE NEW ECONOMY TWO

This photograph shows clearly the positions of the chief components in the set. It should be used in conjunction with the layout and wiring guide on pages 662 and 663

LAYOUT AND WIRING DIAGRAM

Reproduced at Half Scale

EVERY detail for laying out and wiring the New Economy Two is given on this half-scale drawing. If desired, however, a full-size blueprint can be obtained—and at half price, that is 6d. post free, if the coupon on the last page of this issue is used by January 31.

Where to send

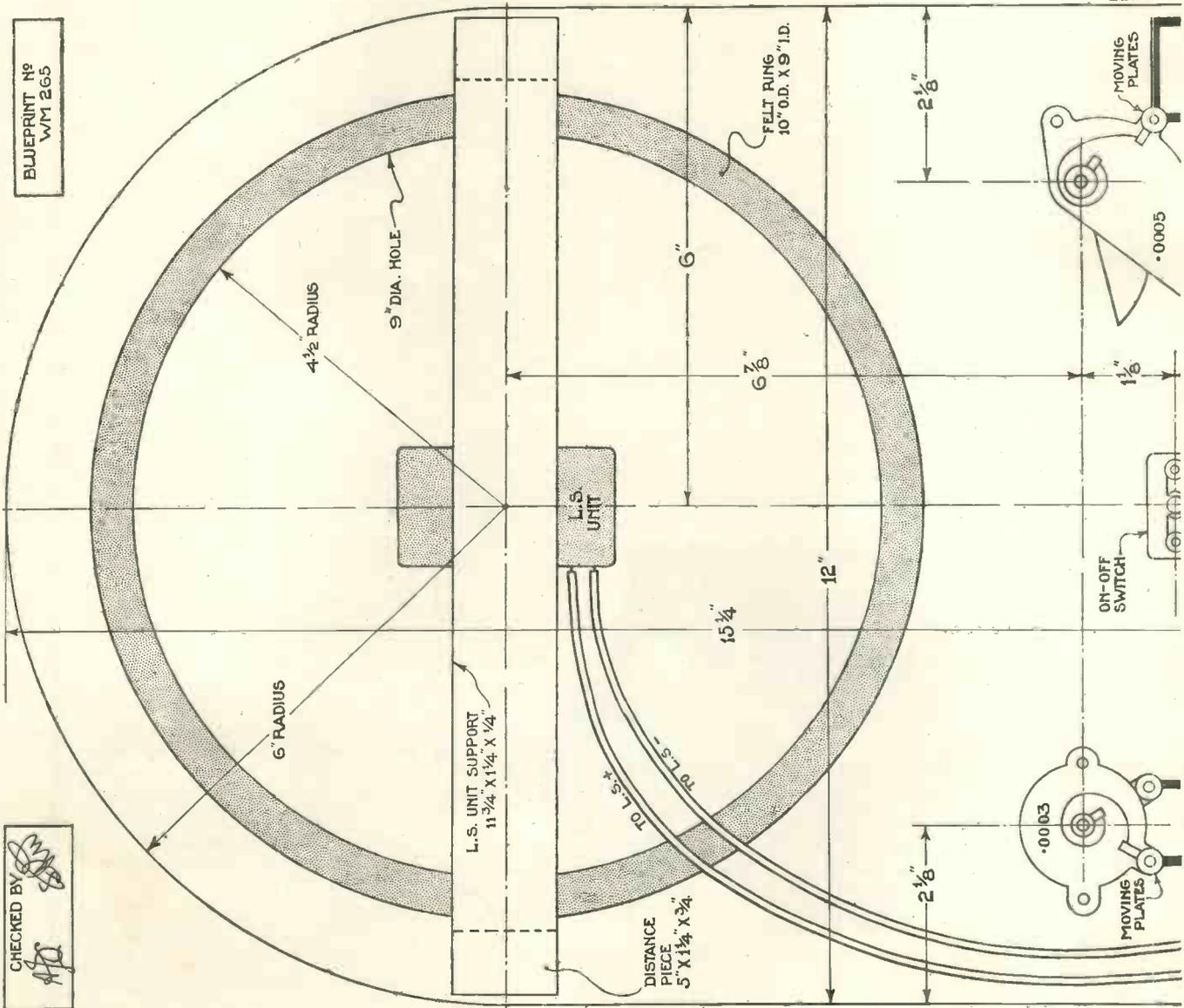
Address your inquiry to Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4, and ask for No. WM265.

If this page is folded down so that the two sets of arrow heads coincide, one complete drawing will be formed: this can be followed without difficulty.

Each connecting wire is numbered separately, a point that is of the very greatest convenience to the constructor. The connections should be made in the numerical order thus indicated. To avoid the possibility of making mistakes, the numbers can be crossed through with a pencil as the corresponding leads are put in position.

Lengths of Sleeving

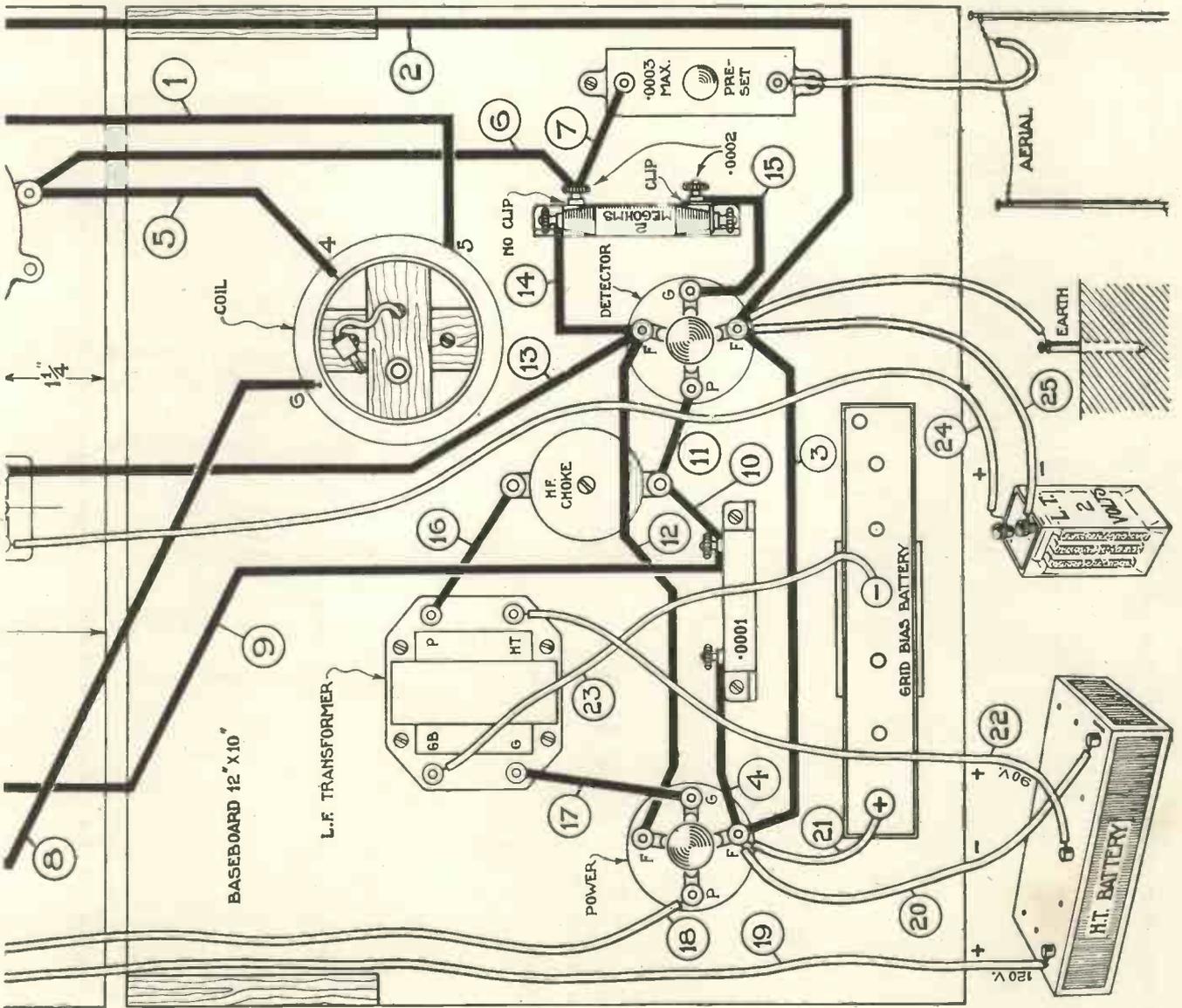
Wiring is most conveniently carried out with No. 20 gauge tinned-copper wire covered with lengths of oiled-cotton sleeving. The following list indicates the lengths of such sleeving needed for the various connections. In each



case the wire itself should be about an inch longer, thus allowing half an inch at each end for screwing under terminal heads:—

- Lead No. 1
3 in. (from coil lead No. 5)
 - Lead No. 2 ... 8 in.
 - Lead No. 3 ... 6 in.
 - Lead No. 4 ... 2 in.
 - Lead No. 5
3 in. (from coil lead No. 4)
 - Lead No. 6 ... 4½ in.
 - Lead No. 7 ... 1¾ in.
 - Lead No. 8
6½ in. (from coil lead No. 6)
 - Lead No. 9 ... 7¾ in.
 - Lead No. 10 ... ¾ in.
 - Lead No. 11 ... ⅞ in.
 - Lead No. 12 ... 6 in.
 - Lead No. 13 ... 6¾ in.
 - Lead No. 14 ... 2 in.
 - Lead No. 15 ... 1¼ in.
 - Lead No. 16 ... 1½ in.
 - Lead No. 17 ... 1¾ in.
 - Lead No. 18 12 in., flex to L.S.—
 - Lead No. 19 24 in. flex to H.T. +2, 120 volts.
 - Lead No. 20 18 in. flex to H.T.—
 - Lead No. 21 5 in. flex to G.B. + H.T. +1, 90 volts.
 - Lead No. 22 24 in. flex to H.T.—
 - Lead No. 23 10 in. flex to G.B.—
 - Lead No. 24 24 in. flex to L.T. +
 - Lead No. 25 18 in. flex to L.T.—
- Total length of flex = 4 yards.
Length of oiled-cotton sleeving = 2 yards.
Length of No. 20 gauge tinned-copper wire = 2½ yards.

Besides the twenty-five connections listed above, it is also necessary to provide leads for the Aerial and Earth.



COMPONENTS AND THE CIRCUIT

COMPONENTS NEEDED FOR THE NEW ECONOMY TWO

- CHOKE, HIGH-FREQUENCY**
1—Telsen, type 75, 2s. (or Watmel, Lissen).
- COIL**
3-in. length of 2-in. diameter Paxolin tubing and one ebonite bobbin (Wearite).
2 oz. No. 28 d.s.c. wire (Lewcos).
- CONDENSERS, FIXED**
1—Graham-Farish .0001-microfarad, 6d. (or Telsen, Readi-Rad).
1—Graham-Farish .0002-microfarad, 6d. (or Telsen, Readi-Rad).
- CONDENSERS, VARIABLE**
1—Telsen .0005-microfarad, bakelite dielectric, 2s. 6d.
1—Telsen .0003-microfarad reaction, 2s.
1—Formodensar .0003-microfarad maximum, type J, 1s. 6d. (or Igranic, Sovereign).
- HOLDERS, VALVE**
2—Lissen, rigid type, 9d. (or Clix, Telsen).
- PLUGS**
1—Clix plug and socket for coil switching, 3d. (or Belling-Lee, Belex).
5—Clix wander plugs, marked: G.B.+, G.B.—, H.T.+2, H.T.+1, H.T.—, 7½d. (or Belling-Lee, Belex).
2—Clix spade terminals, marked: L.T.+, L.T.—, 4d. (or Belling-Lee, Belex).
- RESISTANCE, FIXED**
1—Graham-Farish 2-megohm grid leak, 10d. (or Telsen, Readi-Rad).

- SUNDRIES**
Tinned copper wire for connecting (Lewcos).
Lengths of Lewcos oiled-cotton sleeving.
1—Tonax loud-speaker chuck, 1s.
- SWITCH**
1—Graham-Farish on-off, 8d. (or Readi-Rad, Telsen).
- TRANSFORMER, LOW-FREQUENCY**
1—Lotus, type AT13, 5s. 6d. (or R.I. Dux, Telsen Ace).

ACCESSORIES

- BATTERIES**
1—Fuller 120-volt, type F24, 10s. 9d. (or Ever Ready, Drydex).
1—Fuller 9-volt grid-bias, type F51, 1s. (or Ever Ready, Drydex).
1—Exide 2 volt accumulator, type DTG, 4s. 6d. (or Fuller, Pertrix).
- LOUD-SPEAKER**
1—Puretone loud-speaker unit, 7s. 6d. (or Graham-Farish, Telsen).
- VALVES**
1—Cossor 210HL detector, 8s. 6d. (or Octron HL, Lissen HL210).
1—Cossor 220P power, 10s. 6d. (or Octron PP2, Lissen P220).

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

ALL the parts needed for the construction of the New Economy Two are detailed in the list on this page. It will be seen that the total cost is only about £3 5s.—and it should be noted that the components are all British made.

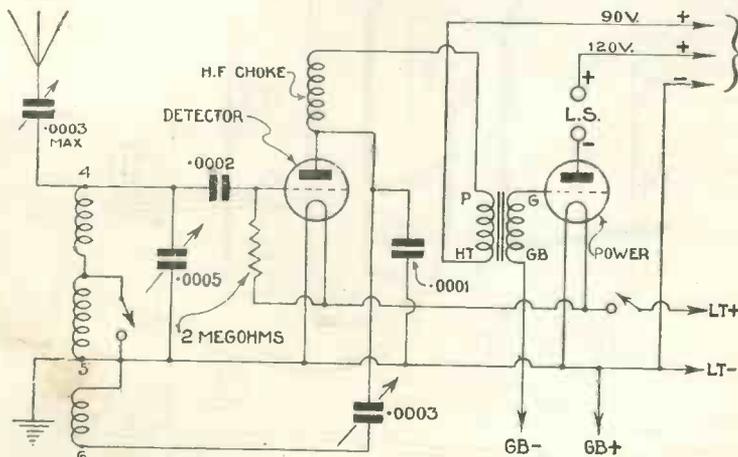
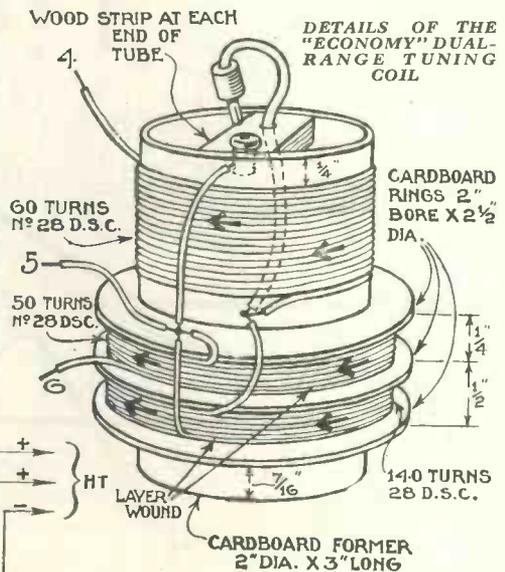
Standard Products

Except for the parts that can be made at home—the chassis, the coil and the loud-speaker—everything is standard and can be obtained from any radio dealer. Those who have never built a

set before—and who therefore have no spare components that they can use in the set—will find it a good plan to buy a complete kit of parts from one or other of the advertisers in WIRELESS MAGAZINE. Some of the kit suppliers provide the wood chassis already drilled for fixing the panel components in position. For those who have a theoretical knowledge

of radio the circuit diagram reproduced on this page will be of interest. It will be seen that the arrangement comprises a leaky-grid detector followed by a transformer-coupled power stage. There is nothing unusual about this circuit; indeed, it is about the most straightforward arrangement for two valves that it is possible to employ. There are no unnecessary "frills." Of course, the use of a pentode output valve would increase the sensitivity of the set, but normally this would be at the cost of increased anode-current consumption that would decrease the life of the high-tension battery.

However, there are several pentodes available now that take no more current than an ordinary three-electrode power valve. The



CIRCUIT OF THE NEW ECONOMY TWO

The arrangement consists of a leaky-grid detector followed by a transformer-coupled power valve. The circuit is quite straightforward and can be relied on to give good results

Mazda 220Pen is a case in point. The assembly of the loud-speaker is quite simple. The dimensions of the cone diaphragm are indicated by the diagram on the opposite page. The edges of the V-shaped cut are stuck together with Seccotine. A ring of felt is stuck round the opening in the wood chassis for the periphery of the cone to bear on and make an air-tight joint.

GETTING THE BEST RECEPTION

EVEN the beginner will not experience any difficulty in operating the New Economy Two. The connections to the various batteries will be clear from the wiring diagram on pages 662 and 663.

Grid-bias Voltage

It should be noted that the grid-bias voltage for the power valve must be adjusted in accordance with the maker's recommendation.

On the left of the set is the aerial-tuning condenser; this adjusts the set for various wavelengths. On the extreme right is the reaction control. The on-off switch is fitted in the centre of the panel; the knob is pulled out to switch the set on and pushed in for switching off.

Positions of Controls

The positions of the controls will be clear from the lettered photograph that appears at the foot of this page.

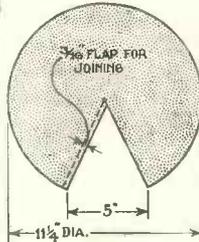
When the receiver is first switched on the reaction control should be turned to the right until the set sounds "live." The effect is difficult to describe in print, but

will easily be recognised in practice.

Adjusting the reaction in this way puts the set on the verge of oscillation and it is then in its most sensitive condition for reception. The knob must not be turned too far to the right or the set will burst into oscillation and is then likely to

the dial readings for different transmissions and there will be no difficulty in tuning the set in on subsequent occasions.

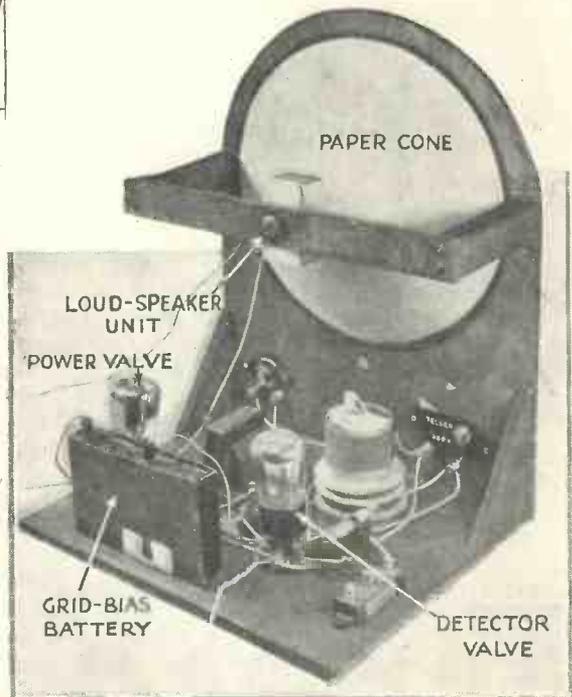
Do not forget that to change the set from medium- to long-wave reception it is necessary to remove the plug from the socket fitted to the tuning coil. The wavelength ranges are approximately from 200 to 600 metres and from 1 000 to 2,000 metres.



CONE DETAILS
This diagram shows the dimensions of the paper cone for the loud-speaker

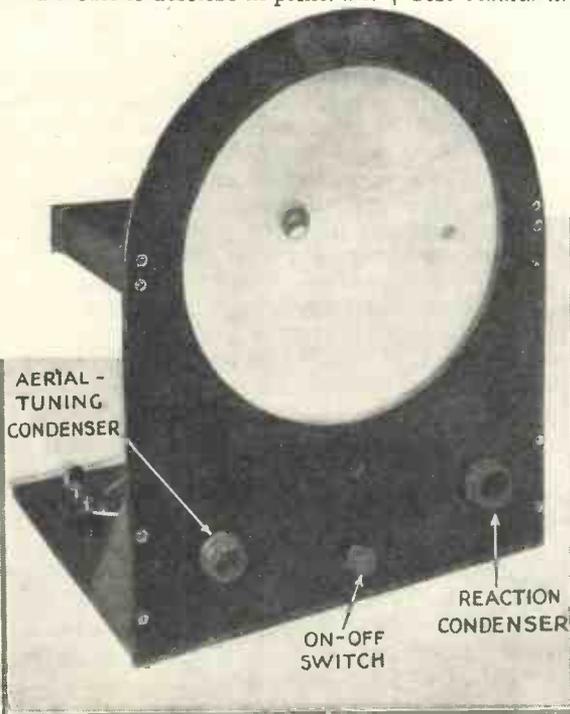
squeal or howl.

As soon as a station has been tuned-in by adjusting the left-hand knob the reaction control should be readjusted until the best results are



POSITIONS OF VALVES

The positions of the two valves will be clear from this illustration. The cost of £3 5s. for the parts includes two British-made "ring" valves



HOW THE CONTROLS ARE ARRANGED

This photograph shows the arrangement of the controls of the New Economy Two. It is very simple to operate and can be relied on to give good results

obtained. Any alteration of the reaction will throw the tuning of the left-hand knob out slightly, so this should also be readjusted to tune the station in at its loudest point.

It will be found a convenience to fit a small calibrated dial in place of the unmarked tuning knob. In this way it will be possible to make notes of

Those who find that the New Economy Two does not give all the foreign stations they desire can easily convert it to the New Economy Three described last month. All of the parts used in the two-valve edition can be utilised for the three-valver.

Test Reports Wanted

That completes the story of the New Economy Two—a simple yet surprisingly efficient set that can be made with British parts for about £3 5s. When you have completed your model, write and let us know what results you get. Reports from readers all over the country are of the greatest value.

These Men Were Human: By Whitaker-Wilson

The World's Greatest Prodigy

WOLFGANG AMADEUS MOZART



WOLFGANG AMADEUS
MOZART

AS far as Mozart was concerned, it all began before he had passed a thousand days on earth; it was perfectly evident to his father, Leopold Mozart, that little "Wolferl" had come for a definite purpose.

As soon as his sister began to take music lessons there was no keeping him away; he toddled into the room and sat on the rug before the fire to listen.

Thirds and Sixths

As soon as an opportunity occurred he clambered on the stool and began to perform himself. I imagine that there are few of us who have not done the same sort of thing, but I doubt whether we played only thirds and sixths when we did it.

Mozart said that the fourths and fifths hurt him. There must have been something in what he said, because it is on record that he fainted the first time he heard a trumpet, so sensitive was his brain.

Naturally his father came to the

conclusion that the boy was a heaven-sent genius and prepared himself for anything in the way of surprises.

Leopold himself was a musician of no small ability; he was a violinist. There were seven in family, but only two—Maria and Wolfgang—survived.

The girl was brilliant as a child, but it ended there; she ultimately became blind and died in extreme poverty.

Leopold Mozart decided to take the children on tour and set out for Munich and Vienna.

Little Mozart was a strange child; in a sense it would almost seem that he was excused childhood altogether, for when he

was engaged on anything connected with his art his little face would wear a very serious expression and he would not tolerate a jest from anyone; when not so engaged he was much as other children.

As soon as he was presented to the Empress he jumped on to her lap and kissed her, thereby doing what he might have been expected to do. Of course, the Court raved over him, and it is a wonder that he was not turned into an objectionable little prig there and then.

On the contrary, he seems to have delighted everyone with his charming manners, not least Marie Antoinette herself, for she often repeated his words when she picked him up after he had fallen on a polished floor: "Thank you very much. You are very kind. When I grow up I will marry you."

The next move was to England and the Mozarts took up their residence in Cecil's Court, off St. Martin's Lane. Their fame had preceded them and a

warm welcome awaited them at the Court of George II.

The King, anxious to test the powers of the little prodigy, set before him pieces by Handel and others, which Mozart played comfortably at sight.

Bach Fascinated

The Queen's music-master was John Christian Bach, the youngest son of John Sebastian. He was fascinated beyond expression with Mozart and the two became fast friends.

Bach would take Mozart on his knee and play fugue subjects for him at the harpsichord, teaching him how to improvise fugues upon them. He was naturally amazed at the child's powers, but also contrived to thrill him by saying: "This is how my daddy used to do it."

I have often wondered what the Daddy would have thought of it all had he been there to hear for himself!

The tour was a great success; Mozart played before nearly every crowned head in Europe. All the same, Leopold realised that it was high time Wolfgang began to settle down to serious study.

Prodigies are all very well, but when the days of "prodigydom" are over the world is inclined to ask no more questions; it is left to the prodigy to establish himself in maturity.

Blind for Ten Days

Unfortunately, both children took small-pox and Wolfgang was blind for ten days; he bore the marks to the end of his life.

They were soon touring again and Mozart caused a sensation in musical circles in Rome by visiting the Sistine Chapel to hear a performance of Allegri's *Miserere*, a work of some difficulty and also of exquisite beauty, and subsequently writing it out from memory, correcting a few errors after hearing it a second time.

Leopold was anxious for his son to be a violinist, but Mozart preferred to use a pen rather than a bow.

He had now been for some time in the service of the Archbishop of

Salzburg. There had recently been a change and a new man, named Hieronymus, had been appointed.

A Sign of the Times

The new prelate was a man of detestable qualities, who treated Mozart disgracefully. The fact that he forced him to dine with the servants was merely a sign of the times, but it is difficult to understand the mentality of a man who retained a famous musician in his service only to insult him as he felt inclined. How Mozart stood it is amazing.

In 1781 he was sent for to compose an opera for Munich; he obliged with *Idomeneo*. As soon as the success of it was known the Archbishop ordered Mozart to return to Salzburg, saying that he considered he had been away long enough.

All of which shows what life was like in those days if you happened to be in the employ of one of "the quality." In the end, Mozart was literally kicked out of the Palace for sending in his resignation.

Mozart and Haydn were at this time fast friends; I gave a brief account of them in November. The opera *Figaro* was by now the rage of Prague, then one of the finest musical centres in Europe.

Success in the artistic sense by no means meant financial success; heavy royalties were completely unknown in those days and the paltry sums Mozart received from the performances of this—or of any other of his operas, for that matter—were barely enough to pay his debts.

Frugal Living

Many an awkward situation had been relieved by good Papa Haydn: nevertheless, Mozart had, for nine years, been compelled to live in the most frugal manner.

He had written over two hundred compositions, but I think it is true to say that he had not earned as many pounds by them. Yet, in these days, he is more popular than ever; the B.B.C. programmes are filled with his music.

Towards the end of his life he received a commission to write *The Magic Flute*. Whilst engaged upon this work a stranger called upon him. The visitor was dressed in deep mourning and the object of his call was to ask Mozart to write a requiem.

No particulars were given regarding the person for whom the work was

to be written; it was simply asked for, and the price was fixed at one hundred ducats. (Some, by the way, give the figure at fifty.)

Anyhow, Mozart agreed, but the writing of the work was suddenly interrupted by an urgent request for some music to be composed for the forthcoming marriage of the Emperor at Prague.

Mozart left the requiem to look after itself and immediately set out for Prague to execute the new commission.

Suddenly the stranger who had asked for the requiem stood before him. Mozart was accompanied by his favourite pupil Süßmayer, as it happened, and knowing how Mozart resented being approached without warning, Süßmayer treated the stranger somewhat coldly.

The stranger ignored Süßmayer and addressed Mozart in rather an aggrieved tone, asking where the requiem was.

Mozart's Promise

Mozart apologised for not having finished it and promised that it should be completed immediately upon his return. On the journey he and Süßmayer occupied themselves with the opera.

Later he began on the requiem, but became obsessed with the idea that he was writing his own requiem. A few weeks later he became very ill from a kind of poisoning. He did not live to finish the work; it was eventually completed by Süßmayer.

It may have been his own requiem, but it was not performed at his funeral. Nothing was performed at it; the whole arrangement was a disgrace to the Court and Emperor alike.

Mozart was practically hurled into a pauper's grave on a wet afternoon in December, 1791; not a friend stood near—he went absolutely alone. And yet he had been the greatest prodigy the world had ever seen.

Later, I hope to give you an account of the magnificence of the funerals of Chopin and Mendelssohn; the comparison will be enough to show how little Mozart was thought of in his day, despite his popularity in Prague.

In appearance he was delicately proportioned, with small hands and feet. He had wonderful blue eyes with long lashes. His was an impelling personality and he generally succeeded in getting his way.

Stories of the Operas

SAMSON AND DELILAH

(Saint-Saëns)

CHARACTERS

DELILAH Mezzo-Soprano
SAMSON Tenor
HIGH PRIEST OF DAGON Baritone
ABIMELECH, *Satrap of Gaza* Bass
AN OLD HEBREW Bass
THE PHILISTINES' WAR MESSENGER Tenor
Place : Gaza.
Time : 1136 B.C.

ACT I

Before the rise of the curtain the Philistines are heard at Gaza, forcing the Israelites to work. The rise of the curtain discovers the temple of Dagon, the mighty god of the Philistines. The lamentations of the Jews are mingled with the bitter scorn of Abimelech, Satrap of Gaza.*

Samson has made no move as yet to conquer the Philistines. He does little but drink. Later, Samson slays Abimelech. The Philistines are now in danger of conquest. Already the Hebrews are jubilant, and Delilah with several maidens appears to do homage to the victorious Samson.

ACT II

Delilah stays in the house of her victim. Samson has never yet told her the secret of his great strength. He comes to bid her farewell. She cannot entice him to give away his secret. Eventually he tells her.

Delilah's cry of triumph summons the Philistines; once deprived of his hair, the champion is soon overcome.

ACT III

The blinded Samson languishes in a dungeon. He reproaches himself for his folly. Then the door rattles and Beadles enter to drag him to the celebration of the Philistines' victory. The scene changes to Dagon's temple, where the rejoicings are taking place. The High Priest insults Samson by suggesting that he sings a love song to Delilah. She herself mocks the powerless warrior.

Samson replies with bitter scorn. He prays to God that once again—only once—he may have strength. It is granted. Then, when the Philistines are thoroughly intoxicated, he allows himself to be led between the supporting pillars of the temple.

As he passes two that are sufficiently close together, he suddenly wrenches himself free and claps the pillars. There is a terrible crash as the masonry gives way and the Philistine people, together with their conqueror, are buried in the ruins of the Temple of Dagon.

WHITAKER-WILSON.

* *Satrap*.—In modern usage a petty tyrant. Originally a provincial governor under the ancient Persian empire, responsible to the King, but possessed of absolute power in his own territory.

Second-Harmonic Distortion

WHAT IT IS AND HOW TO CURE IT

Can you recognise the second-harmonic "edge"?
Are your Valves correctly biased?
Is your output transformer right?

This article
will help to
improve
your set



THE MOST POPULAR B.B.C. PERSONALITY?

Here you see Jack Payne (the leader of the B.B.C. dance band) with his wife at the "other end of the wireless." He is undoubtedly one of the most popular broadcasters

THERE are many people who regard the scientific fraternity as witch doctors, at any rate as far as wireless, and particularly the technical writers, are concerned.

We are assumed to build up powerful ju-jus which we proclaim, with beating of drums, as being essential to success, whereas in reality the average user need only take the scantiest notice.

Mysterious Ingredients

The question of second-harmonic distortion is a case in point. Most readers will be aware that a valve is supposed to be carefully adjusted so that not more than 5 per cent. of this mysterious ingredient is included in the output issuing from the loud-speaker. The average reader also, very probably, says "Pothooks," and goes on his way unperturbed.

An accidental discovery the other day, however, brought home to me rather forcibly the real importance of this matter and I want to show in this article why the trouble occurs in the first place and why it should be

avoided, not because it does any harm, but because you will notice the difference if you do.

First of all let us see where the second harmonic comes in and what exactly it is. The latter question is easily answered.

If we are generating a note of a certain frequency the second harmonic is a vibration of exactly twice the frequency, or in other words the octave. One very rarely encounters a pure note either in music or in wireless reproduction.

The basic pitch of the note is determined by the original oscillation or the "fundamental" as we call it, but we can have mixed up with this other oscillations of different frequencies, usually much smaller in intensity than the fundamental. These are known as harmonics and overtones, and they have a curious effect.

If we have two different frequencies both of the same intensity, they combine to produce what is known as a chord. The two notes blend either to give a pleasing effect, which we call harmony, or a harsh effect, which we

call discord, and music generally is based on the combinations of different notes, often many more than two, in this manner.

A harmonic, on the other hand, is a vibration of a much smaller magnitude than the fundamental tone, and is also characterised by being in definite relationship to the fundamental, usually two, three, or more times the fundamental frequency.

Changed Note

The effect of such an additional vibration is to alter the quality of the note. We often cannot detect the presence of the other frequency as such, but we appreciate at once that the note is changed in character or timbre.

The distinctive quality of various

Nowadays much is heard about second-harmonic distortion, but very few listeners understand exactly what the term means. In this article J. H. REYNER, B.Sc., A.M.I.E.E., explains in simple language how this form of distortion is produced and how it can be avoided in ordinary receivers

instruments, and even different voices, depends entirely upon the range of harmonics and overtones which are included in the make-up. (An overtone is similar to an harmonic, but is not an integral multiple of the fundamental.)

Curious Whine

The second harmonic, in particular, which, as we have seen, is of twice the fundamental frequency, produces a curious sort of whine when mixed with the pure note. The note, while still of the same pitch as before, has an "edge" to it, and although many people would be quite unable to diagnose the trouble, they would appreciate the difficulty at once.

It is quite clear that if certain music is being reproduced, and this music itself depends upon a most intimate

blending of fundamentals and overtones in order to produce the distinctive qualities of the individual instruments, we cannot possibly achieve a natural reproduction if every one of those individual notes is accompanied by a greater or smaller percentage of the octave.

Not in Originally

We are introducing something into the music which was not present in the original. If the composer had intended it to be there, he would have given the various airs to different instruments—instruments which produce this second harmonic in the first place.

I must not labour this explanation any more. The point is that the presence of this second harmonic or octave will give rise to a lack of naturalness in the reproduction which may or may not be tolerable, depending upon the amount of this distortion taking place. A very small percentage is only noticeable by an extremely musical ear, and as the amount increases so does one become more and more aware of it, until if a large proportion of second-harmonic distortion is present, the music has a whining or harsh quality.

How It Is Produced

Let us now show how this second harmonic is produced in practice. It arises from the fact that the valve characteristic is not a straight line. Let us assume that the curve in Fig. 1 represents the characteristic of the valve under working conditions.

Our normal grid bias is such that we work at the point X on the curve. If the grid voltage swings in such a direction as to reduce the effective bias, it sweeps over the upper part of the curve. Due to the curved characteristic the anode current, which should rise to y, reaches Y. The next half cycle we sweep over the

bottom half of the curve. Had it been straight the anode current would have fallen to the point z, whereas in fact it only falls to Z.

Consequently, we find that the anode-current variation is of the form shown on right-hand side, which is not a pure wave, but has alternate peaks and flats.

Why should this be called second-harmonic distortion? We still have the same number of oscillations as before, so that the frequency remains the same. The answer is that a wave of the form shown is capable of being produced by a mixture of two waves, one of the fundamental frequency, and the other of twice that frequency.

I have illustrated this in Fig. 2, which shows first a simple fundamental wave, and on the next line a wave of twice the frequency. This second harmonic is nothing like as large as the fundamental, and it does not start its oscillation at the same time, being a little "out of phase."

The third line shows the effect of

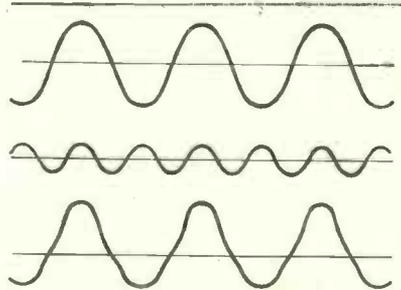


Fig. 2.—Top line shows the fundamental; the second harmonic comes second; and the third line shows the two combined

adding these two currents together. In the first half of the wave it will be seen that the two currents are in the same direction at the maximum point, so that the peak value is accentuated. In the second half-wave the effects are in opposition, the two currents being in the opposite direction, so that the peak value is flattened. The results will be seen to be of a similar character to that shown in Fig. 1.

It is an easily demonstrated fact that if we produce a wave form of any particular character by using a curved valve characteristic, or by some similar means, the musical result produced is indistinguishable from that obtained by building up the same wave form with component vibrations of a fundamental and harmonic frequency as we have just done.

Hence the distorted wave form pro-

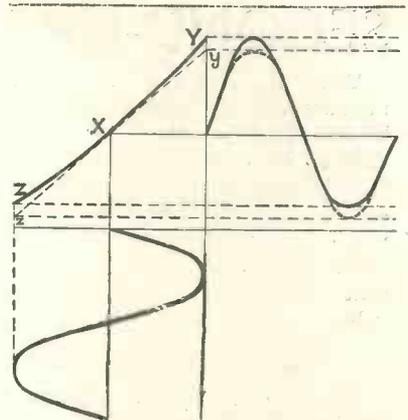


Fig. 1.—Characteristic of a valve under working conditions, showing that it does not follow a straight-line law

duced by the valve in Fig. 1 gives exactly the same musical results as a fundamental or second harmonic of Fig. 2. We say, therefore, that the valve has introduced a second harmonic into the reproduction.

I have assumed for simplicity that we were using the working characteristic of the valve, which is quite different from the ordinary static characteristic, and is not easy to obtain. It is customary to work to-day with the anode-current—anode-voltage curve, when the operating conditions can easily be obtained by drawing a load line.

20 per Cent Difference

We have seen that when second-harmonic distortion is present the peak values of the positive and negative half cycles are different. Practical experience has shown that this difference must not be more than 20 per cent, if the second harmonic distortion is to be negligible. We can easily check this on the anode-current—anode-voltage characteristic as follows:

We choose our working point on the characteristic corresponding to the grid and anode voltage at which we are working. Through this point we draw a "load line." This is a line drawn through the operating point, the slope of which determines the anode impedance, as will be explained shortly (Fig. 3).

Limit of Grid Swing

Draw some such line through the point P at about 45 degrees. Measure the distance from P to the zero grid-bias curve, and from P to a grid bias twice the working bias. These two points are the limit of the grid-voltage swing in actual practice.

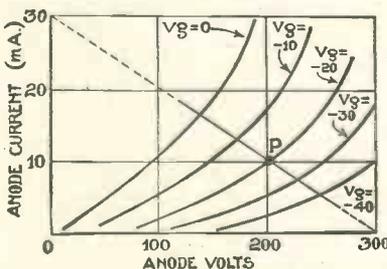


Fig. 3.—Drawing a load line on a valve characteristic curve to get the best compromise between quality and volume of output

SECOND-HARMONIC DISTORTION—Continued

You will find that the former measurement is greater than the latter. Provided that it is not more than 20 per cent. greater the condition is satisfactory, for it can be shown that if we have a second harmonic of 5 per cent. of the fundamental amplitude, we obtain a 20 per cent. difference between the two peak values.

Distorted Reproduction

The ear can only just detect this, but beyond this point the distortion becomes very rapidly worse. This stands to reason, for a 20 per cent. difference between the two halves of the wave is quite large enough, and if we make it any worse we must expect distorted reproduction.

Making the load line more nearly vertical increases the distortion and

vice versa. At the same time it also increases the power from the valve, so that it is our business to make the load line as steep as we can until we reach this limit of 20 per cent. difference. This gives us the optimum load resistance of the valve.

Produce the load line on either side until it cuts the voltage and current axes and divide the figure where it cuts the voltage scale by that at which it cuts the anode-current scale. This will give the resistance corresponding to that particular load line in thousands of ohms. For example, if it cuts the scale at 300 volts and 30 milliamperes, this would correspond to 10,000 ohms.

Many readers will not want to work the matter out theoretically, but they may nevertheless wish to ensure that they are working under correct con-

ditions. The necessary points are:

- 1.—Make sure that your valve is correctly biased for the voltage on the anode of the valve (not necessarily the high-tension voltage, because there will be some voltage drop in the anode circuit).
- 2.—Use an output transformer to match your loud-speaker to your valve.

A Final Point

One final point is worth noticing. I referred at the beginning of the article to a rather striking point which focused my attention on this matter. I was testing a loud-speaker on an oscillator which had a rather bad second harmonic present.

After I had got rid of the second harmonic, or at any rate made it negligibly small, I found that with the same voltage applied across the loud-speaker the signal strength was distinctly less than half what it had been before. I was so surprised that I checked the point several times but the results were the same.

The reason is a rather interesting one. For constant acoustic energy the power supplied to the loud-speaker must fall off as the frequency rises, because we are vibrating the diaphragm more rapidly at the higher frequencies.

Expressed in another way, we can say that if we apply the same voltage to the loud-speaker at twice the frequency, we obtain four times the power radiation. Consequently the effect of the second harmonic is aggravated in the loud-speaker, and although a small amount of distortion is tolerable, the trouble becomes rapidly worse if it is allowed to exceed the safe limits.

Less Apparent Volume

As a result of this effect it may be found that when the loud-speaker is working properly it does not give as much apparent volume for the same signal input, particularly in the bass, but the reproduction will be truer and more natural. Therefore, when matching up the loud-speaker to the valve, do not try to obtain the loudest volume.

If possible, work this out theoretically, but if not, adjust the various ratios until you obtain the sweetest quality, and not necessarily the loudest signal.



"Hello, George, wireless?"

THE SELLER

By DAVID LYSTANER

A story that may or may not have a moral
for the prospective set buyer!

WITH a loud screeching of its brakes, the rickety motor-car came to rest half on the grass, half on the road at the side of the country lane. From under a cover on the back seat the driver took what seemed to be a large box wrapped up in brown paper.

Carrying the parcel by a leather handle which protruded at the top, he walked back into the village through which he had just passed unnoticed in his car.

Reaching the village inn, he pulled slightly with his free hand on one of the two swinging doors and placed an ear to the aperture he had made. Reassured, he pushed the doors inwards and strode in.

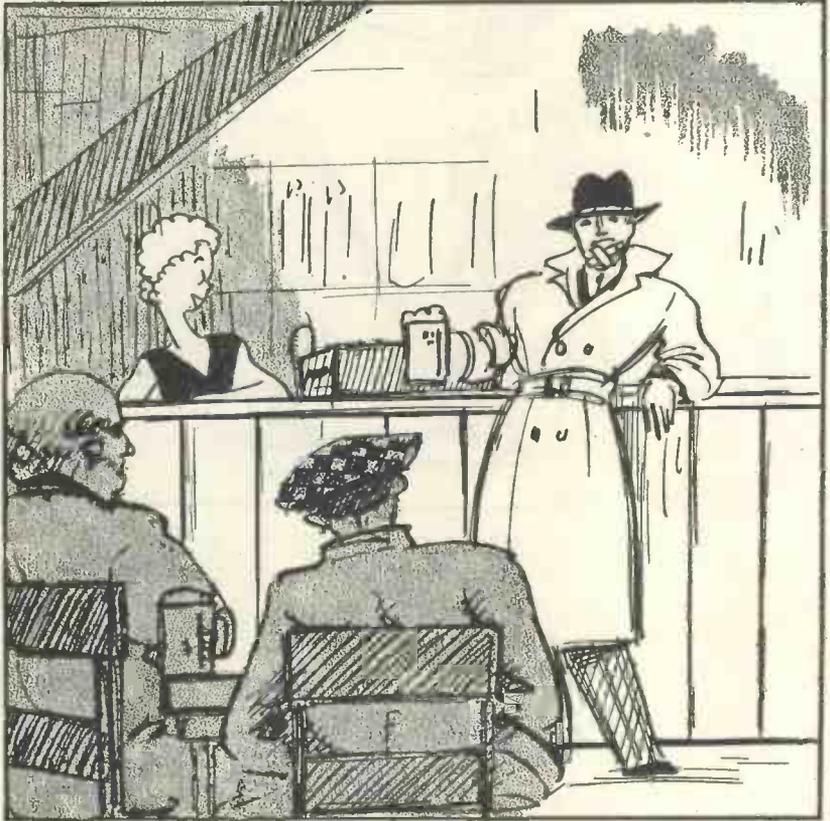
It was a cold, blustering night, with rain about, and a gust of air preceded him. The oleograph of the Iron Duke, after which the inn was named, clattered a little on the wall as if in protest.

The stuttering gases flickered in the gust and someone in the farthest corner of the bar-parlour made an impatient noise and bumped his chair nearer the fire.

The stranger placed his box-parcel on the bar counter and asked for a mixed beer. With the welcome refreshment in his hand, he turned round and surveyed the occupants of the cosy bar.

As he came into full view, it was not his small, shrewd, and twinkling little eyes which attracted attention, for across his chin was stuck in grotesque, almost ridiculous, fashion a huge strip of sticking plaster of none too clean a surface. There was an audible gasp from the warm corner by the fire and mutterings all round the room.

"Somebody tried to murder you?" asked a jolly red-faced countryman who, in his amazement, had pushed



"Somebody tried to murder you?" asked a jolly red-faced countryman who, in his amazement, had pushed his tankard perilously near the edge of the little table at which he and another were sitting. "Aye," replied the stranger fiercely "a barber under the influence of strong —"

his tankard perilously near the edge of the little table at which he and another were sitting.

"Aye," replied the stranger fiercely, "a barber under the influence of strong—"

"Drink," said a voice in the dark corner by the fire.

"No," said the stranger, "but a barber under the influence of strong wireless."

A low chattering broke out amongst the occupants of the pleasant room. Wireless was not unknown in the

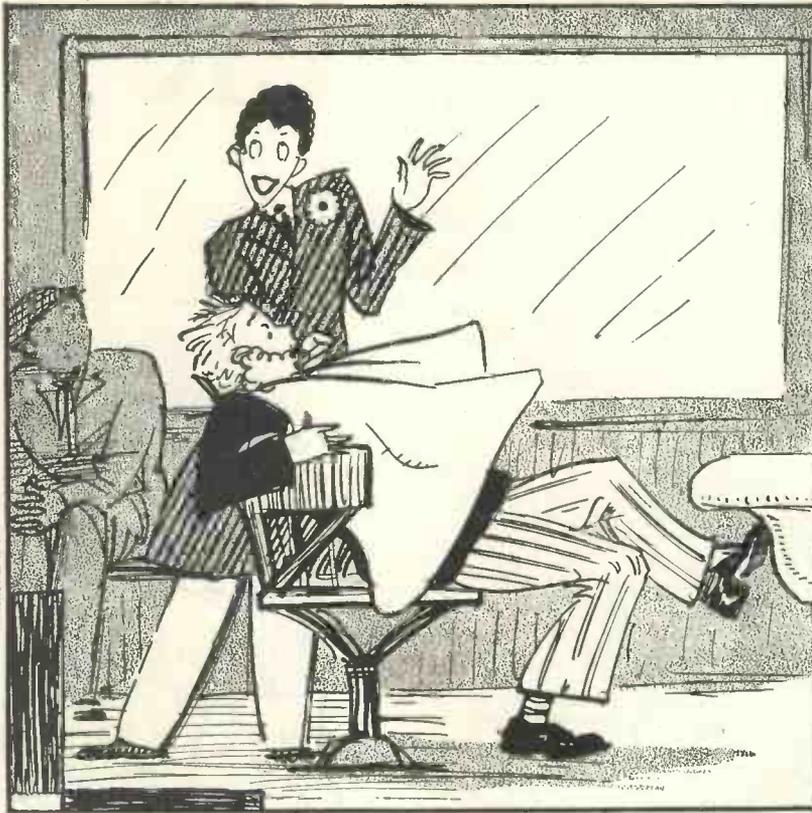
village, but murder by wireless was something new. The chattering ceased and an awed silence followed, broken ultimately by a leery youth who wore his cap at that angle which, in the villages, proclaims the self-appointed wit.

"Better 'ave had a hair cut, mister," said the youth, looking round for appreciation, but the Duke's habitués knew their youth and they preserved their usual, stolid indifference.

The stranger took off his hat and

A Complete Radio Short Story

THE SELLER—Continued



"When I took my seat in the chair for my shave I was enjoying that music. So was my barber. Wireless was new to him, for he gave more attention to the music than to me and he hummed now and then, which is a thing I don't like when I'm having a shave"

revealed a grizzled thatch of wispy hair. His eyes, little and knowing, gleamed and his face took a fiercer expression than ever, but the effect of his wrath was lost by reason of the ludicrous appearance given to him by the strip of sticking plaster on his chin.

The shirt-sleeved publican, sensing by instinct a climax, came into the bar. Seeing him out of the corner of his eye, the stranger nodded and his refilled beer tankard came quickly to hand.

"Murder by wireless, very nearly, very nearly," said the stranger, his little eyes passing from one to another of the occupants of the bar until he seemed to have weighed everybody up satisfactorily.

"A barber with new-fangled ways; a barber with a wireless and a loud-speaker. Now I'm on the road, and have been for thirty years or more, and I've had my shave in most of the decent-sized towns in this country, to say nothing of America. This morning I had my first shave to the accompaniment of wireless, and it's

the first and last time with me for that sort of thing."

The stranger stopped speaking and, lifting his untouched second drink to his lips, drank slowly and deeply. Setting down his tankard with a sigh, he sought, in time-honoured fashion, to wipe his mouth with the back of his hand, but, as his hand touched the grotesque sticking plaster on his chin, he desisted and said:

"Damn wireless!"

"Not in here, please," said the shirt-sleeved publican, who had returned to the bar with his accustomed quickness when swearing began.

"Wireless has its uses in business," said the village schoolmaster, who was sitting almost unseen in the dark corner beyond the fire.

"I know a little place not far from here where there are no evening papers. If you want football results on a Saturday night you get them at the Red Lion, where there is a wireless set. Good for business, I should say. It is no new thing to hear of wireless in a barber's shop. But I

have never heard of attempted murder by wireless—not yet."

"I'll tell you then," said the stranger fiercely. "This morning I went into a barber's shop for a shave. It was not so many miles from here, but I'm mentioning no names. While I was waiting my turn, the wireless came on with fiddle music. Now I know something about wireless, having a set of my own, and I knew which broadcasting station the fiddle music was coming from, and very nice it was too, almost as nice as I could get it from my own set.

"When I took my seat in the chair for my shave I was enjoying that music. So was my barber. Wireless was new to him, for he gave more attention to the music than to me and he hummed now and then, which is a thing I don't like when I'm having a shave.

"It was all right so long as he was only lathering me, but when he began on me with his razor, I had to ask him not to prolong his strokes according to the music. Even then I might almost have escaped if it had not been for that atmospheric."

"Atmospheric?" asked the red-faced countryman.

"Aye, the noise made in a wireless set by distant lightning. That one must have been a near one, though. It was the most awful atmospheric I've ever heard, and I've heard a few, mind you," went on the stranger.

"Atmospherics don't hurt," said the schoolmaster.

"No, that they don't," said the stranger, "but jumping barbers with razors in their hands do, especially when they happen to be rounding your chin with a full blade."

"Did he cut you?" asked a pale-faced man, who had been listening intently, but had not said a word previously.

"Cut me? Oh, yes, he cut me all right," proceeded the stranger. "A nice clean deep cut from the lip to the tip of me chin. That cut finished me with wireless. I'd had the idea of giving it up before and getting a gramophone. No atmospherics on a gramophone. See this parcel?"

The stranger began to take off the brown paper and revealed a neat portable set, a little worn with use.

"That's my wireless set, portable, five valves, self-contained, batteries inside, and I've finished with it. Thought I'd pitch it into the river,

A RADIO SHORT STORY

but I don't like waste, so I'm taking it to a nephew of mine; on my way there now as a matter of fact. Cost me fifteen guineas that set, but no more wireless for me."

"Why don't you sell it and buy a gramophone with the money? Give you three pounds for it," said the pale-faced man with a wink to the other occupants of the bar.

"Now that's an idea certainly," said the stranger thoughtfully, rubbing his chin where the plaster wasn't. "Three pounds for a fifteen-guinea set. Um! Well, three pounds is better than throwing the thing in the river or giving it to my nephew, who might sell it for less."

The stranger looked knowingly round the bar. "I'll switch her on for you. Listen."

The set responded nobly and music filled the bar. It was plain to see that interest was aroused.

"Damn wireless," said the stranger and switched off roughly.

"Give you three pound ten for it," said the red-faced countryman.

"Fifteen," said the schoolmaster.

The bidding continued until the

stranger, with a startled look on his face, found himself accepting four pounds seven shillings from the village grocer, who had a local reputation in things musical. Placing the money carelessly, but not completely disinterestedly in his pocket, the stranger strode to the door.

Nobody took any notice of him as he passed out into the night, and nobody took any notice of another occupant of the bar, who left immediately afterwards. Grocer Read had switched on his newest purchase.

The stranger waited by his decrepit motor-car for a few minutes. He was then joined by the pale-faced man who had made the first bid for the portable set in the bar.

"Wind her up, Joe," said the stranger, from whose face the sticking plaster had disappeared, leaving not the least sign of a cut.

"Who says we can't sell out-of-date portable wireless sets? Eh, Joe? Fifteen out of the twenty gone already and all with the help of a bit of sticking plaster. Time for one more sale to-night, Joe. Hold tight and off we go. Gee-up, Lizzy."

RADIO in PORTUGAL

ALTHOUGH Portugal possesses no official broadcasting system, a few radio programmes are transmitted at regular intervals by well-known experimental amateurs.

Lisbon is specially favoured in this respect inasmuch as a 2-kilowatt station owned by Señor Abilo Nuñez dos Santos, Junr., with the call letters CTIAA, broadcasts every Monday, Wednesday and Saturday between 21.20 and 23.20 G.M.T. on 291 metres (1,031 kilocycles).

Radio Lisboa

On Thursdays and Fridays Radio Lisboa also transmits simultaneously on 42.9 metres (6,991 kilocycles), from 22.00 until midnight G.M.T. for the benefit of amateurs.

On these occasions announcements are made in Portuguese, Spanish, French, Italian, German and English. Most of the broadcasts consist of gramophone records leavened by short news bulletins, but at times concerts are given by a private orchestra and the station has been known to relay performances from local theatres and cabarets.

CTIDH (Lisbon) and, in particular, CTIDY (Paredé) are also keen radio enthusiasts whose transmissions can be picked up abroad under favourable conditions. The latter station is owned by Señor Jorge Botelho Moniz, the president of the Radio Club da Costa da Sol, the Portuguese Riviera.

Large Transmitter

For many months this amateur has been working energetically to induce the Portuguese authorities to assist in erecting a 10-kilowatt transmitter within easy reach of the capital.

In view of its geographical position, radio listeners in that country, to listen to foreign transmissions, require multi-valve receivers of good selectivity, and apparatus of this description must be imported.

Although such is the case the Government exacts a comparatively heavy fee for a permit to install a station and the radio import duties are high.

J. G. A.



The stranger looked knowingly round the bar. "I'll switch her on for you. Listen." The set responded nobly and music filled the bar. It was plain to see that interest was aroused. "Damn wireless," said the stranger and switched off roughly

Get Your Radio Service!

By the "W.M." Set Selection Bureau



CAMCO MAKES ITS STAGE DEBUT

A Camco Mayfair cabinet figures in the stage production of "Late Night Final." Its handsome appearance has been much admired by the audiences

BEFORE buying a receiver, it is in your own interests to inquire what service facilities will be provided when it goes wrong. We do not wish to suggest that buying a wireless set means immediate trouble—that would be most unfair to the makers who so painstakingly test their products through every stage of the assembly.

Vulnerable

But a wireless set is a mass of vulnerable components, most of which, in the modern chassis-built sets, are quite inaccessible to the average amateur. If a reputable make of set is obtained, such as any of those reviewed in these pages, it is unlikely that anything will go wrong for at least a year. Then one or other of the valves will probably need replacing.

If the set is battery

operated it will need attention within the first two or three months—particularly if the set is a portable. The high-tension battery has a limited life, usually not more than two or three months.

Here we should distinguish between service and maintenance needs. If the instructions are carefully read when the set is bought there is no excuse for a set failing owing to wrong maintenance. Service really embraces only actual faults in the design or material. Such faults, although rare, are almost inevitable, and most makers appreciate this contingency by issuing a guarantee for a year.

Until now the service offered by radio firms has been limited to rectifying faults in workmanship, and no attempt has been made to cope with the almost equally

important problem of maintenance.

An important step forward is now announced by the Columbia, H.M.V. and Marconiphone Companies. Under a combined subscription scheme, purchasers of any of the new models marketed un-

der these trade names will be able, for a very small annual subscription, to have their sets regularly inspected and maintained at concert pitch by qualified engineers.

Sliding Scale

The fees for this excellent service vary according to the price of the sets. For the cheapest sets the fee is only 15s., and for the most expensive sets it is £2.

These nominal charges cover three periodical visits. A voucher is also supplied, so that the subscriber can summon a service engineer for one special visit at any time during the year of the subscription.

We trust that this excellent scheme will be considered by other prominent firms, for we are sure that a maintenance service must lead to a greater popularity of radio in general and to an increase in set sales in particular.

Service Squad

It seems to us that the most sensible idea behind radio servicing is a squad of travelling engineers. These "trouble shooters," as they are known in America, can usually put right the normal faults that develop in sets—and in half an hour or so. The only alternative is to send the set back to the dealer, who will then have to pass it on to a district repair depot, or else send it back to the factory—a lengthy process.

FREE ADVICE TO PROSPECTIVE SET BUYERS

To take advantage of this service it is necessary only to mention (1) the maximum price and whether this is for a complete installation or the bare set; (2) where the set will be used; (3) what particular stations are desired; (4) whether a self-contained set (with or without aerial) or an ordinary set with external accessories is preferred; and (5), in the case of mains-driven sets, whether the mains are A.C. or D.C.

A stamped-addressed envelope for reply is the only expense. Address your inquiry to Set Selection Bureau, WIRELESS MAGAZINE, 58-61 Fetter Lane, E.C.4. There is no need to send any coupon, but it is essential to give the information detailed above on one side of the paper only. Tell your friends about this useful service.



VARLEY SQUARE-PEAK FOUR

INCORPORATING the now famous Varley Square-peak tuning coils, the new Varley four-valver was tested with special interest. We congratulate the makers on facing the ether congestion problem in such a determined spirit. Surely four tuned circuits, the first two comprising a band-pass aerial input, should cope with even the present chaos—that was our thought when first looking into this new set.

Selectivity Needs

The makers contend that for the selectivity needs of to-day there are but two alternatives—band-pass or super-het. The latter is ruled out, firstly to justify the inclusion of the former, and secondly on account of expense. We leave this argument to be settled by the experience of the present season, contenting ourselves meanwhile with the reflection that the Varley set does at least attempt to cope with

sound-projecting scheme and automatically switches on and off the mains.

We were soon able to put the Varley set into operation, thanks to the accessible mains-voltage panel, which enables all supplies to be readily adjusted from the back. The only externals are the aerial and earth. These connected, we had an easy time in getting foreign stations.

Most of the more powerful stations are marked directly as such on the tuning dial,

ly engraved, being illuminated from behind when the set is in action.

The volume control on the right works on a different system from the normal, being adjusted for every station received. The volume-control knob actually controls an aerial-coupling coil, so that volume is decreased by reducing the coupling. This being so, there is a delightful freedom from the frequency mutilation that is often experienced with other

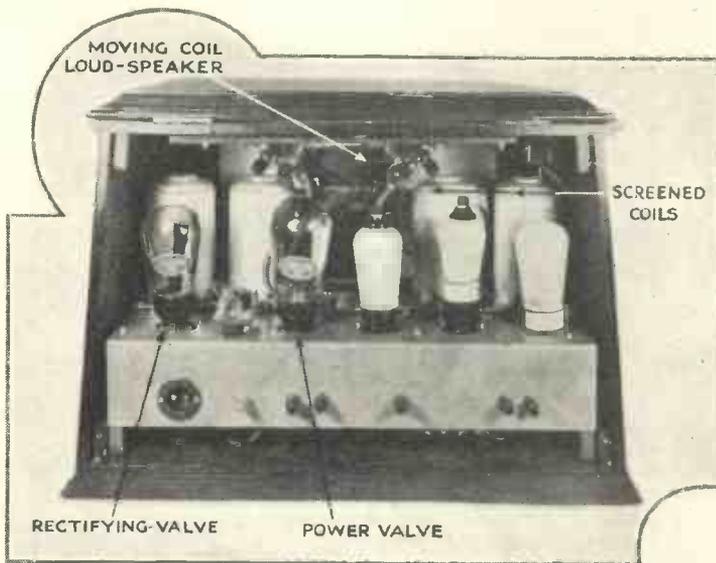
forms of volume control.

When testing the Varley four-valver for quality, we were able to fix up the H.M.V. playing desk in a moment, thus converting the set into a really fine gramophone-record reproducer. The tone quality is really well balanced—the moving-coil being one of the best yet designed, with a new centring device. The total output is that of a PX4, which is more than the normal requirement.

Real Quality

The inclusion of band-passing in this set does more than impart a welcome degree of selectivity—it provides real quality results on at least two dozen stations. Most of the calibrations were accurate, although the makers have naturally had to take a risk, for many stations are (at the time of writing) juggling with their assignments.

An improvement added just recently to this set is a "spot" of reaction, which is now applied by the central segment of the rotation of the gramo-radio switch on the left. This addition is amply justified, for stations that are working very closely together can thereby be entirely separated into programmes of concert value.



VERY UNUSUAL BUT EFFICIENT DESIGN
This Varley four-valver is most unusual in conception. The loud-speaker is mounted in the top of the cabinet with a horizontal grille—a unique form of construction

POINTS ABOUT THE DESIGN

- MAKER:** Varley (Oliver Pell Control, Ltd.)
- PRICE:** 29 guineas, for A.C. or D.C. mains operation.
- VALVE COMBINATION:** Two high-frequency amplifying valves, power-grid detector, and super-power output valve.
- POWER CONSUMPTION:** 75 watts.
- TYPE:** Table console, with self-contained loud-speaker, but needing an external aerial and earth.
- FINISH:** Handsome burr-walnut cabinet.

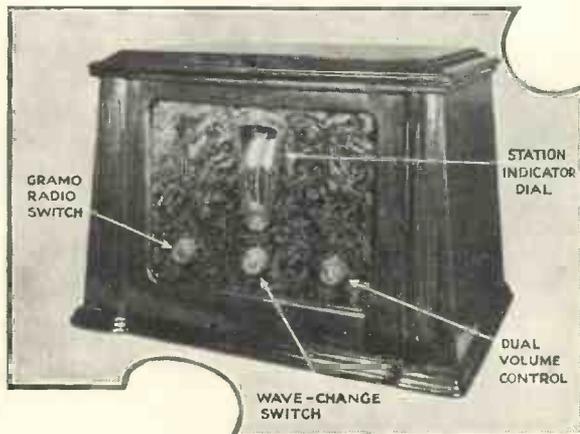
conditions now prevailing. Tests seem to show that the makers have more than justified their faith in band-pass tuning, for the quality of the many foreign stations in range is truly remarkable, bearing a degree of fidelity associated usually only with the local stations. This is praise indeed, but justifiable.

Handsome Case

As would be expected, the new Varley set is good to look upon, being enclosed in a handsome burr-walnut cabinet, with controls to match on the front. A casual look at the closed cabinet does not reveal the true nature of the set, for on lifting the lid we find a horizontally mounted loud-speaker grille—quite a novel feature in set design.

The lid forms part of the

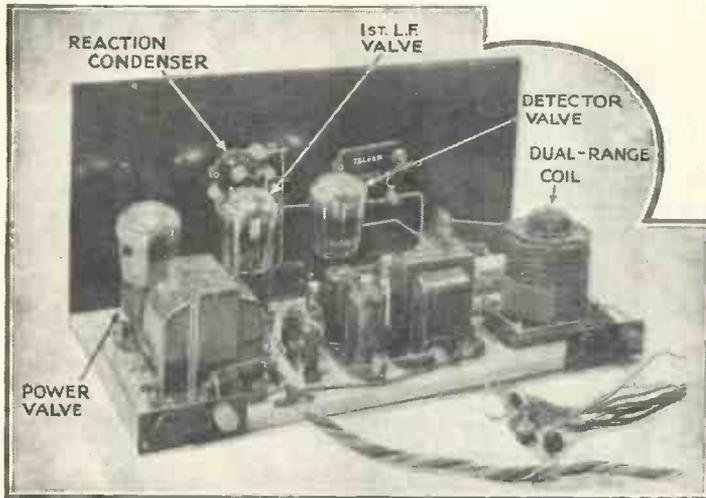
which is large and very clear



COMPLETELY SELF-CONTAINED
A Baker moving-coil reproducer is incorporated in this Varley four-valve receiver, which has two screen-grid valves



TELSEN VICTOR THREE (KIT SET)



THE KIT ASSEMBLED AND READY FOR USE
Here is the Telsen Victor three-valve kit set assembled and ready for reception. It comprises a detector and two low-frequency stages

UNTIL this season the very cheap set has not been produced on a commercial basis by more than one or two firms. But now, somewhat belatedly perhaps, many of our leading radio manufacturers have turned attention to the problem of meeting the modest needs of the listener with only two or three pounds to spend. The Telsen Victor Three is a kit that admirably exemplifies the new order of value.

Sound Components

Moreover, this set, by virtue of its extreme cheapness and ability to perform really well on test, is a great testimony to the essential soundness of the very extensive range of Telsen components. Here we have a set of parts that really do pull well together.

It must not be imagined for a moment that this is a "cheapjack" set. It is a well planned assembly of components that, individually or together, have figured in many of the most successful set constructor's designs of this season.

There are three valves in the Victor Three, a completed model of which we have recently put on test. The first valve is the detector, the second is a choke-capacity coupled low-frequency amplifying stage, and the third is a power output valve.

The natural question is how this type of circuit copes with the present conditions of crowded high-power stations. Our answer, based on actual tests, is that the Victor Three circuit copes surprisingly well with the ether congestion, getting plenty of loud-speaker signals clear of the local stations.

Much of the circuit's effectiveness must be attributed to the Telsen dual-range coil, which pleased us. It embodies an aerial pre-set type of condenser, the knob of which is mounted on the top of the coil moulding. Tuning is, therefore, quite elementary, being controlled by only one variable condenser, a Telsen

frequency side of the Victor Three. The choke-capacity coupling certainly works well, giving a "body" to the repro-

duction of music that is quite remarkable.

There is, of course, a very considerable signal build-up

after detection, and this probably accounts for the large number of stations heard at such strength during tests on our standard aerial and earth. We found that the required degree of selectivity was readily obtained by slowly turning the pre-set on aerial coil to a position about half-way towards its minimum.

Getting the "Twins"

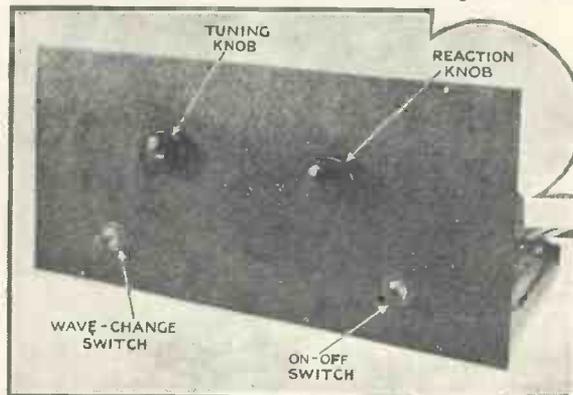
Then the two Brookman's Park stations were readily separated; we cannot give the actual readings, since the knob for tuning is not marked.

This is quite definitely not merely a local-station set, for the strength of Midland Regional and even of North Regional was really good. On the long waves Daventry came in at great strength, and Radio Paris was clearly heard.

The battery connections are taken through a neat coloured cable terminating in

A BRIEF SPECIFICATION

- MAKER: Telsen Electric Co., Ltd.
- PRICE: £1 19s. 6d. for the complete kit of parts, without cabinet or valves.
- POWER SUPPLY: Batteries, connected externally.
- POWER CONSUMPTION: Anode current, 12 milli-amperes. Low-tension current, .5 ampere.
- TYPE: Table cabinet kit set.
- FINISH: Metal panel.



A SET WITH A METAL PANEL
The Telsen three-valve kit set has a metal panel with an attractive crystalline finish. It is good value for money.

wander plugs and tags. A double-capacity battery is needed for economical working, since with the specified Mazda valves the anode-current consumption is not less than 11 milliamperes.

Good Quality

Quality of reproduction was gauged by connecting up the Amplion AB4 model, which is an inexpensive balanced-armature cone. In its class the set is surely alone, for the tone would put to shame the output of many costing at least twice as much.

From an examination of the blueprint we should say this is a very easily assembled Kit set. The wiring instructions are clearly numbered, so that even the novice who cannot understand the theoretical circuit would be able to follow the component point-to-point connections.



EDDYSTONE KILODYNE FOUR (KIT SET)

THE modern short-wave set is a highly specialised product. It has, we suggest, two distinct functions. One is to afford amusement to those jaded with the offerings of the stations on the normal broadcast band. Then there is the more important function of keeping overseas listeners in touch with the Old Country.

The makers of Eddystone sets have established themselves as specialists in short-wave sets, and the Kilodyne Four now reported upon is the latest addition to a remarkable range.

Four-valve Kit

Here we have a simple-to-make four-valve kit, specially suitable for wavelengths between 12.5 metres and 85 metres. As the coils are interchangeable it has been found practicable to include a coil that will tune over the normal broadcasting wavelengths from 250 to 500 metres.

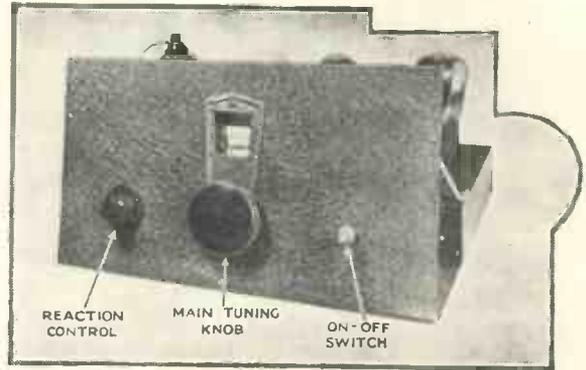
The advantage of this adaptability is obvious. There are many distant countries where a set capable of tuning in the ultra-short waves and the medium waves is essential to the full enjoyment of radio—countries where the only local station is perhaps 500 miles away, but which are quite within range of the

more penetrating ultra-short wave signals from England, America and Holland.

The Kilodyne Four is a very reasonably priced kit when we take into consideration its excellent performance. We were supplied with a ready-assembled set, but we have carefully examined the constructional charts and we find nothing likely to prevent even the novice from making a good job of the assembly work and wiring.

The blueprints of the layout and of the circuit are very clearly planned.

The circuit is a reliable four-valve arrangement, com-



AN EFFICIENT SHORT-WAVER

The Eddystone Kilodyne Four is a short-wave kit set for home-construction. It is the only thing of its kind on the market

IN A NUTSHELL

MAKER: Stratton & Co., Ltd.

PRICE: £6 17s. 6d. for the complete set of parts, without valves.

VALVE COMBINATION: High-frequency amplifier, detector, resistance-capacity low-frequency amplifier, and pentode output.

POWER SUPPLY: Batteries, not self-contained.

POWER CONSUMPTION: Anode current, 14 milli-amperes. Low-tension current, 6 amperes.

TYPE: Metal chassis kit, specially designed for short-wave reception.

FINISH: Open chassis, with sloping front.

prising a screen-grid high-frequency valve coupled to the detector by means of a special high-frequency transformer. Following the detector are two stages of low-

frequency amplification, the first resistance-capacity coupled and the second, a pentode, transformer-coupled. Altogether, a powerful combination, likely to yield strong signals in all parts of the world.

The aerial tuning comprises an aperiodic circuit—actually a high-frequency choke between the aerial and earth. All the tuning is therefore done on the intervalve high-frequency transformer. The primary of this is untuned, and the secondary is tuned with a .00016-microfarad variable condenser of low loss.

During tests we found the tuning and reaction controls smooth and precise in action—particularly the tuning, which is greatly aided by the provision of a really large control knob working on a friction drive.

Coil Units

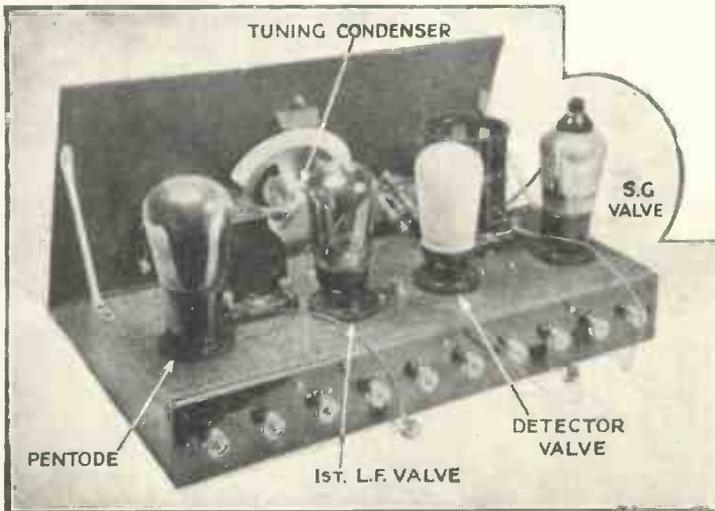
The blue-spot coil tunes from 12.5 to 27.8 metres, the yellow-spot coil from 24.5 to 52 metres, the red-spot coil from 40 to 85 metres, and the green-spot coil from 250 to 500 metres.

We found the yellow-spot coil the most productive of results, amateur telephony signals on 45 metres providing us with plenty of diversion. At the time of the tests the American stations appeared to be below their usual strength, but on the Kilodyne we were definitely able to log 2XAD on 31 metres. Many of the Continental short-wave stations were also tuned in at full loud-speaker strength, such as Rome and Zeesen.

The tuning and reaction operations were noticeably free from the trickiness all too often inevitably associated with short waves.

Medium Waves

On the medium-wave coil we got the two London stations quite clear of each other. Naturally, the selectivity was not of a high order in view of the aperiodic tuning, but we were surprised at the number of foreign stations that could be tuned in without interference. The low-loss transformer certainly justified itself.

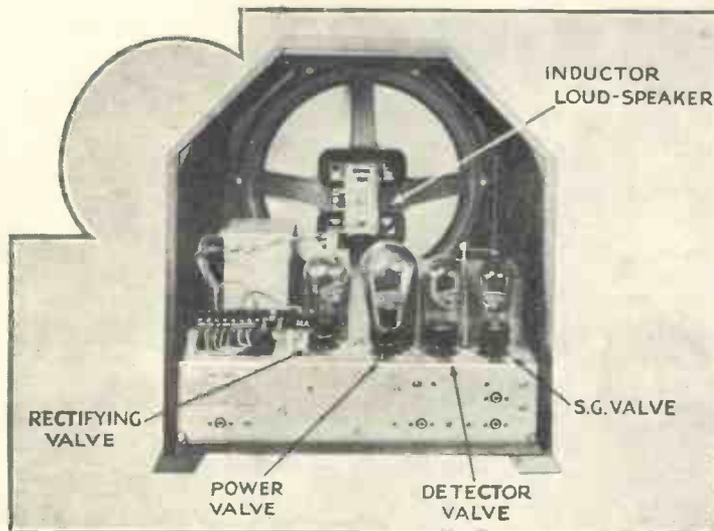


A SET WITH INTERCHANGEABLE COILS

Three coils are used in this Eddystone set to cover wavelengths of 12.5 to 85 metres. It has an aperiodic screen-grid stage



GECOPHONE COMPACT TABLE THREE



WELL DESIGNED AND COMPACTLY ASSEMBLED

This Gecophone three-valve receiver is excellent value for money and gives fine results. It has an inductor loud-speaker

THIS is one of the acknowledged successes of the season—a three-valver of very handsome looks and capable of a fine performance. Every set buyer must be impressed with the cabinet work, with its artistic loud-speaker inlay. But there is much more to comment upon in this set than the outward appearance.

It is one of the best sets in its class that we have so far tested.

Here we have a three-valver working entirely from A.C. mains, comprising a screen-grid high-frequency valve, choke-coupled to a high-amplification detector, which is transformer-coupled to a directly-heated pentode power valve. All the anode supplies are delivered by a Uto valve rectifier.

Straight Circuit

The circuit is devoid of "frills"; but that is not to say that any of the necessary devices, such as low-frequency decoupling, have been omitted. Differential reaction is applied to the detector, and the pentode is properly tone-corrected.

In the practical interpretation of this circuit the makers have kept to an efficient metal chassis layout for the set, the components, such as coils and condensers,

being completely screened. The four valves are arranged in line along the back of the chassis.

handle.

Actually, again proved only by tests, we found that the adjustment of the two knobs

A BRIEF SPECIFICATION

MAKER: General Electric Co., Ltd.

PRICE: 18 guineas.

VALVE COMBINATION: High-frequency amplifier, detector, and pentode.

POWER SUPPLY: A.C. mains.

POWER CONSUMPTION: 30 watts.

TYPE: Table cabinet, with self-contained inductor loud-speaker.

FINISH: Walnut cabinet, with inlaid decoration.

The mains-voltage adjustment, as in all Gecophone sets, is very comprehensive. The accessible panel at the back enables all voltages between 100 and 250 volts to be utilised. On this panel is located a simple bridge for using the mains as an aerial if an external wire cannot be erected.

The rest of the cabinet is taken up with the inductor-dynamic loud-speaker chassis but provision is made for the connection of an external loud-speaker.

The arrangement of the controls is clearly indicated in the photos, but we should emphasise, perhaps, that the tuning knobs are on the front of the cabinet and all the subsidiary controls are

taken to the two sides of the cabinet.

The first impression gained during these tests was—what excellent tone! The inductor loud-speaker more than justifies its inclusion, speech being really natural. It is possible to get considerable volume from this set without causing any distress to the loud-speaker.

Tuning might be thought somewhat of a business with two knobs to

the set is in action, and in the instruction booklet are given a number of calibration figures to co-relate the dial divisions with wavelengths. Tuning is indeed simple if these calibrations are followed, for they are remarkably accurate, and both dials are set to roughly the same dial number.

We found the inherent selectivity of the set good, and by making use of the selectivity-cum-volume control on the left we were able to limit the locals to only 6 degrees on the dials, without much reducing the volume of other stations and certainly without noticeable loss of quality.

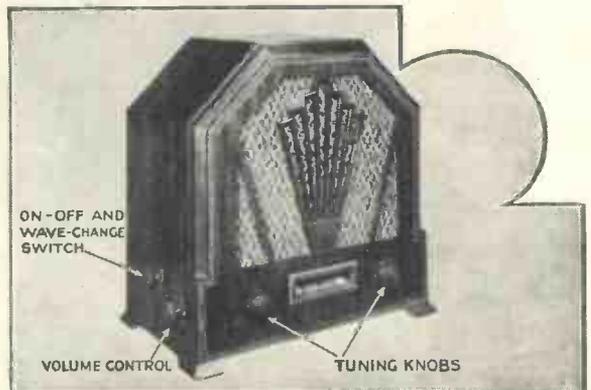
Long-wave Results

The long waves come in somewhat low down on the dials, the reading for Huizen being 55 degrees on the model tested. Nevertheless, at 10 degrees we were right down among the beacon signals, so this crowding is evidently intended. Zeesen was not clear of Daventry, but then that is asking too much of any three-valver.

We can say that this set is as selective as can be expected on long waves, and quite exceptionally so on the medium waves.

The mains aerial serves to bring in the locals at very good strength, but only a few foreigners can be heard. We suggest that this set is worth a really good aerial of, say, 70 feet. Mains hum is absent during reception, even of weak signals.

was very easy. The two scales are illuminated when



HOW THE CONTROLS ARE ARRANGED

This photograph shows clearly how the tuning controls are arranged. The set has a walnut finish that is attractive



THE SUPER TWO

AMONG the very cheap sets on the market must be included the Super Two, which is a complete cabinet set, with self-contained accessories, for the extremely modest price of four guineas.

We note that the chassis of the new set is the same as that originally produced for the Double Two with such success last year. Apparently the makers have no fault to find with the original design,

as the Super Two. The large cabinet houses the Double Two set chassis, which was always a marvel of compactness, a very generous-sized cone loud-speaker, and all the batteries.

There is a two-volt 12-ampere-hour accumulator, and a combined high-tension and grid-bias unit. This is a double-capacity battery, giving 99 volts maximum high tension and 9 volts

A NUTSHELL SPECIFICATION

MAKER: Hustler, Simpson & Webb, Ltd.

PRICE: 24 4s., complete with all accessories.

VALVE COMBINATION: Two valves, comprising a leaky-grid detector and a transformer-coupled power valve.

POWER SUPPLY: Self-contained batteries, comprising a high-tension and grid-bias battery giving 99 volts and 9 volts respectively. Also a 2-volt accumulator.

POWER CONSUMPTION: Anode current, 12 milli-amperes. Filament current, 3 ampere.

TYPE: Self-contained table cabinet set, needing only an external aerial and earth.

FINISH: Dark oak cabinet with ornamental fret on the front for the loud-speaker.

and as many thousands of these sets were sold it follows that the public must also have been satisfied.

This is understandable, because the Double Two must have brought loud-speaker enjoyment to many homes that would have otherwise had, through inability to pay for the more expensive sets, to rely on headphone reception, probably on a crystal set.

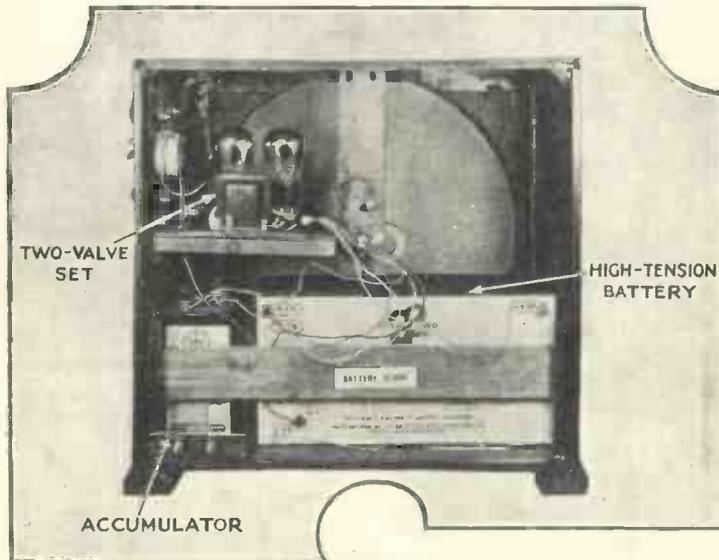
A Bouquet

The Double Two was, in fact, the fore-runner of the really cheap radio now coming into more general practice in this country. We must therefore hand a bouquet to the makers for anticipating a market that will take a lot of surfing. Sets like the Double Two have done more to kill the crystal set than any other type.

Now, the Double Two, as already indicated, has blossomed forth as a truly cabinet affair known

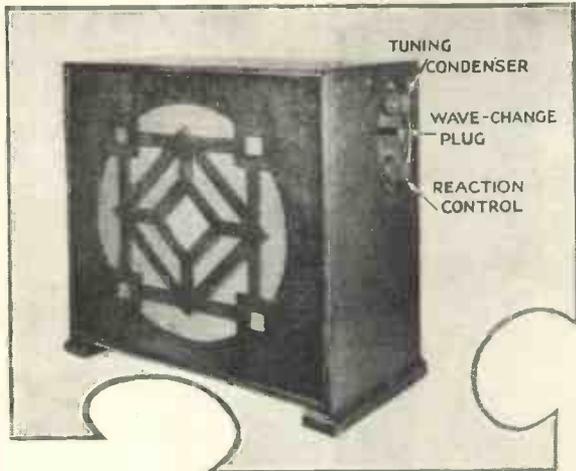
grid bias. We find the total anode-current consumption of this set is 12 milliamperes, the detector taking 5 milliamperes and the power valve the remainder.

The batteries are held firmly in place by means of



INTERNAL ARRANGEMENT OF THE SUPER TWO

The two-valve set is fixed in the top left-hand corner of the cabinet, with the batteries underneath. Note the size of the cone diaphragm



PLENTY FOR THE MONEY

The Super Two, considering its low price, is good value for the money. It incorporates a large cone loud-speaker

a battery clamp. Altogether, the interior is neatly and conveniently laid out.

The two valves used for this set are, according to the valve cartons, specially made for it.

The tuning and reaction condensers are of the solid-dielectric type, being very compact. The tuning is done with the knob at the top and reaction is controlled by the knob below. These knobs

are clearly calibrated. They travel over scales marked in degrees from 0 to 25 in steps of 5 degrees.

The wavelength range of the pile-wound coils is controlled by the position of the aerial plug. If this is inserted in the top socket the medium waves are in circuit, and this position also gives the most selective tuning, as well as the greatest wave-length range.

When the plug is in No. 2 socket the medium waves are still in circuit, and more volume will be obtained from distant stations, with, of course, less selective tuning.

Long Waves

In its No. 3 position the plug brings in the second pile-wound coil, thus enabling Daventry National to be received, as well as one or two of the more powerful foreigners, such as Eiffel Tower and Radio Paris.

During a recent Sunday evening, we were able to bring in many medium-wave stations at fair loud-speaker strength on this little set, the aerial plug being in No. 2 socket.

Quality of reproduction is quite satisfactory for the type of set.





AS A RADIO GRAMOPHONE

Here is the Ether Rover, presented last month as a console set, as a radio gramophone. The circuit is a four-valve band-pass combination with a screen-grid valve

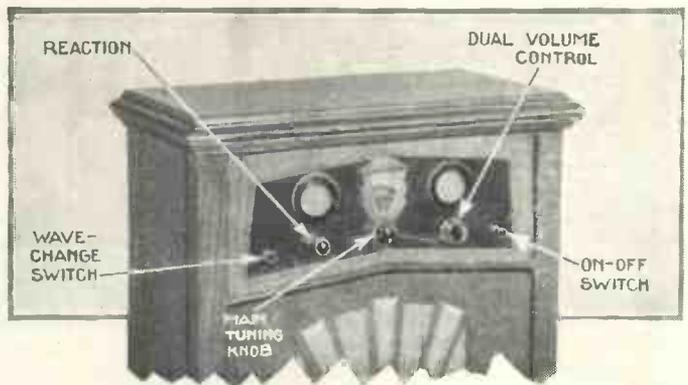
LAST month we described the construction and operation of a band-pass four-valve receiver with a screen-grid stage for high-frequency amplification. It was called the Ether Rover and was introduced as something more powerful than the Ether Marshal, a successful three-valve band-pass set published in August.

The first edition of the Ether Rover was shown as a console type of receiver, with a permanent-magnet moving-coil loud-speaker. It was mentioned that a corresponding radio-gramophone cabinet was available. In these notes it is our intention to explain what alterations have to be made to convert the set to a self-contained radio gramophone.

The Ether Rover

Last Month's Band-pass Screen-grid Four-valver
As A Self-contained Radio Gramophone

The only difference between the console cabinet shown last month and the board (which is not necessary in this case) and it has provision at the top for a turntable and pick-up.



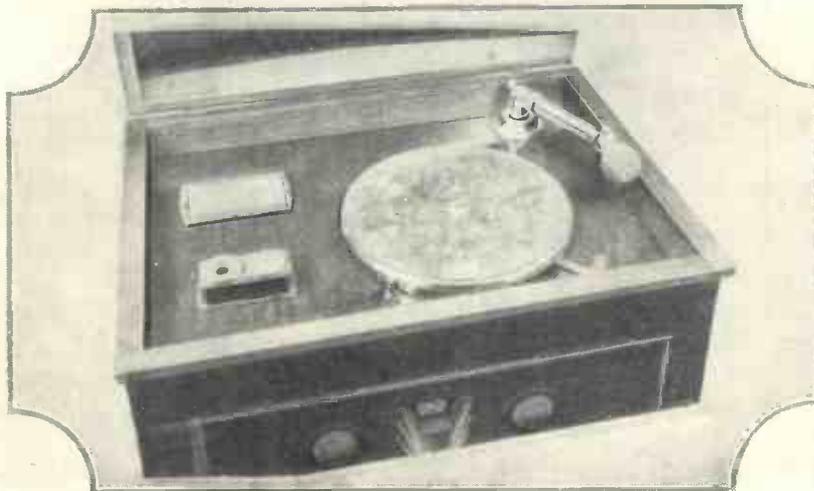
HOW THE CONTROLS ARE ARRANGED

This photograph shows the arrangement of the controls on the Ether Rover, full constructional details of which were published in the December issue of "Wireless Magazine"

radio-gramophone model illustrated in these pages is that the latter is made to accommodate a deeper base-

The panel opening is the same in both cases and the Ether Rover can be used in the radio-gramophone cabinet without any structural alteration. The disposition of the controls will be clear from one of the photographs on this page.

To make the radio-gramophone edition of the Ether Rover it is only necessary to add the parts indicated at the bottom of the main list of parts that appears on page 681—that is, a pick-up and a gramophone motor.



ARRANGEMENT OF THE MOTOR BOARD

Besides the motor and pick-up, there is space for a station log and a needle cup. These can be obtained from A. F. Buigin & Co., Ltd.

There are many other pick-ups and motors besides that recommended here, but it will be found that some of them will not fit into the cabinet. For instance, we have had to use a single-spring motor because there is not sufficient clearance for a double-spring model, which would actually be more desirable.

Choice of Pick-up

In the same way it will be found that some pick-ups are so high that they foul the lid of the cabinet. The model recommended can be accommodated without any difficulty.

There is no need to use a pick-up with a volume control. The Ether Rover is already provided with a dual volume control that works for both radio and gramophone reproduction. It is only necessary to connect the pick-up leads to the point indicated on the wiring diagram published last month.

Full-size Blueprint

Those who are now making acquaintance with the Ether Rover for the first time will be interested to know that a full-size constructional blueprint is available. As a special concession to WIRELESS MAGAZINE readers, this will be obtainable at half price for another month.

Address your application for blueprint No. WM266 (not forgetting the

COMPONENTS NEEDED FOR THE ETHER ROVER

CHOKES, HIGH-FREQUENCY

- 1—Varley Multi-cellular, type BP2, 3s. 6d. (or Lewcos, Wearite).
- 1—Watmel, type DX3, 4s. (or Readi-Rad, Telsen).

COILS

- 1—Lewcos band-pass filter, type BPF, 12s.
- 1—Lewcos dual-range, type ATG, 8s. 6d.

CONDENSERS, FIXED

- 1—Magnum .0001-microfarad, 1s. 6d. (or Telsen, T.C.C.).
- 1—Magnum .0002-microfarad, 1s. 6d. (or Telsen, T.C.C.).
- 2—Magnum .01-microfarad, 3s. (or Telsen, T.C.C.).
- 2—Formo 1-microfarad, 5s. (or Dubilier, Telsen).
- 2—Formo 2-microfarad, 6s. 6d. (or Dubilier, Telsen).

CONDENSERS, VARIABLE

- 1—British Radiophone .0005-microfarad three-gang, with disc drive, £1 16s. 6d.
- 1—Ormond .0002-microfarad differential reaction, type R/190, 4s.

EBONITE

- 1—Red Triangle 18 in. by 7 in., panel, 7s. (or Permcot, Readi-Rad).

HOLDER, GRID-LEAK

- 1—Readi-Rad, 6d. (or Telsen, Bulgin).

HOLDERS, VALVE

- 4—Benjamin Vibrolders, 6s. (or W.B., Lotus).

METERS

- 1—Bulgin 0-2-milliamperere moving-coil meter, type MC2, £1 10s.
- 1—Bulgin 0-50-milliamperere moving-coil meter, type MC8, £1 10s.

PLUGS AND TERMINALS

- 6—Belling-Lee wander plugs, marked: G.B.+ , G.B.-1, G.B.-2, H.T.+2, H.T.+1, H.T.-, 1s. (or Clix, Ealex).
- 2—Belling-Lee spade terminals, marked: L.T.+ , L.T.-, 9d. (or Clix, Ealex).

EXTRA PARTS NEEDED FOR RADIO GRAMOPHONE

CABINET

- 1—Radiocabinet radio-gramophone model, type 118, £3 11s.

GRAMOPHONE MOTOR

- 1—Garrard spring motor, model 12BB, £1 9s. 6d.

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

RESISTANCES, FIXED

- 1—Graham-Farish 10,000-ohm, flexible type, 1s. (or Bulgin, Sovereign).
- 4—Graham-Farish 20,000-ohm, flexible type, 4s. (or Bulgin, Sovereign).
- 1—Graham-Farish 30,000-ohm, flexible type, 1s. 6d. (or Bulgin, Sovereign).
- 1—Dubilier 1-megohm grid leak, 1s. 9d. (or Telsen, Watmel).

RESISTANCE, VARIABLE

- 1—Magnum Dissolver, 10s. (or A.E.D.).

SUNDRIES

- Length of insulated sleeving (Lewcos).
- Tinned copper wire for connecting.
- 2—Lissen terminal blocks, 2s.
- 1—Six-Sixty valve screen, 1s. 8d.

SWITCH

- 1—Wearite on-off, type 622, 1s. (or Readi-Rad, W.B.).

TRANSFORMER, LOW-FREQUENCY

- 1—R.I. Hypermu, £1 1s. (or Ferranti AF3, Telsen Radiogrand).

TRANSFORMER, OUTPUT

- 1—Readi-Rad Instamat, £1 7s. 6d.

ACCESSORIES

BATTERIES

- 1—Pertrix 120-volt super capacity, £1 5s. 6d. (or Siemens, Ever-Ready).
- 1—Pertrix 15-volt grid-bias, 2s. 6d. (or Siemens, Ever-Ready).
- 1—Dagenite 2-volt accumulator, type PGF9, 12s. 6d. (or Smiths, C.A.V.).

LOUD-SPEAKER

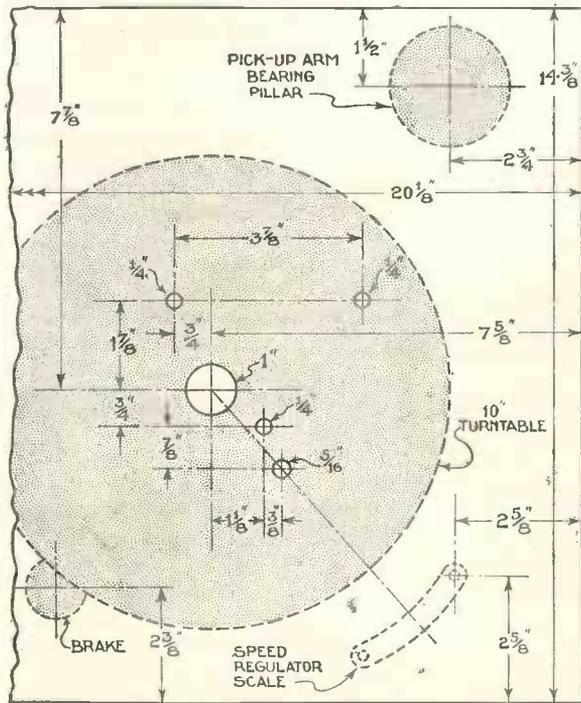
- 1—Ormond permanent-magnet moving-coil chassis, £3 5s. (or Amplion, W.B.).

VALVES

- 1—Six-Sixty 215SG, £1.
- 1—Six-Sixty 210HF, 8s. 6d.
- 1—Six-Sixty 210HL, 8s. 6d.
- 1—Six-Sixty 220SP, 13s. 6d.

ELECTRO-MAGNETIC PICK-UP

- 1—Edison Bell standard, type 407, £1 7s. 6d.



LAYOUT FOR THE MOTOR BOARD

This diagram shows the sizes and positions for all the holes for fitting the motor and pick-up to the Ether Rover

special coupon on the last page of this issue) to Blueprint Dept., WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4. It will be sent post free; the price is thus only 9d.

Full constructional details of the original design will be found on page 534 of the December WIRELESS MAGAZINE. A limited number of copies of that issue is available from the publisher at 1s. 3d. a copy.

A feature of the design, apart from the inclusion of band-pass tuning to give selectivity with good quality of reproduction, is

the use of two milliammeters—one in the detector anode circuit to make ganging easy, and the other in the anode circuit of the output valve to check up distortion.

Operation from the Mains

The Ether Rover is quite suitable as it stands for operation with a mains unit, which is the most economical way of getting the high-tension supply.

The set has been specially tested with a number of mains units, among which are the Formo type Multivo (£5 5s.) and the Heayberd type D150 (£4 6s.). The Formo unit is provided with a trickle charger for charging 2-, 4-, or 6-volt accumulators.

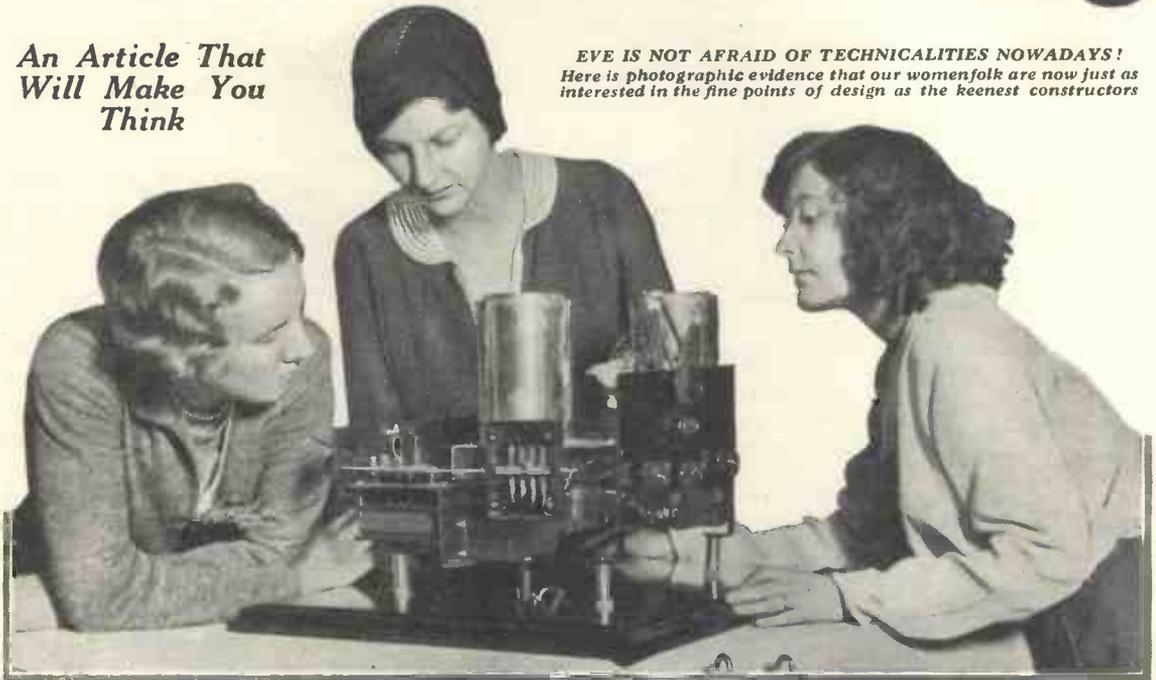
Improved Reproduction

Such a fine set as the Ether Rover deserves a good mains unit. The use of a mains unit will result in better quality of reproduction, for a larger power valve can be used than would be possible were the high-tension supply taken from dry batteries,

New Ideas in Tuning

*An Article That
Will Make You
Think*

*EVE IS NOT AFRAID OF TECHNICALITIES NOWADAYS!
Here is photographic evidence that our womenfolk are now just as
interested in the fine points of design as the keenest constructors*



EVERYONE says that band-pass tuning is the only thing worth having, yet somehow I can't bring myself to fancy it. My idea, in a few words, is that the best way of getting the required selectivity is to get needle-sharp tuning and then compensate for the diminished strength of the side-bands by arranging the low-frequency amplifier to compensate for the loss.

It must be understood that this method of tuning is not new. There are patents several years old referring to it; and the Stenode is essentially this type of circuit. But it is only lately that some of us have come to realise that it has very special advantages for broadcast reception under present-day conditions.

Suggested Circuit

Let us first describe the circuit, and then show its advantages.

Take the very simple circuit of Fig. 1, imagining that L_1C_1 is either the aerial tuner or is supplied from a high-frequency valve not shown. Increase the reaction till the set is nearly oscillating and, as we all know, the side-bands will be cut down. But now consider the coupling from the detector to the first low-frequency valve.

P. K. TURNER, M.I.E.E., in this article, written specially for WIRELESS MAGAZINE, challenges the superiority of the band-pass tuner for meeting present-day selectivity needs and suggests an alternative system which he believes has a number of advantages. His views will be read with interest by everybody

If the inductance L_2 is rather small, and the resistance R_2 were zero, the next grid, instead of getting the whole output of the detector, will get only a part, and the amount will be proportional to the audio frequency.

If R_2 is inserted, it means that there will be rather more bass than without it, and it is easy to prove that there will be perfect compensation for the side-band loss due to over-sharp tuning if the ratio R_2/L_2 equals half the ratio R_1/L_1 .

All this I worked out about eighteen months ago, and I built a most interesting set using the idea. But at that time I was trying to make a

saleable complete set, and I cannot claim to have done so yet on these simple lines; for there are difficulties which make the set too tricky for the general public to handle—though not at all too bad for the experienced wireless amateur.

The trouble is that R_1 is the effective resistance of the circuit L_1C_1 . It is much reduced by the sharp reaction, so that R_1/L_1 is not a fixed quantity.

It alters every time the reaction is adjusted; and this means that R_2 must be adjusted to suit, otherwise the correction will be too much or too little, and the output will have either too much or too little base.

Pushing Reaction

Further, to get the required selectivity, the reaction must be pushed to the limit, and this means special arrangements to keep the set stable.

But before I go on to describe how the final circuit was arranged, I want to say a little about its special good points. Unfortunately, they are rather technical, but I will try and explain them as simply as possible.

There is, however, one good point that hardly needs explanation—it sticks out a mile. If the circuit can be made to work with anything like

the simplicity of Fig. 1, it gives selectivity at about half the cost and trouble of any other method.

In a band-pass filter, we must have the right width of band, and also a fairly flat top; a steep double hump, as in Fig. 2, would exaggerate the treble.

To fulfil these two requirements at the same time we must have the relations between the inductance of the coils, the coupling, and the resistance of the circuit, all just right; and this in turn means that the shape of the curve *outside* the band is fixed—that is, the parts *AB* in Fig. 3.

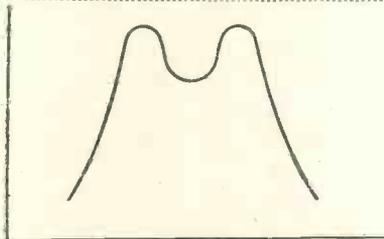


Fig. 2.—A steep double hump would accentuate the treble response

And in practice, with say 6 kilocycles each side included in the band, the falling-off at 9 kilocycles, where the carrier of the next station will come, is by no means so great as we would like it to be.

Low-frequency Response

It really would not usually be good enough to prevent an audible 9-kilocycle whistle between the carriers; but it is helped here by the fact that the low-frequency amplifier, and especially the loud-speaker, usually respond rather badly to such a high audio frequency. So the whistle isn't noticed. But suppose the station we don't want happens to play a 4-kilocycle note—the top note of the piano?

Put down some figures. Say the station we want is on 1,000 kilocycles. Our filter band includes from 994 to 1,006 kilocycles. The jamming station is 1,009 kilocycles. Therefore his 4-kilocycle note puts in side-bands at 1,005 and 1,013 kilocycles; and one of these, 1,005 kilocycles, is within our band.

In actual practice, these notes often do come in, and give trouble; a sort of "twittering" noise. There

is one important reason why they don't give more—the "demodulation effect." The explanation of this effect is much too complex to give here; but the result is easy to put down. *If we use a non-distorting ("linear") detector, the strong carrier of the wanted station tends to kill the modulation of the jamming station.*

For example, if at the detector input the jamming carrier is one-fifth as strong as the one we want, then its modulation, instead of being one-fifth of the wanted one, is only one-fiftieth.

Now this is where the new tuner scores. Since we are compensating after the detector for our cut-down side-bands, we can make the resonance curve as sharp as ever we like. So we can cut down the jamming carrier far weaker than with any band-pass filter.

Thus we kill its modulation to a much greater extent and when we have magnified up the high audio frequencies in the low-frequency amplifier, we don't get that annoying

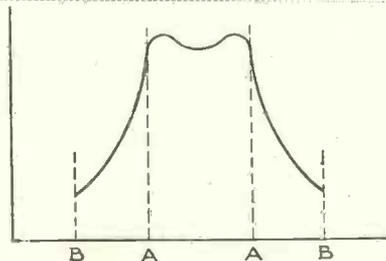


Fig. 3.—Showing shape of the curve outside the tuning band

twittering. We should still get the whistle of the two carriers themselves, just as the band-pass set sometimes does, but that can be got rid of.

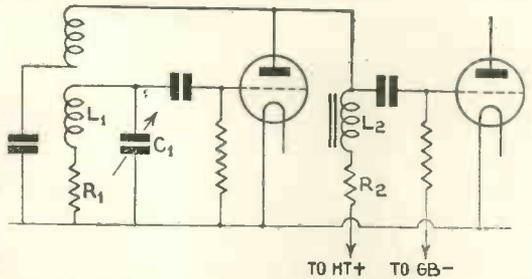


Fig. 1.—A simple circuit incorporating the tuning system suggested by the author

There is another great advantage to seekers after first-class quality. We all know that detectors aren't perfect—not even "power" grid rectifiers. The deeper the modulation the more difficult it is to rectify without distortion; and modern transmitters are very deeply modulated.

Effective Modulation

The new type of tuner helps enormously here, for the signal as it gets to the detector has the carrier so magnified by reaction that its apparent depth of modulation is quite small, and all frequencies except the very lowest—say 50 cycles and below—are rectified with practically no distortion.

Summarised, the two main advantages are:—

- 1.—We cut down interference from the modulation of neighbouring stations, lower than any other tuning of equal selectivity (that is, selectivity for the carriers, as usually understood).
- 2.—We get much less distortion in rectification.

But to do this we must have (leaving on one side quartz crystals and such expensive devices) a reaction circuit which can be kept stable when much nearer oscillation than the usual ones of the present day. That is a problem indeed.



EXPERIMENTAL WORKERS IN THE STENODE LABORATORIES

The Stenode is essentially the type of circuit advocated in this article. The method is to get needle-sharp tuning and then to compensate for the diminished strength of the side-bands

By A Special Representative



ISN'T IT TIME THE NEWS BULLETINS WERE BRIGHTENED UP?

The actual broadcasting of news is a very prosaic affair, as this photograph of a B.B.C. news studio shows. This article explains how the news is collected and edited

One does not need to compare a broadcast news bulletin with the front page of a daily paper in order to realise how the newspaper scores, especially in the way of human interest. The subject is dealt with in this authoritative article.

NEWS is expensive, I know. A friend of mine who is in charge of one of London's leading news agencies assures me that sports news alone costs £40,000 a year to collect.

Reason for Dullness

As the B.B.C. spends well over £600,000 in programmes in the course of a year, I do not think one can hold up expense as the real reason for the apparent dullness of news bulletins.

Listeners are always complaining that news bulletins, although they are strictly impartial, lack that human touch which compels one to read the "leader" of a national daily.

This strict impartiality is one reason for the dullness. It is a pitiful fact and, I think, a thorn in the Corporation's side, that it is restricted in the way in which it can disseminate national news.

Those of us who are not out to be instructed buy a set only in the hope that we shall periodically get some

music we like and an occasional news bulletin or weather forecast when the daily paper doesn't happen to be at hand.

Thus a feature which starts out with an immense public bias in its favour, because it is needed badly, should not be condemned by vested financial interests.

Many listeners hold the belief, though, that it is not only newspaper competition which hems in broadcast bulletins, but that there is a definite policy at Savoy Hill against any liveliness or human interest in the news.

I have just had the opportunity of speaking to the B.B.C. News Editor on this topic. He says: "*The Corporation's policy is to broadcast an accurate, comprehensive, objective, and impartial report about the events of the day, both at home and abroad.*"

This seemed to be at once a millstone around the neck of any individual who tried to get a popular appeal into the bulletins, and I pressed for further information.

Unjust Comment

The News Editor continued: "I do not think, taking into consideration the difficulties with which we have to contend, that one can justly claim that our bulletins are bad.

"We have a much more national appeal than a morning or evening

paper. We have no political bias, and that prevents us 'stunting' our reports in the same way that some papers do. We want to give important news of national interest and that prevents us devoting minutes of our valuable quarter of an hour period to gruesome murders. A murder story may make interesting reading on the front page of an evening paper, but, as our bulletins are broadcast over the whole of the country, and are also relayed by some Continental stations, it would be out of proportion to accentuate the human interest, which, after all, is only a local interest.

Difficulty of Time Limit

"One practical difficulty is the time limit, and listeners do not like sitting for more than a quarter of an hour or twenty minutes and concentrating on one item, even when it is a bulletin full of important news. Another difficulty is the clashing with newspapers and it is up to us to prevent devoting too much space to items with which listeners, who have already bought their newspapers, will be aware."

Listeners make a great mistake in thinking that the B.B.C. receives its news bulletins in a ready prepared form so that they have only to be passed on to the announcer.

There is an active news service

department at Savoy Hill and, as I have just come from the "nerve centre" of this—the tape machines which receive news, via the agencies, from every quarter of the globe—I can vouch for the fact that while the B.B.C. may not make the best use of its news it nevertheless has a news facility as great as that of any national daily.

Automatic Printers

In a little room adjoining the News Editor's department on the fourth floor of Savoy Hill are the four Creed automatic printers connected by cable with the leading news agencies of London—Reuters, Press Association, Central News, and Exchange Telegraph Company. The Reuters and Press Association machines are identical. The Exchange Telegraph printer is of the ordinary "ticker" type familiar to clubmen, while the new Central News machine is a special rapid Creed printer.

These Creeds are amazing machines. They translate the rapid current variations on the lines into actual type and the "key" of the mechanism is a tiny armature supported on a knife edge which is very rapidly vibrated by the current impulses.

The news is typed not on a long strip, but in manuscript form on long paper rolls. As each news item is completed the machine automatically pushes the paper strip a few inches out of the machine, so that the "sub" can pick out the interesting paragraphs at a glance.

In Touch with the World

It is wonderful to watch these machines at work. One feels in touch with the whole world. Here is the result of a soccer match. There is the latest information about the spot of bother in Manchuria. Nothing seems too detailed, nor too international.

For the first time I realised how vast is the job of news selection for any dissemination quite so national in its appeal as a broadcast bulletin.

"If you agree that it is undesirable that a broadcast bulletin should bear a resemblance to a leading paper, in the order in which the news is placed, then what is the next best simile?" I asked the News Editor.

"Our bulletins tally more with the order of the news in the morning paper of the following day," he said.

"When recently there was a big earthquake in New Zealand this was

the first item in our late night bulletin. The following morning it occupied the same position of importance in many London dailies.

"By arrangement with the four agencies we do not have reporters of our own, and, apart from certain special news, all the material we broadcast is received via the tape machines. These exceptions include weather forecasts, SOS's, and *communiqués* from government departments—but not Parliamentary reports.

"We have two special lines through to Reuters, from whom Parliamentary reports and special items are received. Parliamentary reports are often so long and tedious that many hours would be wasted in picking out the 'meat' for broadcasting. A Reuters correspondent in the House phones us a special bulletin.

"You must understand that regional and local news bulletins do not always come from Savoy Hill. In

the case of Belfast, for instance, the station director there is in charge of the news section."

There seemed to be a great deal of work being carried on with quiet efficiency in the News Department, and I asked the Editor how large a staff is required.

Routine Checking

"It varies between six and eight," he said. "A great deal of the work involves routine checking of the news items received on the tape machines and last minute alterations have to be made, in the same way that news is 'subbed' on a daily.

"The B.B.C. library downstairs provides sufficient material for checking, 'Who's Who,' 'The Politician's Year Book,' the 'Encyclopædia Britannica,' and 'Stock Exchange Year Book,' and other reference manuals being the stand-bys."

The items are typed out with very wide spacing in a special clear type on

To ANNOUNCER
CONTROL ROOM
TELEPHONE SWITCHBOARD

S.O.S.

To be Broadcast.

Time 9 p.m.

Date 21st September, 1931.

Will GEORGE PERCIVAL COX, a leather worker, last heard of in Warwickshire about five years ago, go at once to the Hospital, where his mother Mrs. Elizabeth Cox, is dangerously ill.

Sent in by Edwin James Cox, Waterside Terrace, Mundsley.

Confirmed by Dr. John Smith, Mundsley 50516.

TO BE RETURNED TO TALKS.—News Dept.

B.B.C./M7

THE ANNOUNCER'S SOS FORM

This is a reproduction of an SOS form as it is handed to the announcer for broadcasting at the first opportunity

CAN THE NEWS BE IMPROVED?—Continued

foolscap sheets of soft paper, which does not crinkle in the fingers. Editorial alterations are made in blue and words which are difficult to pronounce are underlined in red. The announcer generally has a few minutes in which to look through the sheets and practice the underlined words.

How News is Read

"The news is generally read from No. 5 studio and one official of the News Department goes down with the announcer to the studio and waits in readiness for any last moment items

the chief interest is in the late news items which have arrived after the final editions of the evening newspapers.

"The same difficulty arises with the first bulletin, which is sometimes apt to resemble only a development of the morning papers of the same day. On a day when most of the important happenings have occurred in the morning, or early part of the afternoon, before the final editions of the evening papers go to press, then it is obvious that we cannot prevent even the late night broadcast bulletin

there were insuperable difficulties in this direction, the Company would probably be expected to set up a news collecting agency of its own throughout the world, which is easier said than done and is easier done than paid for."

Weather and SOS Service

"There is one other aspect of the broadcast bulletins on which you must touch," said the News Editor, "the weather and SOS service.

"We cannot be blamed for broadcasting pessimistic weather reports. The B.B.C. does not control the weather!

"Indeed, it does not even prepare the bulletins. It gets them ready written from the Meteorological Office. They are prepared at the headquarters in Kingsway from bulletins wirelessed from ships at sea and from aircraft stations all over the country.

"There is an interesting point in this, so far as we are concerned. Usually the reports are sent over by hand, but as the weather forecasters work always according to Greenwich time there is an extra hour's hustle when we are on British Summer Time. The reports are then sent over the phone."

"When anybody wants to have an SOS broadcast," I inquired, "to which department does the call come?"

"Most SOS messages are made on the phone," explained the News Editor, "and inquiries are put through straight to this room. The SOS is typed out on a special form suitable for sending straight down to the studio, but before it goes it has to be checked up with our rules to see that it does not come outside the scope of broadcast SOS."

Wrong Presentation?

As I left Savoy Hill, I considered the phases of the News Service in the new light of experience. National news, sports bulletins, market reports, weather forecasts, and urgent SOS; they are all there. In journalistic parlance, the "meat" is there, but I feel sure that many listeners aver that the method of presentation is wrong. It is a failing which is evident in many other broadcast productions.

It is inevitable that so vast an organisation as the B.B.C. should be loath to deal with the human-interest side of news.

It is a pity.

14.31

R E U T E R S .

HOLLAND TO TAKE STOCK OF HER GOLD.

A M S T E R D A M , OCT 29.

HOLLAND IS TO TAKE STOCK OF HER GOLD, ON THE INITIATIVE OF THE NETHERLANDS BANK. TO-DAY A MEETING OF AMSTERDAM BANKERS DECIDED TO APPROVE THE CENTRAL BANK'S REQUEST TO THEM TO COMMUNICATE TO IT THE AMOUNTS OF GOLD IMPORTED BY THEM ON THEIR OWN ACCOUNT FROM AMERICA AND STORED IN THEIR RESPECTIVE VAULTS.

HOW THE B.B.C. RECEIVES THE NEWS

A reproduction of a Reuters "flimsy" as received by the B.B.C. from the news agency. Many such messages are handled during the course of a day

that may come down from the tapes. These he pushes on to the reading desk at a suitable moment. He also stands by with the pronouncing dictionary!

"In Broadcasting House the two small news studios have a triangular listening cabinet between them and here is a desk for one of the News Editors. He will be able to receive items over the phone from the News Room below or direct from Reuters. At present the news man has to be brought out of a studio by a green light 'flick' when the late news arrives.

Bulletins Filed

"The bulletins are kept in a special file after broadcasting and after a fortnight's storage are card-indexed, so that any broadcast can be referred to at a moment's notice.

"We have to avoid clashing with the daily papers," the News Editor told me. "We have to remember that a good many people have bought their evening paper before they hear the final broadcast bulletin, and for them

resembling the evening papers, because nothing else has happened to make news. Fortunately for us, such days are few!"

When I hinted that this might be yet another reason for the apparent dullness of bulletins, the idea was pooh-poohed.

"I would refer you to what Sir John Reith said about the collection of news, right at the start of the news service, when the B.B.C. was a company. In 'Broadcast Over Britain' he said: 'The collection of news is a very costly business; the organisations responsible for it are world wide. Newspapers are their customers and it is presumably newspaper custom which justifies the operations of the agencies. One great agency, at least, is owned and controlled by the Press.

"It will therefore be seen that a position of some delicacy would arise if, when the restrictions imposed by the licence apply no longer, broadcasting endeavoured to obtain from the agencies supplies of news in the same unfettered manner as do the newspapers. If it were found that



HOW THE LOUD-SPEAKERS ARE ARRANGED
 This photograph shows how some of the reproducers are mounted on pylons so that they are audible over a large area

NO fewer than thirty-five mammoth loud-speakers have been installed at the Avus, Berlin's famous motor-car road and race course. The reproducers are arranged all round the course,—near the Press platform, in the South Loop, etc.—thus keeping spectators even at the less interesting points of the track informed of what is going on.

Six 200-Watt Amplifiers Used

The announcer takes his stand in the North Curve near a microphone permanently connected by cables to all the more important points of the course. A central station consisting of six 200-watt amplifiers is needed to give his voice the necessary volume.



ONE OF THE 200-WATT AMPLIFIERS
 One of the 200-watt amplifiers made by the Siemens and Halske people for supplying power to the thirty-five loud-speakers at the Avus race track



LOUD-SPEAKERS FOR THE PRESS
 Five loud-speakers are mounted in the roof of the Press platform. One of them can be seen in the top left-hand corner of this photograph

The power actually needed will be appreciated from the fact that a loud-speaker for ordinary use in the home needs only .5 watt for good volume. The enormous volume available at the Avus race track can be imagined from this comparison.

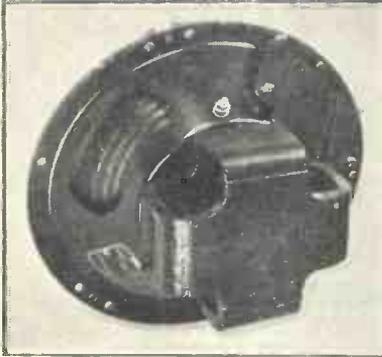
Nine Miles of Cable

The cables connecting the thirty-five loud-speakers to the central amplifying station have a total length of more than nine miles.

The photographs reproduced on this page show various aspects of the installation, which is unique of its kind.

A. G.

Our Tests of New Apparatus



PERMANENT MAGNET

The B.T.H. Minor loud-speaker is a permanent-magnet moving-coil model at a very low price

B.T.H. LOUD-SPEAKER

APPARATUS: Permanent-magnet moving-coil loud-speaker, type Minor.

PRICE: £2 10s.

MAKER: British Thomson-Houston Co., Ltd.

A WELL-MADE permanent-magnet moving-coil loud-speaker is the B.T.H. R.K. Minor model. This loud-speaker is quite conventional in design as far as external appearance goes. The cone, which is of the corrugated paper type, is suspended from a metal chassis by a ring of some felt-like material.

Low-impedance Type

The moving-coil, which is of the low-impedance type requiring an input transformer, is held centrally in the gap by means of a centring device and is anchored to the pole piece. This centring device allows ample free movement of the cone.

The magnetic system employs one of the familiar cross-type magnets which have proved so successful in practice. This magnet is of substantial design and should give long service with no loss of efficiency. It is bolted to the metal chassis holding the cone, the whole forming a very neat and strong assembly.

On test the loud-speaker gave very pleasant results when mounted behind a 3-ft. baffle board and when correctly matched to the output stage of the amplifier. This last point is important if the maximum power and best quality are to be obtained.

Good Sensitivity

The sensitivity was up to standard and quite sufficient to enable the loud-speaker to give good service with the usual type of receiver employing a power valve having a maximum output of the order of 350 milliwatts.

The loud-speaker is, however, quite satisfactory for larger inputs, being capable of handling up to 1.5 to 2 watts with no distress.

The instrument, which is 100 per cent. British made, sells at £2 10s. and can be

recommended as good value. The input transformer retails at 11s. 6d. extra.

FORMO TRIPLE-GANG CONDENSER

APPARATUS: Triple-gang .0005-microfarad variable condenser.

PRICE: £1 10s.

MAKER: Formo Co.

A SHORT time ago we had the opportunity of reviewing the new Formo condenser in which a specially improved moulded insulation is employed. We have the opportunity of testing this month a triple-gang model which is made up of three of these condensers mounted in a die-cast framework.

The arrangement is intended primarily for use in three-valve circuits of the type employing a band-pass filter in the aerial stage and single tuned high-frequency transformer for the intervalve coupling.

The two condenser units on the left of the control panel are intended for tuning the filter and are provided with trimmers of the customary two-plate mica-dielectric type, enabling the individual condensers to be balanced with the coils of the band-pass filter.

To ensure ganging between the aerial circuit and the high-frequency circuit the stators of the two aerial condensers are capable of being rotated by a knob operated from the front panel.

The customary Formo escutcheon plate is used, comprising a large window with two knobs immediately below it, one of which operates the rotor drive and the other the balancing control on the stators just discussed.

The dial is of the same type as has been used on Formo condensers for some time, being provided with a small lamp for illuminating it if desired. This lamp throws a shadow from a given point on to the scale to indicate the position of the stators on the aerial condenser.

A complete high-frequency test was conducted on the condenser in order to determine the equivalent series resis-

tance as discussed in the recent articles on condenser design. The resistance was of the order of .75 ohm at 400 metres, the curve, indeed, being similar to that which appeared on page 196 of the September issue. These figures are quite normal values and the condenser should give good service in practice.

Capacities of Units

The capacity of each condenser unit was measured and found to be just over .0005 microfarad, the minimum capacity being approximately .00007 microfarad. The two condensers intended for the band-pass circuit appeared to be well matched over the whole range. It sells at £1 10s. or £1 11s. 6d. if the rotor of the right-hand condenser is required to be insulated from the left.

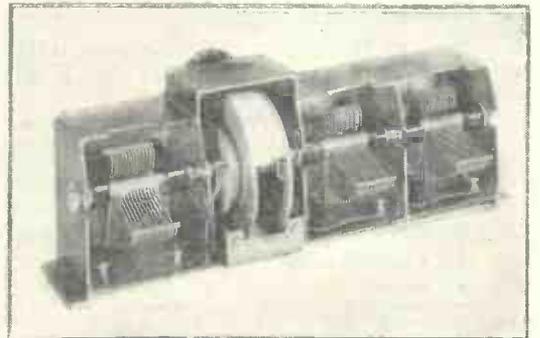
ATLAS HIGH-FREQUENCY CHOKE

APPARATUS: Binocular high-frequency choke.

PRICE: 4s. 6d.

MAKER: H. Clarke & Co. (M/cr.), Ltd.

IT is a rather interesting fact that since the publication of "The Truth



TRIPLE-GANG VARIABLE CONDENSER

This is the new Formo triple-gang variable condenser, suitable for a set with band-pass tuning and a high-frequency stage

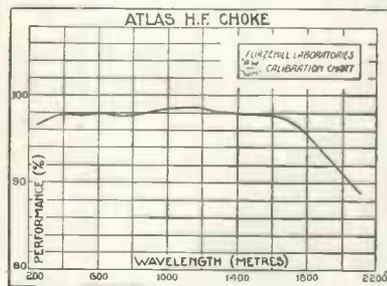
about High-frequency Chokes" in these pages a little more than a year ago, there has been a marked improvement in the standard of this class of component, and of the new components introduced good chokes are the rule rather than the exception.

The Atlas choke, which has recently been introduced, is an excellent example of good design.

The choke is wound in binocular form, the winding being placed on two formers side by side on a small ebonite base. Each former has seven slots, and a terminal at the top for external connections, the whole assembly making a very neat and sturdy job.

Performance Test

The customary performance test was placed on this choke, this consisting of the measurement of the choke impedance relative to that of a .0001-microfarad



PERFORMANCE CURVE

This curve shows the efficiency of the Atlas binocular high-frequency choke

by-pass condenser at various wavelengths. With an ideal choke, of course, this figure would be 100 per cent. over the whole wavelength band.

Needless to say, none of the practical chokes do this, but it will be seen from the curve reproduced herewith that the Atlas choke behaves very creditably. The performance factor was of the order of 95 to 98 per cent. from 200 to 1,700 metres, while at 2,000 metres the factor is still about 91 per cent.

The inductance of the choke is 186,000 microhenries, the resistance being 330 ohms, and the estimated self-capacity from the impedance figures is of the order of 2 micro-microfarads. The choke, therefore, may be recommended as a thoroughly sound production.

R.I. DUX LOW-FREQUENCY TRANSFORMER

APPARATUS: Low-frequency transformer (ratio 1 to 3½), type Dux

PRICE: 6s. 9d.

MAKERS: Radio Instruments, Ltd.

THE Dux transformer, R.I.'s latest product, has been introduced to meet the requirements of those who do not wish to use parallel-feed methods and is, therefore, designed to handle a reasonable anode current without saturation. The transformer is housed in a maroon-coloured moulded casing, finished in the somewhat distinctive style of this firm's products, and all connections, as usual, are clearly indicated. The overall dimensions are 3½ in. by 2 in. by 2½ in.

Primary Inductance

On test, the transformer gave a distinctly good account of itself. The primary inductance was approximately 30 henries with no D.C. flowing, this value falling to 20 henries with 5 milli-



GOOD VALUE FOR MONEY

The new R.I. Dux low-frequency transformer has a surprisingly good performance for its price

amperes. The saturation is thus not rapid and this value could be exceeded without serious trouble.

The step-up ratio, nominally 3½-1, was well maintained, particularly in the upper register which extended beyond 5,000 cycles. A valve of the L210 type used with this transformer will

result in an amplification of between 40 and 50. Thus a relatively low-impedance valve may be used in the detector stage, avoiding overloading on a strong signal and still giving good amplification.

The fact that this transformer is marketed at the very low price of 6s. 9d. is an additional recommendation, and it should prove an attractive proposition to many constructors.

AMPLION PERMANENT-MAGNET LOUD-SPEAKER

APPARATUS: Permanent-magnet moving-coil loud-speaker, type MC6

PRICE: £3 7s. 6d.

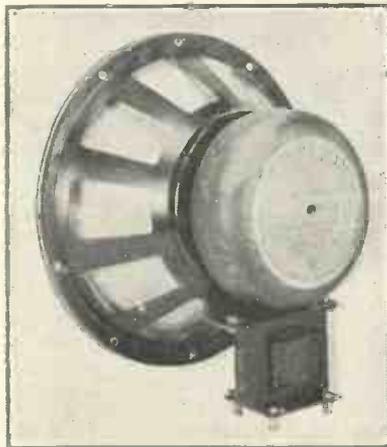
MAKERS: Graham Amplion, Ltd.

A PERMANENT-MAGNET moving-coil loud-speaker which we really liked, and which we had occasion to review recently, was the Amplion type MC6. The construction of this loud-speaker follows the best practice in that the diaphragm is not made of a thin paper but of a thick, ridged paper which has been found to avoid the troubles of paper resonance to a large extent.

The magnet system is a modification of the usual conventional form, being like a doughnut in appearance. It is formed on the basis of the usual cross type, but the return path is complete all the way round and is not divided into four segments.

This presumably enables more magnetic material to be obtained in a given space, and therefore, presumably, a higher field strength, although we must confess that we are a little puzzled as to how an arrangement of this type is magnetised in the first place.

However, the magnetism is there, and apparently very effectively, as we found the loud-speaker to be sensitive and capable of handling good volume without rattling. The frequency response also appeared to be excellent over the whole of the audio range.



EFFECTIVE MAGNET SYSTEM

Unusual but effective is the magnet system of this Amplion moving-coil loud-speaker

The loud-speaker incorporates an output transformer built into the chassis, and by use of the appropriate tapping the impedance may be suitably matched to that of the output valve, thereby ensuring that the maximum undistorted output shall be obtained.

The coil itself is a low-resistance one, which is another good point, as it means comparative immunity from break-downs, and we feel that this loud-speaker, at a price of £3 7s. 6d., represents good value for money.

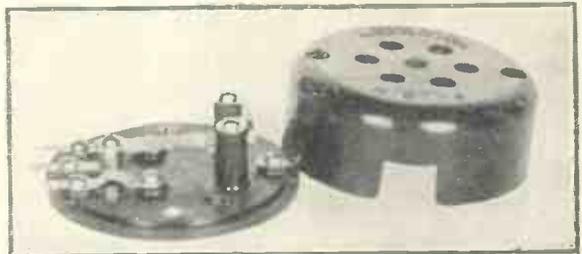
BULGIN THERMAL-DELAY SWITCH

APPARATUS: Thermal delay switch, type A

PRICE: 7s. 6d.

MAKERS: A. F. Bulgin & Co., Ltd.

CASES arise occasionally where it is desired to withhold the application of the high-tension voltage on a set until the filaments have been switched on for an appreciable time. This is particularly the case with indirectly-



AUTOMATIC HIGH-TENSION SWITCH

This switch puts the high tension on some seconds after the low-tension circuit has been completed by means of an ordinary switch. It is made by A. F. Bulgin and Co., Ltd.

heated valves which take an appreciable time to warm up.

There are also certain types of rectifier, such as the Marconi type GU1, in which the voltage must not be applied to the anode until the heater has got under way.

To meet these requirements, A. F. Bulgin & Co., Ltd., have recently introduced a thermal-delay switch. This consists essentially of a strip of bi-metal. Such a strip is made up of two metals side by side, having different expansions. If the strip is heated one side will expand more than the other and the whole strip will bend.

Heater Winding

In the switch in question there is a piece of this bi-metal clamped at one end and provided with a contact at the other. Wound round the strip is a small heater winding, and when the current passes round this the heat generated causes the strip to bend as just described and the contact on the end of the strip moves up against another contact and completes the circuit.

The free end of the strip, however, butts up against a small spring so that the tendency of the strip to move is resisted for a time until the force becomes sufficiently great to push this spring aside when the strip moves over into contact with a click.

This avoids any chattering of the contacts, because after the switch has moved over the same spring holds the

OUR TESTS OF NEW APPARATUS—Cont.

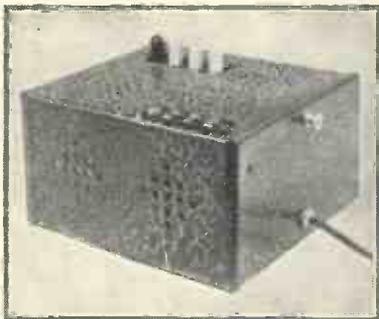
contacts together, which is a desirable feature.

Our tests showed that the switch operated in approximately half a minute, and took fifteen to twenty seconds to release. The heater is wound to suit a 4-volt supply, under which conditions it takes approximately .75 ampere. This, of course, is a negligible drain in an A.C. set, for which the switch is primarily intended.

The arrangement is housed in a neat bakelite casing provided with ventilating holes in the top, and can be recommended where a delayed action of this nature is required.

CLIMAX A.C. UNIT

APPARATUS: A.C. mains unit, type MA20.
PRICE: £2 19s. 6d.
MAKERS: Climax Radio Electric, Ltd.



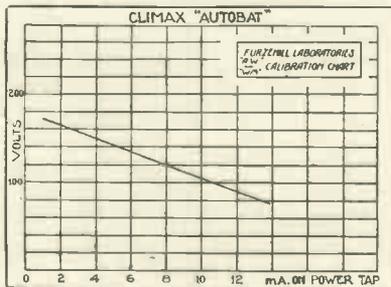
FOR A.C. MAINS

Neat and compact is the new Climax high-tension unit for operation from A.C. mains. It is suitable for the average three-valve set

THE Climax Autobat A.C. unit is a neat power instrument designed to supply high-tension current to small receivers. It is arranged for operation on 200 to 250 volts A.C. supply, the primary winding of the transformer being tapped to suit the different voltages.

Three Outputs

Three outputs are provided, one suitable for the screening grid of the high-frequency valve, one rated to give 80 to 100 volts at about 2 milliamperes for the detector valve, and a power tap rated to give 150 volts at about 15 milliamperes.



REGULATION CURVE

Regulation curve of the Climax A.C. unit for supplying high tension

The circuit is quite normal, single-wave rectification being employed, the rectifying unit being of the well-known Westinghouse type. All outputs are condensed to avoid trouble from low-frequency instability. It is housed in a brown metal casing, on which provision is made for earthing. The output plugs and sockets are carried on a small panel on the top of the unit, the whole forming a neat assembly, measuring 6 in. by 5¾ in. by 3½ in.

Power Output

The unit was tested on 240 volts 50 cycles and the load on the three tappings was adjusted until the rated voltage was obtained. Under these conditions the currents were 4, 2, and .5 milliamperes respectively. The output on the power tap is somewhat low; more current can be drawn, of course, at the expense of voltage, the figures being as shown on the curve.

HELSEBY FIXED CONDENSERS

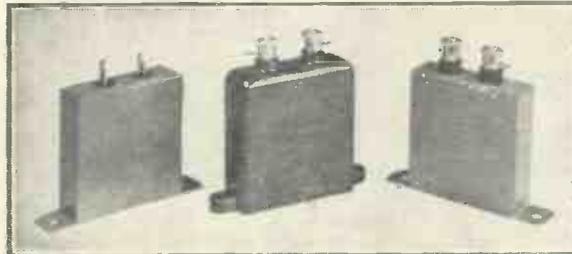
APPARATUS: Fixed condensers, 1-microfarad capacity, in (a) metal and (b) bakelite cases.

PRICE: (a) 3s. 7d.; (b) 2s. 8d.

MAKERS: British Insulated Cables Ltd.

HELSEBY condensers have been known and used in telephone practice for many years. We have recently tested some sample 1-microfarad condensers intended for radio work. These condensers may be obtained in grey-finished metal cases or in brown bakelite cases.

The former type, which has slightly the smaller dimensions, is provided with



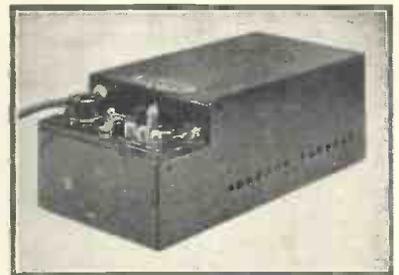
A RANGE OF FIXED CONDENSERS

Three Helseby fixed condensers. Two are in metal cases and the centre one is in a bakelite moulded case

terminals or soldering tags as required. Both types are, of course, provided with lugs for baseboard mounting.

The working voltage is clearly marked on the cases of the condensers, and this value should not be exceeded in practice. This is an important point and should not be overlooked if the condenser is to give satisfactory service for a long period of time.

On test the condensers were satisfactory, the measured capacity of the three samples being 0.99 microfarad, 0.95 microfarad, and 0.92 microfarad, these values being near enough to the rated value of 1 microfarad for all practical purposes. The insulation resistance was excellent, being to all intents and purposes infinite both before and after a full-load run on the full working voltage. These condensers can be recommended.



GIVES YOU HIGH TENSION

This Formo high-tension unit is also provided with a trickle charger for 2-, 4-, and 6-volt accumulators

FORMO A.C. UNIT

APPARATUS: A.C. mains unit, type Multivo.
PRICE: £5 5s.
MAKERS: Arthur Preen & Co., Ltd.

AN interesting mains unit which we have tested recently is that known as the Formo Multivo Battery Eliminator. This unit has been designed for use on A.C. mains of 200 to 240 volts (40 to 100 cycles), and is intended to be used with receivers of the "screen-grid, detector, and power" type requiring a total high-tension current of the order of 25 milliamperes.

Variable Voltage

Three voltage outputs are provided, one suitable for the screen grid of the H.F. valve, the actual voltage obtained being variable by means of a wire-wound potentiometer, a detector tap rated to give 50 to 90 volts, and a power tap to give 150 volts. In addition to the above a trickle-charging arrangement for 2-, 4-, or 6-volt accumulators is provided.

Metal rectifiers are used throughout, the Westinghouse type being employed. The voltage-doubling scheme is employed for the H.T. circuits, and as all outputs are well condensed no trouble from low-frequency instability should occur.

The unit is housed in a metal case finished a dark brown colour, the overall dimensions being 5 in. by 10 in. by 4 in. The small ebonite panel which carries the various controls is mounted at the front end.

Satisfactory Results

The unit was tested on 240 volts, and the results obtained were quite satisfactory. With a 20-milliamperere load on the power tap the voltage was 138, while the screen-grid tap gave 70 volts at 1 milliampere, and the detector tap gave 50 volts at 2 milliamperes. The trickle-charging arrangement gave approximately .5 ampere on any of the taps.

Manufacturers are invited to send apparatus to "W.M." for test

A DOZEN INSTRUMENTS REVIEWED

ATLAS D.C. UNIT

APPARATUS: D.C. mains unit, type DCIS/25.

PRICE: £1 15s. 6d.

MAKERS: H. Clarke & Co., M/cr., Ltd.

A CLASS of mains gear which has not received much attention of late is that intended for use with direct-current mains. Hence it was with interest that we received one of the Atlas D.C. units for test this month.

Control Panel

This unit is housed in the usual type of green metal case employed for Atlas mains apparatus. The front, which carries the small control panel, is inclined at an angle, thus allowing easy access to the plug and sockets.

Three voltage outputs are provided, one rated to give 60 to 90 volts, another 50 to 90 volts, and a power tap rated at 120 to 150 volts. An interesting point here is that the two low-voltage outputs are tapped, enabling the voltage applied



ATLAS UNIT FOR D.C. MAINS

This Atlas unit gives high tension from D.C. mains. It is well made and gives good results

to be adjusted according to the load required.

Another interesting point in the circuit is the provision of a series resistance, which can be inserted in the main positive lead by operation of a switch.

Voltage Dropping

This system is used to drop the voltage on the power stage when the load required is of the order of 10 to 15 milliamperes. If the load is to be as high as 20 to 25 milliamperes, the resistance is short-circuited. Iron-cored choking coils are used in both main leads and the outputs are condensed.

A point to remember when using a unit of this type is that the earth lead to the receiver should be disconnected and should be re-connected to the terminal provided on the unit. It is hardly necessary to point out that the metal casing of the unit must then not be allowed to touch any of the metal screening of the receiver.

Results on Test

The unit was tested on a 250-volt supply, and the following results were obtained: With the switch in the 15-milliamper position, the power tap gave 15 milliamperes at 150 volts. The 50 to 90 volt tap, under a load of 2 milliamperes, gave 110, 70, and 50 volts in the max., mid, and min. positions

respectively. The 60 to 80 volt tap, with a load of 1 milliamper, gave 55 and 35 volts respectively on the max. and min. positions. With the switch in the 25-milliamper position, the voltage on the power tap, with a 25-milliamper load, was 153, the remaining voltages being sensibly unaltered.

It should be borne in mind that if the unit is used on input voltages below 250, the output voltages will be correspondingly less. The unit was then tested on a receiver and proved quite satisfactory. It should give good service in practice.

R. & A. MOVING-COIL LOUD-SPEAKER

APPARATUS: Permanent-magnet moving-coil loud-speaker.

PRICE: £2 5s. (output transformer, 12s. 6d.)

MAKERS: Reproducers and Amplifiers, Ltd.

THE R. & A. type 100 moving-coil loud-speaker belongs to the permanent-magnet class. It employs a diaphragm of somewhat unusual construction in that it is made from fabric material doped to give it the required stiffness.

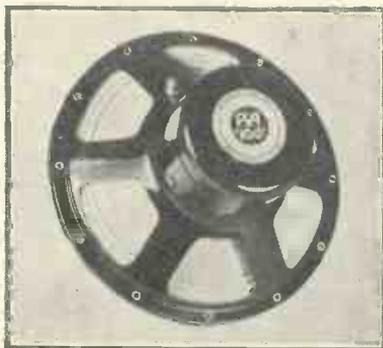
Corrugated Diaphragm

The suspension is actually a part of the diaphragm itself, being formed by bending over the outer edge, which has been corrugated concentrically to give it the required flexibility.

The moving coil is approximately 1 in. in diameter and is of the low-resistance type requiring an input transformer. A special multi-range transformer is sold for use with the loud-speaker. The centring device is quite normal.

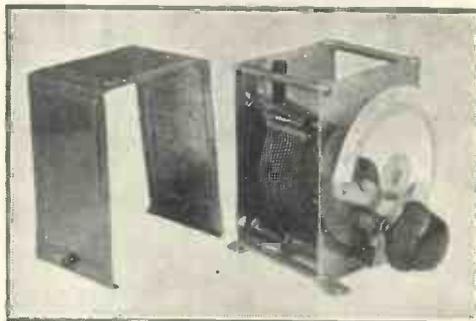
The diaphragm is suspended from a very rigid metal chassis, which is finished in black enamel. To the back of this chassis is bolted the permanent magnet, which is of the popular cross type. This magnet is copper plated to prevent rusting, and is further provided with a dust cover, also finished in black enamel, which fastens on to the back of the chassis.

Tested on our standard amplifier, the results obtained from the reproducer were good. The overall frequency



PERMANENT MAGNET

The R. & A. type 100 permanent-magnet moving-coil loud-speaker, one of the first of the low-priced models to be produced



COMPLETELY SCREENED CONDENSER

A new type of Jackson Bros. variable condenser that can be completely screened

response was excellent up to about 4,000 cycles and down to about 100 cycles, beyond which limits the output appeared to fall off. The sensitivity was also normal for this type of loud-speaker, and it should give good results with receivers equipped with output valves capable of giving as little as 500 milliwatts.

The instrument proved capable of handling inputs up to 2 or 3 watts without distress. The overall dimensions are 10 in. in diameter and 5 in. deep.

J.B. SCREENED VARIABLE CONDENSER

APPARATUS: Screened variable condenser, type R, .0005 microfarad.

PRICE: 12s. 6d.

MAKERS: Jackson Bros.

THE J.B. screened condenser is totally enclosed in a metal casing which, besides supporting the fixed plates, also carries the slow-motion mechanism, this latter having a reduction ratio of approximately 9 to 1. The two sets of plates are of brass, the fixed plates being supported from the casing by means of two ebonite bushes, while the moving plates are, of course, in permanent contact with the casing.

Usual Type of Trimmer

A trimmer is provided, this being of the usual type consisting of a mica sheet between two metal plates, the distance between which can be varied. In order to allow inspection of the condenser the side and top of the casing can be removed in one piece.

Lugs are provided to enable the complete unit to be screwed down to the baseboard. A small moulded bakelite window is included with the condenser, through which the ivory scale is viewed, this latter being marked in degrees.

High-frequency Test

A high-frequency test was conducted on the condenser with a view to determining the equivalent series resistance which would be inserted into a tuned circuit using the condenser.

At 250 metres the value obtained was about 3 ohms. This figure is quite normal and the condenser should give good service. The capacity of the condenser could be varied from just over .0005 microfarad down to approximately .00005 microfarad.

BROADCAST MUSIC



The Old Moscow Balalaika Orchestra

Things Heard and To Hear :: By T. F. HENN

AN interesting story lies behind a new operetta, *Goodnight Vienna*—written by Holt Marvell and set to music by George Potsford—which will be broadcast early in the new year. It was originally intended that this should be one of the first broadcasts from Broadcasting House.

Unfortunately, decorations to the studios will not be completed in time, so the show will have to take place at Savoy Hill. This production will necessitate the use of a large number of studios, and both the B.B.C. Theatre Orchestra and a quintet will be required to provide the music.

The operetta deals with the night

life of Vienna before, during and after the War. Its main feature will be to show the reaction of the war on the artistic side of Vienna's night life.

Adaptability for Films

It was finished during a week-end and on the Sunday night Holt Marvell wrote to Herbert Wilcox, of British Dominion Films, Ltd., at Elstree, describing in detail the production and suggesting its adaptability for film use. When Holt Marvell arrived at his office at 9.30 on the Monday morning, he was told that Mr. Wilcox had already telephoned.

Holt Marvell telephoned Elstree

and arranged to go there immediately. He arrived at eleven for a further talk. The first post on Tuesday he received the contract for the film production. Now the film is in the course of being made, with Jack Buchanan and Anna Neagle in the leading roles. It was this film that made Jack Buchanan give up his proposed visit to Hollywood.

The broadcast version of the operetta will be looked forward to with interest, especially as it is being produced by an unusual combination—John Watt and Val Geilgud.

The second half of the season's B.B.C. Symphony Concerts at the



A favourite broadcaster from Midland Regional, Elsa Tookey is a member of the Tookey Trio, an excellent combination



A Fellow of the Royal College of Organists, Frank Newman is noted for his broadcasts from Lozell's Picture House



One of the earliest of broadcasters, Olive Jenkin, soprano, has broadcast from nearly all B.B.C. stations

Queen's Hall opens on January 13, when an interesting programme of works by Schubert, Mozart and Brahms will be conducted by Adrian Boult. This concert will include the universal favourite, Schubert's *Unfinished Symphony*. No one ever gets tired of hearing this beautiful work.

Prima Donna

Helene Wildbrunn, the German prima donna, will sing in the concert on January 20, which will be wholly devoted to the *Siegfried Idyll*, from Wagner's opera of that name.

A concert which will arouse the greatest interest of all musicians will be that of January 27. Two of Stravinsky's later works are down for performance. There is no living composer whose compositions have aroused such controversy as those of Igor Stravinsky.

Stravinsky studied music under the great Russian musician, Rimsky Korsakov. His earlier works, which include *The Fire Bird*, are typical of what is universally known as Russian music. However, starting with the now famous *Sacre de Printemps*, his musical style changed into that uncanny discordant type which has made his name a household word.

Stravinsky will play the solo part in his *Capriccio* for piano and orchestra, and the National Chorus will be heard in his *Symphonie de Psaumes*,



A brilliant young violinist, Oscar Lampe recently broadcast from London. His recital included works by Kreisler, which he played well



Dorothy Helmrich, the famous Scottish-Australian soprano, has broadcast in nearly all parts of the world. She was recently heard in a Bach cantata

arranged for chorus and orchestra. Ernest Ansermet, the great Swiss conductor, is to conduct.

Well known for his pioneer work in the cause of modern music, Ansermet has done a great deal to popularise it. He has conducted

Russian Ballet in Paris and London.

An artiste who is appearing with increasing frequency in musical-comedy programmes is Warde Morgan. He has a pleasant tenor voice which broadcasts well.

His career has been so romantic



Ethel Houseley has a good contralto voice for broadcasting. Her latest broadcast was from Midland Regional



A clever mimic, Brian Powley has been heard in vaudeville programmes from the London studios



During the last three months Eileen Tunbridge, a well-known soprano, has broadcast from the provinces

BROADCAST MUSIC—Continued



Two clever entertainers, Haver and Lee call themselves the "Fun Racketeers." In a recent broadcast their "smash and grab raid" created much amusement

that it reads much like Dick Whittington's story. He was originally intended for the Bar, but he ran away from home when quite young. Finding his way to London, he got a job at five shillings a week, out of which he paid 9d. for a night's lodging and breakfast.

Later his voice was trained by George Atley, the man who taught John McCormack. He made a hit in the popular musical comedy *Patricia*

and, as a result, was given a chance to play opposite Marie Burke, another popular broadcaster, in Australia.

An interesting story is told of when he was travelling with Marie Burke in Australia with a touring company.

Their train was wrecked, a number of people being killed and many injured; among the latter were the two artistes. For a time the life of

Warde Morgan was despaired of.

Now that Radio Paris is so easily received in this country, it is not out of place to mention two popular items which are broadcast from that station.

On Saturday morning at 9 a.m. a first-class symphony concert is relayed from the Conservatoire. All types of music are played, from the older classics to the hyper-modern. If you are keen on this form of entertainment, these concerts will satisfy.

The other item will appeal to all tastes. Rex Palmer, an announcer in the good old days before standardised pronunciation was introduced, takes charge of a programme of H.M.V. records every Sunday between 3 and 4 p.m.—an alternative to the British programmes that should appeal to all.

Bert Ambrose Band

The Blue Lyres, heard from the Dorchester Hotel, is one of the bands controlled by Bert Ambrose of the Mayfair Hotel. It is one of the best balanced combinations I have heard for a long time. I like its defined rhythm and excellent orchestration. The performers play in a way that makes them an ideal band for dancing to or listening to.

Congratulations to the New Savoy Orpheans. The only fault to be found with this relay from the Savoy Hotel is the excessive background noises.



A talented young violinist, Lillian Barca has broadcast from most B.B.C. stations as a soloist



Marcel Maas, pianist of the Pro-Arte String Quartet, broadcast recently. He has appeared all over the Continent



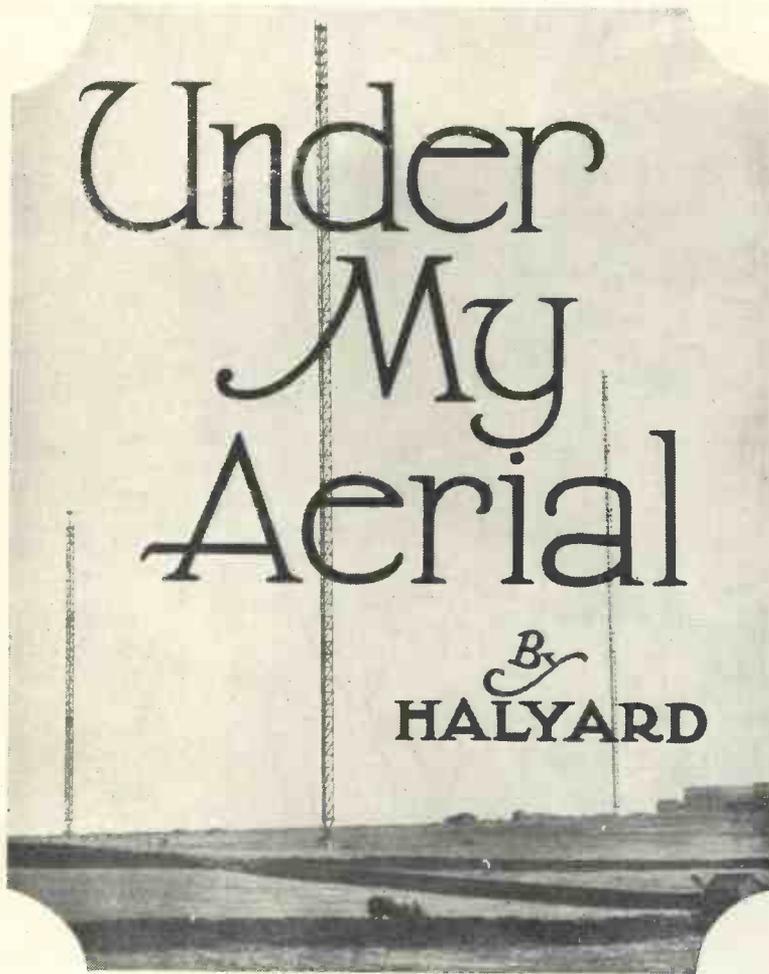
Mary Maddock, soprano, was a pupil of Mada.n. Esta D'Argo. Her latest broadcast was from the Cardiff station

THE RIDGEWAY PARADES



AN IMPRESSION GAINED FROM AN ACTUAL STUDIO VISIT ON A "PARADE" NIGHT

In the centre: Philip Ridgeway, departing with his new leading lady—the fair Anna Day. Behind them are John Charlton, Dorothy Hogben conducting her orchestra, Beatrice Galleway and Irene Vere. From left to right in the foreground are Dorothy Dampier, Hermione Gingold and Fred Curtis



Under My Aerial

By
HALYARD

A FINE VIEW OF THE NORTH REGIONAL STATION

A photographic study of the three huge masts at the B.B.C.'s North Regional station at Moorside Edge. It has proved a great boon to Midlands listeners

My Card

THIS year I had the idea of sending you all a Christmas card. Let me give you a description of it. On the front of the card is a jolly old-fashioned picture of a house from the ground-floor windows of which comes the warm glow of firelight. A man is looking out from one of these windows and if you look closely you might recognise him.

An aerial runs from the house to a mast at the distant end of a snow-covered garden. The aerial wire is down and the owner of the aerial is out there in the snow with a soldering

bit in his hand trying to melt the icicles off the wire. A postman is coming up the garden with a letter from Gourock.

George suggested this picture and there is hardly any need for me to tell you that the man looking out through the fire-lit window is George himself, while the poor fellow in the garden with a nose as red as his soldering bit is your old friend Halyard.

I designed the inside of the card myself. There is a picture of a black cat tuning-in a jolly little three-valve set, mine, and the loud-speaker is saying "Good luck calling."

The verse? Well now, I simply could not compose a suitable verse. George said he would give me two lines if I would add two more. I couldn't do that even, but I will give you George's two lines. Here they are:—



A nose as red as his soldering bit

May your mains set never shock you
Should you change from dry to juice.

Can you complete the verse?

Listeners and Ex-listeners

What is your estimate of the present number of listeners in the British Isles? You know, of course, that the four million mark was passed weeks ago. How far have we gone beyond this? I think we should be quite safe in putting four and a quarter millions as our lowest estimate for the number of listeners this Christmas.

Just think of it, four and a quarter millions. If you are short of puzzles or conundrums at one of your parties you might ask how far these four and a quarter million listeners would reach if they formed one long line.

You might also ask the clever schoolboy at your children's party, how many times a coil of wire, made from the aerials of all these listeners, would go round the earth at the equator. Have a guess at it yourself and then work it out.

An interesting and critical point with regard to wireless this Christmas is this: How many ex-listeners are there? In other words, how many people are there in our islands who had a set last Christmas, but do not possess one this year? Do you know of any such ex-listeners amongst your friends?

Somebody ought to tackle all the ex-listeners throughout the country and find out exactly why they gave up wireless. This seems to me to be a job for the Post Office. They have the records and they could afford to



Why they gave up wireless

do it without further Post Office deductions from our licence money.

Moore and Moore

"Do you know what I wish very much just now, George?" I asked my technical adviser as we settled down before a cheerful fire in my reception room on our return from our first Christmas shopping expedition.

"Couldn't say," replied George.



The doom of the outdoor aerial

"Most people at this time of the year wish for more things than they can possibly hope to get."

"George, I was wishing that you were a wireless Old Moore."

"Indeed, and why?"

"So that you could give me some useful wireless prophecies for 1932, George."

"Oh! I see. Well, here's one for you. Early in the year the world will be astonished by the commercial use in wireless telephony of waves half as short again as the shortest. How's that for a start?"

"Fair, George, fair. Suppose I have a shot myself. Jamming in the ether will continue and a particularly bad heterodyne in March will cause several prominent broadcast engineers to leave the country."

"The season for portables will start early and will prove a long one. An enterprising seaside resort will provide a free charging station for the accumulators of its visitors."

"I'd like to know where that seaside place is, George. Continuing our prophecies, though, June will see a new record in weather forecasts. No mention of the depression off Iceland will be made that month."

"Let's leave it at that. Wait a minute, though, just one more. The early autumn will see the doom of the outdoor aerial, and an obscure wireless writer will have to change the title of his monthly notes."

"No, George, I'm not having that."

Programmes 1931

Can any listener, after casting his mind back over the year 1931 and considering the programmes he has enjoyed that year, have the slightest doubt that he is getting extraordinarily good value for his ten-shilling licence fee?

When I look back over the programmes of 1931, there are certain broadcasts which stand out very vividly to remind me of value received. One of these broadcasts is, of course, the Oxford-Cambridge boat-race commentary. I think I should buy a set and take out a licence for that one broadcast alone.

Another vivid broadcast to me this last year was the Derby, not that I, myself, stood to gain or lose anything on the great race. A little band of people in my neighbourhood, however, had drawn a horse in the Irish Sweepstake and I had my own little share of the excitement as I listened to the race with several of the lucky ones and heard their horse come in second.

Then there was Armistice Day service and the Albert Hall Concert at night. These broadcasts on Armistice Day always touch me and renew in me a feeling of thankfulness and humility. Perhaps they have this effect on all those who served in the war.

On the lighter side we have had some splendid programmes. I have a vivid recollection of the Hulbert Follies, one of whose hours in November seemed to me to be the best broadcast of the light and humorous type we have had during the year.

Taking things all round, 1931 has been a good year for programmes, and if the standard of 1931 is maintained



Broadcasts that stand out very vividly

throughout the New Year I, for one, shall be highly satisfied.

Renewals

Now that there are over four million sets in use in Great Britain, it looks as if the bulk of our wireless trade in 1932 might be in renewals to those existing sets. Ever since wireless started there has been a steady trade in valves, dry batteries, and accumulators, and I should think that trade in these three indispensable things will reach a very high value in 1932.

Of the components parts of a home-constructed set, I should be inclined to say that renewals in transformers and loud-speakers will bring the most trade during the New Year. You cannot expect a low-frequency transformer to last for ever, and some of the old types still in use are not suitable for modern valves.

It is the same with loud-speakers. There are still many old loud-speakers in use, which, so to speak, cry out

nightly for replacement. I know one or two in my own immediate neighbourhood.

Switches might form another item in which renewals might be numerous, especially if someone brought out a really good and noiseless switch. Every three-year-old aerial ought to be renewed during the year. No doubt you can add to my list of renewals.

Why I mention these possible



Some of the old types still in use

renewals for 1932 just now is because you might publish your own list of acceptable renewals. Although it may be late to expect to get any of your renewals in your Christmas stocking, you might pull one or two in as New Year gifts. Try it.

For the Empire

Have any of your relations or friends in Britain Overseas mentioned the proposed B.B.C. Empire broadcasting station in their letters to you yet? I should think the news that this short-wave Empire broadcasting station was at long last to be built must have caused a great flutter of excitement in wireless circles in the various parts of the Empire.

The new Empire broadcasting station is to be built at Daventry, so that Daventry, with its long-wave National transmitter, its medium-wave Midland Regional transmitter, and its new short-wave Empire transmitter, will have greater claims than ever to be looked upon as the wireless centre of England.

Several short wavelengths are to be employed at the new station and programme arrangements will cover practically the whole of the twenty-four hours. It looks as if South Africa will come off best in the matter of programmes, for South Africa will listen to the new short-wave station in our evenings, and will therefore



Flutter of excitement in wireless circles

UNDER MY AERIAL—Continued

enjoy the pick of our evening programmes.

Australia will not fare so well as South Africa for the Australian programmes will coincide with our morning programmes. Canada will, perhaps, fare worst of all, for special programmes for Canada will have to be sent out by the Empire transmitter during the early hours of the morning when broadcast artistes will certainly not be at their best, if my experience of night work is anything to go by.

Europe 1932

What, in your opinion, would constitute the most welcome improvement in broadcasting during the New Year, 1932? I should be inclined to say a general clean-up of the European ether. Just run round the dial of your tuning condenser with your medium-wavelength coil in circuit



Run round the dial of your tuning condenser

and note the number of bad heterodynes. How many are there?

You expect to get curious noises on the common wavelength of the British relay stations, and on the international common wavelengths, and you certainly get what you expect to get. In addition, however, you get other bad cases of interference where all ought to be clear.

Worse still, these bad cases of interference are not always found at the same point on your condenser dial. One night you may get a bad case of interference at a reading of forty-five on your condenser dial. A week later, all will be clear at this reading, but a new case of interference will be found elsewhere on your condenser dial.

This shifting about of interference is due, of course, to European broadcasting stations changing their wavelengths in order to avoid interfering with each other. It would be a great thing indeed if all this shifting interference were done away with in 1932.

How could this be done? There are three methods: (1) A reduction in the number of European broadcasting

Look out for another fine issue of WIRELESS MAGAZINE on Wednesday, January 20 There is certain to be a great demand for it, so order your copy in advance!

stations, (2) a reduction in the power of all broadcasting stations, and (3) a bringing into use of part of the short-wavelength band for broadcasting.

There is little likelihood of an improvement by means of methods 1 or 2, but 1932 might see some improvement by means of method 3.

Winter Breakdowns

In building a broadcasting station on high land there is the advantage of giving the station a greater range than it would have had if it had been built on lower-lying ground. There is also the disadvantage that the aerial equipment of the station is exposed to the full force and severity of the winter gales and weather the district experiences.

Since several of our high-power broadcasting stations in Europe are built on elevated sites, it will be interesting to see whether there will be more breakdowns this winter than there have been in previous winters.

Already our own Northern Regional transmitter has had one bad breakdown this winter through the breaking of down leads in a severe gale. We can only expect that there will be further trouble of this kind at this station which, it is claimed, occupies the highest broadcasting site in Europe.

None of our other British regional stations are as exposed to wind and



The highest broadcasting site in Europe

weather as the Northern Regional station, but several of the best known and most powerful of the Continental stations occupy high sites, Langenberg and the new Radio-Paris, for example.

If we were to keep records of the number and length of time of the breakdowns at these high and exposed broadcasting stations, we might get a good notion of the severity of the winter in the different countries in which these stations are situated.

Broadcast Speech

What is the effect, if any, of broadcasting on the speech of the different members of your family, if any, and on your neighbours, again if any? Do you find your family and your neighbours going about speaking of the war in Chinah, and of Indiah and Americah? Do your wireless cronies ask you to pass the soldering ahn?

It seems to me as if the B.B.C. has been misjudged because of its pronunciation lists, the last of which, by the way, contained the word fiancée, the London equivalent of which, George says, is young lidy.

These pronunciation lists, intended for announcers, might have been kept for announcers only. The publication of these lists has made it appear that the B.B.C. wished to



Pronunciation lists intended for announcers

dictate to us on the ticklish matter of our speech.

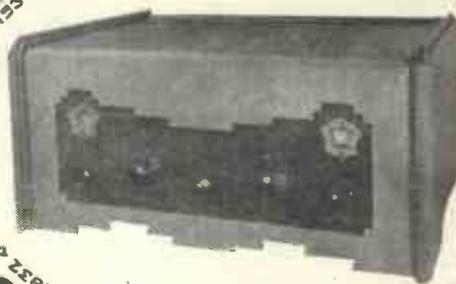
The question of broadcast pronunciation is a difficult one, and one which can never be settled to the satisfaction of everybody. I often wonder how many people in the north of England are annoyed by the B.B.C. announcers' "Southern English."

Don't you think the question of pronunciation is one which the B.B.C. would do well to leave alone, except to issue an instruction to their announcers to be sufficiently human to make a mistake in pronunciation now and then?

The 1932 SUPER 60



*W. James' Set
for the
New Year*



THERE is no question that WIRELESS MAGAZINE has led the way in modern screen-grid super-heterodyne receivers. We need only point to the enormous popularity of the original Super 60 to demonstrate the truth of this statement. That set created more interest than any home-constructed receiver published up to that time.

One feature that makes the super-het such a popular type of receiver is the fact that a reaction control is dispensed with. Anybody can get good results after a few minutes' handling of a set like the Super 60. There are only two tuning knobs and adjustment of these is quickly mastered.

The original Super 60 was described by W. James in these pages last March. Since then considerable developments have taken place and we are now able to present WIRELESS MAGAZINE readers with an improved design costing very little more than the original, which was really exceptional value for the money.

Converting the Original Set

The 1932 Super 60 uses many of the parts to be found in the original version. Those who already have Super 60's can, therefore, convert them to the 1932 edition at small cost—about £5 will be the maximum in most cases.

Why is the 1932 Super 60 better than the original and what are the essential differences between the two?

Well, the new set has band-pass aerial tuning, which makes it decidedly sharper on the aerial side than a frame-aerial receiver. From this it is obvious that an ordinary aerial is utilised; a short wire of 20 or 30 ft., either indoors or out, will give all the signal strength ordinarily needed.

Provision for Gramophone Pick-up

One particular feature of the 1932 edition is the inclusion of a gramophone-switching arrangement. This is so arranged that a pick-up can be kept permanently connected to the set. When this is used the first four valves are automatically switched off, thus conserving the life of the high-tension battery. This is a point that will appeal to thousands.

Perhaps the most pleasing feature of the 1932 Super 60 is its silent background during reception; there are practically no whistles when searching for stations owing to the extra selectivity given by the band-pass aerial tuner. This and other interesting points are fully dealt with by W. James in the following pages.

This set, by the way, uses a new dual-range oscillator, which is coupled to the band-pass tuner, so that only one wave-change switch is needed. Next month we shall explain how the three-range oscillator coil employed in the original model can be fitted to the new version. If it is used, however, there will be two wave-change switches to operate.

W. James' Latest Achievement for 1932

BUILDING THE 1932 SUPER 60

By W. JAMES

FOR broadcasting conditions as they are to-day and will be for some time to come, the best receiver is, without the least shadow of doubt, a super-heterodyne.

The stations are spaced apart by 9 kilocycles, approximately. The power of stations is being increased. Therefore, more stations are to be heard at good strength and at the same time the chances of interference are the greater.

Difficult Conditions

Reception conditions become more difficult from the point of view of selectivity as the power of stations is increased. What we normally find is that we can receive a certain station clear of interference until the power of a station working 9 kilocycles or so away is increased. Then interference is experienced.

We are likely to have the case of Daventry 5XX as a further example. In the south, reception is clear of Radio Paris, but when Radio Paris has been heard testing with increased power there has been interference, using ordinary good sets.

The super-heterodyne receiver, of which the Super 60 was probably the

first popular example with amateurs, scores in many ways.

First, the selectivity may be made all that is necessary. The tuning may be made really sharp, without departing from the band-pass characteristics which are really essential in many respects. This tuning is, further, not obtained at the expense of critical adjustments.

In ordinary sets, having adjustable reaction, you have usually to tune very carefully, adjusting this control a little and then that, one affecting the other. Skill is needed in tuning and the quality varies with the setting of the controls.

Thus the set may be nearly oscillating when receiving one station, and a good way from the oscillating point when receiving another.

The second point in favour of the super-heterodyne set, therefore, is the ease of tuning. You must turn the controls slowly or stations will be passed over. But tuning is not tricky and anyone can learn to tune a set in a few minutes. There are usually only two controls and a further one for the volume.

The third point is the ease with

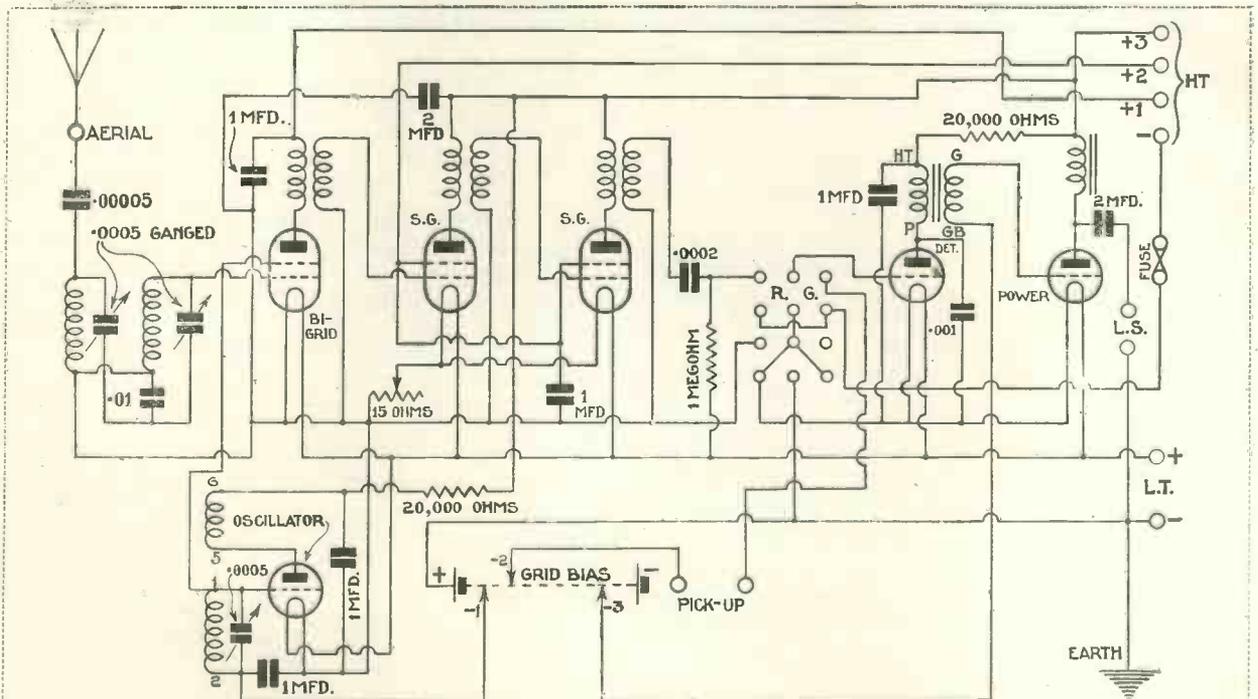
which a super-heterodyne receiver can be made. The chances of failure are so small. Band-pass circuits are used and we have to see to the tuning of the aerial circuit only. We may use a band-pass circuit here and have the gang tuning of this circuit to see to. But there is no difficulty in this. We may have eight tuned circuits, giving wonderful selectivity. Six of these circuits are tuned and matched by the makers and are provided in the form of three band filters having two circuits each.

Correct Band-passing

These units are accurately manufactured and adjusted to have under working conditions the correct band-pass characteristics. You can well imagine the difficulty there would be of gang tuning this number of circuits in an ordinary set, quite apart from the shielding difficulties. In fact the task would be beyond the skill of ordinary amateurs.

There is yet another point in favour of the super-heterodyne. The quality can be made excellent. *There is nothing in the super-heterodyne principle*

(Continued on page 702)



ON THE LINES OF THE ORIGINAL SUPER 60, BUT VERY MUCH MORE EFFICIENT
The circuit combination of the 1932 Super 60 is a bi-grid first detector, oscillator, two screen-grid intermediate amplifiers, second detector, and a power stage. A new type of dual-range oscillator is used and the aerial circuit has band-pass tuning. A switch is provided for putting a gramophone pick-up in circuit

PUTTING THE SET THROUGH ITS PACES!

EVERY listener who tours the Continent by radio knows that confusion is rife. Stations are bunched up together closely and in many cases two adjacent stations are causing interference with each other, making reception of either impossible.

Tremendous Advantage

This is where the 1932 Super 60 has a tremendous advantage over other sets. I found during tests that any two stations, no matter how close to each other, can be separated without mutual interference. Even if the stations are working on high power, this latest achievement of W. James will do the trick.

I have spent a week-end with this set and, as far as logging stations is concerned, the list given on this page speaks for itself. There are about sixty stations in this list, but I am convinced that if the set had been on test for a week the number would probably have reached a hundred. Every station worth hearing comes in without jamming.

Quality is Excellent

In spite of the fact that selectivity is of the knife-edge variety, the quality is excellent. Using the recommended moving-coil loud-speaker for my tests, the quality left little to be desired. Both top and bass notes came through with a true musical balance that made listening a pleasure.

WHAT THE 1932 SUPER 60 WILL DO

- ¶ The set lives up to its name. During one evening's test in south-east London it received fifty-seven stations at good loud-speaker strength.
- ¶ Although there is a station at nearly every degree of the dial, the quality of reproduction leaves nothing to be desired.
- ¶ There is sufficient power to work a moving-coil loud-speaker satisfactorily.
- ¶ With the specified valves the anode-current consumption is only 13 milliamperes, and the set can be run economically from a double-capacity anode battery.
- ¶ There is an absolutely silent background when searching for stations.
- ¶ So great is the overall magnification that the set has an astonishing daylight range.
- ¶ There is only one wave-change switch for the medium and long wavebands.
- ¶ A switch is provided so that a pick-up for playing gramophone records can be put in circuit at will.
- ¶ All these points mean that the 1932 Super 60 is even better than the original model.

A big surprise was that both London Regional and London National came through at ordinary listening strength without an aerial. But in spite of this, when the aerial was connected and a slight adjustment made to the oscillator condenser, Muhlacker—London's Continental nuisance and the bugbear of all South-country listeners—was heard with the strength and clarity of a local station. This is a really wonderful performance.

Using the specified valves, the total anode current was only 13 milliamperes. This low battery consumption was obtained when H.T.+1 was plugged into the 45-volt tapping of the high-tension

battery, H.T.+2 into 75 volts, and H.T.+3, the power tapping, into the maximum, in this case 120 volts.

This set is a great improvement on the original Super 60. All the heterodyne whistles usually associated with this type of set are non-existent. This alone should tempt all possessors of a Super 60 to convert their sets to the 1932 model.

Daylight reception is much better than usual. During a Sunday morning no fewer than a dozen foreign stations were heard at full loud-speaker strength. Of these, eight were logged on the long waves and the remaining four on the medium waves.

On the long waves, Radio

Paris and Zeesen were easily separated. This is no mean feat considering the enormous power that the former station is now using. I doubt if many commercial sets can separate them, irrespective of their cost.

Three Powerful Stations

North Regional is the centre of a group of three powerful stations. With Leiblitz on one side and Langenberg on the other, a set that can separate them is doing something that thousands cannot. The 1932 Super 60 will cut any interfering station "as clean as a whistle."

Another improvement that has been made in the new design is the provision of a pick-up for electrical reproduction of records. By the turn of a switch, the high-frequency stages of the set are switched off and the gramophone pick-up brought into play. Gramophone reproduction was good, but a larger power valve was found to be an advantage and is to be recommended if the source of high tension can stand the drain.

High Entertainment Value

The entertainment value of this set is the highest of any set I have yet tested.

This set will do more than any other that has yet been offered to the home constructor at the price. If you have a Super 60, convert it, and if you haven't—well, build this one!

T.F.H.

ONE EVENING'S LOG WITH THE 1932 SUPER 60*

LONG-WAVE BAND			
Wave length	Station	Aerial Condenser	Oscillator Condenser
1,875	Huizen	168	156
1,724.1	Radio Paris	150	148
1,635	Zeesen	139	144
1,554.4	Daventry	136	139
1,445.7	Eiffel Tower	122	131
1,411.8	Warsaw	116	128
1,348.3	Motala	104	121
1,304	Moscow	100	116
1,153	Kalundborg	90	107
1,091.7	Oslo	80	100
MEDIUM-WAVE BAND			
Wave length	Station	Aerial Condenser	Oscillator Condenser
550	Budapest	172	178
541.5	Sundsvall	170	176
532.9	Munich	168	171
517.2	Vienna	164	167
509.3	Brussels (No. 1)	160	165
501.7	Milan	156	163
489.3	Leiblitz	153	161

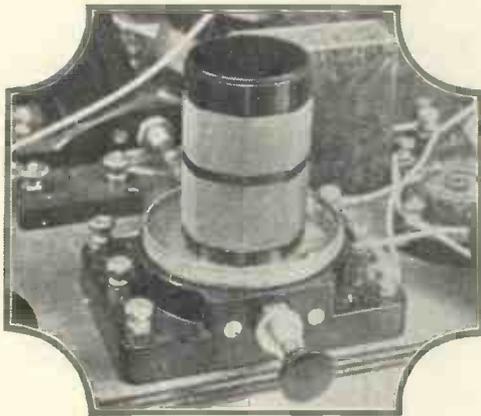
Wave length	Station	Aerial Condenser	Oscillator Condenser
480	North Regional	150	159
472.4	Langenberg	148	157
459	Beromuenster	145	152
441	Rome	139	147
435.4	Stockholm	137	146
430.4	Belgrade	135	140
419	Berlin	134	141
413	Dublin	129	138
409.8	Katowice	127	136
403	Sottens	125	135
398.9	Midland Regional	122	134
394	Bucharest	120	132
389.6	Frankfurt	118	130
384.4	Toulouse	117	128
381	Lvov	116	127
376.4	Glasgow	114	125
372	Hamburg	112	123
363.4	Algiers	109	121
360.6	Muhlacker	108	120
355.8	London Regional	104	118

Wave length	Station	Aerial Condenser	Oscillator Condenser
352.1	Graz	102	116
348.8	Barcelona	101	114
345.2	Strasbourg	98	111
337.8	Brussels (No. 2)	96	108
325	Breslau	90	102
307.6	Bordeaux	85	97
301.5	North National	83	95
298.8	Hilversum	81	93
279.3	Bratislava	72	85
276.5	Heilsberg	70	83
274.2	Turin	69	82
266	Lille	67	80
263.8	Moravska-Ostrava	64	78
261.5	London National	62	76
259.3	Leipzig	59	74
257	Horby	57	72
253.0	Gleitwitz	50	68
249.6	Juan-les-Pins	55	66
247.7	Trieste	40	64
227.4	Cologne	28	56

* Results of a test made in South-east London.

THE 1932 SUPER 60—Continued

Convert Your Super 60 into This Improved 1932 Edition!



NEW DUAL-RANGE OSCILLATOR
This is the dual-range oscillator coil specially developed by Lewcos for the 1932 Super 60. It is shown with the metal cover removed

to make the production of good quality difficult. The reverse is, indeed, the case.

Good quality is readily to be obtained by following the rules that apply in the design of ordinary sets. If you must use a small battery output valve, then you must be satisfied with a small volume of sound. If you push the power valve and overload it, the quality will be poor. Fit a large power valve, use adequate high tension and all the volume needed is obtained, and good quality as well.

In considering the Super 60—what changes could be made in order to improve the performance of this well-known set—it was decided at once to retain the two intermediate-frequency stages; associated with these two stages are two screen-grid amplifying valves and three band filters.

Great Amplification

These provide a unit having great amplification and extremely good selective properties. The amplification is, of course, under control and the selectivity is about as much as you can expect to have or to use in an intermediate-frequency amplifier.

For many purposes a single stage is enough, but for the finest results with battery valves the two stages are advisable. They provide us with a margin of safety against future developments so that a user need not feel that an essential part of his set may go out of date in a season or two. Then the question of the frame aerial crops up. Shall we use a frame aerial or an open aerial and a selective tuner? Numerous tests show that the best all-round results are obtained when an open aerial is used with a band-pass tuner to the first valve. The daylight range

The set is a little bigger owing to the coils and condensers used.

It has band-pass aerial tuning and a radio-gramophone switch, more shielded parts and a choke-filter output circuit.

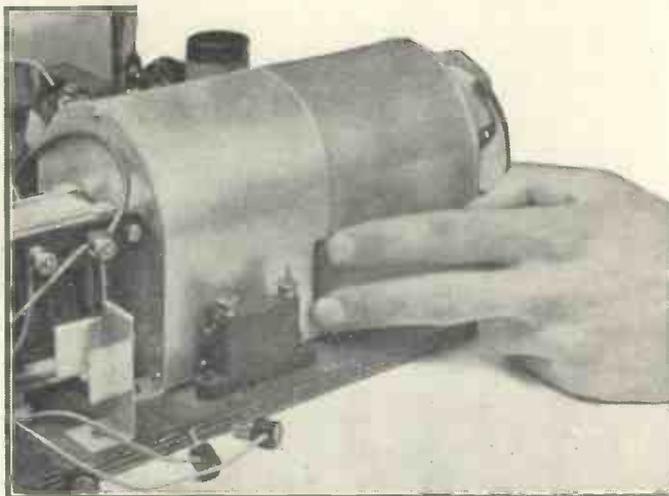
We have, therefore, in the aerial circuit a band-pass coil. This is tuned with a two-gang shielded condenser, quite cheap in price, but good in performance. A slow-motion dial is fitted to the condenser. The shielding prevents direct pick-up of the powerful local stations and avoids stray couplings in the set.

Better Than Frame Aerial

Tuning is sharp and better than that given by the frame aerial, as the band-pass characteristics of the unit are satisfactory. There are two coils in the unit and a fixed condenser of .01-microfarad capacity is used to complete the filter.

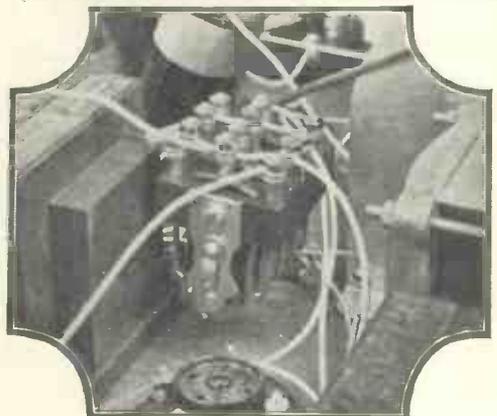
Then we have a fixed filter, as the .01-condenser couples the circuits and the two coils are magnetically coupled as well. The filter unit has been proved to possess desirable band-pass characteristics over the medium- and long-wavelength bands. The result is that interference is greatly reduced by this circuit alone.

In the Super 60 trouble was sometimes experienced through the
(Continued on page 706)



TRIMMING UP THE BAND-PASS CIRCUIT

There will be no difficulty in adjusting the trimmer on the two-gang condenser so that the set gives proper band-passing (see above)



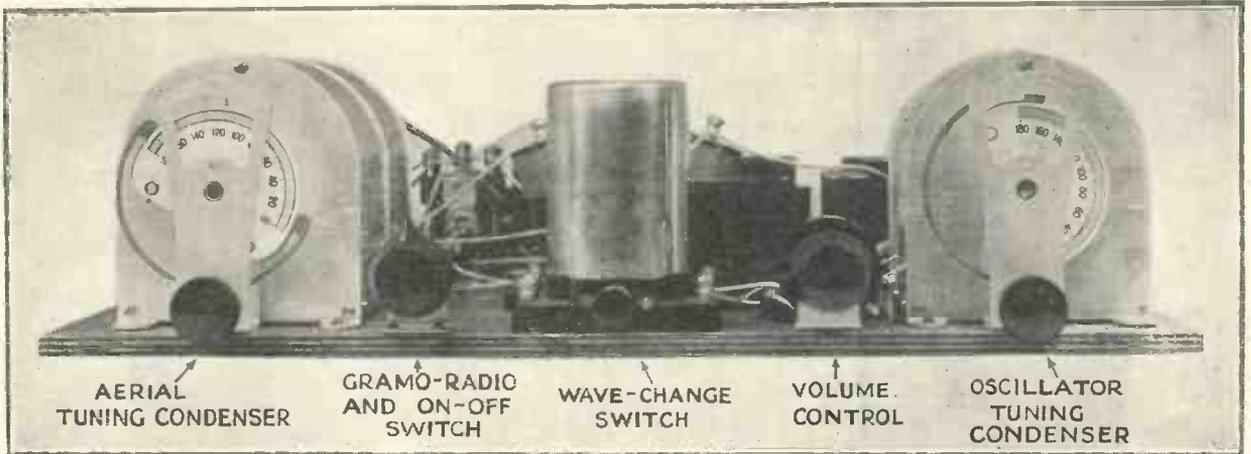
is better. Tuning is better. Some people say that a frame aerial is ugly. This last point is perhaps a small one, as many amateurs consider results first, and appearances afterwards.

In the 1932 Super 60, then, we have various improvements over the 1931 model, the cumulative effect of them being a set having a better performance with little change in the cost of the parts.

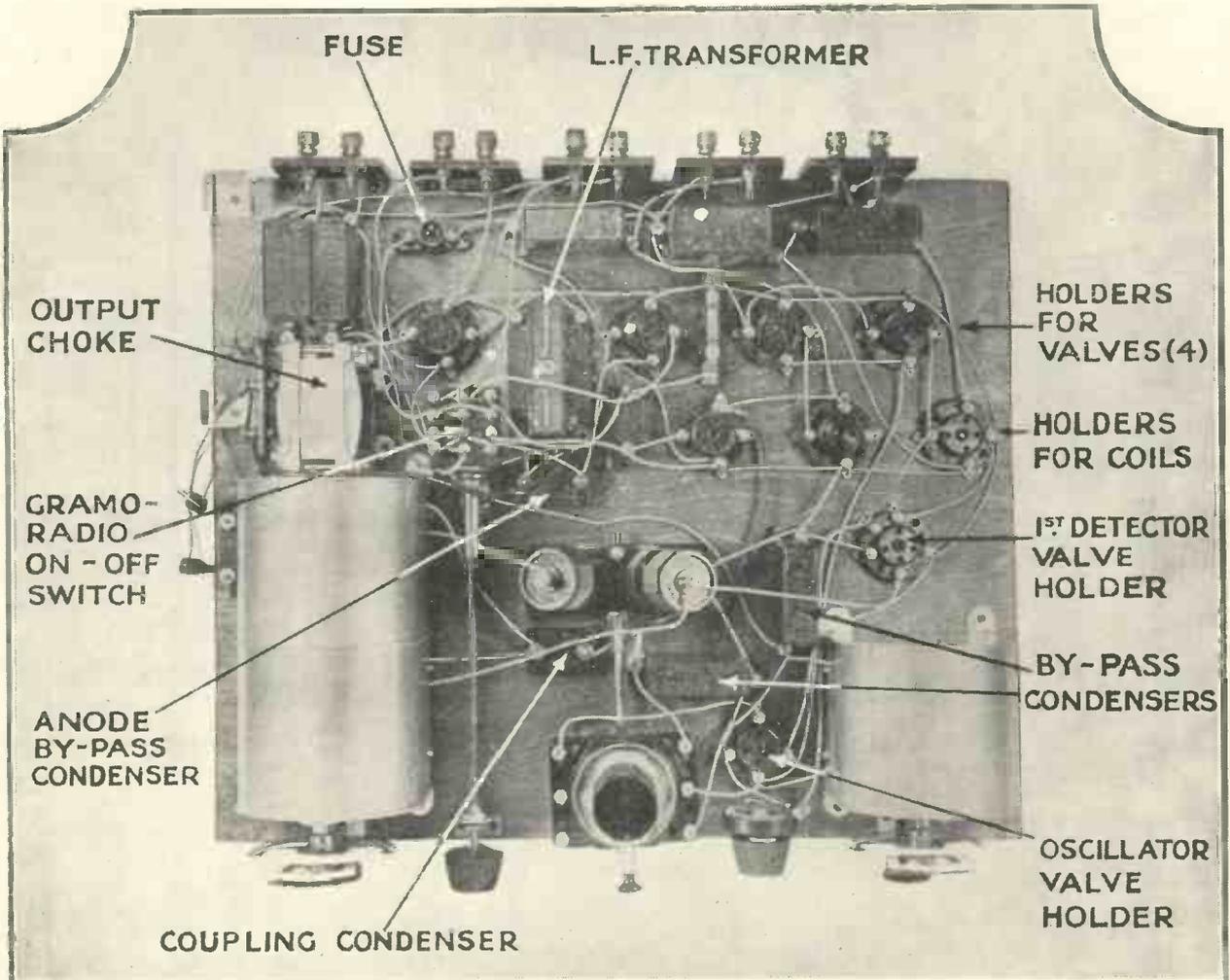
THREE JOBS AT ONCE

One of the best features of the 1932 Super 60 is the inclusion of a three-way switch for (1) radio reproduction, (2) switching off altogether, and (3) gramophone reproduction, for which the first four valves are cut out of circuit

ANOTHER "W.M." WINNER BY W. JAMES



YOU WILL HAVE NO TROUBLE IN WORKING THE FIVE SIMPLE CONTROLS OF THE 1932 SUPER 60. As this photograph shows, the 1932 Super 60 can be completely assembled without a panel of any sort. The two variable condensers and the oscillator coil are "self supporting," as it were, and the spindles for the three-way switch and the rheostat are held in position by small metal brackets.



THIS VIEW SHOWS THE SIMPLE AND STRAIGHT-FORWARD LAYOUT OF THE NEW "WIRELESS MAGAZINE" SUPER-HET. Specially designed by W. JAMES. This special photographic plan view proves beyond doubt the simple nature of the assembly of the 1932 Super 60. It is larger than the original model, but it is no more difficult to construct. Special features are the incorporation of a gramoradio switch and choke-output circuit. A bi-grid valve is used as the first detector and the oscillator coil is a new dual-range type. Note the screened tuning condensers, to avoid direct pick-up of the local station.

LAYOUT and WIRING DIAGRAM of the 1932 SUPER 60

THE diagram reproduced below is a half-scale layout and wiring plan of the 1932 Super 60. If this page is folded down so that the two sets of arrow heads coincide a complete diagram is formed, which can be followed without difficulty even by the beginner.

Full-size Blueprint

Some readers will prefer to work from a full-size blueprint. One of these can be obtained under the WIRELESS MAGAZINE half-price scheme if the coupon on the last page of this issue is used by January 31.

Send your application, together with the coupon referred to and a postal order for 9d., to Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4, and ask for No. WM269. A copy will be sent by return of post.

A Half-scale Reproduction

As is the case with all WIRELESS MAGAZINE blueprints—and the reduced scale reproductions of them that appear in these pages—each connecting wire is numbered separately. In this way the construction is greatly facilitated.

The wires are numbered in the most convenient order of assembly and if the numbers are crossed through as the corresponding leads are put in position there is no possibility of making a mistake.

Wires for Connections

The connections can be made with lengths of tinned-copper wire threaded through pieces of oiled-cotton sleeving. Alternatively, prepared connecting links—such as the Readt-Rad Jiffilinx—can be utilised. These are supplied in assorted lengths and are provided with

brass eyelets at each end for screwing under terminal heads.

Leads to the Switch

Perhaps the most difficult part of the wiring is connecting up the three-way switch. Care should be taken here to put the wires on the proper terminals, which are rather close together; if a mistake is made considerable damage may result when the set is switched on.

It will be seen that the band-pass tuner and the dual-range oscillator coil are coupled together so that a single knob at the front of the set actuates both wave-change switches. It is possible to use the three-range oscillator employed in the original Super 60, but in that case two wave-change switches will have to be used.

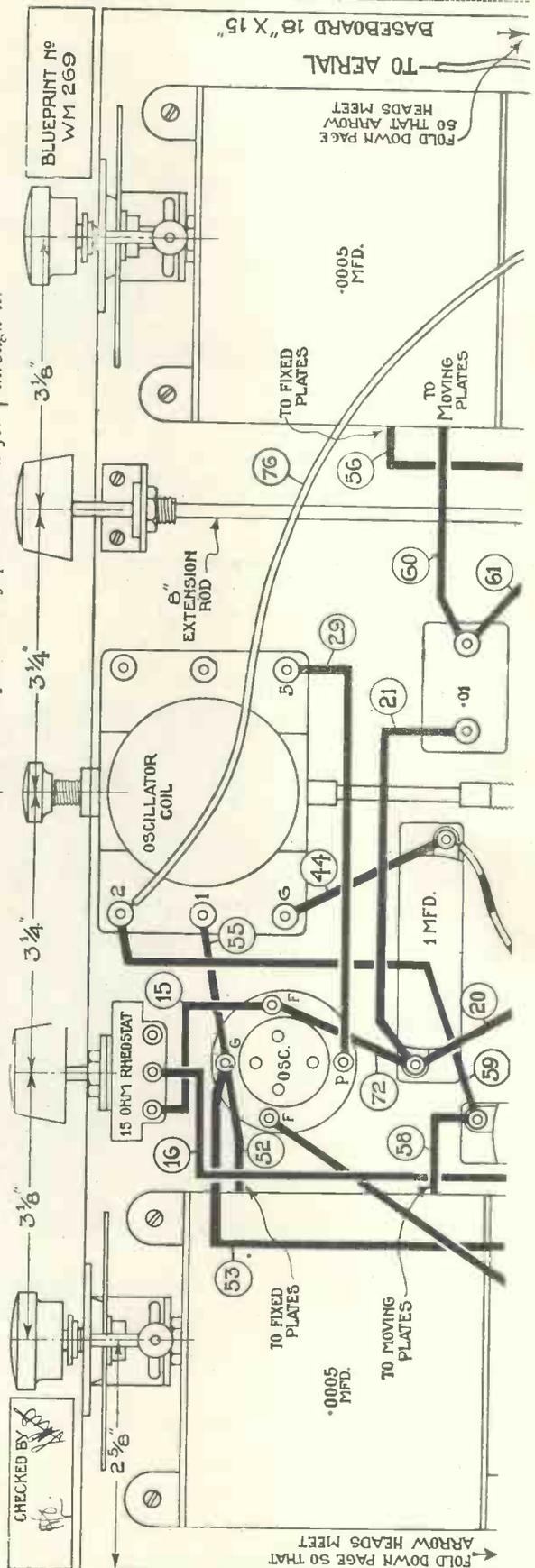
A complete list of parts needed for

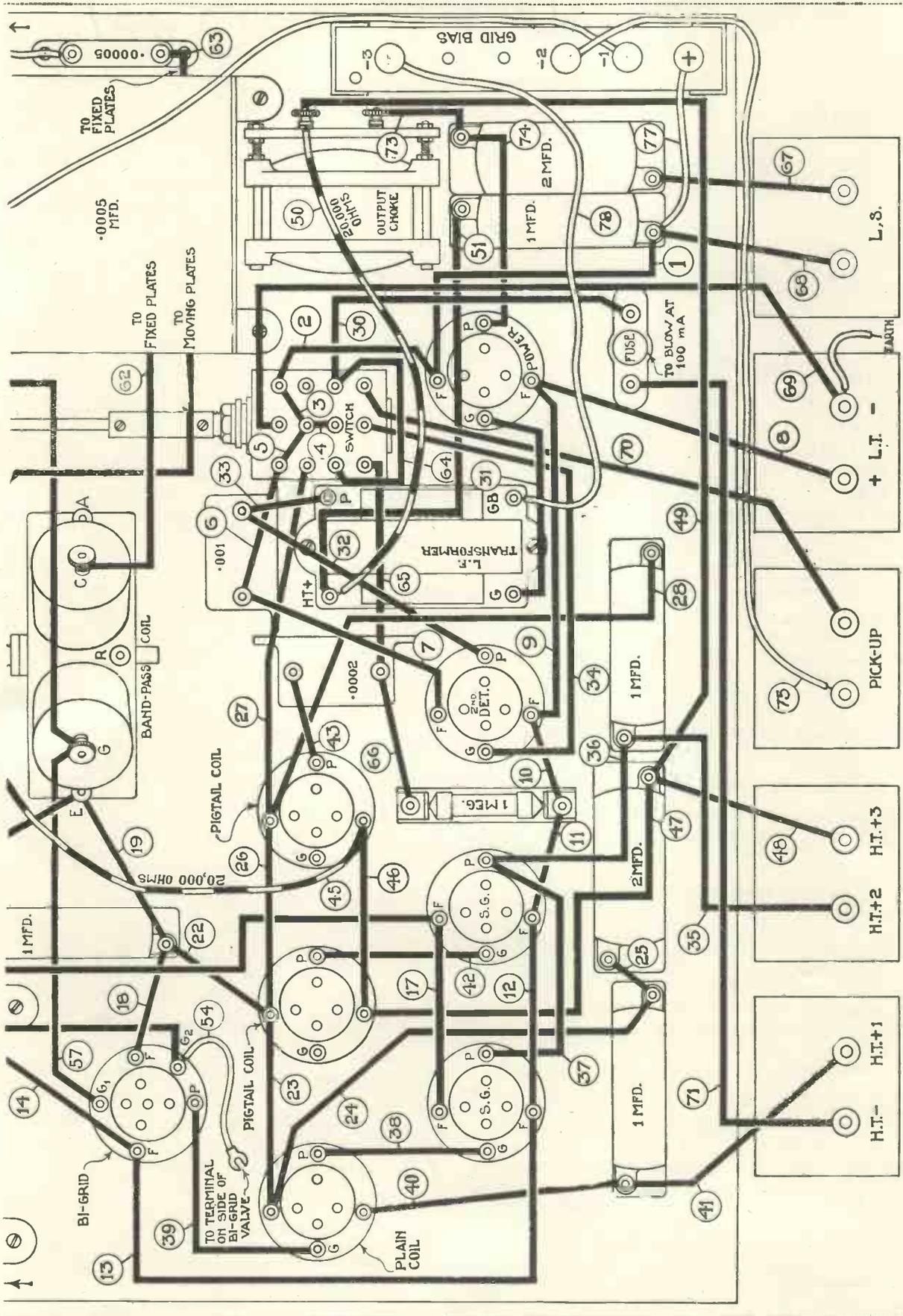
the construction of the 1932 Super 60 appears on page 707. There is also a list of the additional parts needed to convert the original Super 60 to the 1932 edition. It will be seen that the cost of conversion is quite low—in the neighbourhood of £5.

The set can be used without any front panel. The two variable condensers, and the band-pass and oscillator coils, are mounted directly on the baseboard, while the three-way switch and the filament rheostat are fixed to two small brackets.

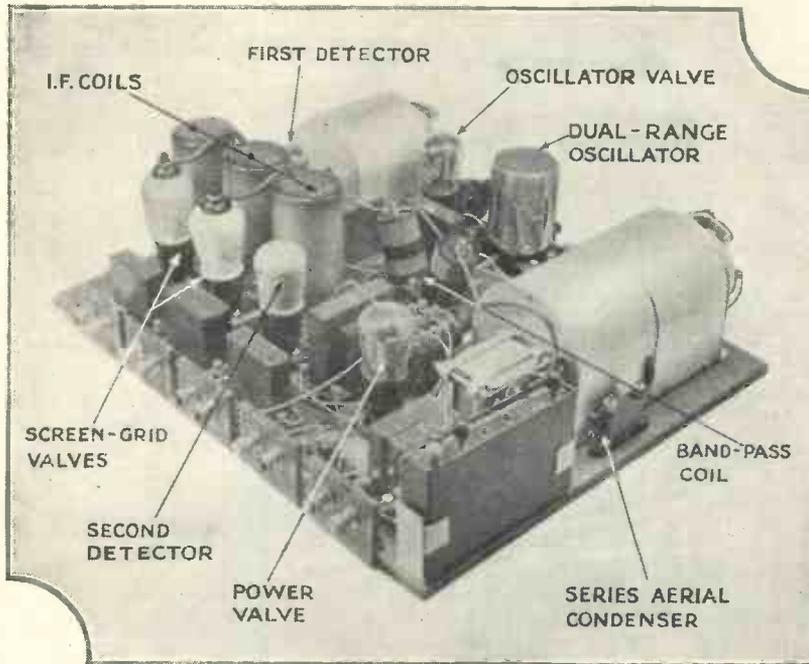
Specially-designed Cabinet

It should also be noted that the Clarton cabinet specially designed for this set is supplied with the front wood panel already drilled to accommodate the various spindles that project through it.





THE 1932 SUPER 60—Continued



HOW THE VALVES ARE PLACED IN THE SET
 It is important, of course, that the six valves should not be mixed up. This photograph shows their positions clearly. Metallised valves can be used if desired

frame aerial letting through a station 252 kilocycles in frequency from the one being received. This is called second-channel interference and this is eliminated by the filter circuit. This is a big advantage in favour of the band-pass filter as compared with the frame aerial.

Switch Positions

The wave-range switch built into the filter coil unit is of the push-pull type—"out" for medium waves and "in" for long.

We have taken the opportunity of having had made a special two-range oscillator unit, for the medium and long wavelengths, which is switched in the same way. One knob is used for both, the spindles being coupled by an extension rod.

The aerial filter-coil unit and the oscillator coil are, therefore, placed one behind the other and the wave range of the set is controlled by the single knob.

Saving in Cost

The oscillator coil is also tuned by a shielded condenser having a slow-motion drive. Incidentally, the new two-range oscillator unit is fairly cheap, so there is a saving here apart from the convenience.

The radio-gramophone switch has been included as the result of many

letters from readers asking for this feature. This switch has three positions. When the knob pointer is upright, the set is off, both the high tension and the low tension being disconnected. When the point of the knob is to the right the last two valves are connected, the fila-

ments of the rest being disconnected.

The pick-up is joined to the terminals provided and a separate volume control must be used. One side of the pick-up goes to the grid bias and the other to the grid of the valve normally used as the second detector. This valve is therefore used properly as an amplifier.

Radio Reception

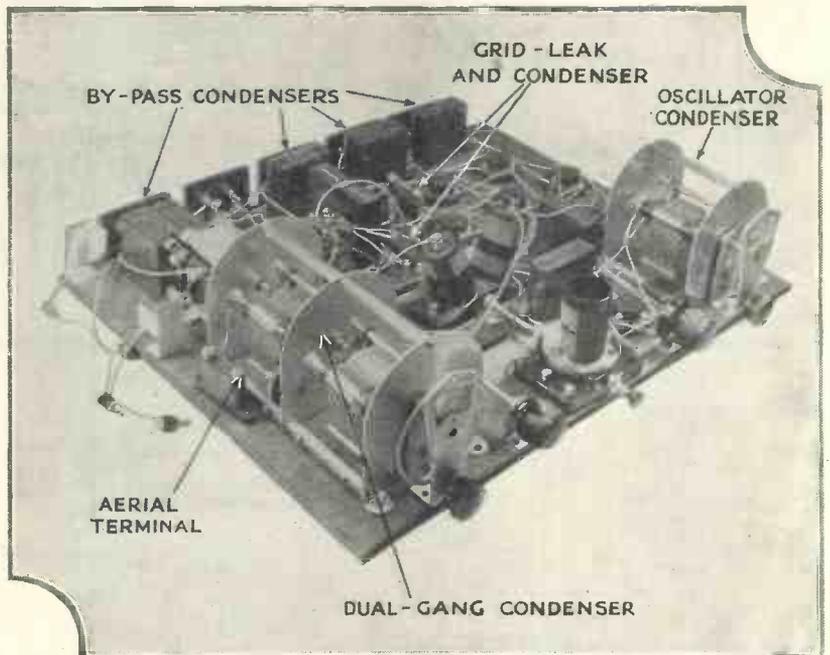
When the switch knob is placed with the pointer to the left, all valves and circuits are connected and the grid condenser and leak are joined to the second-detector valve.

As the pick-up is disconnected at the switch, the pick-up may be left joined to the terminals. A switch having four sets of contacts is used and is mounted upon a bracket with the terminals at the top for easy wiring.

It has been found possible to use a filament resistance as a volume control. This is connected in the negative side of the two screen-grid valves. The volume is varied by altering the amplification provided by the two valves.

Avoiding Trouble

In last season's model we used a screen-grid potentiometer. There was a little trouble owing to this part burning out; with the filament



A FINE SET WITH WHICH TO START THE NEW YEAR
 With the 1932 Super 60 you are assured of a year of fine radio programmes. This view shows the covers of the variable condensers removed

SIXTY STATIONS IN ONE EVENING!

resistance there will be no trouble.

Those who have a Super 60 or one of the modifications described will be able to use the greater part of the components again in this set.

Those who are interested in short-wavelength reception will find elsewhere in this issue two suitable adaptors. One short-wavelength adaptor is designed for connecting to the second detector and the other for connecting to the first detector.

The set is arranged with the two-gang aerial tuning condenser on the left. On the right is the condenser tuning and the oscillator.

Radio-Gramophone Switch

In the centre is the push-pull wave-range switch knob, actuating the switch of the oscillator unit and the filter unit. Then to the left of the wave-range switch is the radio-gramophone switch, and to the right is the volume control. All parts are fitted to the baseboard. The panel, having the necessary holes and the windows for the condensers, is afterwards placed into position and fixed with screens.

There is no aerial terminal in the set, but a wire is taken from the .0005-microfarad fixed condenser at the side of the two-gang tuning condenser. This wire is passed through a hole in the side of the cabinet and fitted with a plug. The aerial wire has a socket connected to it and the plug and socket are fitted together.

It was necessary to make holes in the tuning condensers that I used and

COMPONENTS NEEDED FOR THE 1932 SUPER 60

CHOKE, LOW-FREQUENCY

- 1—Turner, type S20/25, 12s. 6d. (or Igranic, Bulgin).

COILS

- 1—Lewcos band-pass filter, type BPF, 12s.
1—Lewcos oscillator, type TOS, 8s. 6d.
2—Lewcos super-het intermediates, with pig-tails, type IFTP, £1 1s. (or Wearite, Igranic).
1—Lewcos super-het intermediate, without pig-tail, type IFT, 10s. 6d. (or Wearite, Igranic).

CONDENSERS, FIXED

- 1—T.C.C. .0005-microfarad, type 34, 1s. 6d.
1—Telsen .0002-microfarad, 6d. (or Dubilier, T.C.C.).
1—Telsen .001-microfarad, 6d. (or Dubilier, T.C.C.).
1—T.C.C. .01-microfarad non-inductive, type S, 2s. 6d. (or Dubilier).
5—Telsen 1-microfarad, 11s. 3d. (or Dubilier, T.C.C.).
2—Telsen 2-microfarad, 6s. (or Dubilier T.C.C.).

CONDENSERS, VARIABLE

- 1—Ormond .0005-microfarad two-gang, type R/429/S2, with disc drive, 16s. 6d. (or Utility, Jackson).
1—Ormond .0005-microfarad, type R/429/S1, with disc drive 9s. 6d. (or Utility, Jackson).

HOLDER, GRID-LEAK

- 1—Readi-Rad, 6d. (or Bulgin, Telsen).

HOLDERS, VALVE

- 9—W.B., miniature type, 6s. (or Benjamin, Wearite).

PLUGS AND TERMINALS

- 4—Belling-Lee wander plugs, marked: G.B. +, G.B. —1, G.B. —2, G.B. —3, 8d. (or Clix, Ealex).
10—Belling-Lee terminals, marked: H.T. +3, H.T. +2, H.T. +1, H.T. —, L.T. +, L.T. —, L.S. +, L.S. —, Pick-up (2), 5s. (or Clix, Ealex).

RESISTANCES, FIXED

- 2—Sovereign 20,000-ohm, flexible type, 1s. 8d. (or Lewcos, Bulgin).
1—Telsen 1-megohm grid leak, 9d. (or Dubilier, Watmel).

RESISTANCE, VARIABLE

- 1—Wearite 15-ohm rheostat, with bracket, 1s. 9d. (or Varley, Lissen).

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

SUNDRIES

- Tinned-copper wire and oiled-cotton sleeving (or Jifilinx)
5—Sovereign terminal blocks, 2s. 6d. (or Belling-Lee, Junit).
1—pair Bulgin grid-bias battery clips, type No. 1, 6d.
1—Readi-Rad 100-milliamper fuse bulb with holder, 1s. 3d. (or Belling-Lee, Bulgin).

SWITCH

- 1—Wearite four-pole change-over, type I24, with terminals, bracket and 8-in. extension rod, 5s. 6d.

TRANSFORMER, LOW-FREQUENCY

- 1—R.I. general purpose, ratio 1 to 7, 10s. 6d. (or Ferranti AF3, Telsen Radiogrand).

ACCESSORIES

BATTERIES

- 1—Ever Ready 120-volt popular power, £1 4s. (or Pertrix, Drydex).
1—Ever Ready 9-volt grid-bias, Winner type, 1s. (or Pertrix, Drydex).
1—Dagenite 2-volt accumulator, type RMF9, 13s. 6d. (or Exide, Pertrix).

CABINET

- 1—Clarion, with wood panel and baseboard, £1 16s.

LOUD-SPEAKER

- 1—W.B. PM3 moving-coil, cabinet model, £3 15s. (or Amplion, Blue Spot).

VALVES

OSCILLATOR

- 1—Cossor 210LF, 8s. 6d. (or Mullard PM1LF, Mazda L210).

FIRST DETECTOR

- 1—Cossor 210DG, £1 (or Mullard PM1DG).
S.G. INTERMEDIATES
2—Cossor 220SG, £2 (or Mullard PM12, Mazda S215B).

SECOND DETECTOR

- 1—Cossor 210Det, 8s. 6d. (or Mullard PM1HL, Mazda HL210).

POWER

- 1—Cossor 215P, 10s. 6d. (or Mullard PM2, Mazda P220).

MAINS UNITS

- The following may be used in place of the high-tension battery:
Heayberd, model D150, £4 6s. (or Formo, type Multivo, £5 5s.; Regentone, type W1C, £3 10s.).

to bring out wires from the condensers. These wires should, of course, be insulated and be so arranged that the moving plates will not foul them.

The wires are fitted before the condensers are screwed down.

There are a few points to be noted in the assembly. At the back are the battery terminals. The volume-control resistance is fitted upon a small bracket and so is the radio-gramophone switch.

High-tension Voltages

There are three high-tension positives; H.T. +3 goes to 120 volts, H.T. +2 is for the screens of the two screen-grid valves and goes to about 60 volts, and H.T. +1 is for the first detector and is taken to the voltage tap found best by test, about 75 volts.

A four-electrode valve must be used in the first-detector position with the oscillator connected to the side terminal. If a five-pin holder is used the terminal normally used for the cathode and marked C may be wired to the oscillator and a short piece of flexible wire be taken from this terminal to the terminal on the base of the valve.

COMPONENTS NEEDED FOR CONVERTING THE ORIGINAL SUPER 60 TO THE 1932 SUPER 60

CHOKE, LOW FREQUENCY

- 1—Turner, type S20/25, 12s. 6d. (or Igranic, Bulgin).

COILS

- 1—Lewcos band-pass filter, type BPF, 12s.
1—Lewcos oscillator, type TOS, 8s. 6d.

CONDENSERS, FIXED

- 1—T.C.C. .0005-microfarad, type 34, 1s. 6d.
1—T.C.C. .01-microfarad, non-inductive type S, 2s. 6d. (or Dubilier).
2—Telsen 2-microfarad, 6s. (or Dubilier, T.C.C.).

CONDENSERS, VARIABLE

- 1—Ormond .0005-microfarad two-gang, type R/429/S2, with disc drive, 16s. 6d. (or Utility, Jackson).
1—Ormond .0005-microfarad, type R/429/S1, with disc drive, 9s. 6d. (or Utility, Jackson).

PLUGS AND TERMINALS

- 10—Belling-Lee terminals, marked: H.T. +3, H.T. +2, H.T. +1, H.T. —, L.T. +, L.T. —, L.S. +, L.S. —, Pick-up (2), 5s. (or Clix, Ealex).

RESISTANCE, FIXED

- 1—Sovereign 20,000-ohm, flexible type, 10d. (or Lewcos, Bulgin).

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

RESISTANCE, VARIABLE

- 1—Wearite 15-ohm rheostat, with bracket, 1s. 9d. (or Varley, Lissen).

SUNDRIES

- Tinned-copper wire and oiled-cotton sleeving (or Jifilinx).
5—Sovereign terminal blocks, 2s. 6d. (or Belling-Lee, Junit).
1—pair Bulgin grid-bias battery clips, type No. 1, 6d.
1—Readi-Rad 100-milliamper fuse bulb with holder, 1s. 3d. (or Belling-Lee, Bulgin).

SWITCH

- 1—Wearite four-pole change-over, type I24, with terminals, bracket and 8-in. extension rod, 5s. 6d.

ACCESSORIES

CABINET

- 1—Clarion, with wood panel and baseboard, £1 16s.

VALVES

- FIRST DETECTOR
1—Cossor 210DG, £1 (or Mullard PM1DG).

RADIO MEDLEY

* A RADIO FAN'S CAUSERIE CONDUCTED BY BM/PRESS *

Wireless in Our Hospitals :: Mains and "Screen" Aerials :: Getting More Power
 A Set for Hikers :: What Is A Super-power Valve? :: Mains Transformer Outputs
 Gang Condensers :: Interference from Electrical Machines :: A Compliment from Egypt

Hospital Wireless

WHAT is wrong with the wireless installations in our hospitals? During the past few weeks I have visited patients in three different hospitals and each complained that the wireless worked only in the most erratic manner.

In one case the set would not work at all some days; then it would start but unaccountably fade away in the middle of the evening; and then was not working at all for a period of three days.

I cannot help thinking that many of the people who subscribed to the funds for these installations would be disappointed if they realised what little pleasure the patients get out of the gear in many hospitals.

Cause of the Trouble

I am making some inquiries into the cause of the trouble, which seems to be chiefly that there is no qualified person on the hospital staff to take charge of the installation and keep it in proper working order.

If you have any experience of this problem I shall be glad to hear from you; perhaps we could organise a "Hospitals Radio Squad" amongst WIRELESS MAGAZINE readers.

Mains Aerials

Several readers have replied to my request for reports on the efficiency of so-called "mains" aerials. One of the most interesting letters comes from Mr. E. C. J. Thompson, of Manchester. He has a straight three-valve set—detector and two low-frequency stages—which derives its high-tension juice from the A.C. mains, the low tension being of the common "bottled" variety.

I cannot do better than quote from Mr. Thompson's letter: "Close to the cabinet in which the set is housed is a power plug from which the H.T. is taken direct to a simple eliminator in the set itself.

"The H.T. (and L.T.) minus lead

is earthed . . . by means of a 6-ft. lead to an ordinary earth tube buried in the garden, while the aerial terminal on the set is connected by 3 ft. of flex, plus a crocodile clip, to the lead casing of the house power system.

Good Earth

"This particular length of lead-cased cable does not immediately join into that which supplies the plug to which the H.T. is connected, but runs parallel to it for some 30 ft. down to the switch-board and meter, near which is a water-pipe to which all the lead casings are earthed and—be it recorded—earthed very thoroughly.

"Incidentally this particular 'aerial' length of cased wiring terminates in a power plug which is rarely connected to anything in a room some 10 ft. above the set.

"It will be seen, therefore, that the aerial-earth system is in the nature of a somewhat rambling loop—there being, however, a compression-type condenser between the aerial terminal on the set and the aerial tap on the grid coil.

Indoor Aerials

"Previous to this arrangement several types of indoor aerial were tried—one in particular consisting of a fan-shaped spread in a top room two stories up with a straight lead down to the set, which gave good results—many stations being logged at good strength, but the present house-mains connection has all the others beaten—there being a readable station at every degree of tuning—almost!"

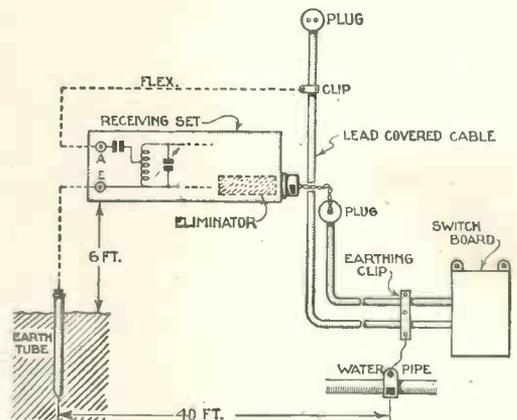
I am reproducing Mr. Thompson's sketch of the wiring here. It is certainly interesting to know that it is

more efficient than a more orthodox form of indoor aerial.

Another Experience

Mr. C. H. Batt, of Bristol, has been using a mains aerial with the Ecko Consolette, a four-valver. The mains aerial is brought into operation by plugging the earth wire into the mains socket.

British and Continental stations are received at good strength. "During the daytime there is practically



A "MAINS" AERIAL SYSTEM
 This diagram of Mr. Thompson's Mains Aerial illustrates the loop effect referred to. It is more efficient than an indoor roof aerial

no interference at all, and only on a few evenings has there been any electrical interference in the form of crackling."

The selectivity is not quite as good with this aerial as with an outdoor one, "which is no doubt due to the considerable length of the mains." Why not try a series condenser of the order of .00005-microfarad capacity?

Mr. Batt concludes: "On the whole, however, the mains aerial is very satisfactory and can be recommended to anyone who has not the facilities for erecting an outside aerial, or who desires to carry his receiver from room to room."

"Screen" Aerials

My mention of screen aerials has brought me a letter from the inventor and patentee. "Of course," says Mr. K. T. Hardman, "I am sure to tell a good tale about them, so I won't boost them up myself, but just send you copies of a few of the many hundreds of testimonials received by the first manufacturers..."

I do not for a moment question the authenticity of these testimonials, but I should like to have some measurements showing the difference in efficiency between the screen aerial with its lead-in and of the lead-in without the screen aerial.

Unknown Correspondent

Amongst my recent correspondence from WIRELESS MAGAZINE readers is a postcard from somebody in Southampton asking how to fix the unit to the "W.M." linen-diaphragm loud-speaker. Now, it is not my province to answer such questions which, as I have pointed out before, should be sent to the Information Bureau.

In this case I cannot do anything for my correspondent, for the postcard bears no address and is unsigned. The only clue is the Southampton postmark.

More Power Wanted

Mr. Alan J. Russell, of Hitchin, wants more power. He has a four-valve screen-grid radio gramophone, using two-volt valves and getting its high tension from an A.C. mains unit. Four loud-speakers are used in different rooms; they are Blue Spot 66R units on the Major chassis.

It is difficult to know what alteration to suggest as no indication is given regarding the output valve at present employed (it is used without an output choke, by the way). The trouble is that the loud-speakers show signs of overloading when the volume is pushed up.

The obvious way out of the trouble seems to be to get a larger mains unit and use a bigger power valve, or perhaps a push-pull system. A 150-volt unit could then be utilised.

"I'm Happy when I'm Hiking"

But a Glasgow reader is not. He wants to know when a set for hikers is going to be produced. Not an ordinary portable set, but one that can be easily carried in separate parts. Glasgow hikers have discussed the problem and conclude that the kind of thing wanted is as follows:

1. Two valves maximum; per-

haps one valve; or valve and crystal combination.

2. Small size and light weight.
3. Sensitivity, but not selectivity essential (phone reception).
4. Able to work well off 60 volts high tension.
5. Robust and without projecting parts, so that it can be easily carried.

Further Suggestions

"With regard to 2," continues my correspondent, "we thought of solid-dielectric condensers and a small transformer. For 3 we think an X-tapped or centre-tapped plug-in coil would do for tuning, with a plug-in reaction coil near it. For 5 we think that the 'works' would fit inside a cigar-box with the controls on top (valves inside).

"As to low tension, we wonder how a dry cell or two would work. Unspillable accumulators are expensive and money does not flow like water as far as we are concerned!"

I am bringing these suggestions to the attention of the WIRELESS MAGAZINE Technical Staff. Perhaps they will be able to do something in time for the next hiking season. My only comment at the moment is that a simple solenoid coil would be much smaller and lighter than two plug-in coils. Perhaps other readers have suggestions to make?

What is Super Power?

One of my regular correspondents, Mr. G. W. Part, of Tunbridge Wells, raises the interesting question as to when a power valve becomes a super-power valve.

"When I read a technical review of some 'amazing new super-power valve' and find some footling little two-volter with an undistorted power output of about 250-350 milliwatts (according to whether one's dry battery will cough up its full 120 volts or otherwise) I feel like heaving a bomb (super-power for choice) into the editorial sanctum," exclaims Mr. Part.

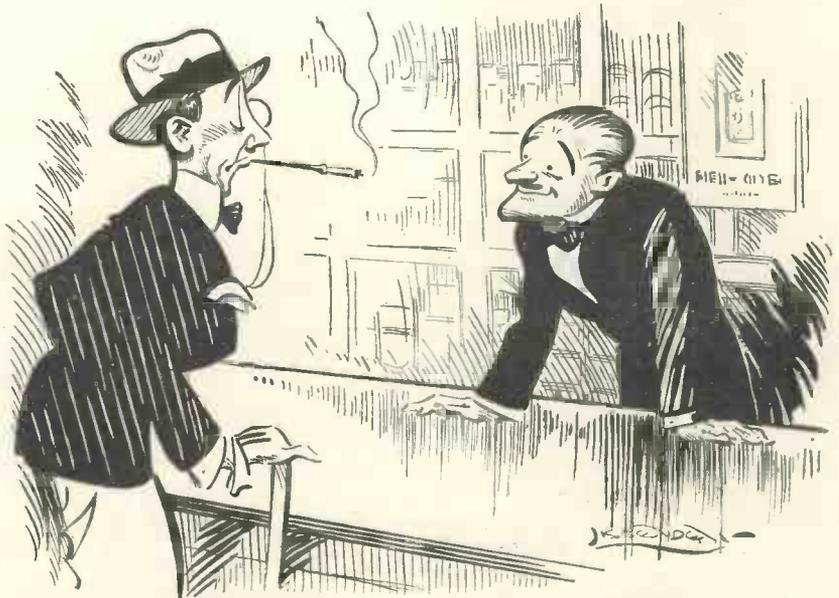
He suggests that the term "super-power" be reserved for such output valves as will provide an undistorted power output of 1 watt or over. The idea is good, but I believe it would be difficult to get a group of technicians to agree what exactly is the undistorted power output of any particular valve.

Transformer Outputs

I was astonished to hear of a misconception regarding the output of a mains transformer adhered to by a man who has had sufficient experience of radio matters to know better. As others may also be under the same misapprehension, it may be worth while to explain it in detail.

The question is the effect of using

A VERY WET (BRAIN) CELL



Customer: "A quarter of a pound of Sarah Ammontac, please."

Chemist: "If it's for wireless batteries, Sir, you mean Sal Ammoniac."

Customer: "Yes, I believe it is sometimes vulgarly called that."

RADIO MEDLEY—Continued

a 4-volt 6-ampere transformer for supplying only three 1-ampere mains valves. Will the valves be overloaded, with a consequent reduction in their life? And will the transformer be damaged?

Those with confused minds on the subject answer "Yes." Their argument is that the transformer was designed to give 24 watts and that if only 12 watts are taken out of it there will be another 12 watts left "floating around"; this "floating" wattage will either overload the valves or burn out the windings.

Regulation

The fallacy is, of course, in supposing that because a transformer is designed to give 24 watts it *must* give that output—or bust! It is a question of regulation. A good mains transformer will vary only about .06 volt for each ampere. For the sake of argument, let us take the figure as .1 volt.

If the transformer is so designed that it gives exactly 4 volts at 6 amperes load, then it will rise to 4.3 volts for a load of 3 amperes; that represents a voltage overload of 7.5 per cent., which is negligible.

I do not know exactly what the valve manufacturers' tolerances are, but they cannot be much closer than plus or minus 10 per cent. Actually, with a well-made transformer, the percentage overload will be less than 7.5 per cent.

It should also be noted that the only current taken from the mains by the transformer is that actually needed for heating the filaments, except for a slight loss due to inefficiency.

Provided the regulation is right, three 1-ampere valves run at 4 volts will take only 12 watts from the mains, whether the transformer is rated at 24 or 240 watts.

Gang Condensers

I have had some hard things to say about ganging in these notes; it is with all the more pleasure, therefore, that I record a visit just made to the British Radiophone factory at Ilford, where gang condensers are produced on really sound lines.

My companion on this visit was Mr. W. James. We both agreed that the British Radiophone people have some of the keenest brains we have yet met in the radio industry.

Our guide was Mr. Packman, who

has helped to develop the assembly of gang condensers to a fine art. I have no space to describe the method of production in detail, but you can take it from me it is hot stuff and results in a reliable job being turned out. I will only say that each condenser is matched up at five different settings of the vanes.

We had a few minutes' conversation with Mr. B. G. Clark, one of the directors. Perhaps the "slickness" of this factory is due to the fact that Mr. Clark is an American; he certainly gives you the impression of "knowing his stuff," if he will pardon what I believe is an Americanism.

Electrical Interference

In quite a large number of cases the question of electrical interference is becoming serious. Last month I cited the case of a new block of flats where reception is almost impossible because of electrically-operated lifts and refrigerators.

A few months ago I had a talk with a man whose reception is spoiled by an accumulator-charging plant about a quarter of a mile away. He has consulted the B.B.C., who arranged for a Post Office engineer to look into the trouble. As a result a bank of condensers was put across the offending generator. This improved matters, but still the interference is so bad at times as to make listening a penance rather than a pleasure.

What Next?

The trouble is that the interference is picked up by the aerial; at least, that is the conclusion I have come to

after hearing all the facts. No noises are heard when the aerial is removed from the set, which seems to prove that the interference is not coming through the mains.

More Unpleasant Noises

What is the solution to this problem? I shall be glad to hear from anybody who has been able to overcome any similar trouble. I frankly do not know what to suggest. The sufferer thought he might be better off with a more powerful set (his present one is a two-valver), but I was not surprised to hear that a three-valver produced even more unpleasant noises.

A Compliment

I was surprised to receive from Alexandria a letter containing a blank cheque made payable to a firm of booksellers. Closer inspection showed that it was from a reader who wanted me to pass on recommendations for some radio text-books to be sent out to him in Egypt.

My correspondent is Mr. Robert Walton. I thank him for the compliment and hope he will find my recommendations will meet his needs.

In concluding his letter Mr. Walton says: "During the coming year I shall be watching your magazine for any remarks that may appear regarding circuits best adapted to this land of excellent wireless reception (of atmospherics)." Interference between high power broadcasting stations is not the only problem in radio, you see!

BM/PRESS

BROADCAST IDENTIFICATIONS

In conjunction with Jay Coote, WIRELESS MAGAZINE has organised a new service that will be of great value to all listeners in calibrating a new receiver or compiling a log.

This Broadcast Identification Service, as it is called, is available for identifying stations from information supplied by readers. Only stations giving a regular broadcast service can be dealt with.

The fee is 6d. for identifying any one station, but if three identifications are required at any one time the fee is only 1s. A stamped addressed envelope must be supplied and the following details given:—

- 1.—What type of set are you using?
- 2.—Date and time when transmission was heard. A.m. or p.m.?
- 3.—Approximate wavelength.
- 4.—Call or interval signal, if heard.
- 5.—Details, if any, of programme received.
- 6.—WRITE LEGIBLY on one side of paper only.

Address your enquiry to Broadcast Identification Service, WIRELESS MAGAZINE, 58/61 Fetter Lane, London, E.C.4.

"Wireless Magazine" GRAMO-RADIO SECTION

A Special Section for Those
Interested in the Electrical
Reproduction of Records



A POPULAR BROADCASTER LISTENS-IN
Paul Robeson, well known to radio and record listeners,
listening to an H.M.V. 5-guinea moving-coil loud-speaker

THIS "FEATHERWEIGHT" QUESTION

DURING the past few months WIRELESS MAGAZINE has given prominence to a new technique of using pick-ups called "featherweighting." The system was suggested by Captain H. T. Barnett, who has described in these pages experiments he has made with light pick-up weighting.

He concluded from his observations that reducing the weight of the pick-up on the record resulted in improved reproduction, less record wear, and prolonged life of the needle—results of importance to every owner of a radio gramophone.

These experiments of Captain Barnett's, and the conclusions he drew from them, have aroused considerable controversy. So that readers of WIRELESS MAGAZINE might hear each side of the question "To featherweight or not to featherweight?" we published last month a challenge by H. E. Gauss, sponsored by the Gramophone Company.

All Serious Work Considered

The WIRELESS MAGAZINE does not put itself in the position of saying that this system or that system is the only one of any value. It seeks to give the benefit of any serious work worth the attention of those interested in record reproduction. To allow our readers to come to their own impartial conclusions we refrained from any editorial comment on featherweighting in our previous issue.

The time has now come when it is desirable to look

into the whole position and see where we have got to. In this issue we publish Captain Barnett's reply to Mr. Gauss' challenge and W. James also has some comments to make on the subject of featherweighting.

A Significant Fact

One significant fact emerges from H. E. Gauss' article: it is not denied that featherweighting results in reduced record wear and prolonged needle life. His case is that the quality of reproduction suffers; to prove that assertion response curves for different values of pick-up weighting were put forward.

W. James, as the reader will see, points out that such curves may be fallacious and that the real test is what is actually heard. Reproduction that would have a badly-shaped curve if translated to paper can, and often does, sound quite acceptable to average ears. Curves, in fact, will never prove that reproduction is bad if in practice it sounds good.

The WIRELESS MAGAZINE retains an open mind on this subject and will welcome the opportunity of presenting opinions on every side. Readers can draw their own conclusions regarding the merits and disadvantages of featherweighting. After all, it is one of the simplest things for the radio-gramophone owner to try out for himself. In this, as in every other radio problem, an ounce of practice is worth a ton of theory.

HEAR ALL SIDES

Concerning Record-reproducing Conditions

I WAS very glad to see the article by Mr. Gauss in the last issue of this magazine giving fully the grounds considered in reference to the mechanical conditions adopted by The Gramophone Co., Ltd., in electrical record-reproducing machines.

The subject is a most important one and too much attention can hardly be focused upon it.

Thanks to the catholicity of our

By **H. T. BARNETT,**
M.I.E.E.

There is another system used by a very important firm, namely, B.T.H., and it is intermediate between the two just mentioned. The new Senior pick-up is set at about 55 degrees needle angle and there is a spring in the arm counterbalancing a considerable portion of the pick-up weight.

letters from readers who have followed my method and one from a reader who anticipated me; not one of them disagrees with my conclusions.

Adapted Pick-up

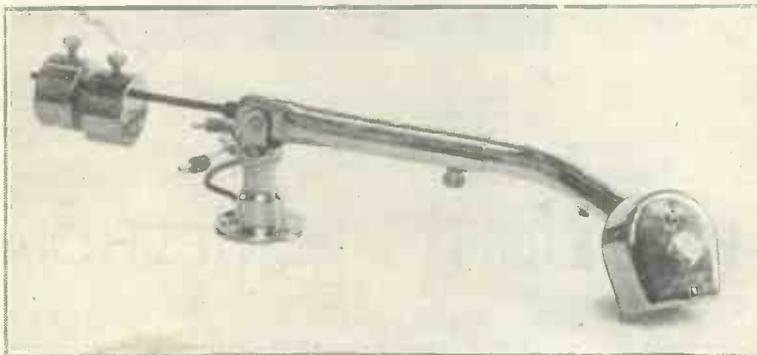
I will ask the Editor to print herewith the illustration of the pick-up and arm I am now using for music. It is the B.T.H. Senior, with the counter-balance spring removed, the U support for the up and down motion filed away on the flats so as to reduce friction in the joint to a minimum, and a counter-weighting device added at the back as described by me in a recent article.

I bent the arm upwardly a little by hand to make the needle angle approximately 50 degrees. With a Columbia soft-tone (really a medium-tone) needle very lightly weighted, I now get quite the best reproduction of music I ever heard.

The "off set" of the pick-up to the arm axis is excellent and I have been able to fix the arm so that the tracking is extremely good from the outside of a 12-in. record to the inside of an 8-in. record.

Try the Three Systems

I hope everyone to whom the question of brilliant whole-scale reproduction with absence of surface noise, and needle and record wear, is of importance will himself try out the three systems now in use and let the Editor know the result at which he finally arrives.



CAPTAIN BARNETT'S EXPERIMENTAL PICK-UP
This is the B.T.H. Senior pick-up as adapted by Captain Barnett for his featherweighting experiments.

Editor, readers have now had clearly put before them the two extremes of reproducing conditions, my own (which I will call the burnishing method) using a Columbia soft-tone needle very lightly weighted and at 50 degrees needle angle, and the H.M.V., using a loud-tone Tung-style needle heavily weighted and at 60 degrees needle angle.

An article from the engineer responsible for the design of this pick-up and arm would be most interesting.

Experiment alone can be the guide for the individual doubtful concerning the system which will best suit his ear and, incidentally, his pocket also.

I have had quite a number of

LISTENING THE ONLY TEST

Says **W. JAMES**

I SEE that Captain Barnett, the well-known gramophone experimenter, has drawn upon himself the fire of the heavy artillery of Mr. Gauss of the Gramophone Company.

Not that he minds very much, I expect anyone who does a bit of pioneering expects to get shot at.

Hints to Amateurs

It must be very annoying, I should imagine, to a big and powerful concern such as the Gramophone Company when an individual dares to offer amateurs hints for improv-

ing upon the results to be obtained from standard pick-ups and gramophone equipment. With their research laboratories they ought to know most things about records, pick-ups, and electrical reproduction.

Yet I think I remember that it was a contemporary which drew attention time after time to the importance of correct tracking and how, afterwards, gramophones were much improved in this respect.

The curves given on page 544 of the December "W.M." may be valuable or valueless. In practice our pick-up is joined by wires having capacity to a volume control, which is in turn connected to the first valve of the amplifier. Then there is resistance and capacity across the pick-up. Both modify the output and the actual voltages applied to the grid of the first valve may be relatively very different from the output voltages represented in the two figures referred to.

In "His Master's Voice" Vade

Mecum they say on page 12 "His Master's Voice pick-up has the widest and most accurate range of tone reproduction of any pick-up known, and it is specially designed to compensate for the reduction in the bass registers in recording."

But on page 17 we are told that "by inserting interchangeable resistances (supplied with the unit) into the volume control the response curve of the pick-up can be compensated for deficiencies in the radio receiver or loud-speaker, i.e. bass or treble notes may be accentuated as required."

Parallel Resistances

In diagrams of H.M.V. apparatus that I have seen fairly low-value resistances are used across the pick-up and they modify the output very considerably. The diagrams Figs. 1 and 2 show the outputs under different weighting conditions, but these outputs will be varied very considerably when the pick-up is connected to a normal circuit. Thus their value may be very little.

The only effective test is the listening one and it seems to me that featherweighting, as Captain Barnett calls it, is worth trying. In my tests I used an H.M.V. pick-up, and I believe the results were improved by reducing the weight upon the needle. Surface noise and needle wear are certainly reduced.

In the matter of needles, I notice that the Gramophone Company recommend H.M.V. Tungstyle, and claim that up to a hundred records may be played without changing the needle (page 12). I have found Tungstyle needles not very satisfactory. With luck I have played a dozen records with one needle.

Great Care Essential

The points are easily bent, however, and they are, in my view, a dangerous needle. You cannot let the children use them, as records are too easily spoiled, and even when the greatest care is taken the chances are that sooner or later damage is caused. I prefer the ordinary steel needle.

Those who are keenly interested in gramophone work must be grateful to Captain Barnett for the many hints and tips published from time to time. Try this featherweighting idea for yourself. The chances are that you will obtain better results.

READERS' EXPERIENCES

Light Pick-up Preferred

To Capt. Barnett, WIRELESS MAGAZINE.

SIR,—I was very interested to peruse your article in WIRELESS MAGAZINE about featherweighting, etc., and note the Gramophone Company's reply in this month's issue of the magazine.

From my own experience I agree with you and at all times prefer a light pick-up balance with a soft-tone needle which, in my opinion (and others who have listened to comparative tests) keeps down surface noise, needle scratch, etc.

As regards definition, so far as I can see this can be ignored. In any case I do not find there is any loss whatever and for vocal renderings and speech the

soft-tone needle, I think, scores every time (also the light balance).

My view may not carry much with the Gramophone Company's research staff, but I certainly don't care for the half-tone needle at all—even if it is volume controlled. It gives—at any rate in my case—considerably more unwanted background and has a much harsher performance all round.

Of course, a lot depends upon the particular amplifying equipment, I suppose, but I have a somewhat elaborate push-pull arrangement, with controls for cutting down peak resonances, etc., where necessary.

WILLIAM DAWES,

Newcastle-on-Tyne.

Measuring the Needle Thrust

To the Editor, WIRELESS MAGAZINE.

SIR,—The article entitled "Featherweight on the Needle," by H. T. Barnett, in your issue for September, has interested me, as it recalls experiments which I performed on this subject as long ago as February last.

In that month I purchased a pick-up of widely advertised make and it immediately became apparent that the pressure on the needle point was unnecessarily heavy. This was confirmed when after purchasing the H.M.V. Album Series No. 92 (Beethoven's *Symphony No. 7*) and Album Series No. 56 (Rimsky-Korsakov's *Symphonic Suite, Scheherazade*), I wore out record No. 10 of the first and record No. 1 of the second, each at only five or six playings.

In each of these, and particularly on the Beethoven record, drum passages frequently occur, and these passages were so worn that the records had to be changed for new ones. Even so the new records show signs of uneven wear.

I, therefore, was prompted to measure the thrust at the needle point on an analytical chemical balance and found this to be the extraordinary value of 160 grams weight. As this seemed very much higher than was necessary to give good reproduction with minimum wear, I arranged to counterbalance the weight of the head and at each stage measured the thrust at the needle point in the manner described above.

Reduction in Volume

I found that with this particular pick-up there was little if any reduction in volume until the pressure had fallen to about 15 grams, but that below this pressure not only did the generated E.M.F. fall suddenly, but certain frequencies were lost.

From my initial experiments it seemed highly desirable to correlate pressure with generated E.M.F., and with this end in view I devised the following method of research: At each value of pressure I proposed to measure with a suitable voltmeter or

Cambridge potentiometer the generated E.M.F. across the 25,000-ohm resistance which is incorporated in the turret of this particular pick-up.

Then, using the H.M.V. constant-frequency records, I proposed to cover the complete diatonic scale and from the readings of the voltmeter or potentiometer to draw a graph at each frequency to show, with E.M.F. as abscissae and pressure as ordinates, the relation between the two. This would give an accurate measurement of the minimum weight which could be applied to secure good reproduction.

Modified Since Conception

Since its first conception this method has been modified, the potentiometer having been considered unsuitable for the required readings.

I have not, however, been able to continue these experiments owing to change of address, but the initial experiments gave very promising results indeed.

Despite this, however, I could deduce the following with a fair degree of accuracy, but would not offer them as definite conclusions, as they have not been confirmed by experiment:

(a) At a certain minimum value of pressure I should expect to find a sharp cut-off of some particular frequencies.

(b) Above this value I should expect to secure good reproduction at all audio frequencies.

(c) The amount of needle scratch and the consequent record wear would be directly proportional to the excess of pressure over the stated minimum value for each make of pick-up.

(d) A certain minimum pressure would have to be applied to the needle point, not only to secure correct reproduction at all frequencies, but also to maintain proper tracking.

(e) Mathematically accurate tracking being impossible with the present swivelling pick-up arm, the question of applied pressure takes precedence in importance.

W. F. CHUBB, B.Sc.

London.

RECORDS *for* Your PARTY

TAKE YOUR CHOICE OF FIFTY!

Here are reviews by WHITAKER-WILSON of nearly fifty new records specially suitable for party purposes. They embrace all types and among them are several novelty numbers of considerable interest. These reviews are in addition to the usual classified reviews, which appear on page 716. Whether you have an electrical or a mechanical gramophone, you will find the records listed under to be just the thing for your winter parties. Read these reviews carefully and then make your choice.

- ★ All Baba's Camel (d.s.), Cicely Courtneidge, 2s. 6d.
H.M.V. B3985

I enjoyed this immensely; it is really funny. I cannot tell you what a relief it is to review something that is funny and not merely vulgar. Ask for it.

- (a) Aria of the Miller, (b) Rondo of Farlaf (Patter Song), Theodore Chaliapine, bass, conducted by M. Steimann, 6s.

H.M.V. DB1580

This is a little more expensive, being a Chaliapine record. Ad-



CHALIAPINE

mirers of his incomparable style of delivering a song of this kind will not object to it being in Russian. He does it so well that I almost fancied I understood it; I know quite as much Russian as you do!

- (a) Artist's Life (w.), (b) Danube Waves (w.), Marek Weber and his Orch., 4s.
H.M.V. C2267

Two very good light waltzes for drawing-room use at Christmas. Both are really beautifully played.

- Big Chief Deerfoot on the War-path (d.s.), Uncle Charlie, and Peter Penrose, 2s. 6d.
H.M.V. B3975

A good children's record. I think you should ask for it and judge for yourself. Personally, I think it will be found useful.

- Bonnie Scotland (d.s.), New Mayfair Orch., 2s. 6d.

H.M.V. B3911

It is a bit noisy. I say,

H.M.V., what about that fader of yours? You frightened me out of a month's normal growth with the first bars. Very Scotch, and quite worth having—if you are Scottish, that is.

- Britelodia (d.s.), New Mayfair Orch., 4s. H.M.V. C2275

This is a medley of "British Melodies." I fought shy of it, but I think it will appeal in certain directions. The production is first class.

- Careless Peter Visits the Land of Topsy Turvy (d.s.), Uncle Charlie and Peter Penrose, 2s. 6d. H.M.V. B3974

A good record for the kiddies. I think even very young children will like it. Certainly those who regularly listen to the broadcast Children's Hour.

- (a) Christians Awake! (b) Hark! The Herald Angels Sing, Choir of St. Mary-le-Bow, 1s. 6d.

BRDCST 3105A

This seems the best of the batch of these carol records. Probably because both carols are used as hymns and one is more accustomed to hymn speed for them.

- (a) Daisy Bell, (b) After the Ball, Two Little Girls in Blue, Old-Time Singers, 2s. 6d. H.M.V. B3966

Quite suitable for Christmas.

- ★(a) Evening Hymn, (b) When I Survey the Wondrous Cross, Black Dyke Mills Band, 1s. RAD 1553

If you want the "waits" in your drawing-room instead of in the street, buy this. It is very realistic.

- (a) First Nowell, (b) While Shepherds Watched Their Flocks by Night, Choir of St. Mary-le-Bow, 1s. 6d.

BRDCST 3107A

Much too slow. Carols should be bright and delicate. This is more like a funeral than a birthday song. Tone quite good, but the stodgy pace is irritating. A suggestion; buy it and play it fast; it will be all right then. The same applies to the other carol records in this list.

- Further Old Songs (d.s.), Jack Hylton and his Orch., 4s.

H.M.V. C2307

Very well done. "Egypt" is typical of its contents. I think you should buy it, put it on a powerful machine, and sing some of the tunes. I may say I did this while reviewing the disc, but protests from the staff restrained my enthusiasm!

- ★Further Selection of Famous Waltzes (d.s.), Viennese Light Orch., 2s.

BRDCST 5259A

Good recording makes this a thoroughly satisfactory light music record. Cheap at the price!

- (a) Good King Wenceslas, (b) See Amid the Winter Snow, Choir of St. Mary-le-Bow, 1s. 6d. BRDCST 3104B

All too slow and dull. St. Mary-le-Bow should be capable of producing something that is really bright. I have been disappointed in all their carol records.

- Guess the Tunes (d.s.), New Mayfair Orch., 4s.

H.M.V. C2298

Quite good but certainly not among the best of these "party" records. Still, do not be put off; ask for it and judge for yourself.

- ★(a) Haunted House, (b) Speedboat Bill, New Mayfair Dance Orch., 2s. 6d.

H.M.V. B6088

Very amusing; the words are really good. Both are novelty fox-trots with quite thrilling side effects. Try the *Haunted*

- his B.B.C. Dance Orch., 2s. 6d. COL CB856

Very good in every respect, not least the *rhythmical*, which makes the disc excellent for dancing. Ask for it.

- (a) Laughter on the Line, (b) Diner a Deux, Laughter Makers, 2s. 6d.

H.M.V. B3932

Quite original and rather amusing. I hate these laughing records, but this one appeals to me as being an improvement on the others. Still, it is a bit silly.

- ★Laughing Gas (d.s.), Cicely Courtneidge and Company, 2s. 6d. H.M.V. B3998

Quite amusing; I think we can do with more humorous records of a good type. The ordinary semi-vulgar efforts are, surely, out of date? This is quite worth getting.

- ★Limerick Puzzle Record



CLAUDE HULBERT

BUILDING A GRAMO-RADIO SET?

Those who have tried electrical methods of reproducing gramophone records will never want to go back to a mechanical machine. Is your radio set suitable for grammo-radio purposes? If not, why not build one of the recent WIRELESS MAGAZINE designs. Nearly all "W.M." sets are now arranged for the electrical reproduction of records—the 1932 Super 60, described in this issue, is a good example. Another grammo-radio set is the Ether Rover (see page 680), a four-valve screen-grid set with band-pass aerial tuning and dual volume control.

House on Christmas Eve with the lights out!

- ★(a) If You Were the Only Girl in the World (f.), (b) They Didn't Believe me (f.), Ambrose and his Orch., 2s. 6d. H.M.V. B6077

(a) is, surely, one of the best tunes the war produced. It makes a splendid slow fox-trot. I sincerely recommend and I wish the modern tunes were as attractive as this is.

- ★(a) Just One More Chance (slow f.), (b) To-day I Feel so Happy (f.), Jack Payne and

(d.s.), Claude Hulbert, 2s. 6d. H.M.V. B3986

This is really novel. Six outer grooves contain six unfinished limericks; the six inner grooves contain the last lines. Excellent for parties!

- Minstrel Show of 1931 (d.s.), English Minstrels, 4s.

H.M.V. C2305

These "shows" have been good each year I have heard them; this is one of the best I have heard

- (a) Lover of My Dreams, Noel Coward, (b) Twentieth Cen-



NOEL COWARD

ture Blues, New Mayfair Novelty Orch., 2s. 6d.

H.M.V. B4001

I do not think much of this; Noel Coward may write plays, but his music, in my opinion, is not worth consideration.

★(a) Many Happy Returns of the Day, (b) Twilight Waltz, Mellow and Rich, rs.

BRDCST 766B

Yes—very good! A cheap record, if you want one.

Musical Chairs (d.s.), New Mayfair Orch., 4s.

H.M.V. C2301

The record stops for you so that you need not keep anyone standing by it. Quite a good idea; the lengths of the tunes, so to speak, are well contrasted.

Nuit Sur le Mont Chauve (d.s.), London Symphony Orch., 6s. H.M.V. B2010

That is to say, *Night on the Bare Mountain*. By Moussorgsky. Very attractive and certainly comes under the heading of light music. Suitable for the Christmas season.

(a) O Come, All Ye Faithful, (b) Good Christian Men Rejoice, Choir of St. Mary-le-Bow, rs. 6d.

BRDCST 3106A

The first of these is too slow and stodgy. The second is unrhymical in many passages. The quality of the voices is quite good and the organ is effective here and there. Not enough *finish* about it.

Other Days (d.s.), De Groot and the New Victoria Orch., 4s. H.M.V. C2281

As the title suggests, this is another medley of tunes that have lost their first bloom. Quite acceptable, the disc will probably be popular.

(a) Old Jim's Christmas Hymn, (b) Christmas Bells are Ringing, Zonophone Concert Quartette, 2s. 6d.

ZONO 5991

You had better ask to hear this before including it in your Christmas party records. It may appeal to you quite a lot. It is certainly well produced.

Paul Jones (d.s.) New Mayfair Dance Orch., 4s.

H.M.V. C2291

The contents are thoroughly suitable for a Paul Jones. It is exceedingly well produced, and with a good loud-speaker should be thoroughly satisfactory for the purpose.

Prelude in C Sharp Minor, Op. 3, No. 2, (b) Intermezzo, London Symphony Orch., 4s. H.M.V. C2292

The first is, surely, rather "dead" now; likewise the *Cavalleria Rusticana* Intermezzo. Still, they are well done, even if overdone!

Puzzle Record No. 3 (d.s.), Novelty Orch., 2s. 6d.

H.M.V. B3981

Not quite so entertaining. Another six-track disc, it sets you to find six tunes. Perhaps children will enjoy it; otherwise I think it the poorest of this batch so far. (I am speaking as I write the reviews, of course).

★(a) Silver Threads Among the Gold, (b) Love's Old Sweet Song, Blodwen Caerleon, rs. 1d. PIC 837

These songs appeal to me no longer, but there are thousands to whom they *still* appeal. Miss Caerleon sings them so expressively that I have no hesitation in recommending the disc.

Smoking Concert (d.s.), Jack Hylton and his Orch., 4s.

H.M.V. C2306

I am not very keen on this; rather on the low side. Not that there is anything absolutely vulgar—but the general tone of this record is rather—well, low! That is all I can say about it.

★(a) Sweet and Lovely, (b) You Call It Madness, but I Call It Love, Russ Colombo, H.M.V. B3984

Very attractive. I think (a) is one of the best modern tunes I have recently heard.

(a) Talk to me (f.), McKinney's Cotton Pickers, (b) Minnie the Mocher (slow f.), Mills' Blue Rhythm Band, 2s. 6d.

H.M.V. B6087

I do not know blue rhythm from any other kind—but I recognise splendid rhythmical qualities in this record. Ask for it.

"Tannhauser" Selection, (d.s.), London Symphony Orch.

4s.

H.M.V. C2293

I am not personally very keen on "selections" from grand opera, but for the Christmas season perhaps the disc will be found useful.

★Ten of To-day's Best Tunes (d.s.), Laddie Ray, Syncopa-

each side has *six* tracks. I have been amusing myself for a few moments by holding the tone-arm and allowing the record to start, after which I have put the needle back again. In about eight or nine shots I secured the six beginnings. That may not be the best way of doing it, but

"W.M." GIVES BETTER SERVICE

Do you realise that WIRELESS MAGAZINE, which costs you only 1s. a month, is as good as TWO papers? It is a complete radio magazine and there is also a special grammo-radio section each month. This not only keeps you in touch with all the latest developments in electrical reproduction, but also includes a complete review of the more important record releases of the big gramophone companies. In this respect WIRELESS MAGAZINE gives its readers better service than any other wireless periodical.

ted Piano Solos, rs. 6d.

BRDCST 311A

I think this will be popular. It is a medley, but such music does not lose by such treatment. I only see red when the classics are treated in this fashion.

★Try Your Fortune (d.s.), 2s. 6d.

H.M.V. B3979

One side of this is for ladies and the other for us! That is not the chief point, however;

I leave you to find that out for yourself. *Very entertaining!*

(a) Two Lovely Black Eyes, (b) Man Who Broke the Bank at Monte Carlo, Harry Fay, 2s. 6d. H.M.V. B3973

This should remind us of other and bygone days. What a tune (b) is! It must have been the best seller *ever*. It is quite well, but not *excellently*, sung.

(a) Way with Every Sailor, (b) Over the Blue, Comedy Harmonists, 2s. 6d.

H.M.V. B3972

Very well worth having. They are pleasant to listen to. Quite useful at Christmas.

★When It's Milking Time in Switzerland (d.s.), Cicely Courtneidge, 2s. 6d.

H.M.V. B4002

This is very original in design



CICELY COURTNEIDGE

and has distinct humorous points. I recommend it to your notice, unreservedly.

★(a) You Can't Stop Me from Lovin' You (f.), (b) Little Girl (f.), Harry Roy and his Rkolians, rs.

BRDCST 773B

There is a good bass on this disc. It is worth having on that account. Ask to hear it; a good test record for your loud-speaker.

(a) You Forgot Your Gloves (f.), (b) Kiss Me Good-night (w.), Ambrose and his Orchestra, 2s. 6d.

H.M.V. B6080

The fox-trot is rather ordinary; the waltz is very well written. I consider this worth having for this side alone.



An impression of WHITAKER-WILSON, the WIRELESS MAGAZINE Music Critic, drawn by a friend

Choosing Your Records

SACRED MUSIC

Christmas Service, St. Mary-le-Bow, Cheapside; the Rector, Choir, and Organist (d.s.)
rs. 6d. **BRDCST 3120B**

The boy soloist is not too good and the singing generally rather below par. The Rector's voice is clear and distinct. It is quite a passable record, but not by any means brilliant.

★Sacred Songs, Isobel Baillie, Clara Serena, Francis Russell, Norman Allin (d.s.), 4s.
COL DX296

This is very well produced and I think may find a response.



CLARA SERENA

personally, am not thrilled by the songs, but I realise that there are many who think differently. *The Holy City*, *Abide with Me*, and *The Lost Chord* give a clue to the style. The singing is good and the general production excellent.

ORGAN MUSIC

(a) Classical Medley, (b) Softly Awakes My Heart, Harry Davidson.
WIN 5380

This is an organ record. Just a vulgar mixture of everything that must have come into his head. I have no use for these so-called "classical medleys." Classics do not require mixing in this unpalatable fashion. I hated every note of it.

(a) You are My Heart's Delight,

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.

(b) At the Temple Gate, Beaufort Cinema Organ, rs. 6d. **BRDCST 3112B**

Yes, I suppose so! You will like it, I am sure. More than I did!

(a) You are My Heart's Delight, (b) I Found You, Sydney Gustard, 2s. 6d.

H.M.V. B3960

Played on a cinema organ at Chester. It must be a very poor example of how such things are played on a cinema organ at Chester.

PIANO SOLO

(a) If You Haven't Got Love Come to Me, (b) Nina Rosa Medley, Ivor Dennis, syn-copated piano solo, rs. 1d.
PIC 834

These things seem to be getting more and more popular. This particular specimen has good points, and I think should prove to be entertaining. Ask to hear it if you are interested.

CHAMBER MUSIC

★(a) Serenade (Drigo), (b) Rondino, Albert Sandler, rs. **BRDCST 5258B**

Quite a good specimen of Sandler's well-known playing. The recording is not perfect, but on the whole there is not much to complain of.

★Sonata in A for Violin and Piano, Winifred Small (violin) and Maurice Cole (piano) (d.s.), 2s.
BRDCST 5257B

Two well-known broadcasters, of course. The sonata is the César Franck and a very good rendering of it. I suggest you ask for it.

LIGHT ORCHESTRAL MUSIC

Around the Volga, Commodore Grand Orchestra (d.s.), rs. 6d. **WIN 5381**

This is a fantasia of Russian waltzes and very attractive it proved to be! The playing is splendid. As a light orchestral record it has everything to commend it.

★Cavalleria Rusticana, Orchestra of the Stadtischen Opera, Berlin (d.s.), 2s. 6d.
STERNO 8019

Quite well produced with plenty of bass. A good test record. In any case, I recommend it on account of its cheapness. Half a crown is not out of the way for such a record—a twelve-incher!

(a) I Love You, (b) Roses of Picardy, Dick Anderson, musical saw, rs. 1d.
PIC 833

I am including this in the light orchestral section as I have no saw section. Very good, I thought it!

Overture "1914," Debroy Somers Band (d.s.), 4s.
COL DX292

This does not attract me in the least. It is a rather noisily recorded medley of war marches. By saying this about it, I think I ought to add that I mean quite well towards the record if there really are people who want such things. Anyhow, the production is such that—apart from the rather noisy tendency—I cannot honestly do other than recommend it.

★(a) Poppies, (b) Gold and Silver Waltz, Middleton and Dawson, rs. **BRDCST 769B**

By the "famous blind piano-acordion duettists." I should like to think it sold well and that they had a royalty on it! It is quite effective.

(a) Raymond, (b) Tangredi Overture, accordion duet by Destifano Brothers, 2s. 6d.
COL DB634

I do not know who buys these things. The fairest criticism I can give is to say that there is nothing wrong with the production if you like accordions. I don't! The record, for what it is, has distinct merits.

★(a) Tales of the Vienna Woods, (b) Russian Potpourri, Eugene's Magyar Tzigane Band, rs. 6d.
BRDCST 3114A

This is a good band. I recommend this as being a very acceptable light music record.

★(A) (a) Traumeri, violin solo by Bernard Reillie, (b) Silver Threads Among the Gold, Nellie Walker, (B) (a)

Cavatina, (b) Gipsy's Warning, 2s. 6d. **COL DB627**

This is a double-track record and I have been amusing myself by switching from one to the other. No interference! I suggest Columbia record symphonic work by this method. Very useful to be able to switch back to finish a movement. One would feel gratified at not breaking the continuity for more than a second or two. Think it over, Columbia, please!

★(a) Wedgewood Blue, (b) Secrets, Broadway Cinema Orchestra, rs. **BRDCST 770B**

Quite good light music; I recommend the disc as being likely to appeal to many readers who are attracted to this sort of thing. It is well done.

LIGHT OPERA AND SONGS

(a) Ave Maria, (b) Ombra Mai Fu, Eva Liebenberg, con. 2s. **BRDCST 5256A**

(a) by Bach and (b) by Handel. Both very well known. Hers is a good voice, but there is a slight tendency to sing sharp in the upper notes. Otherwise the record is very enjoyable.

★Country Girl, London Concert Orchestra (d.s.), 2s.
WIN L5379

Very well done; the singing is good and all words are clear. The music still keeps a great deal of its freshness. Might be useful for members of a amateur operatic societies. I sincerely recommend it.

Everybody's Favourites from Grand Opera, Grand Opera Company, with full orchestra (d.s.), rs. 6d.
BRDCST 3108B

This is a medley and I am not sure opera need be a mixed grill. However, it is well done and I feel I must recommend it on that account.

(a) For You, (b) Twilight Waltz, Jack and Jill, 2s. 6d.
ZONO 5965

You had better ask to hear this. I am, candidly, not too keen on Jill. I understand, however, that they are very popular artistes. As I say, ask for it.

(a) Going Home, (b) A Beggar Can Sing the Song of a King, Douglas Graham, bar., with orchestra, rs. 1d. **PIC 835**

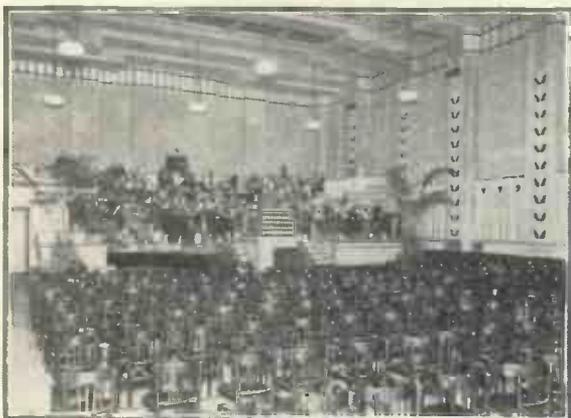
I rather like (b). It has some vivacity about it. Douglas Graham is quite pleasing.

★(a) Heartaches, (b) Song of Happiness, the Three Ginx, rs. 6d. **WIN 5387**

These three, in vocal trio, are really very attractive. They have a short, sharp way of delivering their phrases that is delightful. Ask for it.

★(a) Honeymoon Lane, (b) I Like a Little Girl Like That, Solemn and Gay, 2s. 6d.
ZONO 5962

These two are always worth hearing. They are excellent in these two attractive songs. The words are clear and the



ONE OF THE LARGEST STUDIOS IN THE WORLD
The largest of the three new H.M.V. recording studios at St. John's Wood; the brick walls are more than a foot thick. An orchestra of 250 performers and an audience of 1,000 can be accommodated

accompaniment is most effective.

- (a) I Hear a Thrush at Eve,
(b) For You Alone, Trevor Owen, ten., rs. 6d.

BRDCST 3111A

He sings both well enough, which makes me wonder why he does not sing something really worth hearing. Ten-year-old ballads miss the mark in these days.

- ★(a) Lavender Seller, (b) Vienna, City of My Dreams, Derek Oldham, 2s. 6d.

H.M.V. B3963



DEREK OLDHAM

Very good diction and a thoroughly soun microphone voice. To be recommended.

- ★(a) Le Chemin Du Paradis, Selection, (b) Smiles, Selection, London Orchestra, 2s. 6d.

ZONO 5956

These are two thoroughly good selections. The recording of both sides is good, even for Zonophone, which is saying something these days. Well worth having.

- ★(a) Lonesome, That's All, (b) My Isle of Golden Dreams, National Cavaliers, 2s. 6d.

H.M.V. B3962

Very good. This is really well worth getting. Singing like this makes light music really beautiful. I have every admiration for it.

- ★(a) Maule, (b) Good-night, and Pardon, Madame, Manhattan Melody Makers, 1s. 6d.

BRDCST 3116B

Two further numbers from the immortal *Viktor*. Very good. If you have not invested in any of the lady's perpetrations you can safely get this. It is very good.

- ★Morgenblatter, Vocal Waltz, B.B.C. Wireless Orchestra (d.s.), 2s. 6d.

COL DB629

The Wireless Chorus, conducted by Stanford Robinson, is splendid in every way. The precision with which they effect the short notes shows how well he has trained them. A good record.

- ★(a) My Gal's Given Me the Co-bye, (b) Hot Yodel, G. H. Elliott, 1s.

RAD 1562



G. H. ELLIOTT

Splendid. I always enjoy him, but never more than in this disc. Ask for it, of course!

- (a) Oh, Sailor Behave! (b) Fred Fannakapan, Henny Howard, with orchestra, 1s. 6d.

WIN 5385

Some voice! Her top notes produced a strange depression in me. Both songs are sheer rubbish.

- ★(a) Old Spanish Moon, (b) Queen was in the Parlour, Chris. Hall, with the Radio Melody Boys, 1s. RAD 1562

Both are well done from the singing point of view. At last we are getting rid of the ordinary dance voice. The fact makes my work a deal pleasanter!

- ★Plantation Song Medley, Bob and Alf Pearson (d.s.), 1s. 6d.

BRDCST 3109A

"O dem golden slippers" is the style and B. and A. P. are the stylists. They are excellent as usual. Get it.

- ★(a) Sally, (b) When It's Night-time in Nevada, Terence O'Neill, with vocal chorus, 1s.

RAD 1557

To be recommended on account of the excellent singing. This is one of the best versions I have heard of either work. Ask for it.

- (a) Silver Threads Among the Gull, (b) By the Side of the Zuyder Zee, George Van Dusen, 1s.

BRDCST 788B

These are both yodelling songs. If you are interested I think I can recommend them; they are quite well done.

- ★(a) I'm Alone Will Tell, (b) Just One More Chance, Bob and Alf Pearson, 1s. 6d.

BRDCST 3110A

Well up to their high standard. I have heard a good deal of rubbish to-day; I have enjoyed this. Buy it!

- (a) Viktoria and Her Hussar, Mausie, (b) Viktoria and Her Hussar, Mama, Oskar Denes and Barbara Diu, 2s. 6d.

COL DB645

Very good, if you have not already purchased some other edition of it. Dear Viktoria, I am so tired of her!

- ★Viktoria and Her Hussar, London Concert Orchestra (d.s.), 2s.

WIN L5378

Stiles-Allen, John McKenna, Tessa Dean, Anthony Quorn, and a concert orchestra combine to make this a very attractive record. I am very tired of this music, but I listened to this with considerable pleasure.

- (a) What a Fool I've Been, (b) Would You Take Me Back Again? Jack Bright, 1s.

BRDCST 767B

Nothing outstanding either about the compositions or the singing of them. Sorry, but I cannot honestly say anything more definite about this. Just mediocre!

- ★White Blackbirds, Zonophone Minstrels (d.s.), 2s. 6d.

ZONO 5864

A very entertaining "darkie" record. The dialogue is amusingly delivered. There are, apparently, several parts of this. I suggest you ask to hear one or two of them. They are really good.

MILITARY BAND

- Hungarian Rhapsody, Part I, Band of H.M. Welsh Guards (d.s.), 1s. 6d.

BRDCST 3115B

I do not quite know what to say about this. Liszt does not go well on a military band. On the other hand, the playing is cleverly done. Ask to hear it and see if you are attracted by bad Liszt and good playing!

- ★Leek, Selection, Kneller Hall Band (d.s.), 2s. 6d.

STERNO 8020

The title should give you a clue to the Celtic quality about the composition of this record, which is a medley. I think it might appeal.

- Leslie Stuart Songs, London Fire Brigade Band (d.s.), 1s. 1d.

PIC 532

These make quite a good little programme of military band music. I do not see much object in so rendering them, but there may be others who think differently.

- (a) Merry Hunting Day, (b) Fire-Star, cornet solo, Owen Bottomley, Black Dyke Mills Band, 1s. 6d.

WIN 5386

Of the military band style, this certainly has points. The music

This, of course, is only one of a set.

HUMOROUS RECORDS

- ★(a) Drunken Sailor, (b) Shenandoah, Thorpe Bates. bar., 1s. 3d.

STERNO 801

Thorpe Bates is always worth hearing. Here he is in top form. His voice is exactly as it should be for recording.

- (a) I'm a Daddy at Sixty-three, (b) Charlie in Spain, Charlie Higgins, 1s.

BRDCST 764B

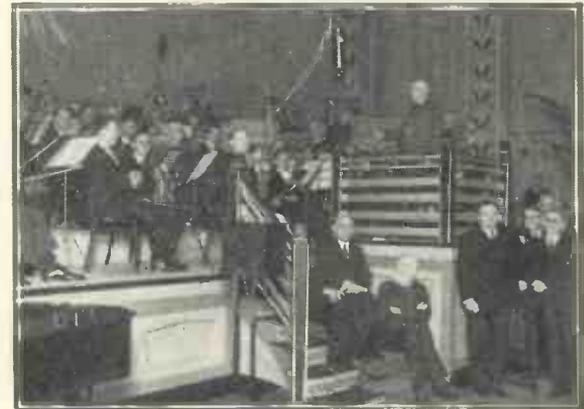
The first is what I thought it would be—dependent on its vulgarity and suggestiveness for its so-called humour. The second is much the same. I suppose it had better go into the humorous column.

- (a) Laughing Speed-cop, (b) Laughing Lover, Joy Day and Merry Andrew, 1s.

BRDCST 765B

You must judge this for yourself. I am no hand at these laughing records. Another for the "yell" column!

- ★(a) Life's Desire, (b) Queen



SIR EDWARD ELGAR AT THE H.M.V. STUDIO

Sir Edward Elgar conducted the London Symphony Orchestra at the opening of the large H.M.V. studio. Sir Landon Ronald and Mr. George Bernard Shaw are sitting on the steps

is not very entertaining, but I think the record may find a vogue.

- Zampa, Metropolitan Police Band (d.s.), 1s. 1d.

PIC 203

This has not come out too well, but it is passable. I am not very keen on the band, to tell the honest truth. On the other hand, it is not a bad record.

SPOKEN RECORD

- German Language Course, Otto Siepmann (d.s.), 4s. 0d.

H.M.V. C2159

Very valuable for students of the language, of whom I am one.



OTTO SIEPMANN

was in the Parlour, Maurice Winnick and his Band, from the Piccadilly Hotel, 1s. 6d.

WIN 5389

(b) is getting very popular. There is something very attractive about it. If you have not heard it I certainly advise you to get a copy. There is a delicate humour in it.

- Sandy's Christmas Eve, Sandy Powell (d.s.), 1s.

BRDCST 761A

This is certainly better than most of his recent records. I look upon Sandy as having produced one record—the Lost Policeman. After that, he lost his art, seemingly.

- Sandy, the Schoolmaster, Sandy Powell (d.s.), 1s.

BRDCST 762B

This is a miserable affair. Sandy is done—for the time being, at all events. He is not even remotely funny. The dialogue is, in my opinion, sheer rubbish. When are we going to have something worth hearing? I have waded through this, but honestly I cannot say a word for it. Broadcast, this is not up to your standard.

- (a) So I Joined the Navy, (b) Naw! I Don't Wanta be Rich, Leyland Franklin, 1s. 1d.

PIC 838

CHOOSING YOUR RECORDS—Continued

Quite amusing in places. Ask to hear it; I say this because I think it is on the borderline of success.

(a) Sweepstake, (b) Spring Cleaning, George Crowther, com., rs. rd. **PIC 836**
The words are very distinct; it is a pity they are not cleverer. I was very disappointed in both songs. Nothing really funny.
Telegraph Boy, Billy Lancet (d.s.), rs. **BRDCST 763A**



BILLY LANCET

A failure from the humorous point of view. Two sides of real boring material. Sorry, but I cannot recommend it. It is not funny, that's why!

DANCE MUSIC

(a) All on Account of Your Kisses (f.), (b) Under Your Window To-night (f.), Nat Shilkret and his Orchestra, 2s. 6d. **H.M.V. B6078**
The first is the better of the two, but neither is really original. The recording, however, is irreproachable.



NAT SHILKRET

★(a) Good-night (w.), (b) Pardon, Madame (w.), Andre Astan and his Orchestra, rs. 3d. **STERNO 794**
Both, of course, from the eternal Viktoria and that Hussar of hers. Very well produced. I need not say any more except to remark on the quality of the bass in the second.
(a) Got a Date with an Angel, (b) Lover of My Dreams, Jack Harris and His Grosvenor House Band, rs. 6d. **BRDCST 3118A**
The title of (a) is a bit startling, but the actual thing is nothing very remarkable. I prefer (b). The playing is up to his standard.
★(a) Hang Out the Stars in Indiana, (b) You Can't Stop Me from Lovin' You, Sydney Baynes and his Radio Dance Band, rs. 6d. **WIN 5383**
The first is one of the best slow fox-trots I have recently heard. The recording and playing

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

a and (b) indicate the titles of each side of a record.

generally make it a very attractive record.

(a) If They Ever Had an Income Tax on Love, (b) Nevertheless I'm in Love with You, Jack Harris and his Grosvenor House Band, rs. 6d. **BRDCST 3119A**

The second is a slow fox-trot and the more attractive of the two. Both, however, are well sung. The lyrics, in both instances, have a certain snappiness about them. Rather original!

(a) I'm Keeping Company (f.), (b) Makin' Faces at the Man in the Moon (f.), Rudy Vallee and his Connecticut Yankees, 2s. 6d. **H.M.V. B6082**

Quite a good dance record. There is nothing particular to recommend either tune. We do want something original.

(a) It Always Starts to Rain (f.), (b) Jolly Good Company (six-eight), Jack Leon and his Band, rs. rd. **PIC 842**

I like (b) specially. The words are rubbish, but the tune is quite arresting and excellent for dance purposes.

★(a) Just One More Chance (slow f.), (b) It Always Starts to Rain, Bidgood's Good Boys, rs. **BRDCST 772B**

The second is amusing, but I was attracted to (a), which is a very effective slow fox-trot.

(a) Kiss Me Again (w.), (b) I Love You in the Same Sweet Way (f.), Jack Leon and his Band, rs. rd. **PIC 844**

The waltz is very attractive. The fox-trot is quite good, also, but I am beginning to look round for something original.

★(a) Kiss Me Good-night (w.), (b) What are You Thinking About, Baby (f.), Bidgood's Good Boys, rs. **BRDCST 771B**

Good—as they always are. Very good, rhythmical playing and first-class recording.

★(a) Kiss Me Good-night (w.), (b) Song of Happiness (f.), Jerry Hoey and his Orchestra, rs. rd. **PIC 839**

Quite good enough to recommend for dancing purposes. The recording is quite well done and the record will reproduce on an electric machine.

(a) Panicky Pete the Pirate,

(b) Ice-man Lives in an Ice-house, Percy Chandler and his Band, rs. rd. **PIC 845**

I do not care particularly for (a), and (b) was not as original as I hoped it would be. Still, it is not amiss and a good tune.

★(a) Please Don't Talk About Me when I'm Gone (f.), (b) It's the Girl (f.), Jerry Hoey and his Orchestra, rs. rd. **PIC 841**

I like this band; it produces a good dance record. The recording is quite good and the singing above the average.

★(a) Put Your Loving Arms Around Me (w.), (b) Maizie (f.), Tommy Kinsman and his Ciro's Club Band, rs. 3d. **STERNO 790**

(a) is well worth buying from the waltz point of view. (b) I am so tired of that I could not summon up enough courage to hear it through. It is all right, I think!

★(a) Sally (w.), (b) Fall In and Follow the Band (one-step), Orpheus Dance Band, 2s. 6d. **ZONO 5967**

The one-step is particularly attractive and well worth hearing, while the waltz is one of the best tunes I have recently heard. I call this a distinctly good record.

★(a) Smile, Darn Ya, Smile (f.), (b) That's What I Like About You, Manhattan Melody Makers, rs. 6d. **BRDCST 3117B**

This is cheap at the price; both works are well produced. The singing is good and the words very distinct. Quite a good dance record.

★(a) Song of Happiness (f.), (b) Queen was in the Par-lour (f.), Harry Roy and his Rkollians, rs. **BRDCST 774B**

A very good band. This record is to be recommended for dance purposes. Cheap at the price, in my judgment.

★(a) Standchen (Serenade), Op. 21, (b) Vienna, City of My Dreams, Sydney Baynes and his Radio Orchestra, rs. 6d. **WIN 5391**

(b) is specially attractive, both from the melodic and dance point of view. The orchestra is good and the recording better.

★(a) Sunny Skies (f.), (b) You Can't Stop Me from Lovin' You (f.), Jack Leon and his Band, rs. rd. **PIC 843**

Both works are attractively written and I like Jack Leon's band. I think these dance discs by Piccadilly are exceedingly cheap.

(a) There Must be a Bright To-morrow (w.), (b) Little Girl, Sid Phillips and his Melodians, rs. **RAD 1555**

Of these two I prefer the second—the fox-trot. It is a good tune and the singer is also good.

★(a) Time Alone Will Tell, (b) Song of Happiness, Harry Hudson's Melody Men, rs. **RAD 1554**

Well worth having, Hudson's band is, in my opinion, one of the best bands habitually recorded.

★(a) What's Gonna Happen to Me (f.), (b) Looking For You (f.), Jack Hylton and his Orch., 2s. 6d. **H.M.V. B6081**

The first is really attractive and both are very well done. I consider this an outstanding dance record.

(a) What's Going to Happen to Me? (f.), (b) Time Alone Will Tell (f.), Jerry Hoey and his Orchestra, rs. rd. **PIC 840**

The second is the more quickly moving and in many



JERRY HOEY

respects the more attractive of these two dances. The orchestra seems well-balanced; the recording is quite good, but not outstanding.

★(a) When the Waltz was Through (w.), (b) Changing of the Guard, Debroy Somers Band, 2s. 6d. **COL CB362**

The somewhat heavy recording on this disc makes it useful for dance purposes, especially if reproduced electrically. (b) is a splendid tune.

★(a) Whistling in the Dark (f.), (b) Wrap Your Troubles in Dreams (f.), Rhythmic Eight, 2s. 6d. **ZONO 5969**

The recording is so good that I feel I must put this into the starred list on that account alone. The general musical production makes for a splendid dance record.

★(a) You Call It Madness, but I Call It Love (f.), (b) Yes, Yes, My Baby Says Yes (f.), Ambrose and his Orchestra, 2s. 6d. **H.M.V. B6079**

Very good indeed, (b) especially. I think this deserves to be really popular. Ask to hear it; it impressed me as being original.

The B.B.C. In 1931

Our Special Commissioner Reviews the Year's Work

TO the eight hundred persons working for the B.B.C. in London and the provinces, the year 1931 goes out under the sombre shadow of the economy axe, intensified by a restless anxiety inseparable from so distasteful a task as that of whittling down expenditure and leaving the nut after having extracted a goodly part of the kernel.

The Opera Scheme

A year ago the review in these columns of the outstanding activities of 1930 opened with a defence of the proposal to spend £17,500 annually on the opera scheme, which, in view of the state of the country's finances at that time, was considered in some quarters to be a retrograde idea that, if pursued, would eventually land the B.B.C. in the position of an *enfant perdu*.

Before the year 1931 has run its course the call for national economy had involved the B.B.C. as deeply as any other public organisation, and the argument about a mere £17,500 outlay on opera had sunk into insignificance.

Revenue provided by the public was to be surrendered, £50,000 in the six months October, 1931, to March, 1932, and £150,000 in the financial year 1932-3; but as the public's money was at stake, the onus fell upon the Corporation of continuing to give an unimpaired service without serious detriment to the public interest.

Government Cuts

Government might cut down on the defence services without any apparent or immediate material result—except in so far as the Treasury audit was concerned. Percentage cuts in Government staffs' salaries might also result in appreciable economies.

But directly broadcasting revenue was touched, unless the consequent economies were dealt with in a way which would not suggest interference with programmes, the effect would be to administer a cold douche to the listener.

Hence, although the necessity of surrendering £50,000 came like a

bolt from the blue, savings were effected in the autumn so skilfully that probably not even the day-by-day listener could detect any variation in the material broadcast and certainly could not divine any "cheapening" process at work.

This was because savings were effected chiefly on outside broadcasts, the use of long landlines for relays, the employment of British artistes to a larger degree, thus avoiding heavy expense accounts, to say nothing of big fees, for foreign artistes.

The monetary allotments to the various stations on account of programme requirements were also curtailed in a way which would enable the programme staff to cut down with the least prejudice to the actual material broadcast.

The record of 1931 shows an advance on the programme standard of previous years. A series of talks on unemployment attracted world-wide attention, the American broadcasters and Press relaying and reproducing the opinions expressed by Britain's leading economists.

At the beginning of the year the B.B.C. brought Arnold Schonberg and Ernest Ansermet, the well-known composers and conductors, to this country to direct concerts for broadcasting.

On January 10 the B.B.C. announced the signing of a contract for the building of the Scottish Regional transmitting station at Westerglen, near Falkirk.

A performance of Arthur Bliss's *Morning Heroes*, which was in the programme for February 4 and was postponed until March 25, to make additional rehearsals possible, deserves mention here, for the reason that a certain music critic perpetrated one of the greatest *faux pas* of the year.

He reviewed in his paper, on February 5, the performance which he assumed took place on the previous evening and about the postponement of which he was unaware, thus showing that he



YOU'VE HEARD HIM BROADCAST
Leslie Woodgate, conductor of the B.B.C.
Theatre Orchestra

neither attended the Queen's Hall concert at which, according to the original arrangements, it was to have been given, nor listened at home that evening, nor read his contemporaries which announced the postponement.

Two highly successful relays in the first month of the year were from Daly's Theatre and Belle Vue, Manchester. In the first case the subject was a broadcasting studio on the stage of the theatre, which formed a scene in the musical comedy *Little Tommy Tucker*, and the second occasion was a commentary by Mr. L. Seacombe on the fight between Bert Kirby and Jackie Brown for the flyweight championship of Great Britain.

Outstanding Relay

The outstanding relay of the second month of the year was that of the proceedings on the occasion of the opening of the Vatican broadcasting station by Pope Pius XI, the first time that the nations of the world had heard the voice of His Holiness.

Throughout two months the B.B.C. co-operated in the census of 1931 by

THE B.B.C. IN 1931—Continued

broadcasting a series of introductory talks for the guidance of householders in the filling in of their census papers on April 26. The utilisation of wireless for this purpose assisted the Registrar General to an extent which would have been possible in no other way.

Novel Experiment

A novel experiment was the opportunity given to listeners of judging the quality of reproduction attained by a number of the latest sound films. Excerpts were cut from six British and American sound films of representative types and were linked together by announcements which were specially recorded for the purpose.

The resultant composite programme attracted wide attention among technical experts in broadcasting and in sound recording, while providing listeners with a programme of intense interest.

The month of March provided a relay from Buenos Aires, the Prince of Wales' speech at the opening of the British Empire Exhibition being heard in England with exceptional clearness.

The B.B.C. announced beforehand with characteristic caution that a successful transmission could not be guaranteed as this was the first attempt to relay a programme from South America to Great Britain; but thanks to the co-operation of the British Post Office, results exceeded the most sanguine anticipations.

Moorside Edge

In the last week of March the first transmission took place from Moorside Edge for reception tests by the general public. Compared with the volume of correspondence occasioned a year earlier at the opening of the London Regional transmitting station at Brookman's Park, Moorside Edge was found right from the outset to be an unqualified success.

This was regarded as being due to the intelligent adaptation by the public of their receiving apparatus as much as to the modifications adopted by the B.B.C. in the light of the experience gained with the Brookman's Park transmitters.

Special relays throughout the year attracted a good deal more attention than the ordinary run of programme

events which listeners have come to accept as a matter of course.

The Kentucky Derby, for instance, the oldest race in the United States, provided a first-class relay of a commentary by Clem McCarthy and Graham McNamee, two names to conjure with in American broadcasting annals. The pick-up was one of the best things done by the B.B.C. listening post at Tatsfield, Surrey, during the year.

Another event of importance was

You must tell your
friends about the
1932 SUPER 60.

It will get sixty
stations in one evening!

the conversation conducted from a studio by Commander Stephen King-Hall with the *Empress of Britain*, when the vessel was about seven hundred miles from our shores on her maiden voyage.

Here again, the co-operation of the Post Office, with its ship-and-shore telephone service, played a large part in the entertainment of listeners.

The year saw the first relay from the Wagner Festival at Bayreuth, Great Britain sharing with practically all the broadcasting nations of Europe, as well as with the American stations, what was regarded musically as a history-making event.

Such broadcasts as the Oxford *v.* Cambridge boat race, the Derby, the St. Leger, the Grand National, the Schneider Trophy and even the Cup Final, which were described in running commentaries, as is the usual custom, have come to be accepted as normal happenings in broadcasting affairs and so the B.B.C. made unceasing endeavours to reach out after the super-specialised relay—not for "stunt" purposes, but in order that broadcasting might genuinely be regarded as dealing with every social interest that was broadcastable.

It may, however, come as a surprise to listeners to learn that even now, in the tenth year of broadcasting and in spite of the obvious fact that broadcasting has come to stay, obstacles are placed in the way

of the B.B.C. in many directions so that the fulfilment of the mission of broadcasting is rendered extremely difficult.

Football Broadcasts

Apart from the impasse with the Football Association and Football League, which is matter of common knowledge, there have been occasions during the past year when, although arrangements for a relay have been made well in advance and the engineering plans prepared in consultation with the officials responsible for certain events, attempts have been made by their subordinates to upset everyone's calculations at the last moment, in order to spoil the relay and discredit the B.B.C.

In the interests of listeners the corporation officials have accepted many rebuffs and carried on with their work while smothering the temptation to give the widest publicity to the actions of those who appeared to be unsympathetic to the public interest.

But, after all, the policy of ignoring pinpricks is perhaps the wisest one for a gigantic organisation to adopt, as experience has shown that it is the most successful policy in the end.

Towards the close of the year the B.B.C. made an important announcement respecting Empire broadcasting. Negotiations with the colonies and dependencies having shown that the difficulty of obtaining financial assistance for an Empire broadcasting station would not be readily solved, the Corporation decided itself to bear the cost of such a station, with the object of giving as many listeners as possible in all parts of the Empire a programme from the home country at hours when it was most convenient for them to listen.

New Short-wave Station

As this issue of WIRELESS MAGAZINE goes to press, designs are being prepared for a station at Daventry, adjacent to 5XX and Midland Regional, to comprise two transmitters whose wavelengths shall be changed about as required according to the time of day, the time of year and the part of the Empire which it is desired to reach.

It is hinted that the new station may be ready to send out greetings to the Empire at Christmas, 1932.

WORLD-WIDE RECEPTION



ON

YOUR SET

With Special
Reference to
the
Short Waves

The Lure of the Short Waves

OUR object in producing this special supplement is to enable set owners to get more enjoyment out of their radio installations. To that end we give details of the wavelengths and identification signals of a large number of broadcasting stations all over the world and hints on tuning for the best results.

There is no reason why any listener should be restricted to Europe for his radio entertainment, and therefore considerable space is devoted to the ultra-short waves: we explain how almost any set can be adapted for short-wave reception and give an hour-by-hour guide to the best and most easily received short-wave transmissions that take place from stations

all over the world. If you have never yet listened to a short-wave transmission from the other end of the earth—then you have a new radio thrill to come!

The B.B.C. has announced its intention of erecting a special Empire short-wave station. When it is working, everyone will want to listen to it. With this supplement to help them, all set owners will be able to prepare for the B.B.C. short-wave transmissions now—and in the meantime pick up many interesting transmissions from places as far distant as South America, Java, India, Australia, Africa, and Indo-China! Try the Short Waves for a change!

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WAVELENGTHS OF EUROPE'S BROADCASTERS

WITH SPACES TO RECORD YOUR DIAL READINGS

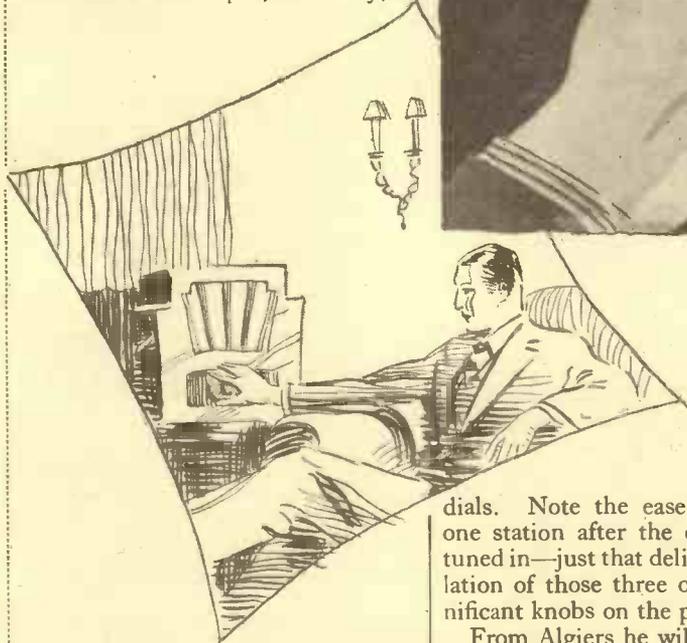
Wave-length	Name of Station	Dial Readings	Country	Wave-length	Name of Station	Dial Readings	Country
206	Antwerp		Belgium	355.8	London Regional		Great Britain
214.2	Warsaw		Poland	360.6	Möhlacker		Germany
215.6	Châtelineau		Belgium	363.4	Algiers		North Africa
217	Königsberg		Germany	365	Bergen		Norway
218.5	Flensburg		Germany	367.6	Frederiksstad		Norway
218.7	Salzburg		Austria		Helinki		Finland
219.7	Binche		Belgium	368.1	Seville		Spain
219.9	Beziers		France		Bolzano		Italy
223	Fécamp		France	369.4	Radio LL (Paris)		France
224.4	Cork		Irish Free State	372	Hamburg		Germany
	Cologne		Germany	376.4	Glasgow		Great Britain
227.4	Munster		Germany	380.7	Lyov		Poland
	Aachen		Germany	384.4	Radio Toulouse		France
230	Malmö		Sweden	389.6	Frankfurt		Germany
232.2	Kiel		Germany	394	Bucarest		Roumania
234	Lodz		Poland	398.9	Midland Regional		Great Britain
235.5	Kristianssand		Norway	403	Sötteus		Switzerland
237.6	Bordeaux-Sud-Ouest		France	409.8	Madrid		Spain
239.4	Nürnberg		Germany		Katowice		Poland
240.2	Stavanger		Norway	413	Dublin (2RN)		Irish Free State
242.3	Belfast		Ireland	416	Radio Maroc		North Africa
244.1	Basle		Switzerland	419	Berlin		Germany
	Wilno		Poland	424	Madrid (EAJ7)		Spain
245.9	Schaerbeek		Belgium	424.4	Moscow Stalin		Russia
	Cassel		Germany	431.7	Belgrade		Yugo-Slavia
	Linz		Austria	435.4	Stockholm		Sweden
247.7	Trieste		Italy	441	Rome		Italy
249.6	Juan-les-Pins		France	447.1	Paris (Ecole Sup. PTT)		France
	Prague		Czecho-Slovakia	451	San Sebastian		Spain
251	Barcelona		Spain	453.2	Danzig		Danzig
253.3	Gleiwitz		Germany		Klagenfurt		Austria
255.1	Toulouse		France		Porsgrund		Norway
257	Hörby		Sweden	459	Beromuenster		Switzerland
259.3	Leipzig		Germany	466	Lyon-la-Doua		France
261.5	London National		Great Britain	468.7	Tartu		Estonia
263.8	Moravska-Ostrava		Czecho-Slovakia	472.4	Langenberg		Germany
266	Lille		France	480	North Regional		Great Britain
268.8	Valencia		Spain	488.6	Leibnitz		Czecho-Slovakia
269.8	Bremen		Germany	493.4	Trondheim		Norway
271.5	Rennes		France	500.8	Tallinn		Estonia
273.6	Turin		Italy		Milan		Italy
276.5	Heilsberg		Germany	501.7	Florence		Italy
279.3	Bratislava		Czecho-Slovakia	509.3	Brussels (No. 1)		Belgium
281.2	Copenhagen		Denmark	517.2	Vienna		Austria
	Magdeburg		Germany	526	Riga		Latvia
283	Berlin		Germany	533	Munich		Germany
	Stettin		Germany	541.5	Palermo		Italy
283.5	Innsbruck		Austria		Sundsvall		Sweden
286	Montpellier		France	550	Budapest		Hungary
287.3	Radio Lyons		France	556	Hanover		Germany
	Swansea		Great Britain	559.7	Kaiserlautern		Germany
	Plymouth		Great Britain		Tampere		Germany
	Aberdeen		Great Britain	569.3	Augsberg		Finland
288.5	Edinburgh		Great Britain	569.3	Freiburg		Germany
	Dundee		Great Britain	574.7	Ljubljana		Yugo-Slavia
	Bournemouth		Great Britain	581	Hamar		Norway
	Newcastle		Great Britain	720	Moscow		Russia
290.5	Lisbon		Portugal	770	Ostersund		Sweden
291	Viiipuri		Finland	937.5	Kharkov		Russia
293	Kosice		Czecho-Slovakia	1,000	Leningrad		Russia
294.6	Limoges		France	1,053	Kootwijk		Holland
298.1	Hilversum		Holland	1,071	Scheveningen-Haven		Holland
299.5	Radio Idzerda		Holland	1,091	Oslo		Norway
301.5	North National		Great Britain	1,106	Tiflis		Russia
306.8	Falun		Sweden	1,117.3	Moscow Popoff		Russia
307.6	Zagreb (Agram)		Yugo-Slavia	1,153	Kalundborg		Denmark
307.6	Bordeaux		France	1,200	Reykjavik		Iceland
309.9	Cardiff		Great Britain	1,204.8	Istanbul		Turkey
312.6	Natan-Vitus		France	1,242	Vienna (testing)		Austria
312.8	Cracow		Poland	1,255.3	Boden		Sweden
315	Marseilles		France	1,304	Moscow		Russia
315.8	Genoa		Italy	1,348	Motala		Sweden
318.8	Sofia (Radio Rodno)		Bulgaria	1,411.8	Warsaw		Poland
	Dresden		Germany	1,445.7	Eiffel Tower, Paris		France
321.9	Göteborg		Sweden	1,481	Moscow (Kom)		Russia
325	Breslau		Germany	1,517	Ankara		Turkey
328.2	Grenoble		France	1,554.4	Daventry (National)		Great Britain
328.9	Poste Parisien		France		Norddeich		Germany
331.5	Naples		Italy	1,634.9	Zeesen		Germany
334.4	Poznan		Poland	1,724.1	Radio Paris		France
337.8	Brussels (No. 2)		Belgium	1,796	Lahti		Finland
341.7	Brunn		Czecho-Slovakia	1,875	Huizen		Holland
345.2	Strasbourg		France	1,935	Kaunas		Lithuania
348.8	Barcelona		Spain	2,525	Königswusterhausen		Germany
352.1	Graz		Austria	2,900	Königswusterhausen		Germany

FINGER-TIP TUNING

You will never be able to get good results unless you tune your set right. In this article J. GODCHAUX ABRAHAMS gives many useful hints of value to every set owner. There is no doubt that proper tuning is the secret of success in radio

HAVE you ever taken a trial run with an expert driver in a demonstration car; have you noticed with what ease the various controls were handled and how quickly the motor responded to them? Yet, when you watched him you must have observed how little effort was expended in making the car do what he wanted.

With a slight touch of the wheel he steered in and out of the traffic. It seemed so simple; in a way, it



fact that, barring sundry painful "bloops" and squeaks, he cannot pick up any transmission clearly.

Possibly you may say: "All receivers are not alike and, consequently, we cannot handle them in the same manner." This is true, in a sense, but all sets possess condensers. Whether there is one dial or two dials on the panel, they are your main controls.

Volume Control

Whether the volume is regulated by a potentiometer acting on the grids of the high-frequency valves; whether it is brought about by reaction on the detector, or whether you possess the means of varying the aerial input in order to increase selectivity matters little; it amounts to the same thing in the end.

Successful results—and by that I mean good tuning—can only be

dials. Note the ease with which one station after the other can be tuned in—just that delicate manipulation of those three or four insignificant knobs on the panel.

From Algiers he will take you to Copenhagen or from London to Poznan, pausing incidentally by the way at Rome, Brussels, Vienna, Stockholm, and Berlin.

Then watch the tyro. In all probability he will swing his condensers as if he were at the wheel of some old and particularly sluggish Thames steam tug, surprised at the

was. He understood these delicate controls and by experience had acquired that light touch which induced the vehicle to give of its best.

In a certain measure, it is possible to apply the same observation to the expert who handles a radio receiver; here, again, a light touch is also necessary with the condenser

Fine Tuning is the Secret of Radio Success!

FINGER-TIP TUNING—Continued

expected if these respective "thro-tles" and "regulators" are carefully handled. To do so a light touch is essential.

And so we come to finger-tip tuning.

Never Too Late

You may be a mere tyro; you may also have long passed that preliminary stage: it is never too late to mend. It is necessary that you should start right. If you tune your receiver in a haphazard fashion you cannot obtain pleasing results; in

vidual units the actual capture of transmissions on different wavelengths will be considerably simplified.

In most instances I have come across, *too much use is made of reaction*. When signals are powerful or when the station is within easy reach, reaction will often be found to be unnecessary. On the other hand, the power it gives you to boost signals is a valuable one, but the amount of effect required to bring reception up to a readable strength may differ according to whether

very gently, degree by degree; even a slower movement may be judicious as, failing this, you will encounter difficulties.

With the other hand, twirl the aerial dial slowly backwards and forwards, say 10 degrees at one move. At some point you will get the circuits in tune and a transmission will be picked up.

With the Super-het

Bear in mind that in the case of the super-het the oscillator is the "big noise" and requires first consideration. Do not reverse the procedure and act on the assumption, as I have seen it done, that the aerial circuit is *the tuner* and the oscillator used simply to secure a louder signal.

If you are dealing with a straight circuit, you should act in the same manner. The dials when in tune may or may not coincide in their readings; that is, they may not remain in step throughout the scale. Some slight difference will probably exist on the lower and on the higher readings, but otherwise you will find that with most receivers the difference between the two dials for the greater part of the way will be constant. Most of the condensers used in to-day's receivers are specially made to attain these results.

Have we established the readings of the local station? Very well, now come to the question of volume. Reaction may or may not be required. We can test this easily. Our guiding principle is to use *as little of it as we can* if we wish to secure undistorted music and speech. Volume control may act in the same way; a soft, pleasant tone is better than great strength of signal with a screech or blast in it.

Wavelength Readings

Dot down the readings against the name of the station and its corresponding wavelength; you will need this information later. Again, slightly twirl the condensers as before, keeping the dials as much in step as possible and seek another known transmission. Log it in the same way.

It should be borne in mind that if the station is a powerful one and you are within its "swamp" area, it



A SOUTH AMERICAN SHORT-WAVE STATION

A photograph of the short-wave transmitting station at Monte Grande near Buenos Aires. This is used for transoceanic communication

fact, with the modern selective circuits it is all Fetter Lane to a grid leak that you will distort the signals received.

It would be impossible in a short article to describe the different methods to be adopted in the case of each individual circuit, but a general principle governs most of them. Whether you use a straight three- or four-valver, or whether you have acquired a more up-to-date five- or six-valve super-het means but little difference in the way it should be handled.

Circuits "Syntonised"

In both cases two or three distinct circuits must be in *tune* or "syntonised," if we care to adopt a very fitting French expression. When you have secured the simultaneous co-operation of these indi-

you are working on the lower or upper part of the condenser.

Let us presume that we have in front of us a totally new instrument, which we are handling for the first time. Having connected up our various leads to aerial (be it outdoor, indoor, or frame), to earth, accumulator, and high-tension battery or mains unit, what is the next step to take?

Well, personally, I start out by finding the condenser settings of the local station. No need to worry much about volume control at the outset. Merely give it a slight throttle; put it on about half-way. As to reaction, just enough to cause a slight hiss, thus indicating that you are approaching oscillation point.

If the receiver is a super-het, you will have both oscillator and aerial dials. The former *must* be turned

HINTS AND TIPS FOR ALL LISTENERS

may happen that the signals will be heard over several degrees of the aerial dial and, consequently, if you wish to obtain an accurate reading necessary for calibration purposes, volume must be reduced as much as possible.

You will find that by tuning to a whisper you can establish the exact position at which the condenser should be set; you cannot do otherwise when dealing with a loud transmission.

We have now logged two transmissions and if we have used judgment they are well separated from one another, say, by 200 or more metres. Now consult a list of wavelenths, say on Page Two of this Supplement, and pick out a station working about half-way between.

Valuable Data

In your log you possess data on which to base your condenser settings and if you turn the dials roughly to that position, within a degree or so, you will capture the desired transmission. On repeating the performance several times, halving the differences in the settings in each instance, you will register valuable landmarks which should enable you to find without trouble any broadcast you desire.

In the same manner, you will travel slowly downwards from the first station tuned in and also above from the highest broadcast regis-



SHORT-WAVE TRANSMISSIONS FROM THE AIR
An interesting photograph of the radio apparatus installed on the Graf Zeppelin. Quite short wavelengths are used for the transmissions

tered. As you increase the dial readings so, possibly, you may have to use more reaction to obtain signals from the weaker transmitters, but as you go down the dial you will find that less reaction is required.

In the case of the super-het, potentiometer control will play an important part in tuning.

You may notice that when reaction is used too strongly you obtain a howl as you gradually reach the correct setting. It is one of those weird ululations—a howl with a rise and fall like a wave—as you pass across the transmission. Your first

step is to reduce reaction and you discover, as it were, *in the silent point or trough of that wave*, the broadcast you seek.

To-day, most sets are free from hand capacity, but should you come across any instance in which the signal falls off as you withdraw your hand from the dial it is a sure sign that the tuning is incorrect. As you take away your hand, so the capacity is reduced and to counteract this a slight upward movement of the dial (that is, an increase in condenser reading) will prove a remedy.

Do not tune in on a howl; it annoys your neighbours and, what is just as bad, it will hamper your reception. With that delicate touch to which I have referred it is possible to slide into a transmission with the merest suggestion of a strong breathing sound.

Smooth Manipulation

Gentle and smooth manipulation of dials, potentiometer, and reaction or volume control will give you the feeling that you are master of your receiver. Those squeals, zips, and other unearthly ear-splitting noises are painfully unpleasant, both to yourself and to any members of your family who are unlucky enough to be in the same room.

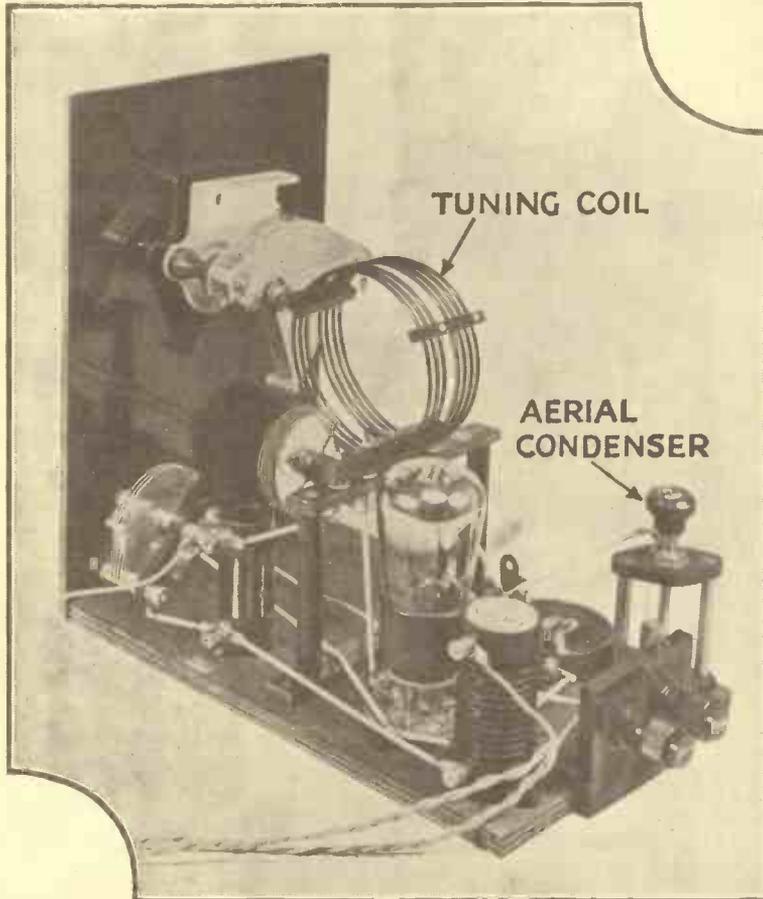
Moreover, far from enhancing your reputation as a wireless experimenter, they brand you as the greenest of raw tyros.



HAVE YOU HEARD A JAVANESE ORCHESTRA?
One of the best-known short-wave transmitters is that at Bandoeng, in Java. Here is a photograph of the station orchestra

The Super-het Adaptor

A unit that converts any standard set with high-frequency amplification into a short-wave super-het. It has been designed by the WIRELESS MAGAZINE Technical Staff and will widen anyone's field of reception



FINISHED AND READY FOR PULLING IN THE ULTRA-SHORT WAVES
Here is the Super-het Adaptor ready for connecting to a set with high-frequency amplification; the latter is then converted into a short-wave super-het

IT should be clearly understood at the outset that this short-wave unit is not intended specially for use with super-het receivers—it simply converts any set with high-frequency amplification into a short-wave super-het.

Principle of Operation

The principle of the system is to use the short-wave unit as the combined first detector/oscillator of a super-het, the intermediate amplifier and the second detector being formed by the main receiver.

The short-wave unit is always used in the oscillating condition, the circuit being tuned so that there

is a "beat" between the incoming signal and the oscillations generated locally. This "beat" frequency is amplified as a long-wave signal by the main receiver.

From this it follows that the bigger the set with which the short-wave unit is used, the better there will be the signal strength, because there will be considerable intermediate amplification. A unit of this type can only be used with a set having a stage of high-frequency amplification; better results will naturally be obtained if two or more stages of high-frequency amplification are available.

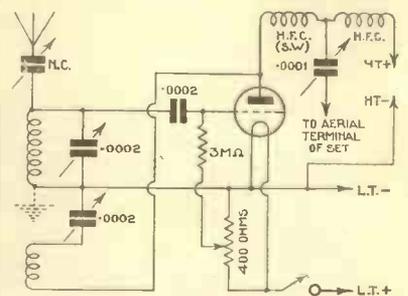
This super-het system of short-

wave reception has obvious advantages over the more common method of plugging in a short-wave detector and using the low-frequency stages only of the main receiver (a unit of this type, however, is described on Page Fourteen for the benefit of those who have sets without any high-frequency amplification).

Efficient in Practice

The super-het method adopted in this instance was suggested by Capt. Round in these pages some years ago and has proved to be particularly efficient in practice. It has previously been used with success by the WIRELESS MAGAZINE Technical Staff.

It must be emphasised that this short-wave unit can be used without altering the main receiver in any way. The same batteries can be used; apart from that the only extra connection is a lead from the unit to the aerial terminal of the main set, the aerial, of course,



CIRCUIT OF THE UNIT

The circuit used for the Super-het Adaptor is practically the same as that of an ordinary one-valve short-wave receiver

being connected to the unit in the ordinary way.

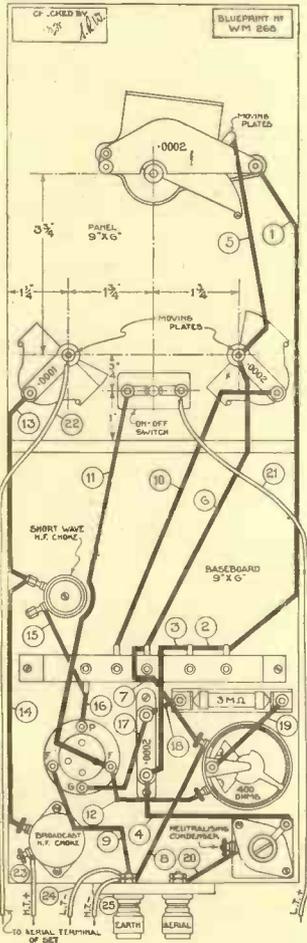
There is no difficulty about the operation of the system. The main set is tuned to a long wavelength, say in the neighbourhood of 1,000 metres to 1,500 metres, and the unit itself tuned as an ordinary short-wave set. It must, however, be kept on the oscillating point all

the time or there will be no super-het action.

It will be seen from the circuit diagram on Page Six that the parts needed for the unit are practically the same as those for a single-valve short-wave set.

Aerial Condenser

There is a series condenser of the neutralising type in the aerial circuit to reduce the effective capacity of the aerial system. An ordinary



WIRING DIAGRAM

This wiring plan is reproduced at quarter scale. A full-size blueprint can be obtained for 6d., post free, if the coupon on the last page is used by January 31. Ask for No. W.M268.

grid-tuning circuit is employed, this being adjusted by means of a .0002-microfarad variable condenser.

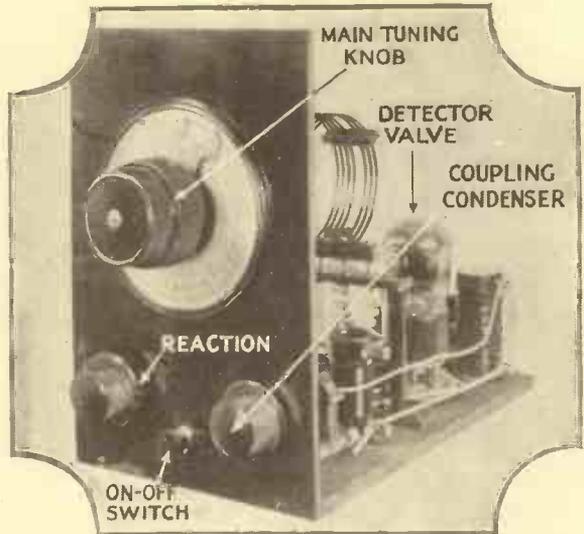
The grid leak and condenser have values of 3 megohms and .0002 microfarad respectively, but these can be changed as the constructor desires. Different valves work better with different values.

One end of the grid leak, instead of being taken direct to low-tension positive, as in the ordinary way, is connected to the slider of a potentiometer placed across the low-tension supply. This enables the bias on the valve to be controlled within close limits and adds considerably to the general efficiency of the unit.

In the anode circuit of the valve are two high-frequency chokes, one of a special short-wave type and the other of the standard type. The latter prevents medium- and long-wave signals from breaking through into the long-wave amplifier formed by the main set and consequently reduces the amount of interference experienced.

Reaction is applied by coupling a coil in the anode circuit with the grid circuit in the ordinary way; the amount of feedback is controlled by a second .0002-microfarad variable condenser.

Build It for the New Year!



HOW THE CONTROLS ARE ARRANGED
There are only four controls on the Super-het adaptor, which is simple to operate. It converts any set with high-frequency amplification into a short-wave super-het

As for the construction of the unit, it will be clear from the photographs that this is simple. There are few components to be fixed in position, and the assembly is easily accomplished even by a beginner.

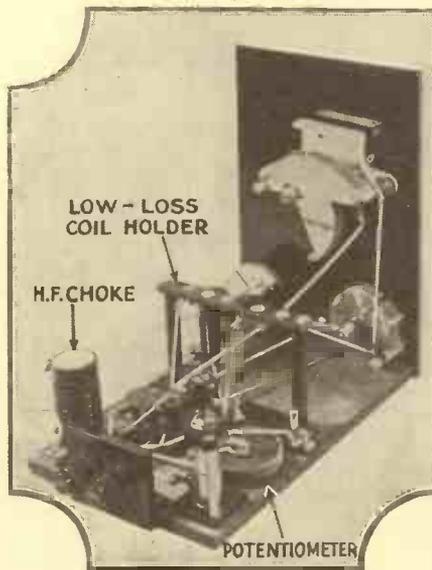
Full-size Blueprint

All the essential details for construction are included in these pages, but if desired a full-size blueprint can be obtained for half price, that is, 6d. post free, if the coupon on the last page of this issue is used by January 31. Send your application to Blueprint Dept., WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4.

Each connection is numbered separately and all the leads should be put in position in the numerical order thus indicated. In this way there is no possibility of making a mistake.

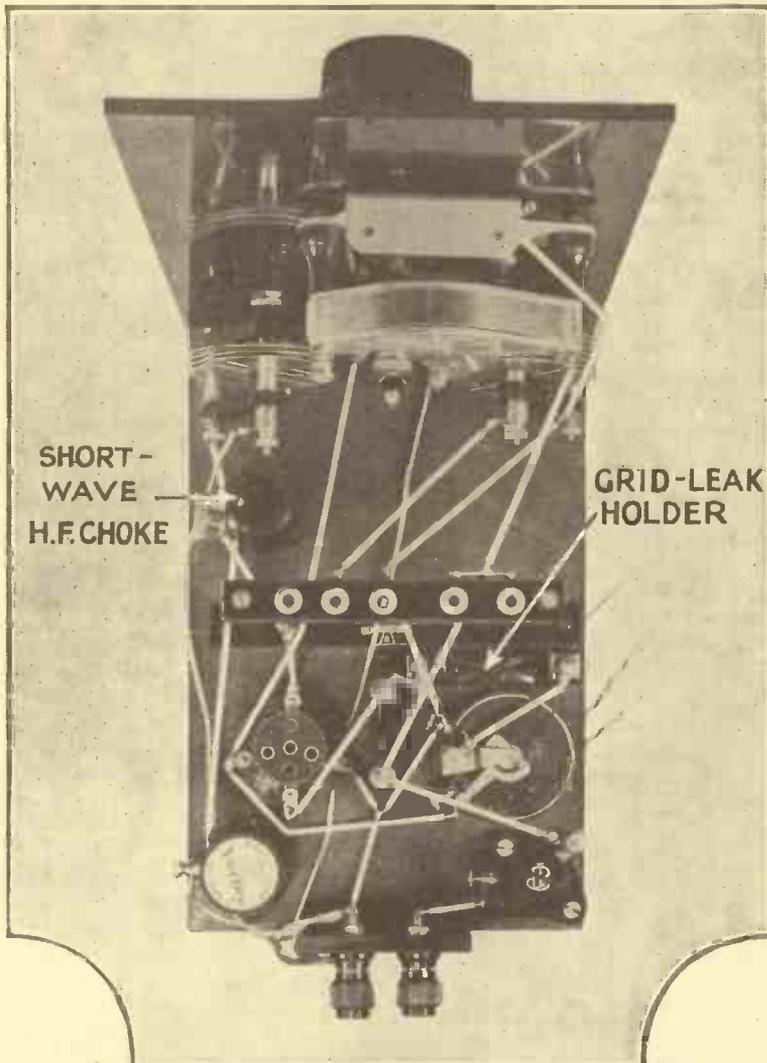
Using the Unit

There will be no trouble about putting the unit into use. Any standard detector valve will be suitable. The batteries should be connected up so that the proper voltages are applied; the batteries employed for the main set can be used for the short-wave unit also.



NOTE THE SIMPLICITY
This photograph shows beyond doubt the simple nature of the Super-het Adaptor. The cost of construction is very reasonable

THE SUPER-HET ADAPTOR—Continued



HOW THE COMPONENTS ARE ARRANGED IN THE ADAPTOR
 This special plan view shows how the components are placed in position. It will be evident that the construction is quite straightforward and presents no difficulty

The aerial connection should be removed from the main receiver and connected to the terminal on the unit. A lead (No. 22 on the wiring plan) is taken from the unit to the aerial terminal of the main receiver.

Adjusting Main Set

The next step is to switch the main set on and adjust it to a wavelength between 1,000 and 1,500 metres. The operator should be able to do this without difficulty with the aid of his log of wavelengths.

Next switch on the unit itself and tune it in the ordinary way. There are four coils in the set; pick out one that will give the

desired range of wavelengths. They adjust the reaction control and the aerial series condenser (which is on the right-hand side of the panel) until the set oscillates over the whole of the scale. Tuning is then accomplished by rotating the knob of the main condenser.

Avoiding Interference

It is not necessary always to have the main set adjusted to the same wavelength. It is desirable, however, to pick a wavelength that is not subject to interference. Some powerful stations might break through into the main set although no aerial is actually connected to it. For this reason it is worth taking some trouble to pick out a wavelength that is free of any powerful transmission.

Hour-by-hour Guide

When it is desired to change the wavelength range of the unit, another coil unit should be plugged into the holder. With the aid of the Hour-by-hour Guide on Pages Ten and Eleven of this Supplement, there will be no trouble in finding what wavelengths will prove the most fruitful at any time of the day or night.

That is all that the reader needs to be told about the Super-het Adaptor. But, in conclusion, let it be specially noted that the unit is only suitable for sets that already incorporate high-frequency amplification. Another unit for other sets is described on Page Fourteen.

COMPONENTS NEEDED FOR THE SUPER-HET ADAPTOR

CHOKES, HIGH-FREQUENCY

1—Ignic short-wave, 2s. (or Wearite, Eddystone).

1—Varley multi-cellular Junior, type BP2, 3s. 6d. (or Watmel DX3, Readi-Rad).

COILS

1—Eddystone short-wave inductance unit, £1 2s. 6d.

CONDENSERS, FIXED

1—T.C.C. .0002-microfarad, type 34, 1s. 6d. (or Magnum, Trix).

CONDENSERS, VARIABLE

1—Utility .0002-microfarad, type W163, with vernier dial, 13s. (or Jackson, Cydon).

1—Formo .0002-microfarad, midget type with knob, 3s. 3d. (or Dubilier).

1—Formo .0001-microfarad, midget type with knob, 3s. 3d. (or Dubilier).

1—I.B. neutralising, 3s. 6d. (or Peto-Scott).

EBONITE

1—Permcot 6-in. by 9-in. panel (or Red Triangle, Readi-Rad).

HOLDER, GRID-LEAK

1—Readi-Rad, 6d. (or Telsen, Bulgin).

HOLDER, VALVE

1—Clix, with terminals, 10d. (or W.B., Wearite).

RESISTANCE, FIXED

1—Telsen 3-megohm grid leak, 6d. (or Dubilier, Watmel).

RESISTANCE, VARIABLE

1—Lissen 400-ohm baseboard mounting potentiometer, 2s. 6d.

SUNDRIES

Glazite insulated wire for connecting.
 1—Junit terminal block, 8d. (or Belling-Lee, Sovereign).

1—Baseboard, 6 in. by 9 in. Length of rubber-covered flex.

SWITCH

1—Readi-Rad on-off, 10d. (or Bulgin, W.B.).

TERMINALS

2—Belling-Lee, marked: Aerial, Earth, 1s. (or Clix, Ealex).

VALVE

1—Mazda HL210, 8s. 6d. (or Cossor 210Det, Six-Sixty 210D).

Short-wave Broadcasters

Details of More Than Eighty Transmitters

Wave-length	Call Sign	Station	Observations	Wave-length	Call Sign	Station	Observations
14.47	LSY	Buenos Aires*	15.00-19.00 daily	31.86	PLE	Bandoeng*(Java)	—
14.55	PMB	Malabar	10.40-15.40 (Mon., Wed., Thu., and Sat.)	32.00	—	Dakar (French W. Afric)	19.15-21.00 (Tue., Thu., and Sat)
15.93	PLE	Bandoeng (Java)	10.40-15.40 (Tues. and Fri.)	32.26	—	Rabat*(Morocco)	19.00-21.00 (Sun.)
19.56	W2XAD	Schenectady*	Relays WGY	33.00	LL	Paris ..	12.30-13.30; 18.00-20.30
19.68	—	Pontoise* (Paris)	—	34.68	W2XV	Long Island (N.J.)	23.00-01.30 (Fri.)
19.72	W8XK	East Pittsburgh*	Relays KDKA	36.92	PLW	Bandoeng (Java)	13.40-15.40
19.84	HJV	Rome* (Vatican)	—	39.4	X26A	Nuevo Laredo (Mexico)	16.00-17.30 (Thu.)
20.5	XDA	Chapuetepc* (Mexico)	—	39.7	HKF	Bogota (Colombia)	01.00-03.00
21.5	—	Bucarest*	—	39.8	—	Rio Bamba (Ecuador)	02.00-04.00 (Fri.)
23.8	—	Rabat*(Morocco)	—	40.00	DOA	Doerberitz (Berlin)	19.00-23.00
24	CT3AQ	Funchal (Madeira)	22.00-02.00 (Thu. and Sat.)	41.00	HSP2	Bangkok (Siam)	13.00-16.00 (Mon.)
25.16	RW50	Moscow-Popoff	18.00-21.00	41.6	EAR58	Teneriffe (Las Palmas)	16.00-23.00
25.20	—	Pontoise* (Paris)	—	41.7	VS1AB	Singapore	14.30-16.00 (Sun. and Wed.)
25.25	W8XK	E. Pittsburgh*	Relays KDKA	42.3	D4XAA	Stuttgart	19.00-23.00
25.27	VUC	Calcutta*	—	42.8	F8BP	Rugles (France)	13.30, 21.00-23.00
25.42	3RO	Rome* ..	—	42.9	CT1AA	Lisbon* (Portugal)	Also on 291.5 m.
25.465	—	Saigon (Indo-China)	—	43.00	EAR100	Madrid ..	22.30-24.00 (Tue. and Sat.)
25.5	XDA	Chapuetepc* (Mexico)	—	43.75	—	Vitus (Paris)	Relays Radio Vitus
25.53	G5SW	Chelmsford* ..	12.30-13.30; 18.45-24.00 (exc. Sat. and Sun.)	45.00	8KR	Constantine (Tunis)	23.00 (Mon. and Fri.)
25.6	—	Caracas (Venezuela)	21.00 onwards	45.38	—	Moscow (U.S.S.R.)	18.00-21.00
25.63	—	Pontoise* (Paris)	—	46.69	W3XL	Boundbrook (N.J.)	Relay WJ2 : 22.00-23.45 (Fri.), 18.30-23.45 (Sat.), 04.00-08.00 (Fri. and Sat.)
26.7	1BXX	S.S. "Elettra" ..	(Irregular)	47.72	RW62	Minsk(U.S.S.R)	20.00-22.00
28.98	LSX	Buenos Aires*	—	48.00	CN8MC	Casablanca (Morocco)	20.00-21.00 (Mon. and Tues.), 12.00 (Tues.)
29.3	—	Heredia* (Costa Rica)	—	48.05	HKD	Baranquilla (Colombia)	15.00-18.00
30	—	Belgrade* (Jugo)	—	48.35	HKC	Bogota* (Col.)	—
30.57	LSOR	Buenos Aires ..	22.00-01.00	48.62	HRB	Tegucigalpa* (Hon.)	—
31.28	VK2ME	Sydney*(N.S.W.)	—	48.80	VE9CL	Winnipeg*(Can.)	—
31.28	VK3ME	Melbourne*	—	48.86	W8XK	E. Pittsburgh*	Relays KWKA
31.30	W3XAU	Philadelphia ..	21.00-06.00 (exc. Thu. and Fri.)	49.02	W2XE	Richmond Hill (N.Y.)	Relays WABC 13.00-05.00
31.35	W1XAZ	Springfield (Mass.)	Relays WB2	49.05	F31CD	Saigon* (Indo-China)	—
31.35	SR1	Poznan (Poland)	18.45-21.45 (Tue.), until 01.0 (Thu.)				
31.38	—	Zeesen* (Germany)	Relays Berlin				
31.48	W2XAF	Schenectady (N.Y.)	Relays WGY				
31.51	OXY	Skamleback* ..	Relays Copenhagen				
31.55	VK3ME	Melbourne*	—				
31.75	—	Rio de Janeiro* (Brazil)	—				

An asterisk (*) against the name of a station indicates that times of transmission are to be found in the special Hour-by-hour Guide on Pages Ten and Eleven.

SHORT-WAVE BROADCASTERS—Cont.

Wave-length	Call Sign	Station	Observations	Wave-length	Call Sign	Station	Observations
49.18	W3XAL	Boundbrook* (N.J.)	Relays WJZ				(Mon.); 15.15-17.00, 20.30-06.00 (exc. Sat.)
49.22	VE9GW	Bowmanville (Can.)	11.45-15.00, 20.00-03.00, week days; 17.30-04.15 Sun.	50.0	RV59	Moscow* (U.S.S.R.)	—
49.34	W9XAA	Chicago (Ill.)	Relays WCFL : 02.00-05.00	50.0	EAJ25	Barcelona* ..	20.00-21.00 (Sat.)
49.4	—	Johannesburg*	15.30-20.30	50.0	—	Tananarive (Madagascar)	18.00-20.00 daily; 19.00-23.00 (Sat.)
49.43	VE9CS	Vancouver(B.C.)	01.00-04.00	50.26	HJV	Rome* (Vatican)	15.30-17.00
49.5	7LO	Nairobi*(Kenya)	—	51.22	XDA	Chapultepec* (Mex.)	—
49.5	W3XAU	Philadelphia ..	Relays WCAU : 14.00-21.00; to 06.00 on Sat.	58.00	OVJMPT	Prague* (C2) ..	—
49.67	W2XAL	New York ..	24.00-04.00	62.5	W2XV	Long Island (N.J.)	23.00-01.30 (Fri.)
49.83	W9XF	Chicago ..	Relays WENR : 05.00-07.00(Sun.) 13.00-17.30, 20.30-23.00, 01.00-06.00	70.2	RV15	Khabarovsk* (U.S.S.R.)	09.00-13.00
				92.3	—	Doberitz (Berlin)	08.30-09.00 speech; television on 143 metres

An asterisk (*) against the name of a station indicates that times of transmission are to be found in the special Hour-by-hour Guide on Pages Ten and Eleven.

The "W.M." Hour-by-hour Short-wave Guide

An invaluable guide for short-wave reception. The figures in brackets indicate the times on the Continental twenty-four hour system. Stations are repeated hour by hour while they are on the air.

1 a.m. (01.00)

East Pittsburgh 25.25 metres
 Schenectady 31.48 metres
 Tegucigalpa 48.62 metres
 Winnipeg 48.8 metres
 East Pittsburgh 48.86 metres
 (Wed. and Sat.)

2 a.m. (02.00)

East Pittsburgh 25.25 metres
 Heredia 29.3 metres
 Schenectady 31.48 metres
 Tegucigalpa 48.62 metres
 Winnipeg 48.8 metres
 East Pittsburgh 48.86 metres
 (Wed. and Sat.)

3 a.m. (03.00)

Calcutta 25.27 metres
 Schenectady 31.48 metres
 Tegucigalpa 48.62 metres
 East Pittsburgh 48.86 metres
 (Wed. and Sat.)

4 a.m. (04.00)

Schenectady 31.48 metres
 Tegucigalpa 48.62 metres
 East Pittsburgh 48.86 metres
 (Wed. and Sat.)

5 a.m. (05.00)

Sydney 31.28 metres
 (Sun.)

6 a.m. (06.00)

Sydney 31.28 metres
 (Sun.)

9 a.m. (09.00)

Khabarovsk 70.2 metres

10 a.m. (10.00)

Vatican (Rome) 19.84 metres
 Sydney 31.28 metres
 (Sun.)
 Melbourne, Sun. 31.28 metres
 Wed. and Sat. 31.55 metres
 Khabarovsk 70.2 metres

11 a.m. (11.00)

Khabarovsk 70.2 metres
 Sydney 31.28 metres
 Melbourne 31.28 metres
 (Wed. and Sat.)

12 noon (12.00)

East Pittsburgh 19.72 metres
 (Wed. and Sat.)

Rabat (Sun.) 23.8 metres
 G5SW Chelmsford 25.53 metres
 Sydney 31.28 metres
 Saigon 49.05 metres
 Khabarovsk 70.2 metres

1 p.m. (13.00)

East Pittsburgh 19.72 metres
 (Wed. and Sat.)
 Sydney 31.28 metres
 Zeesen 31.38 metres
 Saigon 49.05 metres
 Boundbrook (Sun.) 49.18 metres

HOUR-BY-HOUR SHORT-WAVE GUIDE

2 p.m. (14.00)

Pontoise	19.68 metres
East Pittsburgh	19.72 metres (Wed. and Sat.)
Zeesen	31.38 metres
Bandoeng (Tues.)	31.86 metres
Saigon	49.05 metres
Boundbrook (Sun.)	49.18 metres

3 p.m. (15.00)

Buenos Aires	14.47 metres
Pontoise	19.68 metres
East Pittsburgh	19.72 metres (Wed. and Sat.)
Zeesen	31.38 metres
Bandoeng (Tues.)	31.86 metres
Bogota	48.35 metres
Saigon	49.05 metres
Boundbrook (Sun.)	49.18 metres
Vatican (Rome)	50.26 metres
Chapuetepc	51.22 metres

4 p.m. (16.00)

Buenos Aires	14.47 metres
Pontoise	19.68 metres
East Pittsburgh	19.72 metres (Wed. and Sat.)
Calcutta	25.27 metres
Zeesen	31.38 metres
Boundbrook (Sun.)	49.18 metres
Johannesburg	49.4 metres

5 p.m. (17.00)

Buenos Aires	14.47 metres
Pontoise	19.68 metres
East Pittsburgh	25.25 metres
Zeesen	31.38 metres
Boundbrook (Sun.)	49.18 metres
Johannesburg	49.4 metres

6 p.m. (18.00)

Buenos Aires	14.47 metres
Schenectady	19.56 metres
Pontoise	25.20 metres
East Pittsburgh	25.25 metres
Zeesen	31.38 metres
Skamleback	31.51 metres
Boundbrook (Sun.)	49.18 metres
Johannesburg	49.4 metres
Nairobi	49.5 metres

7 p.m. (19.00)

Schenectady	19.56 metres
Chapuetepc	20.5 metres
Bucharest	21.5 metres (Wed. and Sat.)
Pontoise	25.2 metres
East Pittsburgh	25.25 metres
G5SW Cl-Elmsford	25.53 metres (Until midnight exc. Sat. & Sun.)

SPECIAL NOTE FOR LISTENERS

The special Hour-by-hour Guide published in these pages is of the greatest utility to those who want to receive short-wave programmes. For each of the twenty-four hours of the day are indicated the chief sources of reception. The important stations are repeated hour by hour as long as they are on the air.

With this list as a guide the listener will not waste valuable time in trying to get stations that are not transmitting.

Short-wave transmitters that broadcast only on certain days of the week (and not daily) are indicated in the feature "Short-wave Broadcasters" on Page Nine.

As soon as is convenient the short-wave listener should make a log of dial readings for stations received—searching on the ultra-short waves is not the simple matter it is on the medium and long waves.

Sydney	31.28 metres
Zeesen	31.38 metres
Skamleback	31.51 metres
Rabat (Sun.)	32.26 metres
Boundbrook	49.18 metres (Exc. Mon, Fri., Sat., and Sun.)
Johannesburg	49.4 metres
Nairobi	49.5 metres

8 p.m. (20.00)

Schenectady	19.56 metres
Chapuetepc	20.5 metres
Bucharest	21.5 metres (Wed. and Sat.)

Pontoise	25.2 metres
East Pittsburgh	25.25 metres
Rome	25.42 metres
Buenos Aires	28.98 metres
Belgrade (Mon.)	30.0 metres
Sydney	31.28 metres
Zeesen	31.38 metres
Skamleback	31.51 metres
Rabat (Sun.)	32.26 metres
Boundbrook	49.18 metres (Tues., Wed., and Thurs.)

Johannesburg	49.4 metres
Nairobi	49.5 metres
Barcelona	50 metres
Moscow	50 metres
Prague	58 metres (Tues. and Fri.)

9 p.m. (21.00)

Schenectady	19.56 metres (Sat. and Sun.)
Bucharest	21.5 metres (Wed. and Sat.)
East Pittsburgh	25.25 metres
Rome	25.42 metres
Pontoise	25.63 metres
Buenos Aires	28.98 metres
Zeesen	31.38 metres
Schenectady	31.48 metres

Skamleback	31.51 metres
Boundbrook	49.18 metres (Tues., Wed., and Thurs.)
Barcelona	50 metres

10 p.m. (22.00)

East Pittsburgh	25.25 metres
Rome	25.42 metres
Pontoise	25.63 metres
Buenos Aires	28.98 metres
Heredia	29.3 metres
Zeesen	31.38 metres
Schenectady	31.48 metres
Skamleback	31.51 metres
Rio de Janeiro	31.75 metres
Lisbon (Fri.)	42.9 metres
East Pittsburgh	48.86 metres (Wed. and Sat.)

Boundbrook	49.18 metres (Tues., Wed., and Thurs.)
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11 p.m. (23.00)

East Pittsburgh	25.25 metres
Pontoise	25.63 metres
Buenos Aires	28.98 metres
Zeesen	31.38 metres
Schenectady	31.48 metres
Skamleback	31.51 metres
East Pittsburgh	48.86 metres (Wed. and Sat.)
Boundbrook	49.18 metres (Tues., Wed., and Thurs.)

12 midnight (24.00)

East Pittsburgh	25.25 metres
Pontoise	25.63 metres
Buenos Aires	28.98 metres
Schenectady	31.48 metres
Tegucigalpa	48.62 metres
Winnipeg	48.8 metres
East Pittsburgh	48.86 metres (Wed. and Sat.)

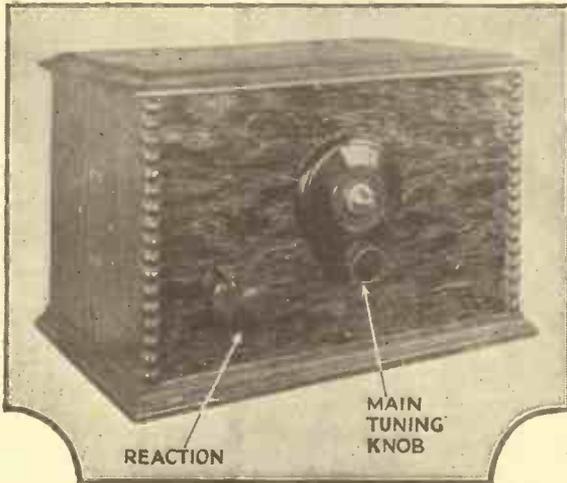
Recognising the European Stations

★ All station calls are spelled out phonetically

Station Details	Dial Readings	Station Details	Dial Readings
223.9 metres, FECAMP (France). Call* : <i>Ee-ci Rah-dee-owe Normandee</i> . (Carillon.) On 245.9 metres after 11.0 p.m. Sunday.		307 metres, ZAGREB (Yugoslavia). Call : <i>Rah-dee-owe Zar-greb</i> . (Hooter, metronome).	
224.4 metres, CORK (I.F.S.). Relays Dublin. Call : <i>Gláodach radio Corcaighe e seo</i> .		307.6 metres, BORDEAUX-LAFAYETTE (France). Call : <i>Ee-ci Bore-do Lar-fay-yett (Pay Tay Tay)</i> . Concerts, plays.	
234 metres, LODZ (Poland). Call : <i>Har-low Raadjo Polsky Woodsh</i> . Relays Warsaw, 1,411.8 metres.		309.9 metres, CARDIFF (Wales). Call : <i>This is the Western Regional programme</i> .	
237.6 metres, BORDEAUX (France). Call : <i>Ee-ci Rah-dee-owe Sudwest Bordowe</i> . (Dulcimer). Gramophone records.		312.6 metres, VITUS, Paris (France). Call : <i>Allo! (twice) Ee-ci poste de Mon-marter ay-miss-yon day Rah-ae-owe Vee-tuos</i> . (Two notes). Concerts; gramophone records.	
239.4 metres, NURNBERG (Germany). See Munich, 533 metres.		312.8 metres, CRACOW (Poland). Call : <i>Har-low (twice) Polsky raadjo Krar-koof</i> . (Three notes). Concerts; relays Warsaw, 1,411.8 metres.	
242.3 metres, BELFAST (N. Ireland). Call : <i>Belfast calling</i> . (Tuning note).		315 metres, MARSEILLES (France). Call : <i>Allo! (twice) Ee-ci Mar-say provance</i> . (Two bells). Relays PTT Paris.	
244.1 metres, WILNO (Poland). Call : <i>Oowaaga Polsky Raadjo Wilno</i> . (Cuckoo). Relays Warsaw, 1,411.8 metres.		315.8 metres, GENOA (Italy). Call : <i>Eh-yah rah-dee-owe djenn-owe-wa</i> . (Nightingale). Concerts, opera.	
247.7 metres, TRIESTE (Italy). Call : <i>Eh-yah Rah-dee-owe Tree-ess-tay</i> . (Musical box). Concerts.		325 metres, Breslau (Germany). Call : <i>Ach-toong! here Schlay-zischer foonk-shoondo Brays-lau oond Glyvitz</i> . (Metronome). Concerts, etc.	
249.6 metres, NICE - JUAN - LES - PINS (France). Call : <i>Ee-ci poste de Niece, Can, ay Jewan lay Pan; Ay-miss-yon de lar coat d'Azure</i> . Gramophone records.		328.2 metres, GRENOBLE (France). Call : <i>Allo! (twice) Ee-cee Grainoble pay-tay-tay</i> . Gramophone records. Relays PTT, Paris.	
255.1 metres, TOULOUSE (France). Call : <i>Ee-ci Too-looze Pee-rain-aye</i> . Relays PTT, Paris, Lyons or Marseilles.		331.5 metres, NAPLES (Italy). Call : <i>Eh-yah Rah-dee-owe Roe-ma har-polly</i> . (Pipes of Pan). Opera.	
259.3 metres, LEIPZIG (Germany). Call : <i>Here mittel-doytsch-aye foonk-shoonde Lyptsish oond Draysden</i> . (Vibraphone). Concerts.		334.4 metres, POZNAN (Poland). Call : <i>Har-low (twice) raadjo Poznansky</i> . (Carillon). Relays Warsaw, 1,411.8 metres.	
261.5 metres, LONDON (England). Call : <i>This is the National Programme</i> .		337.8 metres, BRUSSELS (Belgium). Call : <i>Here Bruessel</i> . (Carillon). Concerts, gramophone records, relays.	
266 metres, LILLE (France). Call : <i>Ee-ci Rah-de-owe Lil</i> . Gramophone records; plays; relays.		341.7 metres, BRNO (Czechoslovakia). Call : <i>Allo. Rah-dee-owe Djoor-narl Vrooknow</i> . Concerts; relays Prague.	
268.8 metres, VALENCIA (Spain). Call : <i>Rah-dee-owe Valencee-ya</i> . Gramophone records.		345.2 metres, STRASBOURG (France). Call : <i>Allo! (twice) Ee-ci Rah-dee-owe Strarsboer pay-tay-tay</i> . (Deep gong). Concerts, plays, gramophone records.	
271.5 metres, RENNES (France). Call : <i>Allo! Allo! Ee-ci Rah-dee-owe pay-tay-tay Ren</i> . Relays PTT, Paris. Gramophone records.		348.8 metres, BARCELONA (Spain). Call : <i>Akkyess-ta-the-own-ay oon-ay-own rah-dee-owe Barth-ell-ovna</i> . Gramophone records; outside broadcasts.	
273.6 metres, TURIN (Italy). Call : <i>Eh-yah, Rah-dee-owe Tor-ee-know (ay Mee-lah-know)</i> . (Nightingale). Opera.		355.8 metres, LONDON (England). Call : <i>This is the London Regional programme</i> . (Metronome).	
276.5 metres, HELLSBERG (Germany). Call : <i>Here oast-marken roond-foonk oond Dant-zisch</i> . (Two notes : D flat, A flat). Concerts, etc.		360.6 metres, MUHLACKER (Germany). Call : <i>Ach-toong! Here Sued-foonk</i> . (Three notes : C, D, G). Concerts.	
281.2 metres, COPENHAGEN (Denmark). Call : See Kalundborg, 1,153 metres.		363.4 metres, ALGIERS (N. Africa). Call : <i>Ee-ci rah-dee-owe pay-tay-tay Al-zhay</i> . (Fanfare and gong). Oriental music.	
287.3 metres, LYONS (France). Call : <i>Hallo (twice) Ee-ci Rah-dee-owe Lee-yon</i> . Gramophone records.		365 metres, BERGEN (Norway). Call : <i>Hair Bair-genx</i> . Concerts.	
290.5 metres, LISBON (Portugal). Call : <i>Ess-tar-saa-owe Rah-dee-owe Lees-bow-a</i> .		369.4 metres, RADIO LL, Paris (France). Call : <i>Ee-ci rah-dee-owe Ell-ell. Compagnee nar-see-yon-al de rah-dee-ov-dee-few-zee-yon ar Paree</i> . Concerts.	
294.6 metres, LIMOGES (France). Call : <i>Ee-ci pay-tay Lee-mgw-je</i> . Gramophone records.		372 metres, HAMBURG (Germany). Call : <i>Ach-toong. Here dee Noragsender Hamboorg, Bray-men Keel cond Flens-boorg</i> .	
298.8 metres, HILVERSUM (Holland). Call : <i>Here Hilversoom (de Ar-vrowe or de Far-rah)</i> . Concerts and relays.			
301.5 metres, NORTH NATIONAL (England). Call : <i>Daventry and North National programme</i> .			

Station Details	Dial Readings	Station Details	Dial Readings
376.4 metres, GLASGOW (Scotland). Call: <i>This is the Glasgow station calling.</i>		509.3 metres, BRUSSELS (Belgium). Call: <i>Allo! Ee-ci Brew-sale.</i> Concerts.	
380.7 metres, LVOV (Poland). Call: <i>Har-low raadjo polsky Lvoo.</i> (Clock gong). Relays Warsaw, 1,411.8 metres.		517.2 metres, VIENNA (Austria). Call: <i>Hallo! Rah-dee-owe-Veen.</i> (Metronome). Concerts, opera, dance music.	
384.4 metres, TOULOUSE (France). Call: <i>Allo! Ee-ci rah-dee-owe Too-locze.</i> (Gong). Gramophone records.		526 metres, RIGA (Latvia). Call: <i>Hallo Ree-ga.</i> Concerts.	
389.6 metres, FRANKFURT-ON-MAIN (Germany). Call: <i>Ach-toong! Here Sued-vest-foonk.</i> (Metronome). Concerts.		533 metres, MUNICH (Germany). Call: <i>Here Buy-er-ischer roondfoonk Metw-shen, Noornbaing, Owgsboorg oond Kysers-lowtern.</i> (Musical notes and hooter). Concerts, opera.	
394 metres, BUCHAREST (Roumania). Call: <i>At-tent-see-oon-aye ah-eetch rah-dee-owe Book-oo-recht.</i> (Metronome).		541.5 metres, PALERMO (Italy). Call: <i>Eh-yah Rah-dee-owe Pal-air-mow.</i> (Gramophone record of bells). Concerts.	
398.9 metres, MIDLAND REGIONAL (England). Call: <i>This is the Midland Regional programme.</i>		550 metres, BUDAPEST (Hungary). Call: <i>Hallo! rah-dee-owe Booda-pescht.</i> (Musical box). Concerts and relays.	
403 metres, SOTTENS (Switzerland). Call: <i>Allo (twice) ee-ci rah-dee-owe Swiss Roemande, studio de Low-zanne (or) de Jean-ayve.</i> Concerts.		574.7 metres, LJUBLJANA (Yugoslavia). Call: <i>Hallo! rah-dee-owe Loo-ble-ahnah.</i> (Cuckoo). Concerts.	
409.8 metres, KATOWICE (Poland). Call: <i>Har-low (twice) Polsky rah-dee-owe Kar-tow-vit-see.</i> (Metronome). Concerts.		937.5 metres, KHARKOV (U.S.S.R.). Call: <i>Nar-rod-knee-yarah-dee-owe-stan-cee-ya Car-coov.</i> Concerts, talks.	
413 metres, DUBLIN (I.F.S.). Call: <i>Rahdio ath clee-ath aye-say-owe.</i> Dublin calling! (Tuning note). Concerts; sponsored programmes.		1,000 metres, LENINGRAD (U.S.S.R.). Call: <i>Sloo-shah-ee-tee-ye Leningrad-sky-yah Kol-pee-know</i> (Cuckoo). Concerts.	
416 metres, RABAT (N. Africa). Call: <i>Ee-ci rah-dee-owe Mar-rock ar Rab-ba.</i> (Metronome). Oriental music, etc.		1,071 metres, SCHEVENINGEN-HAVEN (Holland). Call: <i>Heer de Zakker-likker omroop te Skay-venningen-Harven.</i> (Hooter). Commercial reports.	
419 metres, BERLIN (Germany). Call: <i>Ach-toong! Here Bear-leen oond dee glychvellen-sender Shtet-teen, Mag-dee-boorg oond bear-leen oost.</i> (Metronome).		1,091 metres, OSLO (Norway). Call: <i>Hallo Ou-zlo hare.</i> (Musical box).	
424 metres, MADRID (Spain). Call: <i>Ay-ah rhot a see-ett-aye oon-ee-own-aye rah-dee-owe madreed.</i> Concerts, outside broadcasts.		1,153 metres, KALUNDBORG (Denmark). Call: <i>Kee-yob-en-harvn Karl-oond-borr og Danmarks kort-boelge-senner.</i> (Hooter). Concerts, opera, dance music.	
424.4 metres, MOSCOW (U.S.S.R.). Call: <i>Govoreet Moskva Stalina.</i>		1,200 metres, REYKJAVIK (Iceland). Call: <i>Ootwarp Ray-kee-yar-veek.</i> Concerts.	
431.7 metres, BELGRADE (Yugoslavia). Call: <i>Ov-day rah dee-owe Bay-owe grad.</i> (Metronome). Concerts, relays.		1,204.8 metres, ISTANBUL (Turkey). Call: <i>Allo! Ee-stambool tell-six tell-ay-fon-ou.</i> Oriental concerts.	
435.4 metres, STOCKHOLM (Sweden). Call: See Motala, 1,348 metres.		1,304 metres, MOSCOW (U.S.S.R.). Call: <i>Sloo-shah-ee-tee-aye Moskva ra-dee-owe cent-rarl.</i> Concerts, international talks.	
441 metres, ROME (Italy). Call: <i>Eg-yah rah-dee-owe Roe-ma (aye-Nar-polly).</i> (Musical box melody). Concerts, opera.		1,348 metres, MOTALA (Sweden). Call: <i>Stockholm-Mott-allah.</i> (Rapid strokes on gong). Concerts, talks.	
447.1 metres, PARIS (France). Call: <i>Ee-ci l'on-somble day stass-ee-yon de rah-dee-oh-few-zee-yon de lay-ta fran-say.</i> Concerts, outside broadcasts, speeches, etc.		1,411.8 metres, WARSAW (Poland). Call: <i>Hallo (twice) Polsky raadjo Var-schav-va.</i> (Metronome or morse letter W). Concerts, opera, dance music.	
451 metres, SAN SEBASTIAN (Spain). Call: <i>Ay-ah rhot a ot-cho oon ee own ay rah-dee-owe San Say-bar-stee-yahn.</i>		1,445.8 metres, EIFFEL TOWER (France). Call: <i>Ee-ci le poste Nar-see-own-al de la Two-er Ay-fell.</i> (Trumpet call and chimes). Talks, gramophone records.	
459 metres, BEROMUENSTER (Switzerland). Call: <i>Here schwytzerisher landes-sender</i> followed by studio (for example, <i>Bairn Bar-zel, Tsou-reech</i>). (Clock chimes or musical box).		1,481 metres, MOSCOW (U.S.S.R.). Call: <i>Sloo-shah-eet-yay govoreet Moskva rah-dee-owe stant-tsee ya ee-men-ee konin-terna.</i> Talks.	
466 metres, LYONS (France). Call: <i>Ee-ci pay tay-tay Lee-ong.</i> (Stroke on gong). Relays PTT, Paris.		1,554.4 metres, DAVENTRY NATIONAL (England). Call: <i>This is the National programme.</i> (Metronome).	
472.4 metres, LANGENBERG (Germany). Call: <i>Ach-toong! vest-doy-tcher roondfoonk.</i> (Chimes). Relays Cologne group.		1,634.9 metres, KONIGSWUSTERHAUSEN (Germany). Call: <i>Ach-toong! Doytschland-sender oond koorz-vellen-sender koymigs-vooster-how-zen.</i> (Metronome).	
480 metres, NORTH REGIONAL (England). Call: <i>This is the North Regional programme.</i>		1,724.1 metres, RADIO PARIS (France). Call: <i>Ee-ci ay-miss-ee-yon ra-dee-owe Pavee.</i> Gramophone records.	
488.6 metres, PRAGUE (Czechoslovakia). Call: <i>Allo! Prar-ha.</i> (Musical box). Symphony concerts, opera.		1,796 metres, LAHTI (Finland). Call: <i>Who-ohm-ee-owe (twice) taar-la soo-owe men lys-rah-dee-owe Helsinki-Larti.</i>	
501.7 metres, MILAN (Italy). Call: <i>Eh-yah rah-dee-owe Mee-lar-know.</i> (Musical box or nightingale). Concerts, opera. Also: FLORENCE (Firenze).		1,875 metres, HUIZEN (Holland). Call: <i>Here Hoy-zen.</i> Gramophone records; plays.	
		1,935 metres, KAUNAS (Lithuania). Call: <i>Allo (twice). Let-ou-voss rah-dee-owe Kow-nass.</i> (Gong and metronome). Concerts.	

The Plug-in Adaptor



TO WIDEN YOUR FIELD OF RECEPTION
 This front view of the Plug-in Adaptor shows how simply the controls are arranged. The unit can be used with almost any battery-operated receiver

This unit is for converting any battery-operated set with low-frequency amplification into an efficient short-wave receiver. The cost of construction is low and the operation very simple. The unit has been designed by the WIRELESS MAGAZINE Technical Staff.

shown opposite. There is a small series condenser in the aerial lead to reduce the effective capacity of the aerial-earth system. In practice it is a good plan to use a small condenser of the neu-

farad and the leak a resistance of 5 megohms.

It will be noticed that this is higher than the value of grid leak used in the Super-het Adaptor; the reason is that the valve in the latter has to detect and oscillate at the same time, and it does so better with a lower value of resistance. However, the best value of grid leak is largely a matter for experiment; different valves work better with different values of leak.

WHEREAS the Super-het Adaptor described on Page Six of this supplement is intended for use with sets having high-frequency amplification, this unit is for working in conjunction with a low-frequency amplifier.

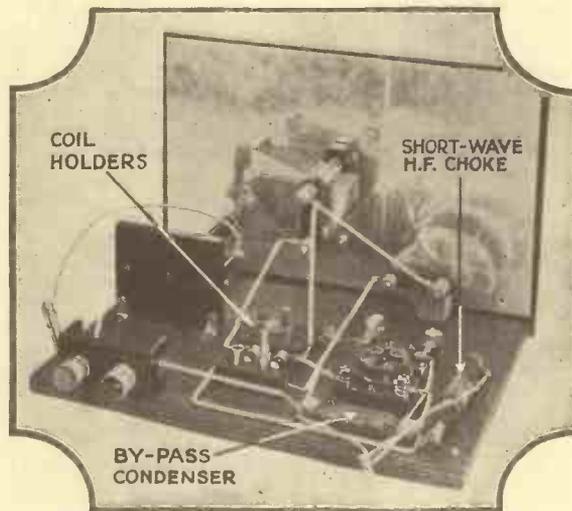
The Plug-in Adaptor consists of a single-valve short-wave receiver which replaces the detector in the main set; whatever low-frequency amplifying stages there are being thus used for boosting up the short-wave signals.

Efficiency

It follows from this that the efficiency of the system, so far as the short waves are concerned, is dependent entirely on the efficiency of the Plug-in Adaptor as a short-wave detector. If the signals are not well developed at the detector stage, then the results will be poor, no matter how much low-frequency amplification is available.

For this reason a good valve should be used and the voltages should be carefully adjusted to get the very best results.

The actual circuit diagram is



SEE HOW THE UNIT ALMOST FALLS TOGETHER
 Nobody looking at this photograph can have any doubt about the simplicity of construction of the Plug-in Adaptor for short-wave reception

tralisating variety; that is what has been done in this instance, the control being accessibly mounted on the front panel.

Plug-in short-wave tuning coils are used and these are tuned by means of a .00015-microfarad variable condenser. There are four different coils in a set to cover the required range of wavelengths.

Of course, the valve is arranged as a leaky-grid detector for the sake of sensitivity. The grid condenser has a value of .0002-micro-

High-frequency Choke

In the anode circuit of the valve there is a high-frequency choke. This prevents the passage of high-frequency currents into the low-frequency stages and also makes reaction possible. It is essential that this choke should have a very low self-capacity or it will not have the required effect.

Reaction is actually obtained by coupling a coil in the anode circuit to the aerial coil, which is of course in the grid circuit of the valve. The amount of feedback is controlled by a second variable condenser, the capacity of this being .0002 microfarad.

It should be noted that there is no need to connect any batteries to this adaptor. The filament of the battery is supplied from the battery that normally supplies power to the main receiver—the valve in the Plug-in Adaptor replaces the detector valve of the main set and is not additional to it.

In the same way, the short-wave detector valve obtains its anode current from the battery that supplies the main receiver. There

is a four-pin plug to insert in the detector-valve holder of the main receiver.

Simple Construction

The photographs in these pages show clearly how simple is the construction of the unit; no beginner need have any hesitation about building it. All the essential details are included in these pages, but if desired a full-size blueprint can be obtained. The cost of this is only 6d., post free, if the coupon on the last page is used by January 31.

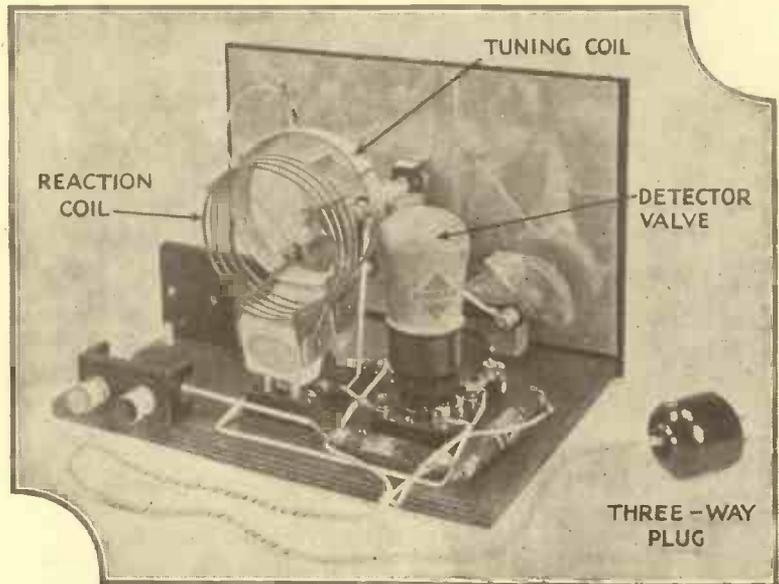
Send your application to Blueprint Department, WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4, and ask for No. WM267.

The full-size blueprint can be used as a template for laying out the components and drilling the holes in the front panel. Further than this, the wires are all numbered separately so that there is no confusion in wiring up. The best procedure is to put the leads in position in the numerical order thus indicated.

No Mistakes Possible

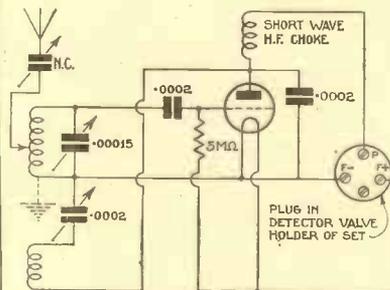
If the numbers are crossed through as the corresponding leads are put in position there is no possibility of making a mistake.

There is one important point that must not be overlooked. It is essential that the filament pins of



WIRING FINISHED AND THE UNIT ALL READY FOR USE

On the right is seen the plug that is inserted into the detector-valve holder of the main receiver for converting it for short-wave reception



A SIMPLE CIRCUIT

The circuit used is quite straightforward and there is nothing to go wrong

the adaptor plug are wired in the same way as the leads to the detector-valve holder in the main receiver.

That is to say, low-tension positive in the unit must correspond to low-tension positive in the receiver with which it is to be used. If this is not done then the low-tension accumulator will be short-circuited—with what disastrous results can be imagined!

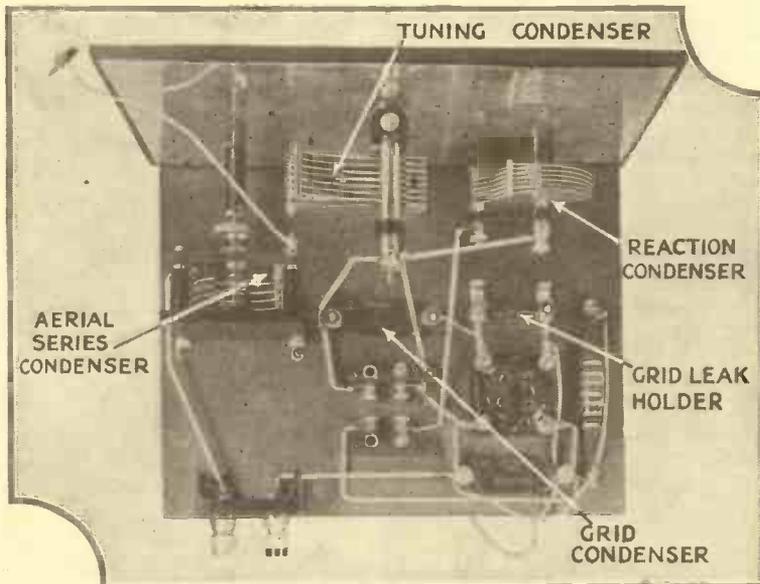
Using the Unit

To put the unit into use it is necessary to remove the aerial and earth leads from the main set and reconnect them to the Plug-in Adaptor. The detector valve is then removed from the main set and placed in the holder in the unit. The adaptor plug, connected by a flexible lead to the unit, is then inserted in the detector-valve holder of the main set.

Suitable Valve

In most cases the detector valve used in the main set will be suitable for use in the unit, but that does not always follow. The valve needed is one of medium impedance, say of the order of 20,000 ohms.

The whole secret of success in short-wave reception with a unit of this nature is the proper control of reaction. It is for this reason that a fully adjustable series condenser is used in the aerial lead. If this is adjusted carefully it will be

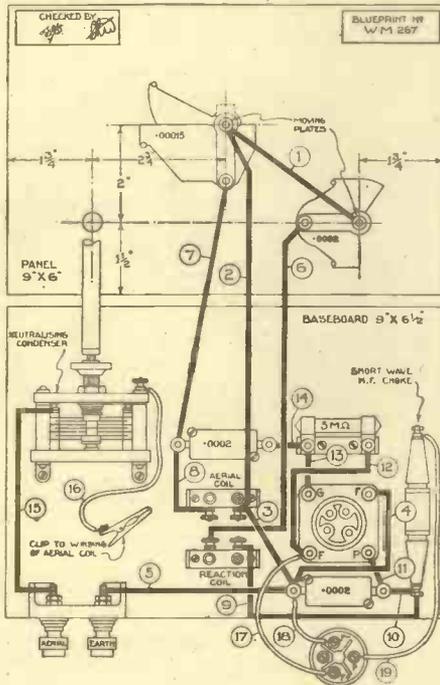


MAKING THE POSITIONS OF ALL THE PARTS CLEAR

With this special plan photograph and a full-size blueprint there can be no difficulty in the assembly of the unit, which can be relied on to pull in the short-wavers at good strength

THE PLUG-IN ADAPTOR—Continued

SPECIAL NOTE



LAYOUT AND WIRING DIAGRAM

This is reproduced at quarter scale. 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 January 31. Ask for No. WM267

possible to go into oscillation smoothly over the whole of the wavelength ranges covered by the tuning coils.

In short-wave reception "dead spots" are experienced and these can often be avoided by a readjustment of this small condenser, which for this reason is so mounted that it can be controlled from the panel.

Readjustment

The beginner should note, that each time the reaction is adjusted the tuning of the aerial circuit will be thrown out to some extent. For this reason it is essential to readjust the main tuning knob each time an alteration is made to the reaction control.

As soon as possible after the unit has been put into use the operator should compile a log of dial readings for different wavelengths. Tuning is so sharp on the ultra-short waves that searching for stations is not the simple matter it is on the medium waveband.

Usually an aerial on the short side is better than a long wire, which naturally has a high capacity.

IN the October issue of WIRELESS MAGAZINE a three-valve short-wave receiver was described; it was called the Meridian Short-waver and is extremely efficient for its type. Indeed, the set is so good that the WIRELESS MAGAZINE Technical Staff see no need at the present time to produce another version.

For this reason full-size blueprints of the set are again offered at half price this month, so that those who want to build a complete short-wave set and not merely an adaptor for an existing set can do so without difficulty.

To take advantage of this offer the blueprint coupon on the last page of this issue must be sent, together with a postal order for 6d., to WIRELESS MAGAZINE, Blueprint Department, 58-61

Fetter Lane, London, E.C.4, not later than January 31. Ask for No. WM255 and a blueprint will be sent by return of post.

There are no tricks about the Meridian Short-waver. A sensitive leaky-grid detector is followed by two stages of low-frequency amplification, the first being resistance-capacity coupled and the second transformer coupled. A standard choke-output circuit is provided for the best results.

Refinements

Among the refinements incorporated are a full-size reaction condenser with a large slow-motion dial to give fine control of sensitivity; a short-wave coil unit with adjustable aerial coupling; and a grid potentiometer to enable the best possible results to be obtained from the detector valve.

Low Cost

The total cost of the construction including valves but none of the other accessories, is approximately £6 10s. For this price the constructor will have a set that will bring the whole world to his fire-side. At least a dozen stations can normally be obtained any night at loud-speaker strength.

If headphones are used there is

COMPONENTS NEEDED FOR THE PLUG-IN ADAPTOR

CHOKE, HIGH-FREQUENCY

- 1—Weirite short-wave, type HF3, 4s. 6d. (or Igranic, Eddystone).

COILS

- 1—Set of Atlas two-pin plug-in, Nos. 2, 4, 6, and 9, 10s.

CONDENSERS, FIXED

- 2—Dubilier .0002-microfarad, type 670, 2s. (or T.C.C., Telsen).

CONDENSERS, VARIABLE

- 1—Formo .0002-microfarad reaction with knob, 3s. 3d. (or Dubilier).
- 1—Formo double-spaced .00015-microfarad, 4s.
- 1—Peto-Scott neutralising, 3s. 6d. (or Jackson).

DIAL

- 1—Formo vernier, 2s. 6d. (or Igranic, Ormond).

EBONITE

- 1—Red Triangle 9-in. by 6-in. panel, 2s. 3d. (or Readi-Rad, Permool).

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

HOLDERS, COIL

- 2—Bulgin two-pin, type P14, 9d.

HOLDER, GRID-LEAK

- 1—Telsen, 6d. (or Bulgin, Readi-Rad).

HOLDER, VALVE

- 1—Magnum, 1s. 6d. (or Benjamin, Igranic).

RESISTANCE, FIXED

- 1—Telsen, 5-megohm grid leak 6d. (or Watmel, Dubilier).

SUNDRIES

- Glazite insulated wire for connecting.
- 1—Baseboard, 9 in. by 6 1/2 in.
- 1—Belling-Lee terminal block, 8d. (or Sovereign, Junit).
- 1—Bulgin four-way multiple cable plug, type P9, 2s.
- Length of rubber-covered flex.

TERMINALS

- 2—Belling-Lee, marked: Aerial, Earth, 1s. (or Clix, Ealex).

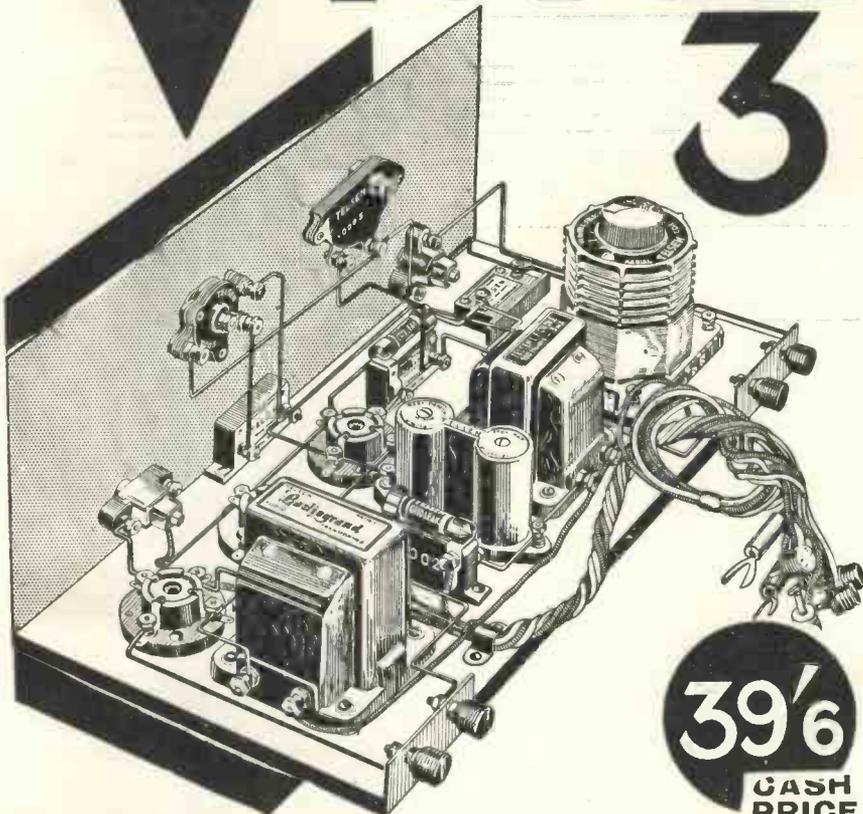
The set is extremely simple to operate, for there are only two tuning controls. That on the left of the panel adjusts the wavelength, while the right-hand condenser is a reaction control to vary the sensitivity of the set. Apart from these dials, there is only the usual on-off switch on the panel.

no limit to the number of transmissions that can be picked up. There are literally hundreds of short-wave stations all over the world, although not all of them transmit telephony. Those who can read morse will have more transmissions at their disposal than they can possibly cope with.

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KIT "C" . 82/6

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SEE PAGE 723

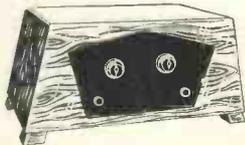


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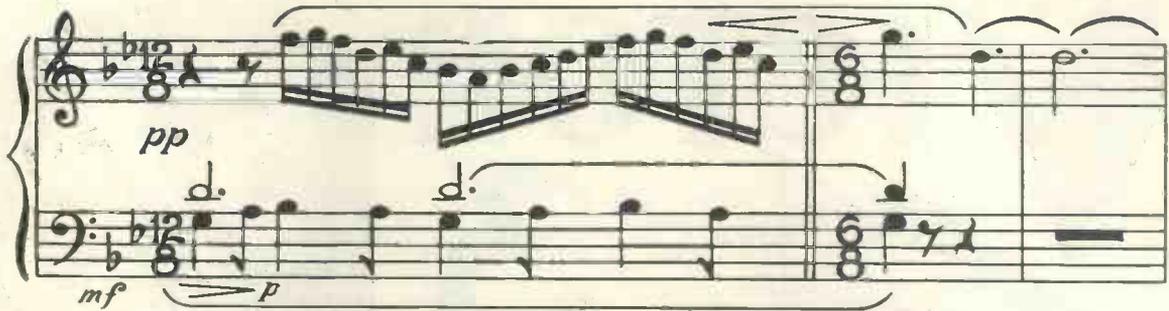
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W.M. 1/1932

A MUSICIAN OF FRANCE



Copy from score (Copyright: Heugel et Cie, Paris) of Massenet's *CENDRILLON* of the little tune used throughout the opera in association with Cinderella

JULES EMILE FREDERIC MASSENET, of whose fairy opera *Cendrillon* (*Cinderella*) a studio performance in English will be broadcast on December 23 and 25, was assuredly a musician of France in his individuality and the style of his music.

Piquancy and Grace

He was of that type of Frenchman of whom the Briton is most apt to think, the Parisian; and his art is characterised by the piquancy, lightness and grace of the essentially national music of his country, flowing from the source of the *chansons populaires* into the sophisticated milieu of Rameau, and his successors, including Massenet (but not Debussy) down to Louis Aubert, the leading, living representative of this particular school of *musique française*.

As a 'cello or violin solo, most people have heard at some time or other the gravely beautiful melody of Massenet's *Elegie*, the sole surviving number from incidental music he wrote in 1875 for a play, *Les Erynnies*, of Leconte de Lisle.

His Masterpiece

Excerpts from his two most popular operas—*Manon* (1884), his masterpiece, and *Thais*—are also familiar, like a song, "Vision Fugitive" (from *Herodiade*, 1881), beloved of tenors budding, blossoming and full-blown. Indeed, I have heard over-blown ones go "pop" on its top notes more than once!

However, we are not here concerned with the tribulations of lyric tenors, but with the suave, facile personality that was Jules Emile Frédéric Massenet.

A spiteful contemporary who said

By
WATSON LYLE

that Massenet "had a nice taste in religiosity" shed light upon a facet of his psychology that may have had much to do with his popularity as a composer during his lifetime, and that was clearly revealed in his first outstanding success, *Marie Madeleine*, produced at Colonne in 1873 as a "Sacred Drama," but accommodatingly rearranged for the Opera Comique in 1906.

It is to be feared that Massenet's Muse was in the habit of refreshing herself at a commercial hotel in Olympus for, when something he wrote hit the public taste, the composer seems to have done his best to repeat the dose. Thus, *Marie Madeleine* was soon followed by *Eve* (1875), an oratorio which was gulped down with relish, unlike the next in the suite, *La Vierge* (1880) who proved indigestible to his followers.

But Massenet was not cast down by this failure. He was not that kind of person. He was astute, and he had charm of personality. That much his belittlers granted.

And as for his technical equipment and powers as an artist, no less a judge than his great contemporary and, in the realm of the theatre, rival—Saint-Saëns—openly admired his facility in turning out with little apparent effort page after page of full score—not of dull, academic stuff, either, but of music instinct with grace and gaiety.

He considered that Massenet's nice judgment of the taste and sympathies of the operatic public

amounted to an extra sense. He was anxious to be friends with him, but Massenet remained suspicious, privately, it may be, fearing some ulterior professional advantage for his rival.

This was rather absurd considering Saint-Saëns' powers in nearly every department of composition, whereas the achievements of Massenet were practically confined to the theatre.

A Swollen Head

In this matter Massenet's attitude shows him to have been to some extent the victim of his own charm and of the flattery it induced, making him susceptible to the devastating malady known as "swelled head," a canker in his psychology that may account for the expenditure of his talents for the needs and plaudits of the moment, causing him to leave very little music of permanent value to art.

His use of spoken dialogue to a lightly orchestrated accompaniment, in place of the usual recitative, in *Manon* (which should not, by the way, be confused with Puccini's *Manon Lescaut*) marks his most original contribution to the literature of music.

Of all he wrote this is the work that seems fated to bear his art onwards to posterity.

His Popularity

Some idea of his popularity with the Paris of his day may be gained from the fact that his election to the membership of L'Académie des Beaux-Arts, in place of Bazin, whom he had succeeded at the Conservatoire, showed a majority of five over

(Continued on page 724)

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W.M. 1/1932

It helps us if you mention "Wireless Magazine"

A MUSICIAN OF FRANCE—Cont. from page 722

the voting for Saint-Saëns. At that time, 1878, he was but thirty-six and the only member of the Academy to be elected so young. He died in Paris on August 13, 1912.

Tuneful Melodies

There is no need to give anything like a detailed analysis of the music of *Cendrillon*, the fairy opera in four acts and six tableaux, which is thoroughly representative of the composer's gracious style of writing, with plenty of tuneful melodies and plenty of the coinage of everyday harmony and instrumentation to denote the emotional play of the music, in addition to the suggestion of the words.

Throughout the score he follows the plan he adopted in *Manon* of giving music and particular tunes of a special type (the idea was, of

course, originally Wagner's) to each of the chief characters.

Madame de la Haltière, the wicked mother of Cinderella, is introduced in Scene 3, Act 1 by music of a ridiculously "virago" sort, and similarly, thereafter, Pandolfe, the father, is characterised by more varied and straighter tunes; the Ugly Sisters, Noémie and Dorothée, are heartlessly exposed as ninnies and echoes of the mother and each other, and so on.

A charming little tune much used in connection with Cinderella is first heard in Scene 5, Act 1 at her initial appearance, and I have chosen it for quotation at the top of this article.

Very beautiful is much of the music used to create the tonal "atmosphere" suited to the fairy, her attendant sprites, *lutins* (goblins) and *follets* (Will-o'-the-wisps); while in

the music expressing the heroine's agitation over the loss of her immortal *pantoufle de verre* (glass slipper) Massenet makes deft use of simple harmonisation to create the effect desired.

Dance Music

Naturally, the tableaux and ballets for the entrances of the various groups of personages at the ball give scope for melodious dance music—a great contrast to the jazz rhythms now prevalent, but again going back to more tuneful melodies.

Cendrillon was first produced at the Opéra Comique, Paris, on May 24, 1899, under the direction of M. Albert Carré. It is of interest to recall that M. André Messager, himself well known as a composer of light opera, was Musical Director of the Opéra at the time.

RADIO RHYMES



The Sopranos sing songs about larks up in Heaven (You hear them each night, they're on about seven). When they've finished with larks they sing about roses; Their motive for doing so, nobody knows!



The Actor (Dramatic) his voice always throbs, Reducing his listeners to heartbreaking sobs. ("Unhand her, you scoundrel, d'ye hear me, by heck!") And on the way out he calls for his cheque!

TELSEN RADIO COMPONENTS

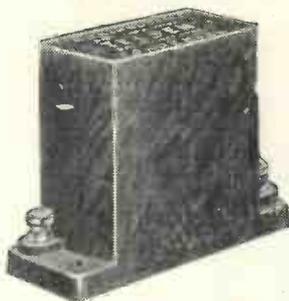


6^d

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

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

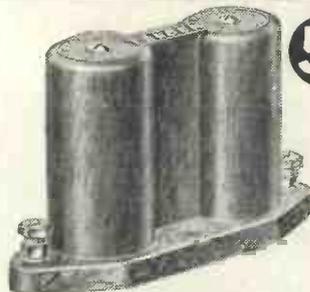
Telsen 4-pin Valve Holder Price 6d.
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TELSEN MANSBRIDGE TYPE CONDENSERS

Made in capacities from .01 to 2.0 mfd. From 1/6
Telsen Fixed Condensers are made in capacities from .0001 to .002 mfd. Price 6d.



5/-

TELSEN BINOCULAR H.F. CHOKE
Hailed unanimously by the leading experts as the perfect H.F. Choke. The Telsen Binocular Choke is called for wherever highest efficiency is desired. Its highest inductance (180,000 micro-henrys) and exceptionally low self-capacity (.000002 mfd.) ensure a very high impedance at all wavelengths, and its excellent efficiency curve is free from parasitic resonances Price 5/-



5/6

TELSEN LOUD-SPEAKER UNIT
The Telsen Loud-speaker Unit is pleasing to the most sensitive ear. The deep notes of the bass, the brilliance of the soprano, and the crispness of diction are clearly reproduced without any distortion.

It employs cobalt steel magnets, and the detachable rod which carries the cone is fitted with cone washers and clutch. The entire unit is enclosed in a beautifully moulded bakelite dust cover... .. Price 5/6

TELSEN

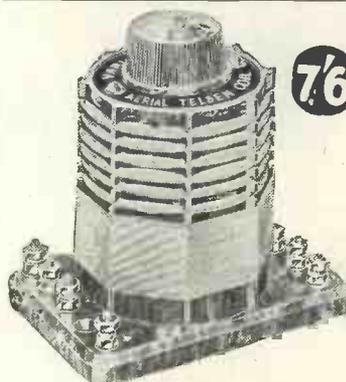
ALL-BRITISH RADIO COMPONENTS

Also include:—

Output Transformers	12/6
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Grid-leak Holder	...	"	6d.

Send for the "Telsen Radio Catalogue" and book of "All-Telsen Circuits" to:—

THE TELSEN ELECTRIC CO., LTD.,
Aston, Birmingham.



7/6

TELSEN DUAL-RANGE AERIAL COIL

It incorporates a variable series condenser and is suitable for all districts. It has been tested in various parts of the country, and down to distances of five miles from Regional stations, a single tuned circuit will definitely separate the Regional programmes. A reaction winding is provided Price 7/6
Telsen H.F. Transformer and Aerial Coil Price 5/6

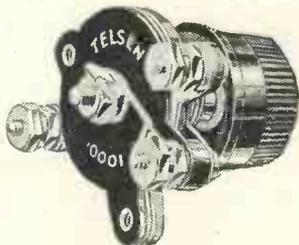


9^d

TELSEN GRID LEAKS

Telsen Grid Leaks are absolutely silent and non-microphonic, and practically unbreakable. They cannot be burnt out and are unaffected by atmospheric changes. Telsen Grid Leaks are not wire wound, and therefore there are no capacity effects. Their value is not affected by variation in the applied voltage. Made in values from 1/4-5 megohms.

Telsen Grid Leak ... Price 9d.



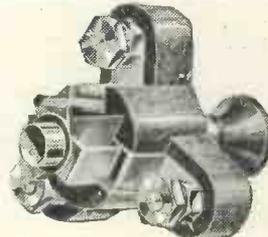
2/-

TELSEN BAKELITE DIELECTRIC CONDENSERS

The moving vanes are keyed on to the spindle and there is a definite stop at each end of the travel. The connection to rotor is made by a phosphor-bronze pigtail so there is no crackling due to rubbing contacts. The connection to the stator vanes is absolutely positive—a very important point. All Telsen Bakelite Condensers are supplied complete with knob.

Differential Condenser—

Capacities of .0003, .00015, .0001 Price 2/-
Reaction Condenser — Capacities .0003, .00015, .0001 Price 2/- .00075, .0005 Price 2/6
Tuning Condenser—Capacities .0005, .0003 Price 2/-



1/3

TELSEN PUSH-PULL SWITCHES
(Prov. Pat. No. 14125/31).

The Telsen Push-pull Switches employ a proper electrical knife switch contact and are soundly constructed on engineering principles. The centre plunger is wedge-shaped, so that as it is pulled out it forces the inner fixed contacts outwards, tightly gripping the moving contacts. There is no fear of crackling with Telsen Push-pull Switches. Their low self-capacity makes them suitable for use in H.F. circuits.

Two-point Price 1/-
Three-point Price 1/3
Four-point (2-pole) Price 1/3

The New Wisdom of Wireless

AS "EVE" SEES IT



EVE APPRECIATES A GOOD RADIO SET

Listening to radio programmes with the popular Marconiphone portable receiver, which can be carried about from room to room without difficulty

MANY of us are beginning to get a new angle on wireless—seeing it, as it were, through a fresh pair of spectacles. At a time when everybody is feeling the pinch, the wireless set has found a new mantle of virtue.

It is not easy to follow the vagaries of high finance, but the head of the family knows only too well that the £ is now only worth 13s. or 14s. instead of 20s. This is a serious fact. Economy is necessary, not desirable, and expenses must be cut down all round.

Cheapest Entertainment on Earth

Naturally, one starts first on entertainment. How can the wife and family be kept at home instead of gadding about spending money? "Why," says Paterfamilias, with a sudden burst of inspiration, "of course, broadcasting—the cheapest form of entertainment on earth."

Mind you, up to the present I don't think we women-folk were really given a fair chance to take a keen interest in wireless or to hear the best side of broadcasting. Of course, it always had a certain fascination—but the menfolk came first.

Always Some New Gadget or Other!

For instance, our very first set was made at home—out of a cigar box. But almost as soon as it would receive the local station on a pair of headphones, it was ruthlessly scrapped in favour of a more ambitious collection of coils and condensers. Next there was always some new gadget or other, and it was eternally being tested out on the set. We never had a chance to get used to the set, or to listen quietly to a full programme.

If one said: "Jack, can't you leave the set alone for a bit?" Jack, wrestling with condensers and atmos-

pherics, would reply: "Hush, I'm just getting Rome." Probably the family didn't want Rome—but they had to have it—generally mixed up with some other item from Germany.

In other households wireless was, perhaps, an incidental novelty, to be turned on during a slack evening—often only at intervals of a week or more. When it went wrong, nothing could be done until Brown came round—"Brown knows all about it." Sometimes he did and just as often he did not.

In these circumstances we weren't encouraged to look upon broadcasting as a consistent form of amusement. I mean it was hardly a joy for ever.

But now we have a decent set installed at home and I honestly think the money spent on it was wisely spent,

NIGHTMARE AFTER CHRISTMAS DINNER!

*As I sat me down to my radio-gram,
Intending to try for distant stations,
I dreamily thought of all the York ham,
The turkey, mince pies, and similar rations
Of which, with several glasses of port,
I'd just been taking—well, more than I ought.*

*And then, before I could raise a hand,
The set began to speak (the sinner).
"What ho!" it said, "this beats the band—
Here's master eaten too much dinner!
So now, for once, we'll swap relations—
I'll tune him in to distant stations!"*

*And lo! The pick-up arm arose,
Reached out, and, turning my waistcoat button,
I heard a voice say, "Listen close—
We'll see what we can get out of the glutton."
And in my dreams I gave a groan:
"That's Turkey!" said the radio gramophone.*

C. P. P.

even in these difficult times, especially as the upkeep—for an all-mains receiver—amounts to very little beyond the moderate licence fee of 10s. a year.

One needn't elaborate on the marvellous variety of the programmes. Operas where a seat would cost anything from 5s. 9d. to 5 guineas, concerts from the Queen's Hall, leading revue artists, and dance music galore. Radio plays can be thrilling and most of the talks are mentally stimulating.

There Is a Boom in Wireless

I am told that there is a boom in wireless. If so, it is because broadcasting is no longer so much a luxury for the menfolk as an economy for all.

Aladdin's "magic lamp" of wireless is helping to lighten the financial gloom and no one can afford to be without it.

S. J. H.

METEOR III

The new ALL-WAVE Quality Receiver



THE most interesting receiver ever designed! Possesses all the most attractive features of a modern 3-valver, plus a number of unique advantages.

SENSITIVE AND POWERFUL—so that you may be sure of a good choice of programmes from home and abroad at excellent strength.

ADJUSTABLE SELECTIVITY—so that each programme may be received free from interference, even under the most difficult conditions.

QUALITY—so good that you will really enjoy the programmes you receive.

EASY TO TUNE—single knob tuning with slow-motion control.

SLOW MOTION REACTION—of wonderful advantage when tuning in distant stations.

RADIO-GRAM SWITCHING—with connections for pick-up, and, in addition,

ULTRA SHORT-WAVE TUNING, enabling you to enjoy the fascination of short-wave reception—**AMERICA, AUSTRALIA, AFRICA, THE CONTINENT, ETC.**

No need for the expense and inconvenience of a separate short-wave set—build a Meteor and you have a receiver which covers ALL wavelengths, with single dial tuning.

FREE—
FULL SIZE 1/- PLAN
 Complete building instructions. Go to your radio dealer. Ask him for your **FREE** copy of the Meteor Folder. Read all about this fascinating **ALL-WAVE ALL-PURPOSE** Receiver. See how easy it is to build. We are distributing 100,000 Meteor Folders **FREE**. If your dealer is out of stock, post coupon now.

THE EASIEST SET TO BUILD. The full-size Meteor Folder will prove to you how easily and quickly the Meteor can be built. No cutting or drilling—the polished panel is already cut and drilled. No soldering—Jiffilinx of correct lengths are supplied ready to drop into position. A screw-driver and pliers are the only tools you need.



EQUAL IN APPEARANCE TO A 15 GUINEA MODEL

METEOR III KIT

Full set of components with polished panel (cut and drilled), baseboard, Jiffilinx, screws, etc.

PRICE 75/- OR

9/- DOWN and 7 monthly payments of 10/6

METEOR STANDARD CABINET MODEL

Kit as above with Standard Cabinet.

PRICE 89/6 OR

11/- DOWN and 8 monthly payments of 11/-

METEOR CONSOLETTA CABINET MODEL

Kit as above with Consolette Cabinet, as illustrated.

PRICE £5.0.0 OR

11/- DOWN and 9 monthly payments of 11/-

G. P. KENDALL, B.Sc., designed the Meteor III. His name alone is sufficient guarantee that the Meteor is a "Super" receiver in all except price.

To: READY RADIO LTD., EASTNOR HOUSE, BLACKHEATH, S.E.3.

Please send me Meteor III Folder—**FREE**.

Name _____

Address _____

READY RADIO

Ready Radio Ltd., Eastnor House, Blackheath, S.E.3
 Showrooms: 159 Borough High Street, S.E.1.

Advertisers like to know you "saw it in the 'Wireless Magazine'"

On the Crest of the Waves

THE WORLD'S RADIO ACTIVITIES :: By JAY COOTE



INSIDE AN AMERICAN BROADCASTING STATION

The engineer on the left is controlling the quality of the transmission by means of the "gain control." Note the compact nature of the equipment used

ON a recent occasion when the Brussels studio announced a running commentary on an anti-Flemish demonstration taking place in the town of Hasselt (Belgium), as the engineers prepared to switch through, they discovered that all telephone cables connecting the station to that city had been cut!

In Russia

With a view to providing reception of the Moscow programmes throughout the whole of Russian territory the Soviet authorities have opened two 100-kilowatt transmitters at Noginsk. When it is desired to ensure that official communiques shall reach all corners of the State the transmissions are relayed by telephone cable for re-broadcast by

Sverdlovsk, Taschkend, Stalinabad, Kiev, Odessa, Kharkov, Alma-Ata, Novosibirsk, Irkutsk, Tomsk, Kiev, Chabarovsk and Vladivostock. By this means the capital programmes are available to all listeners, even those blessed with only small receivers.

Leipzig, after consulting its local listeners, has definitely adopted the new interval signal comprising, according to German notation, four notes spelling the name of the composer Bach. This signal will break in every half-minute on the ticking of the metronome. Dresden, imbued with the same spirit, will use a short phrase from the opera *Oberon*, by Weber, in view of the latter's long association with the local opera house.

San Sebastian (EA[8]), on 453 metres, for the major part of its entertainments relays the Madrid broadcasts on Mondays, Wednesdays, and Fridays from 8.20 p.m., G.M.T. On other days, transmitting from its own studio from 11 p.m., the station provides local concerts or relays.

Latvia, for the relay of the Riga broadcasts, proposes to build two 35-kilowatt stations at Madona and Kuldija. Their respective wavelengths may be 875 and 761.4 metres.

Vatican Broadcasts

Under the title of "Scientiarum Nuntius Radiophonicus," the Vatican transmitter at Rome daily broadcasts a news bulletin. From 10 to 10.30 a.m., G.M.T., transmissions are carried out on 19.84 metres, and from 11 a.m. on 50.26 metres. Between 10.30 and 11 a.m., the transmitter is only used for telegraphic communications.

As Oslo is anxious that its nationals abroad should be given the opportunity of hearing the voice from the homeland, the Norwegian Post Office authorities have declared their intention of building a high-power short-wave station on similar lines to the one actually in use at Zeesen (Germany).

When the Marseilles (PTT) station was recently burnt down, the major portion of the transmitting plant was salvaged. It has since been re-erected at Limoges, whence broadcasts are now put out with a power of about 1 kilowatt.

In a recent beauty competition which took place at Lyons (France), the first prize was won by Mademoiselle Juliette Vuillet, who fulfils the part of announcer at the local broadcasting station. She has added to her role of "speakerinne" the title of "Reine de Lyon" (Queen of the City of Lyons).

Swiss Time Signals

The Swiss national stations have adopted a special time signal; it is automatically relayed from the Neuenburg Observatory. As a warning, five dashes, each lasting five seconds with an equal interval, are broadcast at 11.29 and 14.59 G.M.T., followed by a pause of ten seconds, after which six dots are transmitted. The final signal, indicating the last second of the complete minute, at 11.30 and 15.00 G.M.T., is of a different pitch to the others.

In anticipation of broadcasts on higher power, Radio Toulouse has resumed its relays of orchestral and

(Continued on page 730)

Specified for the 1932 SUPER SIXTY



Specified for the "Wireless Magazine" 1932 Super 60 and other circuits employing high ratio amplification, the 7 to 1 model recently introduced by **R.I.** gives *exceptionally high amplification with amazing uniformity over all wanted frequencies*, whilst all interference frequencies are eliminated, thus ensuring *utmost perfection in reception.*

The technical information supplied as with all **R.I.** transformers is the guarantee, before you buy, that the 7 to 1 will do its job—*there's no speculation about R.I. productions.*

There's an R.I. transformer for every circuit at lowest price for guaranteed performance. Ask for the new 1932 Catalogue—indispensable to every Radio enthusiast.

The HYPERMU For the Exacting Expert

The world's best Transformer at any price, showing highest and most uniform amplification between 25 and 8,000 cycles. Its core of Nickel Alloy guarantees an unequalled and lasting performance. Primary inductance 85 henries.

Ratio 4-1. Weight 18 oz. List No. DY21.

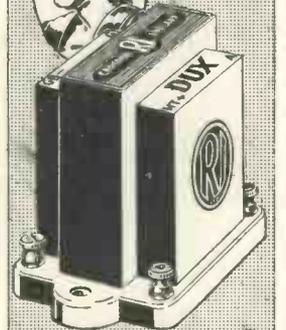
The DUX For Utmost Economic Efficiency

The RELIABLE low priced transformer with the amazing performance, which is credited by the Technical Press as being equal to that of transformers costing four times the price. It has the amazing inductance of 30 HENRIES and its performance is guaranteed by the full technical data which is given with it.

Ratio 1-3½ (standard). 1-4½ (auto-connection). Weight 11½ oz. Size 3½ x 2 x 2½ in. high. List No. DY29.



The HYPERMU
Specified for the
ETHER ROVER
2V.



The DUX
Recommended for the
NEW
ECONOMY TWO
6/9



7-1 L.F. INTERVALVE TRANSFORMER

Highest Efficiency at Lowest Price!

10/6

The Advertisement of Radio Instruments, Ltd., Croydon, England. Telephone: Thornton Heath 3211 (5 lines).

There is news in the "Wireless Magazine" advertisements

ON THE CREST OF THE WAVES—Cont. from page 728

dance music from the Café des Américains and from the Sion Restaurant. On Mondays, at 9 p.m., G.M.T., the studio takes listeners over to the Casino at Biarritz for an hour's entertainment by the Boldi Tzigane Orchestra.

Sponsored Programmes

Sponsored concerts by the International Broadcasting Company of London are transmitted every Sunday at 10 p.m., G.M.T., from Radio Normandie (Fécamp). As the wavelength (223 metres) used by this station for its daily programme is deemed unsatisfactory for reception in the United Kingdom, these special concerts are sent out on 245.9 metres. Announcements are regularly made in the French and English languages.

A New York daily recently published curious statistics contributed by one of its readers. According to this correspondent, between July 1, 1930, and March 31, 1931, a total of 663,065,445 musical notes had been transmitted through the microphone of WABC, New York, the key station of the Columbia broadcast system. In addition, the "mike" has also dealt with 13,096,200 words. Of these, roughly one-third had been emitted by politicians and clergymen, and represented a talk of 1,889 hours at an average of 115 words per minute. It is not stated whether these statistics were put to any use or whether any doubting Thomas took the trouble to check them up!

Experimental transmissions are being carried out daily by the Munich (Germany) police authorities on 1,340 metres. Between 6 and 7 a.m., G.M.T., and again during the same hours in the evening, tests can be picked up from this transmitter in the intervals of the Motala wireless broadcasts.

It is reported that when the Prague high-power transmitter takes over the daily programmes broadcast from the Czechoslovak capital studio, the old 5.5-kilowatt station which has been hitherto in operation will act as relay on a wavelength of 249.6 metres (1,202 kilocycles).

Dissatisfied Dutchmen

Dutch listeners are not satisfied with the power of the two transmitters from which they receive their programmes and every effort is to be made to reconstruct the Huizen station with a view to obtaining increased energy. On the other hand, subscriptions are being raised to install a 60-kilowatt transmitter at Hilversum. If authority can be obtained from the Ministry of Waterways, the controlling authority in Holland, work is to be started at once with a view to completing its construction by May, 1932.

The Compagnie Luxembourgeoise de Radiodiffusion, a private commercial concern formed in June last, has obtained

a 25-year concession from the Grand Duchy of Luxemburg granting it a monopoly for the establishment of a broadcasting system in that country. In view of the fact that the authorities are only interested in the enterprise to the extent of an annual compensation for the permit granted, no licence tax is to be charged to listeners. The broadcasting service will be free, all income for the upkeep and operation of the transmitter being derived from publicity fees.

Although work on the installation of the station was started some weeks ago there is little likelihood of the service coming into operation before July, 1932. According to the scheme submitted the transmitter will be the most powerful in Europe as its energy may reach 200 kilowatts.

The wavelength to be adopted has not yet been fixed, but as the broadcasts are destined to all Continental countries and also Great Britain it is stated that the channel reserved to this state by the Prague plan will not be used. It is more likely that some wavelength over

1,000 metres will be taken for that purpose.

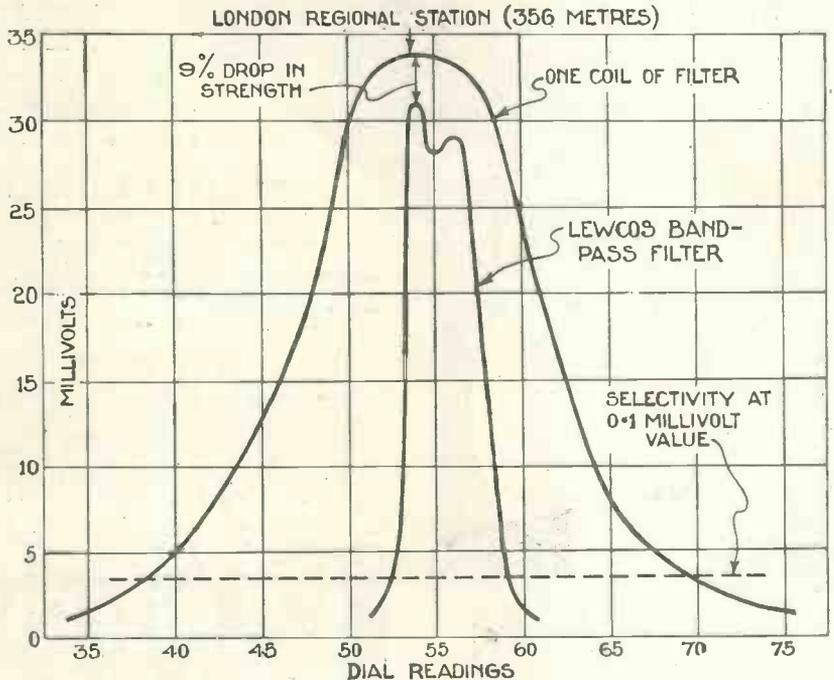
Regular daily programmes are now being broadcast by Reykjavik (Iceland) on 1,200 metres. The evening entertainments usually start at 20.30, G.M.T., with weather forecast and time signal, followed by a news bulletin. The main programme is timed for 22.35, Icelandic local time being an hour behind G.M.T.

New Station Director

Monsieur Vitali, announcer at the Berne studio, has been appointed director of the new Tessin (Switzerland) station to be installed for the supply of wireless programmes to the Italian-speaking population of Switzerland. As he is only 35 years old he will be the youngest station director in Europe.

It is reported from Paris that a broadcasting station has been installed in the Central Telegraph office at Baghdad (Iraq). Wireless programmes will be announced in both Arabic and English.

BAND-PASS EFFICIENCY



OF special interest is the curve reproduced above. It was taken by the Lewcos engineers to satisfy the curiosity of a Dutch customer and shows the efficiency of their type BPF band-pass tuner, as used in the WIRELESS MAGAZINE Ether Rover.

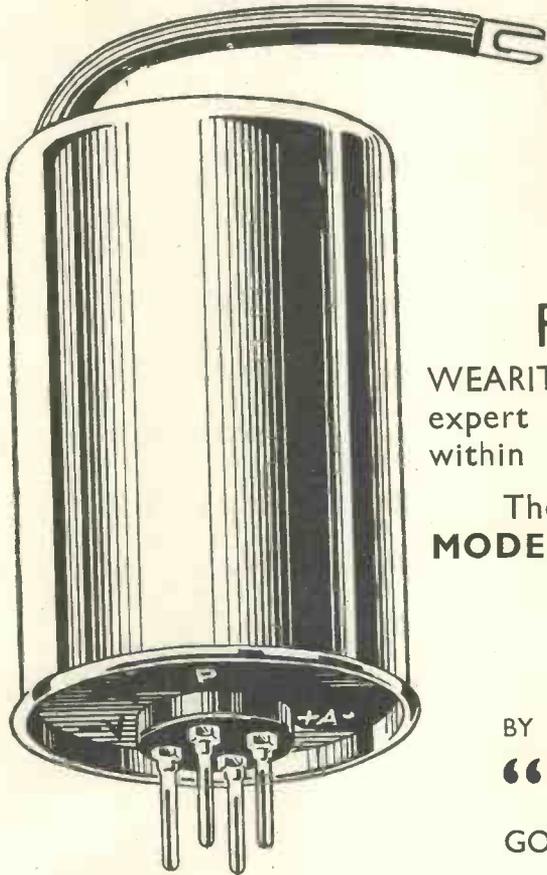
The outer curve shows the selectivity of one side of the band-pass coil used as a single-circuit tuner, while the inner curve shows the results obtained when the whole coil is used in a band-pass circuit. It will be seen that the drop in

sensitivity experienced when the band-pass arrangement is used is only 9 per cent., while the selectivity is very much improved.

Both curves were taken when the London Regional station was being received and show the results under actual reception conditions.

Actually, at the 1-millivolt line, the band-pass circuit is 4.7 times as selective as the single-coil circuit. That seems to be proof that the band-pass tuner is worth while.

WEARITE COMPONENTS



FIRST and FOREMOST

WEARITE SUPER-HET COILS designed by a radio expert of international repute, and guaranteed to within .5 of 1 per cent accuracy of matching.

These coils made the introduction of the **MODERN SUPER-HETERODYNE RECEIVER** possible.

BRITISH MADE IN OUR OWN WORKS
UNDER BRITISH PATENT No. 349403.

BY USING THESE COILS IN THE
"1932 SUPER 60"

GOOD RESULTS ARE BOUND TO FOLLOW



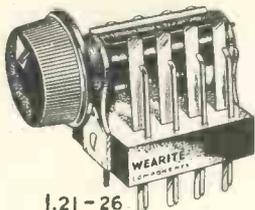
15-ohm Rheostat
Price 1/6



HF3
SHORT-WAVE
CHOKE
Price 4/6

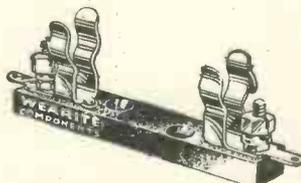


G22
ON-OFF SWITCH
Price 1/-



l.21-26
l.31-36
124 4-pole change-over
(3 positions) switch
Price 4/6

Use the Wearite
Special Aerial Coil
for
"NEW ECONOMY
TWO"
Price 4/6 each



GRIDLEAK HOLDER
Price 6d.



HFO CHOKE
Price 6/6

"PLUG-IN ADAPTOR"
"NEW ECONOMY TWO"
"ETHER ROVER"

Advert. of Wright and Weare, Ltd., 740 High Road, Tottenham, N.17 Phone: Tottenham 3847-8-9
When you send your order don't forget to say you "saw it in the 'W.M.'"

A Record of Success

AS far as WIRELESS MAGAZINE is concerned the year 1931 has been a period of unbounded success. Readers have had better value for their money from WIRELESS MAGAZINE during the past twelve months than any other monthly radio paper in the world has been able to offer, and this is an opportune moment to bring a number of important facts to their attention:

WIRELESS MAGAZINE'S slogan is "The Best Shillingsworth in Radio." During the past year the reader has had ample evidence that this slogan is lived up to; it is no empty phrase that cannot be substantiated.

Over 1,500 Pages

For an expenditure of 12s. during the year the reader has had no fewer than 1,576 pages of radio literature, covering every field of interest to the broadcast listener. The average is 130 pages a month—30 pages a week.

That number of pages was only made possible by the whole-hearted and increasing support of the radio manufacturers, who have long since come to regard WIRELESS MAGAZINE as the leading publication in its field.

Discriminating advertisers are interested in quality as much as in quantity, and WIRELESS MAGAZINE is in its present leading position not only because of the high quality of its contents, but also because of the buying power of its readers.

If it were possible to take a census there is no doubt that it would be proved that WIRELESS MAGAZINE readers spend more on radio per head during a year than the readers of any other monthly wireless periodical published in this country—and perhaps in the world.

Expert Contributors

A list of some of the contributors to WIRELESS MAGAZINE is proof of the quality of its contents. Such men as H. T. Barnett, H. J. Barton Chapple, W. James, J. H. Reyner, H. J. Round, and P. K. Turner command the attention of all radio technicians. Their contributions are not only authentic but, what is perhaps even more important to the reader, eminently practical.

Then in the popularity of its

designs for home-constructor receivers, WIRELESS MAGAZINE definitely leads the way. There is no need here to go into the history of the success of the "Super 60" series of sets; that is something about which every regular reader must be well informed.

It is enough to remind readers that WIRELESS MAGAZINE undoubtedly did all the "spade work" in reviving interest in this type of receiver.

Three exclusive WIRELESS MAGAZINE features have proved invaluable to all readers and account in some measure for the record of success that has been attained.

WIRELESS MAGAZINE, for instance, is the only radio paper to publish with the specifications for its sets the price of each component. That is of the greatest utility to the prospective constructor, for it enables him in a moment to estimate the cost of converting his existing apparatus into a new and improved design.

The second exclusive feature is the WIRELESS MAGAZINE half-price blueprint scheme, whereby any reader can obtain a full-size constructional layout and wiring guide for a "W.M." set for half price during the currency of the issue in which it is described.

That this scheme meets with general approval is proved by the tremendous demand experienced throughout the year for these full-size blueprints.

Then for those who want to buy their sets and not build them there is the WIRELESS MAGAZINE "We Test Before You Buy" feature, with its supplementary service of free impartial advice to prospective buyers who want to know what sets will best meet their individual needs.

Those are three invaluable WIRELESS MAGAZINE features; they are popular because they save the reader time and trouble—which is nowadays equivalent to saving money. Indeed, that is one of the secrets of WIRELESS MAGAZINE'S continued success; it seeks to save its readers as much trouble as possible, and to make radio an enjoyment and not merely an irksome electrical puzzle.

Another popular feature of WIRELESS MAGAZINE is the inclusion in certain issues of special supplements

printed on tinted paper. During the year these supplements have dealt with set construction, the world's broadcasting stations, loud-speakers and radio-gramophones.

WIRELESS MAGAZINE is also able to present some of the best regular features in radio journalism.

Its valve tables, with characteristics of some three hundred different types, prove invaluable to the constructor—and to the radio dealer!

For the Keen Listener

Its broadcast identification sheets and list of wavelengths are invaluable to the keen listener who wants to reach out and identify foreign stations beyond any shadow of doubt.

Its design data sheets meet the needs of the more advanced constructor who likes to make variations in design to meet his own particular fancies.

Its test reports have the authenticity of impartiality and guide the reader to the best value for this money.

Its gramophone-record reviews are read by the whole family and are much appreciated by those who live beyond reach of a shop where records can be tried before they are bought.

Its two gossip features, "Radio Medley" and "Under My Aerial," are two of the most popular contributions of their kind in radio.

Even Better in 1932!

It follows from all this that WIRELESS MAGAZINE has set itself a very high standard—a standard so high that some may think it cannot be improved on. But while it is proud of past achievements, WIRELESS MAGAZINE is not resting on its laurels. Preparations are in hand to make the issues for 1932 even better than were those for 1931. The task will not be easy, but there is not one member of the staff who is not prepared to make even greater efforts in the future than have been made in the past.

Readers can rest assured that by buying WIRELESS MAGAZINE throughout 1932 they will still be getting "The Best Shillingsworth in Radio"—and nobody can really want more than that!

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Our new 100-page fully-illustrated Catalogue contains details of all modern radio sets. You need a copy. Price 1/-, post free.

Be sure to read Kendall's book entitled "10 Hows for Modern Radio Constructors." Send four 1 1/2d. stamps now.

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	£	s.	d.
1 Wooden panel	2	6	8
1 Cabinet to specification	1	12	6
1 R. I. L.F. choke, type G.P.	12	6	
1 Lewcos band-pass filter coil, type B.P.F.	12	0	
1 Lewcos oscillator coil, type T.O.S.	8	6	
2 Lewcos super-het. intermediate with pig-tail, type I.F.T.P.	1	1	0
1 Lewcos super-het. intermediate without pig-tails, type I.F.T.	10	6	
1 T.C.C. .00005-mfd. fixed condenser, type 34	1	6	
1 T.C.C. .0002-mfd. fixed condenser, type 34	1	6	
1 T.C.C. .001-mfd. fixed condenser, type 34	1	10	
1 T.C.C. .01-mfd. fixed condenser, type S	2	6	
5 T.C.C. 1-mfd. fixed condensers, type 50	14	2	
2 T.C.C. 2-mfd. fixed condensers, type 50	7	8	
1 J.B. .0005-mfd. two-gang condenser, type R.2	1	1	0
1 J.B. .0005-mfd. gang condenser, type R.1	12	6	
1 Readi-Rad 1-meg. leak and holder	1	4	
9 Jun.t valve holders	6	0	
4 Belling-Lee wander plugs	8		
10 Belling-Lee terminals, type B	5	0	
2 Lewcos 20,000-ohm spaghetti resistances	3	0	
1 Wearit 15-ohm rheostat	1	9	
5 Sovereign terminal blocks	2	6	
1 Pair Bulgin G.B. clips	6		
1 Readi-Rad fuse and holder	1	3	
1 Wearit 4-pole change-over switch with terminals and 8 in. extension rod, type 124	5	6	
1 R.I. L.F. transformer, ratio 1-7, type G.P.	10	6	
6 Valves as specified	4	7	6
2 Packets of Jiffilinx for wiring	5	0	
Flex, screws, etc.	1	1	
Total	£14	13	9

KIT A £8.14.0

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KIT B With valves less cabinet **£14.6.6**
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Or deposit of 26/6 and 11 monthly payments of 26/6

CONVERTING THE ETHER ROVER TO A RADIO-GRAM

	£	s.	d.
1 Radio cabinet in polished oak	4	0	0
1 Collaro spring motor with unit plate	1	10	0
1 B.f.H. Minor pick-up	1	7	6
Total	£6	17	6

If ordered with an Ether Rover kit add £6 17s. 6d. to the cash price or 12s. 9d. to the monthly easy payment price.

JIFFILINX FOR SIMPLER WIRING

Always use Jiffilinx for wiring. They eliminate soldering, they give perfect contact and are the most convenient, rapid and neat method of wiring a set. Forty Jiffilinx in various lengths, fitted with shock-proof connectors—price 2/6. Send for a packet to-day.

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To: Ready Radio, Ltd.
Eastnor House,
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Please dispatch to me at once the following goods.....

for which (a) I enclose (b) I will pay on delivery (Cross out line not applicable) £.....

NAME.....

ADDRESS.....

W.M. 1/32

To: Ready Radio, Ltd.,
Eastnor House,
Blackheath, S.E.3.

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ADDRESS.....

W.M. 1/32

Advt. of Ready Radio, Ltd.

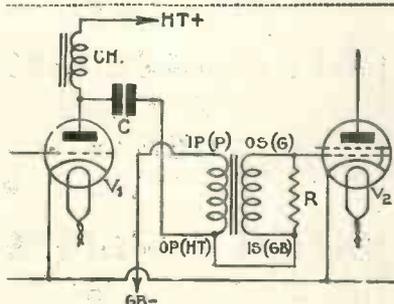
When you send your order don't forget to say you "saw it in the W.M."

“GETTING THE BEST FROM PARALLEL FEED”

CONSIDERABLE interest was aroused by the article by J. H. Reyner that appeared under the above title on page 564 of the December issue of WIRELESS MAGAZINE. Below we print a letter from a reader who suggests that variation of the

the value of the coupling condenser C relative to the primary inductance. If the inductance of the transformer is known, the value of the capacity may be chosen to give a resonance at any desired frequency by reference to the table below:—

not able to exercise much effect. For example, a transformer which began to cut off fairly rapidly at 100 cycles could not be arranged to have a marked resonance at, say, 25 cycles. If the circuits were arranged to resonate at 50 or 70 cycles, however, the amplification could be maintained or even increased.



VARYING CHARACTERISTICS
The values of the parts will be found in the letter from Mr. Galbraith, reproduced below

Inductance	Frequency			
	50	70	100	160
100H	0.1	0.05	0.025	0.01
80H	0.13	0.063	0.031	0.013
60H	0.16	0.083	0.042	0.016
40H	0.25	0.125	0.063	0.025

Capacities in Microfarads

This table gives the value of capacity required to resonate with various inductances for different frequencies. By choosing a condenser approximately of this order the required resonance will be obtained sufficiently for practical purposes. For example, if the condenser required is .042 microfarad, then an .05-microfarad condenser would be quite suitable.

Secondary Resonance

With regard to the upper frequencies, these are obtained by juggling with the secondary resonance, which is really dependent on the leakage inductance of the transformer. With many parallel-feed transformers this leakage is rather high, which tends to give a rising characteristic. The presence of a damping resistance across the secondary will reduce this high-frequency response.

Actually it cuts down the amplification over the whole spectrum, but it affects the upper frequencies more than the lower ones. It is a method which should be used somewhat sparingly, and in any case the amplification of the upper frequencies is usually to be sought after rather than cut out.

coupling values will give control of the frequency characteristics of the low-frequency side of the set:—

To J. H. Reyner, WIRELESS MAGAZINE.
SIR,—Referring to your article on parallel feed in the December issue of WIRELESS MAGAZINE, perhaps it is not realised by some of your readers that the amplifier characteristics can be varied widely by this method.

Undenoted are the values I use:—
V1, Mazda ACP as power-grid detector, 70 volts on anode; V2, Mazda AC/Pentode; transformer, R.I. Hypermu; choke, R.I. power grid; C, from .1 microfarad to .01 microfarad; R, non-inductive resistance from 50,000 ohms to 1 megohm.

By varying values of coupling condenser and stabilising resistance, peaks in the amplification can be secured and good results got with any loud-speaker, particularly moving coils and inductors.

If the listener normally has to use reaction, values can be adjusted to compensate side-band cutting.

W. GALBRAITH, Junr.

J. H. Reyner's Reply

Following is J. H. Reyner's reply to this letter: Mr. Galbraith's suggestion is an eminently practical one, which is capable of a variety of applications. The parallel-feed arrangement may be either choke- or resistance-fed, according to circumstances, and the variation in the characteristics is then accomplished by juggling with the two fundamental resonances in the transformer.

The first of these is the bass resonance, which is obtained by adjusting

The extent of the resonance depends upon the rapidity with which the transformer is cutting off at the time. If owing to the circumstances the amplification is already fairly low, then the resonance is

A TELEVISION ROMANCE

EVERYBODY will congratulate Mr. J. L. Baird, the British television pioneer, on his recent marriage to Miss Margaret Albu, well known as a B.B.C. pianist. It is not revealed whether Mr. Baird first met Miss Albu through the medium of television!



A photograph of Mr. and Mrs. Baird taken at Coney Island during their honeymoon appears above.

The other photograph shows Mr. Baird talking to Mr. H. G. Wells during a voyage across the Atlantic. Perhaps he is going to take an active interest in television.



GIVE YOUR SET THIS CHRISTMAS PRESENT



Handsome grained oak cabinet to suit the P.M.3. (of similar size of speaker) ... **30/-**



And learn how good your set really is. Any set capable of working an ordinary cone speaker will work, with complete efficiency, the new "W.B." P.M.3—giving true moving-coil reproduction, beautiful radio compared to ordinary speakers. This is the W.B. Permanent Magnet Moving Coil Speaker which the Editor of "Radio for the Million" has so strongly recommended for the very selective V.3 Kit Set. It has a Sheffield-made Cobalt steel magnet weighing 5 lbs. Write for the interesting Art Booklet, "Speaking of Speakers" (post free), giving full information of Models P.M.1 £5-5-0; P.M.2, £3-10-0; and the new W.B. Popular Cone Speaker—complete with cabinet—22/6. Also the famous W.B. Valveholders and Switches.

THE P.M.3 FOR THE V.3 PERMANENT MAGNET MOVING COIL SPEAKER

PM3
45/-

Three-ratio output transformer extra 7/6

Whiteley Electrical Radio Co., Ltd., Nottingham Road, Mansfield, Notts
Irish Free State Distributors: Kelly & Shiel, Ltd., 47, Fleet Street, Dublin.



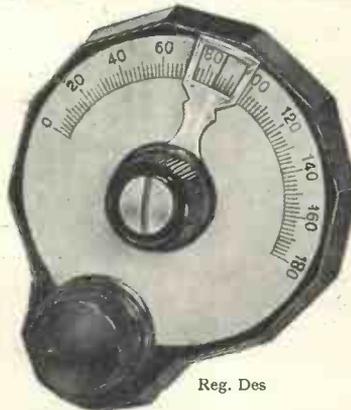
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A Technical Revolution
A Super-electric Turntable. One Unit only, for A.C. or D.C. Mains of all voltages—little deeper than an ordinary turntable—will transform any wireless set into a radio-gramophone. Complete with sensitive pick-up, volume-control, accurate tracking arm, automatic start and stop, rubber feet and lead. No gears—cannot overheat or burn out—no oiling—constant speed. Complete ready for use.

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"Masterpiece of Precision." Geared Movement which gives the ideal tuning control. Smooth, accurate, no slip or backlash. Easily mounted and adjustable to fit any condenser spindle. Various attractive finishes

Type 1	3-inch diam	3/-
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THE LEAKY GRID

Whitaker-Wilson Presents His
Showdeville for December 32

THIS is the night that only occurs once in many centuries. It is the night between the Old Year and the New. The last time it happened was the year when Nero tried to poison Mrs. Nero; it will not occur again until the year 3098. So we must make the most of it this year.

What is wanted in a good Showdeville. If I don't suggest something, the B.B.C. will only ask the Bach Cantata Club to broadcast six of those horrible cantatas; I hate the things, personally.

For the B.B.C. to Take Up

So, for the sake of my readers, I will suggest a good Showdeville which the B.B.C. will be sure to take up; they always do anything I tell them. Nice people, the B.B.C. Very nice people, indeed!

I am arranging for the broadcast, which will be from 5 p.m. until midnight without that beastly hammer thing going once, to be put on to the Coventry Rational so that everybody will get it.

My programme is strictly copyright and must not be reproduced without permission from the Governor of the Bank of England. I have had it protected in England, Scotland, Ireland, the U.S.A., Kilburn, and the Hampstead Garden Suburb.

The great thing is to have the programme upset from time to time by some good comedian. All posh Showdevilles have that done to them. So I have engaged Dean Binge, the cheery optimist, to upset it every half-hour, and there will be prizes for those who phone up the B.B.C. immediately he enters the studio. Those sorts of competitions are always popular.

A Good Band

Then we must have a band to play throughout the programme. I notice that most Showdevilles do that. So I have engaged the Shedric Sharpe Shextet for the evening. Also I have arranged for *Snaps from the Snoperas* to be relayed from Covent Garden Market at intervals. I have chosen the best composers.

Wagner is always popular, of course. You will hear bits out of *Itannaüser*, *Lie Lohengrin*, *The String he was Nibelung*, and *Die Damhot-*

terung. There will be two from Rossini. They are, *Should William Tell?* and the well-known *Barber of Savoy Hill*.

Also two by Verdi. These are *Wriggletto* and *I'll Drivatori*, which latter I have arranged in view of the recent election. I think *The Magic Newt*, by Mozart, may come through well; it will be specially relayed from the Aquarium at the Zoo. Piccini's *Girl with the Golden Vest* should make a good sporting finish.

You will remember those excellent discussions by Mais and Marvell? Well, I have engaged them to discuss Mannequin versus Ridgeway Parades. You will find one as aMaising as the other is Marvellous.

The Foundations of Music, solid reinforced concrete in this instance, should be rather diverting. Suitable music will be played on two pianos by Carnera and Ethel M. Dell. If you Carnera it won't be my fault.

Chamber music will be represented by the Arthur Caterwaul String Quartet. The strings of their instruments will be made of cat-gut, not sheep-gut. The band consists of a half-Persian, one tabby, and two black toms.

Our friend Jaila Crowbartok will conduct his new concerto for Overhead Camshaft and Full Orchestra
(Continued on page 752)

A NEW LOUD-SPEAKER CABINET



This is the new Clarion loud-speaker cabinet designed to harmonise with the special cabinet of the 1932 Super 60 (see page 699). It takes a cone up to 15 in. in diameter, the overall dimensions being 16½ in. high, 16½ in. wide and 10 in. deep. The price is £1 6s.

FRENCH RADIO

FURTHER details are now forthcoming with regard to the Ferrié Plan for the complete re-organisation of the State broadcasting system in France. According to an official communique the authorities have earmarked a sum of sixty-million francs to defray the cost of constructing and equipping a chain of regional transmitters.

Three High-power Stations

The plan calls for three high-power stations in the immediate neighbourhood of Paris, namely, the Eiffel Tower on long waves, Ecole des Postes et Télégraphes, on the medium band, and Pontoise (Poste Colonial) for transmissions overseas on short waves.

In the provinces, Lille, with a 60-kilowatt transmitter and two studios, one of which will be situated at Arras, is to supply a service to the northern region. For the western districts the scheme provides a main station at Rennes with a studio at Angers, as well as a relay at Brest to cover "blind spots."

Radio Strasbourg will remain on its present site, but its power is to be increased fourfold. Limoges is destined to operate for central France.

As regards Lyons, it is not yet quite clear whether a new transmitter is to be erected near that city or whether the proposed new station to be built by Radio Lyon is to be taken over by the authorities.

In the south-west, Bordeaux is considered to be the most favourable site for a new transmitter and Agen will supply a local relay.

There is a possibility that the powerful station now nearing completion at Chateau d'Aignan for Radio Toulouse may be taken over by the State.

Mediterranean Area

For the Mediterranean districts the Ferrié plan proposes to build a station at Marseilles, with an extra studio at Montpellier, and a regional transmitter at Nice with an annexe at Juan-les-Pins.

Finally, in the alpine district, Grenoble is not to be disinherited, but as a consolation prize will be awarded a 20-kilowatt station, as hitherto, under State control. J. G. A.

1932 SUPER-TWO

10!

DOWN

COMPLETE WITH EVERYTHING READY TO PLAY



BRITAIN'S SUPER-TWO

STAGGERING OFFER BY BRITISH RADIO MANUFACTURER

100,000 Radio Sets complete to be sold at 84s. each. This world-famous Super-Two Set is the most compact and trouble-free radio set ever invented. (Yet you can have it playing in your home for 10s. down!)

There are no gadgets or fancy bits to worry you. Simplicity and perfect year-after-year performances are the keynotes of this wonder set. In three years' time it will still be a modern up-to-date set.

A child can fix it up and work it easily.

The Super-Two is the Morris of the wireless world—efficient—utterly dependable—and inexpensive. Playing for you like clockwork when more elaborate and fancy-priced sets are "not working."

How different to sit by the fireside on winter nights—calling music to you from anywhere at a turn of a dial! Clear, pure-toned music of gramophone volume—you can tone it down quiet if baby's sleeping.

"What station shall we have?"

"Regional?" Push that plug in. You've got Regional, perfectly clear.

"National?" Plug in there. You've got National by itself—no "back-stage" noises of any kind.

Maybe there is a special programme of Spanish music. Turn the dials according to the simple-to-follow instructions—and there is the blood-stirring Spanish music.

Dance music from Paris—even on a Sunday evening? There you are—clear as a bell—all other stations cut out automatically whilst you listen to the one you want.

Even with an indoor aerial you can listen to British stations, in full volume, and with an outdoor aerial foreign stations roll in clear and pure.

The Super-Two has been specially tested in 148 centres in every corner of the British Isles, so no matter where you live your Super-Two will give you perfectly satisfactory reception.

Yet this Super-Two set is yours for 10s. down, absolutely complete. Then only 9 more monthly payments of 9s. 5d. Everything self-contained in handsome Jacobean Oak Cabinet. 16 1/2 in. high. Post special "Wireless Magazine" Order Form below for return post delivery.

Guaranteed to arrive in perfect condition and to fulfil every claim made by the manufacturers and thousands of present owners.

HOW THIS PRICE BECAME POSSIBLE. By eliminating all the frills and troublesome gadgets of the ordinary wireless set and concentrating upon utter simplicity and effectiveness, we have, by modern British mass-production methods, achieved what the wireless trade had thought impossible—**WE HAVE PRODUCED A 10-GUINEA SET TO SELL AT 84/-.** But this was only made possible by making 100,000 sets at a time instead of 1,000, by cutting out intermediate profits, and by cutting our costs to the bone.

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Dear Sirs,

Please send me by return, carriage paid, with full instructions:—

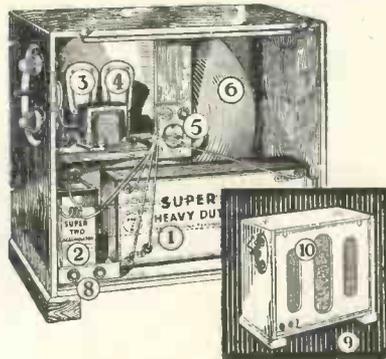
- (1) One H.S.W. 1932 Super-Two Set, complete with valves, batteries, and loud-speaker, in oak cabinet, at £4 4s.
 - (2) I enclose 10s. deposit for an H.S.W. 1932 Super-Two Set complete with valves, batteries, and loud-speaker, in oak cabinet, on hire purchase terms, as advertised. I agree to pay 9 further monthly instalments of 9s. 5d. (Cross out paragraph (1) or (2) not required.) I order only on the condition that my Super-Two Set will be delivered in perfect working order and exactly as advertised.
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I enclose.....

Name.....

Address.....

W.T.1..... W.M. 1/1/32



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6. Special large '1932 SUPER-TWO' cone gives natural reproduction of low and high notes.
7. Outline of Clamp holding Batteries in position—Accumulator cannot spill.
8. Terminals for Aerial and Earth—the only outside wires.
9. Back view of '1932 SUPER-TWO'. 10. Fine metal gill gauze, prevents vibration and nasal tone, giving loud-speaker reproduction back and front.

Advertisers like to know you "saw it in the 'Wireless Magazine'"



AN IMPORTANT PART OF VALVE MANUFACTURE
This photograph shows how the glass bulb of a valve is fixed into the insulating base. The process is known technically as "capping"

Is Valve Progress on the Wrong Lines?

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

the desirable tit-bit which we first thought it was?

Many people to-day are asking this question. Those who cry "Halt" are dubbed slow-coaches, afraid of progress and all that it entails. Yet are they really? Is not blind progress more dangerous than none at all?

Consider the position in America. A valve having a mutual conductance of 1 is still considered good over there. They have made valves of this performance for years and they continue to do so. There has been no continual progress in the direction of the improvements of the characteristics. Consequently a valve which you buy now is substantially the same in performance as the one which you bought two years ago.

Buying the New British Valves

What is more, if you want a valve now you can go and buy it. Try and buy a reasonably efficient valve of British manufacture to-day. You will have more trouble than in buying a complete set, despite the fact that the valve in question may possibly have been on the market many months.

In a word, the Americans have deliberately called a halt in their characteristics. They say: "We know we can make much better valves than this as far as characteristics are concerned, but we prefer to decide upon a good type of valve and to confine our attention to the manufacture of these valves with the greatest possible uniformity and in large quantities."

Are we to consider that they are wrong? Is it not a fact that American sets will, at any rate, compete with ours, not only as regards performance, but as regards price?

Less Magnification But Cheaper Production

Admittedly a low-conductance valve means less magnification per stage, but it also means cheaper production. The American designer can afford to use more valves and, with them, more intervalve circuits, which gives him a better chance to adjust the characteristics (either high or low frequency) of the receiver.

We are just waking up to the possibility of "multi-toob" sets in this country, but any real progress in this matter will be restricted until we have a limited number of types of valve cheap in price and uniform in behaviour.

This question of uniformity is one of some interest. A tolerance of 30 per
(Continued on page 740)

THERE was once a snake who had gone for some days without his breakfast. He had, for that matter, gone without any other meal owing to the lamentable dearth of any suitable edible matter. Suddenly he caught sight of something moving in the undergrowth. Quick as a flash he pounced on this choice tit-bit and proceeded to swallow it.

Tying Himself in a Knot

The particular object proved longer and more difficult to handle than the snake had anticipated, but he persevered manfully until he suddenly discovered that he was eating his own tail, by which time, of course, he was rather in a knot.

Not so long ago the valve manufacturers discovered they could improve the mutual conductance of their valves by the use of better filaments, new methods of construction, and so on. At that time a mutual conductance of 1 was considered good.

That is to say, if the valve had an impedance of 5,000 ohms, then if it had an amplification factor of 5 it was considered a good valve.

All this has now been altered, and we now expect to get a mutual conductance of 3 or 4 and we are not unduly surprised if the figure reaches something like 6.

The improvement in the performance of valves started slowly and has gradually become more and more rapid, until we now find that the valves in use at the end of any one season are distinctly better than those in use at the beginning!

Are we not rapidly following the example of the snake? Is this increasing mutual conductance quite

Readers of WIRELESS MAGAZINE—and particularly those associated with valve manufacture—are invited to send their comments on the valve position in this country to the Editor. There must be many who would like to reply to the challenge J. H. Reyner makes in this article



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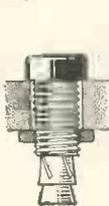
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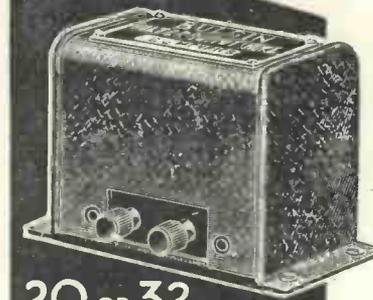
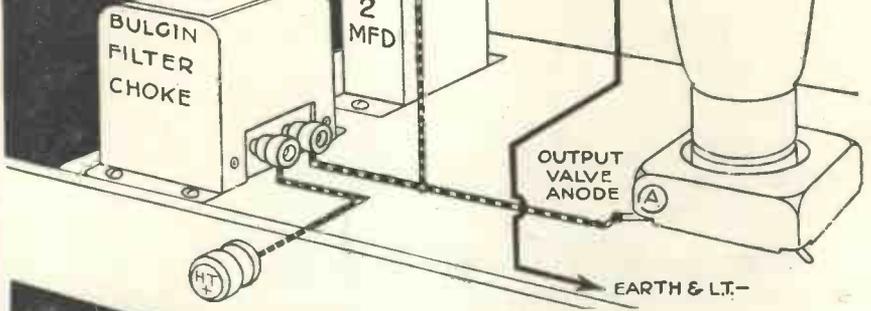
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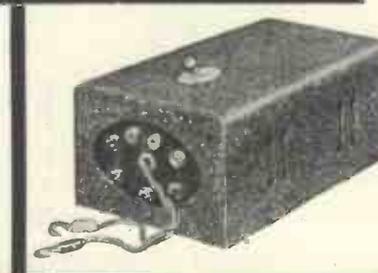
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IS VALVE PROGRESS WRONG?—Cont. from page 738



RADIO DIGNITY AND IMPUDENCE

A comparison between a 10-kilowatt water-cooled transmitting valve and a small receiving valve. The large valve is of the type used at the Post Office station at Rugby

cent. is considered good in modern high-conductance valve manufacture. Suppose you went to a shop for a 100-volt high-tension battery and found that the battery gave you only 70 volts. Would you consider that a fair manufacturing tolerance?

Ganged Tuning

Again, if you had two inductance coils, both of which had to be tuned with a ganged condenser, and you found that one coil had 30 per cent. more inductance than the other, so that the two condensers in the gang assembly had to be some 20 or 30 degrees different in their setting, would you consider that the coils were reasonably matched? Surely not.

Large Tolerance

These comparisons are not strictly fair, because a variation of 30 per cent. in the anode current does not, perhaps, make as much difference as might appear from the figures, but it seems to me a very large tolerance for an engineering product.

An electric lamp can be manufactured to a tolerance

of 5 per cent., and actually some recent tests on standard lamps taken from stock indicated a variation of less than 3 per cent. Would it not be better to concentrate a little less on exceptional conductivity and try to aim at a little more uniformity?

The manufacturer of sets is himself to blame to a very large extent. There are very few manufacturers, apparently, who will look over the various valves available, choose a certain representative type, and say, "Very good; we will build our set around this class of valve."

Too Many Sets That Need Special Valves

What usually happens is that the set manufacturer designs his receiver and then discovers that he wants a particular kind of valve to suit it. He scours the valve market and either chooses a special type made by one firm, or else gets the firm in question to make up a valve for him.

Sooner or later this particular special valve comes on the market and we have another type of valve to add to our already overburdened series.

The consequences are that the other valve makers are called on for a corresponding type and we have, at one fell swoop, four or five new valves introduced into the range, all of higher conductance and less inherent uniformity.

I venture to suggest that the set manufacturer who *must* have a special valve does not produce an inherently better set than the manufacturer who makes use of an existing type of modest performance. If only the great bulk of set manufacturers would realise this the valve makers would have an opportunity of standardising

their valves, reducing the number of types, and agreeing upon some uniform performance.

This would not remove competition, because there would be plenty of scope for the individual manufacturers on the score of quality and closer tolerances.

Difficult Problem

As to what the mutual conductance should be, this is a point which requires careful consideration. Any serious reduction in the efficiency seems to be a retrograde step, and I am a little doubtful as to the wisdom of adopting a really low figure, such as 1 milliamperes per volt. At the same time any attempt to standardise on a high figure of 4 milliamperes per volt or something of that order is equally unwise, because it makes things difficult for the valve manufacturer, the set designer, and user.

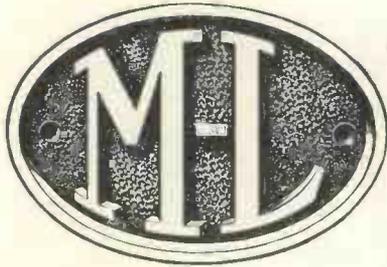
Probably a figure round about 2 milliamperes per volt would prove a satisfactory compromise, enabling British valves to maintain their position as the best in the world.



FOR GERMAN BROADCASTING

A Telefunken 150-kilowatt transmitting valve as used at the Muhlacker and Königswusterhausen broadcasting stations. One of these valves replaces sixty of the standard 2.6-kilowatt valves

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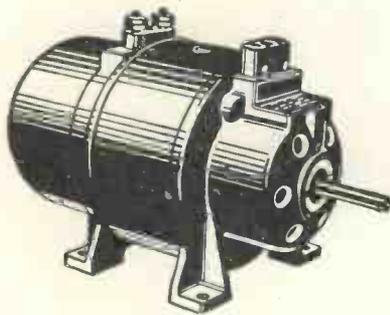


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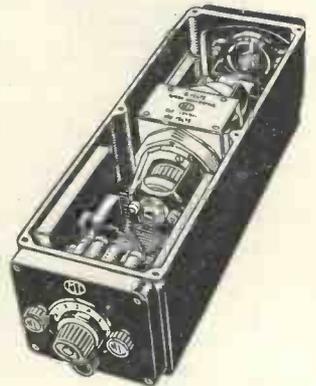
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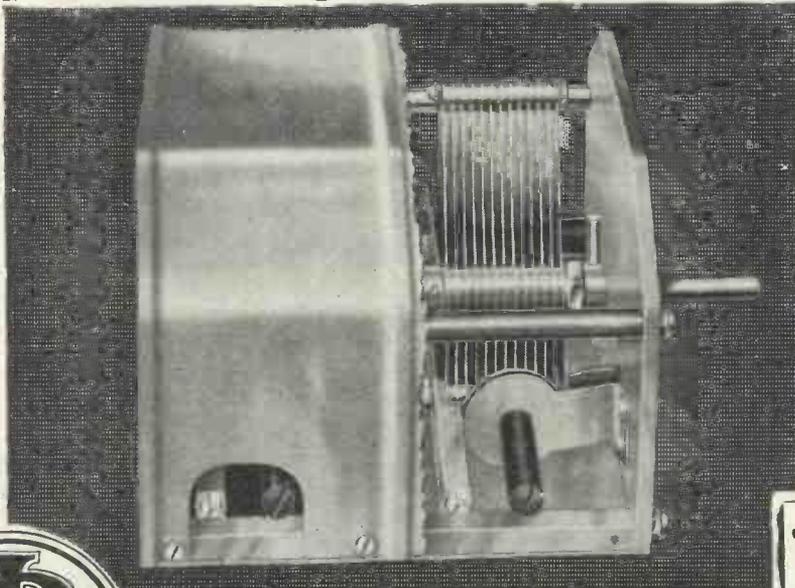
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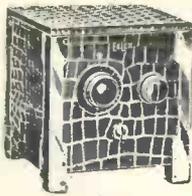
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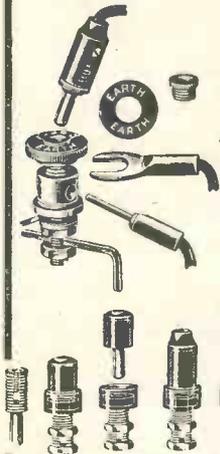
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BRITISH CONDENSERS ARE BEST!
Here you see one of the giant T.C.C. smoothing condensers installed at Leiblitz. It is over 6 ft. high and has a capacity of 5 microfarads

It is certain that most listeners have heard Leiblitz, the new Czech 200-kilowatt station, working on a wavelength of 489.3 metres. In case you haven't, this strong signal is easily identified. It is easily found immediately above the familiar North Regional station.

The equipment of Leiblitz was

installed by the Standard Electric Company and it is interesting to note that, despite the number of Continental condensers available, the Prague engineers insisted upon using British condensers on account of their reliability.

The condensers used were supplied by T.C.C., a name familiar to every reader. There are seven banks of smoothing condensers rated to work under a pressure of 25,000 volts D.C. Actually these condensers were tested up to 50,000 volts and are similar to the type supplied to the Post Office and the B.B.C.

Mica Dielectrics

Many condensers were required to work up to a peak value of 50,000 volts. These have mica dielectrics and are immersed in oil so that the heat generated may be easily dissipated.



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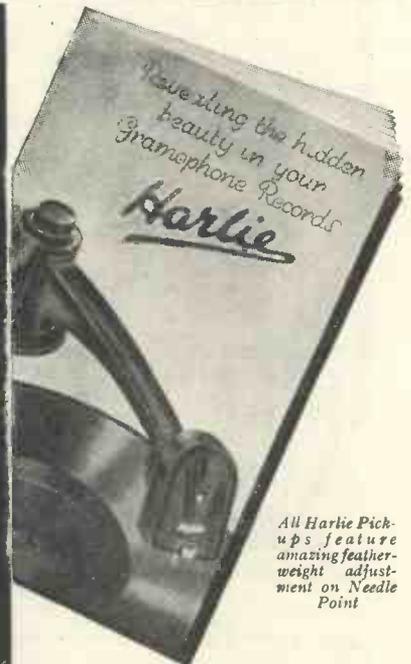
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DESIGN DATA SHEETS By J. H. Reyner, B.Sc., A.M.I.E.E.

"W.M." Design Data

No. 33

LOUD-SPEAKER FILTERS

THE use of loud-speaker filters was described in Sheet No. 18, and a number of suitable values of inductance and capacity for three different frequencies were given in Sheet No. 19.

There was, unfortunately, an error in the calculations on Sheet No. 19, and the various values have, therefore, been

worked out again and are given in the tables below.

The values of L and C are those in the diagrams of Sheet No. 18. In the first circuit the two end inductances must be half the value quoted, while in the second the capacity in the centre leg must be double that shown in the table:—

Loud-speaker Resistance (ohms)	f=4,000		f=4,500		f=5,000		f=6,000	
	L micro-henries	C micro-farad						
10	800	8	700	7	640	6.4	530	5.3
15	1,180	5.25	1,050	4.75	960	4.25	810	3.5
20	1,580	4	1,400	3.5	1,280	3.2	1,060	2.65
25	2,000	3.15	1,750	2.85	1,600	2.55	1,350	2.1
1,000	80,000	.08	70,000	.07	64,000	.064	53,000	.053
2,000	158,000	.04	140,000	.035	128,000	.032	106,000	.027
3,000	237,000	.027	210,000	.024	192,000	.021	159,000	.018
4,000	316,000	.02	280,000	.018	256,000	.016	212,000	.013

"W.M." Design Data

No. 34

LOW-FREQUENCY RESONANCE

THE value of inductance and capacity required to tune to resonance can be calculated from the formula:

$$f = \frac{159}{\sqrt{LC}} \text{ cycles per second.}$$

Where L=inductance in henries,

C=capacity in microfarads.

Thus for a given frequency the product of the inductance and capacity is definitely fixed. The values of the

inductance and capacity themselves may vary widely provided that their product is correct.

The table below gives the product of L and C for resonance at various frequencies within the audible limits. This product is worked out on the assumption that the inductance is expressed in henries and the capacity in microfarads:—

Frequency	LC	Frequency	LC
50	10.1	1,000	0.025
75	4.5	1,500	.011
100	2.52	2,000	.0063
150	1.12	2,500	.0041
200	0.63	3,000	.0028
250	0.41	3,500	.0021
300	0.28	4,000	.0016
400	0.16	4,500	.00125
500	0.1	5,000	0.01
600	0.07	6,000	0.007
700	0.052	7,000	.0005
800	0.04	8,000	.0004
900	0.031	10,000	.00025

(Continued on page 748)

NEW PRINCIPLE, NEW PERFORMANCE

... The "Square Peak" Sets owe their amazing selectivity and range to Varley "Square Peak" Canned Coils (*prov. protected*) which were placed first in the recent "Wireless World" Olympia Ballot. Their fine quality of reproduction comes from VARLEY L.F. Components—the first to give a straight-line N.P.L. curve—and from the built-in British Moving-coil Speaker. A "Square Peak" Set will be a source of lasting pride and pleasure.

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Illustrated is the "Square Peak" 4-Valve Mains Receiver.



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VARLEY "SQUARE PEAK" 4-VALVE MAINS RECEIVER. Complete as illustrated with built-in moving-coil speaker. One-dial tuning. Stations calibrated direct on tuning dial. Equipped for gramophone pick-up. Exquisite Burr Walnut-finished cabinet. A.C. or D.C. models, 29 guineas.

VARLEY "SQUARE PEAK" 4-VALVE CONSOLE RECEIVER with moving-coil speaker housed beneath the set. A.C. or D.C. models, 34 guineas.

VARLEY 3-VALVE MAINS RECEIVER. Complete with built-in moving-coil speaker. New special aerial filter control. Highly selective. Dial marked in degrees. Supplied with log chart showing 12 station points. A.C. or D.C. models 24, guineas.

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"Star" sets, which will be revolutionary in design, are being prepared for 1932. The "Century Super," 1931 "Ether Searcher," "Three Star," "Everybody's Radiogram," etc., etc., are outstanding successes of 1931. Read "Amateur Wireless" weekly in 1932 and keep in the forefront of radio development.

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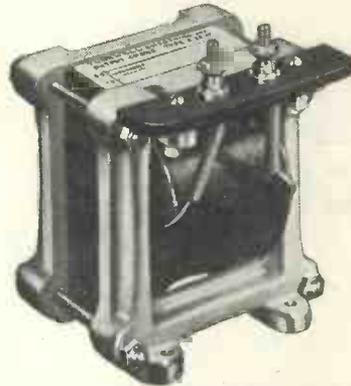
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Eliminator, type	100 m/A., 4 v. at	Choke S20/25.	Inductance 20H up to
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150 volts at 30	2 amps., and 4 v.		
m/A., 4 tappings (2	at 2 amps. ... 15s.	Power Unit for A.C.	
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Choke.	9 ratios, inductance	MV/50.	Output
70 H. at 20 m/A.	4 v. at 1 amp. and		250 v. at 60 m/A,
Low self-capacity.	4 v. at 4 amp., centre		4 v. at 4 amp., 4 v.
	tapped for heaters		at 2 amp., 4 v. at
	of A.C. valves.		1 amp. ... 11/6.
Choke S50/50.	Inductance 50H at		
50 m/A. ... 18/6			
Transformer T4.	Output 450 v. at		

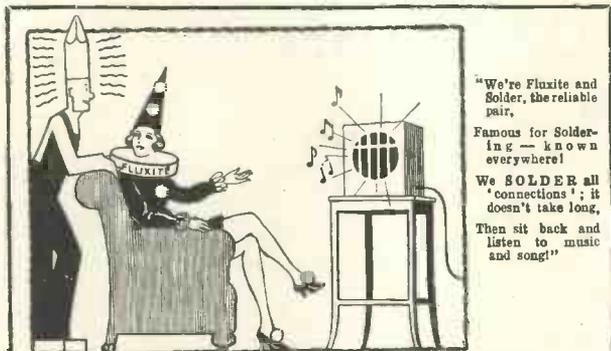
Ready Shortly A NEW SET FOR THE NEW YEAR

Brief Specification:
All-mains A.C. three. Console model, moving-coil speaker
Linked, copper-screened and ganged, dual-range band-pass coils,
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designed. The enormous loss of pick-up common to this type
coil had to be eliminated and after months of research and experi-
mental work success was achieved. Satisfactory L.F. transformers
were required, and here again our technical staff have produced
a transformer giving a really satisfactory reproduction of all
frequencies. These are but two of the features that place this set
far ahead in design and performance.

**INSIST ON HEARING THE NEW TUNEWELL.
GET YOUR DEALER TO DEMONSTRATE.**

A whole range of new components at greatly reduced prices will be offered shortly. Lists are being prepared, send your application now.

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See that Fluxite and Solder are always by you—in the house, garage, workshop—anywhere where simple, speedy, soldering is needed. They cost so little, but will make scores of everyday articles last years longer! For Pots, Pans, Silver, and Brassware; RADIO; odd jobs in the garage—there's always something useful for Fluxite and Solder to do. **All Hardware and Ironmongery ANOTHER USE FOR FLUXITE.** Stores sell Fluxite in tins, 8d., Hardening Tools and Case Hardening. 1/4 and 2/8. Ask for Leaflet on improved method.

NEW "JUNIOR" SIZE, 4d. per tin FLUXITE SOLDERING SET

Simple to use and lasts for years in constant use. Contains special "small-space" soldering iron with non-heating metal handle; pocket blow-lamp, Fluxite, Solder, etc.; and full instructions.

COMPLETE 7/6 or LAMP only 2/6

FLUXITE, LTD.
(Dept. 332)
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ALL MECHANICS WILL HAVE

FLUXITE

IT SIMPLIFIES ALL SOLDERING

IT'S THE LIMIT YOU ARE WANTING



THE PICK-UP with the Adjustable Reed

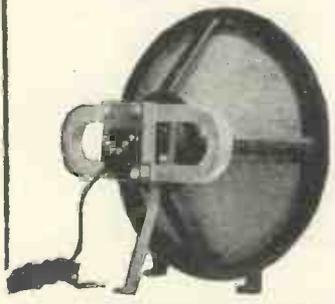
Combined Pick-up and Arm

H. T. BARNETT, Esq., writes:
"The variable damping feature is so valuable that the LIMIT should certainly be added to the Radiogram."

Pick-up only with leads and Ferrules 21/-
LIMIT RADIO LTD., 15-21 Windsor Street, Essex Road, N.1

32/6

THE N&K 'TEN PAS' INDUCTOR LOUDSPEAKER



No finer reproduction possible—every note clear and true

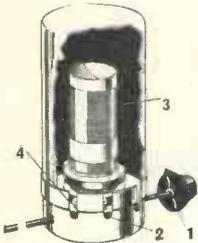
- CHASSIS £3 : 10 : 0
- IN NON RESONANT CABINET £6 : 6 : 0
- IN BAKELITE CABINET £5 : 5 : 0
- IN WOODEN CABINETS
- Oak ... £5 : 5 : 0
- Mahogany £5 : 10 : 0

A. BRODERSEN 11 Northampton Sq., Goswell Rd.,
'Phone: Clerkenwell 7286. E.C.1

Advertisers like to know you "saw it in the 'Wireless Magazine'"



FREE circuits



Watmel coils can be adapted to nearly every circuit, including such popular circuits as the Mullard, Cossor, etc. Just drop us a line stating what you require.

Remember they have been specified for many of the sets described in the Wireless Press.

The Advantage of Watmel Coils. This range of coils has been specially designed in view of modern broadcasting conditions

they are specially screened to prevent direct pick-up or interaction between the various units.

TYPE S.A.1

Screened aerial tuner with a periodic aerial tapping for high selectivity. This tuner can be adapted for any type of receiver. Price **8/6**

1. Wave-change switch.
2. Contacts are gold and silver alloy—prevents oxidation and assures perfect low-resistance contacts and reliable switching.
3. The medium-wave winding is carried on a high-grade paxolin tube and wound on silk-covered wire.
4. Aluminium screen with spring contact between top and bottom.

Information on other types of coils may be had on application.

THE NEW WATMEL 50,000 Ohms POTENTIOMETER

As Specified by "Amateur Wireless" for the "Century Portable."

1. Polished Pointer Knob.
2. Engraved Bakelite front plate.
3. Wire wound former.
4. Insulating bush to insulate spindle from panel.
5. Contact finger Phosphor-bronze.
6. One-hole fixing—brass bearing bush resulting in perfect bearing.
7. Bakelite case, protecting winding.
8. Back self-cleaning contact.
9. Large contact plate.
10. Stops at end of wiring.



Any resistance up to 50,000 ohms standard wiring, Square Law **5/6**

Every part is made from the finest materials.

WRITE FOR COMPONENT CATALOGUE.

If you have any difficulty in obtaining Watmel components, write direct to us. TRADE ENQUIRIES INVITED.



GETS THE BEST OUT OF ANY SET.
WATMEL WIRELESS CO., LTD.,
 IMPERIAL WORKS, High Street, EDGWARE.
 Telephone: Edgware 0323.

BUY



BRITISH

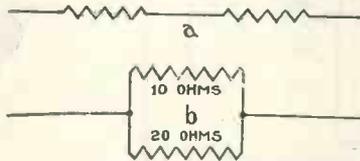
(M.C.49)

DESIGN DATA SHEETS—Cont. from page 744

"W.M." Design Data

No. 35

RESISTANCES



Resistance in (a) series (b) in parallel

RESISTANCES are employed to a considerable extent in radio practice, in values ranging from less than 1 ohm to over 1,000,000 ohms. In dealing with very high resistances it is customary to deal in megohms, one megohm being a million ohms.

Resistances may be connected in series or parallel in certain circumstances. If two resistances are connected in series (Fig. a) the total resistance is the sum of the individual resistances. Thus a 50,000-ohm resistance in series with a 100,000-ohm resistance would result in a value of 150,000 ohms. The current through each resistance is the same as that flowing through the whole circuit.

If two resistances are placed in parallel, as in Fig. b, the current divides in inverse ratio to the resistance. Thus with the values of 10 and 20 ohms shown, one-third of the

current will go through the 20-ohm resistance and two-thirds through the 10-ohm resistance, the total current being the sum of the currents in each branch.

If a resistance is placed in parallel with another resistance the current drawn from the circuit is obviously increased. In other words, the effective resistance of the combination has been reduced. The parallel resistance is given by the expression.....

$$R = \frac{R_1 R_2}{R_1 + R_2}$$

where R_1 and R_2 are the individual resistances.

This parallel resistance is less than either R_1 or R_2 .

The voltage drop on a resistance is obtained by multiplying the current (in amperes) by the resistance (in ohms). Thus a resistance of 7 ohms carrying a current of 2 amperes will drop 14 volts. In feed resistances and grid-bias resistors the current is usually in milliamperes. It is convenient in such cases to express the resistance in thousands of ohms, and to multiply the value so obtained by the current in milliamperes. This gives the voltage drop. For example, a resistance of 50,000 ohms carrying a current of 2 milliamperes will drop $50 \times 2 = 100$ volts.

"W.M." Design Data

No. 36

CONDENSERS, TEST VOLTAGE OF

FIXED condensers, particularly of the paper-dielectric and electrolytic types, are designed to withstand a certain maximum voltage. It is desirable, in designing a receiver, to ensure that this voltage shall not be approached, let alone exceeded, in order to allow a factor of safety.

Many designers arrange that the condensers used shall be tested on a voltage twice as great as the maximum value which they are likely to encounter under practical conditions.

These conditions depend on the circuit in which the condenser is used. If the supply across which the condenser is connected is D.C., the test voltage of the condenser should be twice the D.C. voltage.

If the supply is A.C., however, this is insufficient, for the rated voltage of supply is a mean value whereas the alternating voltage rises to a maximum, at the peaks of the wave, considerably above this value. The peak voltage is about one and a half times the rated voltage, the actual ratio depending on whether the supply has a good waveform or not.

Hence, with A.C. the condenser test voltage should be three times the rated value if it is to be twice the maximum working voltage. A similar state of

affairs arises with rectified A.C. as used in high tension units, for if the load on the unit is removed the voltage on the reservoir condenser will build up to the maximum peak value of the A.C. volts on the secondary of the transformer.

For instance, a transformer with a 250-volt secondary feeding a rectifier and smoothing circuit of the ordinary type would deliver about 250 volts D.C. on load. If the load were removed, however, the voltage would rise to about 375, or even more if the transformer were of poor design giving a peaky waveform.

The test voltage chosen for condensers in such a case depends on the likelihood of the unit being used with no load. If the occurrence is likely to be rare a condenser of 500 volts (D.C.) test could be used, but for complete safety a condenser of 750 volts test would be employed.

It may be objected that this factor of safety is unnecessary and that if the condenser is tested at 500 volts it will be safe to run it at any less voltage indefinitely. This is not so, for the test is of limited duration and a continually applied strain at 400 volts may easily break the insulation down in time.



SPECIFIED FOR THE 'ETHER ROVER'

The Radiophone Three Ganged Condenser incorporated in the "ETHER ROVER."

THE British Radiophone Ganged Condenser aims at extremely high selectivity and sensitivity. That is why it is specified in the wonderful "Ether Rover." An entirely new and novel method of construction assures absolute rigidity and a very high degree of accuracy.

OUR GUARANTEE is for a maximum error of half a millionth part of a microfarad plus 1/2%!

- 3-Gang Condenser 28/- Dustproof Metal Cover 3/6
 - Oxidised Silver Escutcheon and Drive Assembly complete with pilot lamp attachment 5/-
 - 2-Gang Condenser 18/- Dustproof Metal Cover 3/-
 - 4-Gang Condenser 38/- Dustproof Metal Cover 4/-
- Send to-day for completely illustrated descriptive brochure.

- Minimum Capacity - 26 m.mfd.
- Total Variation of Trimmers - 60 m.mfd.
- Total Variation of Capacity - 500 m.mfd.

RADIOPHONE GANGED CONDENSER

THE BRITISH RADIOPHONE LTD., Aldwych House, Aldwych, London, W.C.2

Telephone: HOLBORN 6744

of course



is specified
in the 1932
Super 60

you would expect to find Sovereign in this new Super 60 Circuit. 2 Spaghetti Resistances, 20,000 ohms, 18 each, and 5 Terminal Blocks, 6d. each, are specified. Study the component list carefully and use Sovereign wherever you can in building this set.

SEND FOR THE
SOVEREIGN
CATALOGUE

SOVEREIGN PRODUCTS LTD., 59/61 Rochester Av., London, E.C.1

Amateur Wireless HANDBOOKS

each 2/6 net.

Loud-speaker Crystal Sets.

The Wireless Man's Workshop.

Wireless-Controlled Mechanism for Amateurs.

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THE BOOK OF THE NEUTRODYNE, by J. H. Reyner, B.Sc. (Hons.), A.M.I.E.E. Price 1/6 net, or post free for 1/9

Of all Newsagents and Booksellers or by post, 3d. extra, from Cassell & Co., La Belle Sauvage, E.C.3.

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Permanent Magnet Moving Coil Speaker



Amazing
Tone-Purity

The extraordinary purity of tone, combined with brilliant clear-cut reproduction of voice and music, will satisfy the most critical ear. Size of Cone 10" dia. Supplied complete with Input Transformer.

May we arrange a demonstration for you?

PRICE
67/6

Write for a copy of our leaflet No. J. 1163

IGRANIC ELECTRIC CO., LTD.,
149 Queen Victoria St., London

Mention of the "Wireless Magazine" will ensure prompt attention

A WORD ABOUT "WIRELESS"

Each blueprint shows the position of all components and every wire, and makes construction a simple matter. Copies of "Wireless Magazine" and of "Amateur Wireless" containing descriptions of most of 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.

CRYSTAL SETS

6d. each, post free

Regional Crystal Set	WM176
"B.B.C." Crystal Set	AW281

ONE-VALVE SETS

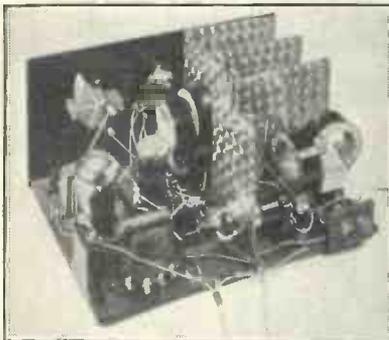
All these 1s. each, post free

Regional Ultra-selective One	AW278
"B.B.C." One	AW280
Easy-to-Build One	AW304

TWO-VALVE SETS

All these 1s. each, post free

Brookman's Two (D, Trans)	WM168
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
Station-finder Two (D, Trans)	WM243
Music-lover's Two (D, Trans)	WM260
★New Economy Two (D, Trans)	WM265
Talisman Two (D, Trans)	AW194



BAND-PASS ACTION WITH PLUG-IN COILS
The Band-pass Inceptordyne is a three-valve screen-grid set using plug-in coils

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



FOR MAINS OPERATION
A six-valve for operation from A.C. mains—the A.C. Super 60 designed by W. James



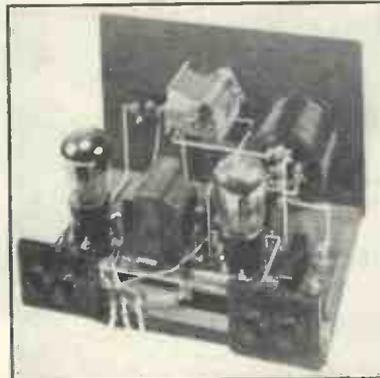
ONE OF THE LATEST "SUPERS"
The Super Senior was W. James' star set for the last Radio Exhibition at Olympia

B.B.C. Selective Two (D, Trans)	AW292
The Room-to-Room 2 (D, Trans)	AW298
Big-volume Two (D, Pentode)	AW309
Two Star 2 (D, Pen)	AW315

THREE-VALVE SETS

All these 1s. each, post free

Brookman's Three (SG, D, Trans)	WM161
Celerity Three (SG, D, Trans)	WM173
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



A USEFUL TWO-VALVER
An ideal battery-operated set for local-station reception is the Station-finder Two

Do you realise that, except for one or two in a range of more than 250, all "Wireless Magazine" blueprints are full-scale drawings? They are not small-scale drawings which, as you know, are useless as patterns and templates.

Do you appreciate the fact that they save much time and trouble in construction, as they can be used as panel and baseboard templates for marking the centres for drilling holes and laying out components?

Five-point Short-waver (D, 2 Trans)	WM223
Baffle-board Three (D, RC, Trans)	WM226
Plug-in Coil Three (D, 2 Trans)	WM232
Regional Three (SG, D, Trans)	WM236
Gramo-radio AC3 (SG, D, Trans)	WM237
Band-pass Inceptordyne (SG, D, Pen.)	WM244
Ether Marshal (SG, D, Trans)	WM247
Five-Advantage Three (D, RC, Trans)	WM257
Everybody's Radiogram (SG, D, Trans)	WM258
★Meridian Short-waver (D, RC, Trans)	WM255
Double Band-pass Three (SG, D, Trans)	WM259
Everybody's Radiogram (with Automatic Grid Bias)	WM262
New Economy Three (SG, D, Trans)	WM263
Knife-edge Three (D, RC, Trans)	AW201
Everybody's Three (SG, D, Trans)	AW209
1930 Ether Searcher (SG, D, Trans)	AW211
New All-Britain Three (HF, D, Trans)	AW214
Best-by-ballot Three (SG, D, Trans)	AW217
Price 4d., free with copy of "A.W."	AW220
Brookman's By-pass Three (D, 2 Trans)	AW220
Everybody's All-electric Three (SG, D, Trans)	AW221
1930 Clarion Three (SG, D, Trans)	AW223
Auto-coupler Three (D, 2 LF)	AW225
Beginner's Regional Three (D, RC, Trans)	AW233
Car Three (D, RC, Trans)	AW244
"A.W." Exhibition 3 (SG, D, Trans)	AW247
"A.W." Challenge Kit 3 (SG, D, Trans)	AW256
Push-pull Two for D.C. Mains (D, Push-pull)	AW270
1931 Ether Searcher (SG, D, Trans)	AW271
1931 Ether Searcher (A.C. Mains)	AW276

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

Mains Section	AW277
Ultra-selective Straight Three	AW282
1931 Ether Searcher (D.C. model)	AW284
Mains Section	AW285
Square-peak Three (SG, D, Trans)	AW293
1931 Britain's Favourite Three (D, RC, Trans)	AW299
Universal Short-wave Three (SG, D, Trans)	AW301
Olympian Three (SG, D, Trans)	AW306
Tonality Three (D, RC, Trans)	AW321

FOUR-VALVE SETS

All these 1s. 6d. each, post free

Lodestone Four (HF, D, RC, Trans)	WM193
Searcher's Four (SG, D, RC, Trans)	WM194
Regional Band-pass Four (SG, D, RC, Trans)	WM211

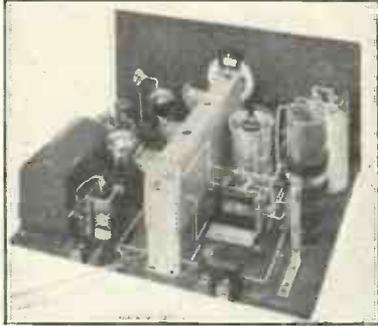
BUILD YOUR NEXT SET FROM A

MAGAZINE " BLUEPRINTS!

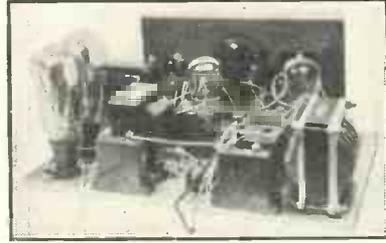
Further than this, do you know that all the connecting wires are numbered separately, so that they can be assembled easily and automatically?

Remember also that a blueprint of any set constructionally described in "Wireless Magazine" can be obtained for half price during the currency of the issue by using the coupon to be found on the last page.

"Wireless Magazine" and "Amateur Wireless" are the only papers that can supply full-size blueprints of every set described.



A FINE BAND-PASS SET
One of the most popular "W.M." band-pass sets yet described—the Ether Marshal



FOR THE BEST QUALITY
The D.C. Quality Amplifier takes its anode-current supply from D.C. electric-light mains

- Five-point Four (SG, D, RC, Trans) .. WM216
- Supertone Four (SG, D, Push-pull) .. WM227
- Brookman's Three-Plus-One (SG, D, RC, Trans) .. WM233
- ★Ether Rover (SG, D, RC, Trans) .. WM266
- Broadcast Picture Four (HF, D, 2RC) .. AW163
- The Orchestra Four (D, RC, Push-pull) AW167
- All-Europe Four (2HF, D, Trans) .. AW173
- Stability Four (HF, D, RC, Trans) .. AW182
- 3 3s. Four (SG, D, RC, Trans) .. AW303
- 3 3s. Four (Improved Model) .. AW303A
- Everybody's Radiogramophone .. AW310
- Four-star Four (SG, D, RC, Trans) .. AW318

FIVE-VALVE SETS

All these 1s. 6d. each, post free

- Overseas Five (3SG, D, Trans) .. WM191
- Regional D.C.5 (SG, D, LF, Push-pull) WM252
- James Quality Five (2SG, D, RC, Trans) AW227
- Britain's Super (Super-het) .. AW311

SIX-VALVE SETS

All these 1s. 6d. each, post free

- Hyperdyne .. WM221
- Super 60 (Super-het) .. WM229
- A.C. Super 60 (Super-het Radiogram) .. WM239
- A.C. Super 60 (Super-het Table Model) WM245
- Super 60 (with Wearite Base) .. WM249
- Super 60 (with Lewcos Base) .. WM251
- ★1932 Super 60 (Super-het) .. WM269
- Century Super (Super-het) .. AW287

WIRELESS MAGAZINE,
Blueprint Dept.,
58/61 Fetter Lane,
LONDON, E.C.4

- A.C. Century Super (Super-het) .. AW295
- Mains Unit (1s.) .. AW295a

SEVEN-VALVE SET

1s. 6d., post free

- Super Senior (Super-het) .. WM256

PORTABLE SETS

- Pedlar Portable (D, 2 Trans) .. WM197 1/-
- Super 60 Portable (Super-het) .. WM238 1/6
- Home and Garden Three (D, RC, Trans) .. WM246 1/-
- Music Leader (SG, D, RC, Trans) with copy "A.W." .. AW203 1/-
- Merry-maker Portable (D, 2 Trans) AW228 1/-
- Sunshine Three (SG, HF, SG, D, Trans) .. AW235 1/-

- Continental Portable (SG, D, Trans) AW241 1/-
- Companion Portable (2HF, D, 2 Trans) .. AW279 1/6
- Portable Century Super (Super-het) AW297 1/6

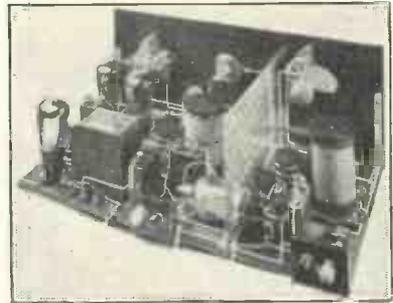
AMPLIFIERS

All these 1s. each, post free

- Radio-record Amplifier (DC Mains) .. WM183
- Selecto Amplifier (HF Unit) .. WM210
- D.C. Fader .. WM242
- Quality Amplifier (D.C.) 1s. 6d. .. WM264
- "A.W." Gramophone Amplifier .. AW205
- Simple Gramophone Amplifier .. AW257
- High Quality Amplifier for A.C. Mains AW275
- 2-Watt Amplifier for A.C. Mains .. AW283
- A.C. Push-pull Amplifier .. AW291
- Add-on H.F. Screened-grid Unit .. AW296
- Universal Push-pull Amplifier .. AW300
- "A.W." Record Player (LF, Push-pull) AW319

MISCELLANEOUS

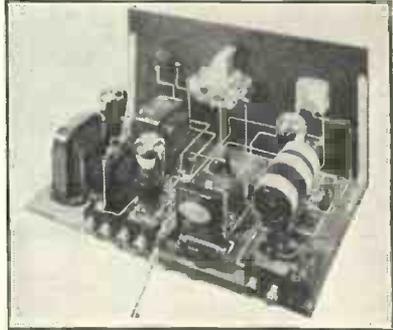
- "W.M." Standard A.C. Unit .. WM214 1/-



A "BROOKMAN'S" FOUR
The Brookman's Three-plus-one uses W. James' popular Binowave coils

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

- "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 -/6
- "W.M." Linen-diaphragm Loud-speaker .. WM235 1/-
- Two-minute Adaptor for Short Waves .. WM240 1/-
- Super 60 A.C. Unit (for Battery Super 60) .. WM248 1/-
- Simple Neon Oscillator .. WM251 1/-
- ★Plug-in Adaptor .. WM267 1/-
- ★Super-het Adaptor .. WM268 1/-
- James H.T. and L.T. Charging Unit AW232 1/-
- Simple Battery Eliminator for A.C. Mains .. AW236 1/-
- Choke Output Unit .. AW240 1/-
- Simple Tester Unit .. AW246 -/6
- "A.W." Improved Linen-diaphragm Speaker .. AW248 1/-
- Handy L.T. and G.B. Unit for A.C. Mains .. AW254 1/-
- Ohmic Coupled DX Unit .. AW255 1/-
- Simple Gramophone Amplifier .. AW257 1/-
- Novel Linen Diaphragm Speaker .. AW260 1/-
- H.T. Unit for A.C. Mains .. AW262 1/-
- Gramophone Tone Control .. AW264 1/-



A SET WITH PLUG-IN COILS
For those who want to use plug-in coils the Plug-in Coil-Three is just the thing

- Short-wave Super-het Adaptor .. AW268 1/-
- H.T. Unit and Trickle Charger for D.C. Mains .. AW272 1/-
- High Quality Amplifier for A.C. Mains .. AW275 1/-
- 2-Watt A.C. Amplifier .. AW283 1/-
- Booster Speaker .. AW286 -/6
- "A.W." Tone Changer .. AW288 -/6
- "A.W." Selectivity Unit .. AW290 -/6
- B.B.C. Official Selectivity Unit .. AW294 -/6
- A.C. Trickle Charger .. AW305 1/-
- Amateur's Linen Speaker .. AW307
- D.C. H.T. Unit .. AW312
- Output Unit for Pentode Sets .. AW316
- "A.W." Short-wave Adaptor .. AW317

"W.M." FULL-SIZE BLUEPRINT

BLUEPRINT COUPON

Valid only until January 31
1932 (or until February 29,
1932 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:—

- NEW ECONOMY TWO (page 660), No. WM265, 6d., post free.
- ETHER ROVER (page 680), No. WM266, 9d., post free.
- 1932 SUPER 60 (page 699), No. WM269, 9d., post free.
- PLUG-IN ADAPTOR (page 14 of Supplement), No. WM267, 6d., post free.
- SUPER-HET ADAPTOR (page 6 of supplement), No. WM268, 6d., post free.
- MERIDIAN SHORT-WAVER (page 16 of Supplement), No. WM255, 6d., post free.

INFORMATION COUPON

Valid only until January 31,
1932 (or until February 29,
1932 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 the Set Selection Bureau, WIRELESS MAGAZINE, 58-61 Fetter Lane, London, E.C.4.

THE LEAKY GRID

(Continued from page 736)

during a running commentary from the Elbert All of a boxing match between Senior Muscleeeni and Reginald Foort.

If Reginald is knocked down more than five times the Coldstream Guards will play the well-known hymn, *Foort the good foort*, to revive him. We must support the English side, of course.

I shall try to get Bishop Barnes to speak on *What I would like to do with all the vicars in the world*; perhaps Bernard Shaw will reply with *What I shall do with all the Bishops in heaven*.

A talk to India might not be amiss by our good friend Burnon Tartlett. He will take for his subject *What's sauce for the Goose is sauce for the Gander*.

Bransby Williams will give some recitations from Shakespoke.

I am arranging for two of these before closing time—the *Serchant for Guinnice* and the *Naming of the Brew*.

Quite late in the programme will be a splendid turn called *How to Amuse Baby*, in the form of a discussion between Slapham and Cryer in *Another Shot at Mother*.

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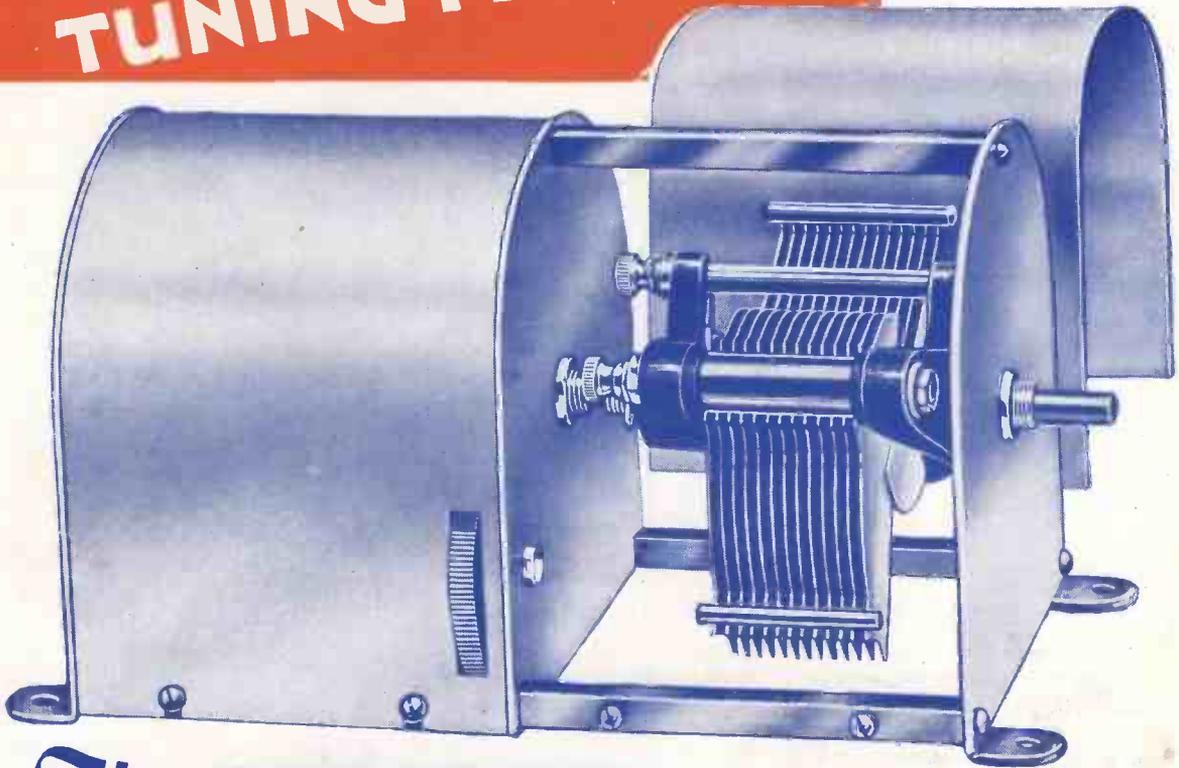
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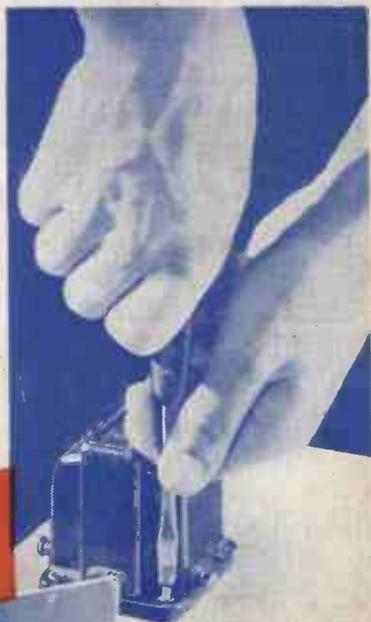
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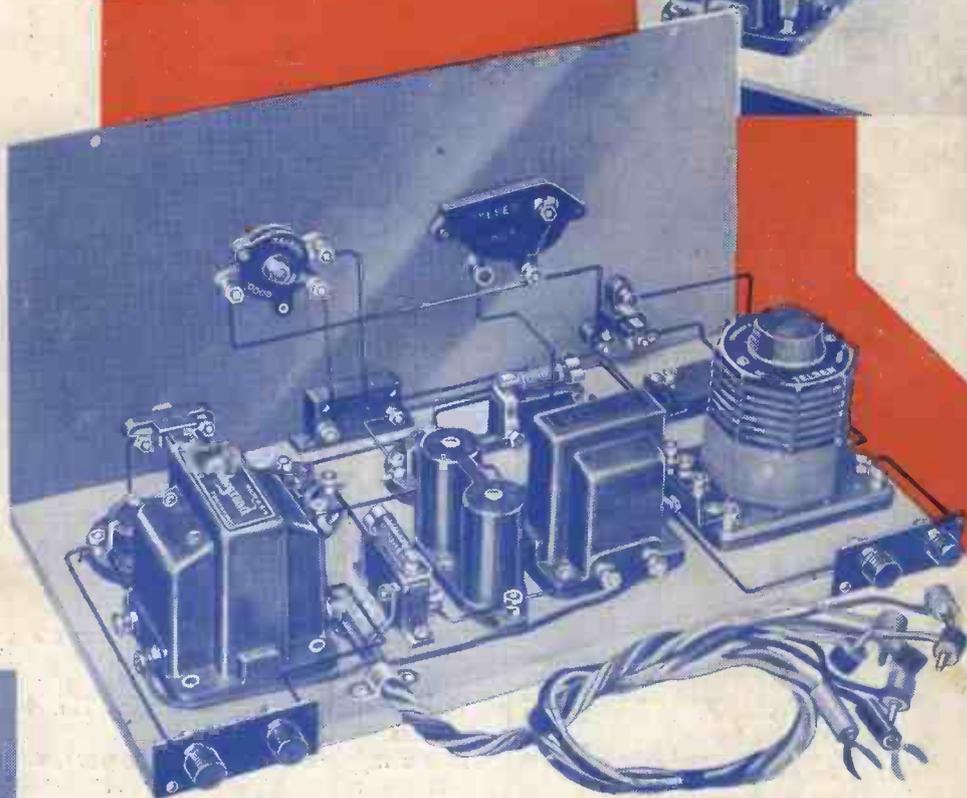


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